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Admitted in: MA, ME, NH

March 25, 2019

James R. Beyer
Maine Dept. of Environmental Protection
106 Hogan Road, Suite 6
Bangor, ME 04401

RE: NECEC – Comments of Central Maine Power Company Regarding Greenhouse Gas Emissions Reductions

Dear Jim:

Enclosed are CMP's Comments Regarding Greenhouse Gas Emissions Reductions.

Sincerely,

Matthew D. Manahan

Enclosure
cc: Bill Hinkel, LUPC
Service Lists

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

CENTRAL MAINE POWER COMPANY	)
NEW ENGLAND CLEAN ENERGY CONNECT	)
#L-27625-26-A-N/#L-27625-TG-B-N/	)
#L-27625-2C-C-N/#L-27625-VP-D-N/	)
#L-27625-IW-E-N	)

COMMENTS OF CENTRAL MAINE POWER COMPANY REGARDING GREENHOUSE GAS EMISSIONS REDUCTIONS

Pursuant to the Maine Department of Environmental Protection's (DEP's) Third Procedural Order,[1] CMP provides these comments in support of its September 2017 Site Location of Development Act (Site Law) application and Natural Resources Protection Act (NRPA) application (collectively, applications) statements that the New England Clean Energy Connect (NECEC) Project is expected to reduce regional greenhouse gas (GHG) emissions. *See* Site Law Application at § 1.4;[2] NRPA Application at § 2.2.[3]

[1] DEP stated, "CMP stated in its application that the reduction of greenhouse gas emissions will be a benefit of the project and CMP presents such a reduction as a rationale for the construction of the project. The parties and the general public will be allowed to submit evidence with regard to these statements in the application, which may include, for example, comments, data, and reports, until the close of the record." DEP Third Procedural Order ¶ 8.a. The Maine Land Use Planning Commission determined that the Project's impact on greenhouse gas levels "does not relate to the Commission's role or review criteria." LUPC Third Procedural Order § II.B.

[2] "The use of the NECEC for delivery of up to 8,500,000 MWh of Clean Energy Generation will provide many significant benefits to Maine and all of New England. In particular, the delivery of Quebec-sourced Clean Energy Generation is expected to reduce greenhouse gas emissions from fossil-fuel fired thermal generation in New England, enhance electric reliability (particularly during winter months when natural gas supply constraints have occurred in recent years), and reduce the wholesale cost of electricity for the benefit of retail customers across the region." The NECEC Site Law Application stated that the NECEC would deliver up to 8,500,000 MWh of Clean Energy Generation because at the time the Application was submitted to the DEP in September 2017, Massachusetts had not yet selected the winning bid in the Section 83D RFP and

GHG emissions are not directly relevant to DEP's approval criteria, as stated in CMP's January 29, 2019 letter to Presiding Officer Miller (incorporated herein by reference). Nevertheless, to the extent the parties are allowed to rebut in written submissions CMP's application statements about GHG emissions benefits, or to the extent DEP determines that GHG benefits should be considered in determining the reasonableness of the Project's impact (if any) on certain resources, CMP submits these comments to supplement the record with evidence that supports its application statements.

I. The Project Will Reduce Regional GHG Emissions.

A. The Clean Hydropower Delivered by the NECEC Will Reduce Carbon Dioxide Emissions in Maine, New England, and Beyond, Consistent with Maine's Long-Term GHG Emissions Reductions Goals.

Once the NECEC Project goes into service in late 2022, it will significantly advance Maine's progress toward meeting the long-term GHG reduction goals set forth in 38 M.R.S. § 576 by substantially reducing the emissions of carbon dioxide (CO2), a greenhouse gas, across Maine and New England, through the delivery of clean energy into the ISO-NE Control Area, that will displace fossil-fuel-fired generation.

In the Certificate of Public Convenience and Necessity (CPCN) proceeding before the Maine Public Utilities Commission (PUC), Docket No. 2017-00232, three different studies of the NECEC's impact on CO2 emissions were submitted by three different production cost modeling

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8,500,000 MWh was the minimum amount of Clean Energy Generation that the NECEC proposed to supply to Massachusetts. Ultimately, on March 28, 2018, the NECEC's 100% hydro proposal to supply 9,450,000 MWh (9.45 TWh) was selected as the winning bid in the 83D RFP process. *See* https://macleanenergy.com/83d/.

[3] "The NECEC project is expected to reduce regional CO2 (greenhouse gas) emissions by over one million metric tons per year in Massachusetts, which is a direct benefit to neighboring states, including Maine. This amount would help achieve the stated goals of the Regional Greenhouse Gas Initiative (RGGI) by reducing the total amount of CO2 emissions from the power sector of the six New England states, and Delaware, Maryland, and New York."

experts. The first study was conducted by CMP's expert Daymark Energy Advisors; the second study was conducted by Energyzt Energy Advisors (Energyzt) on behalf of the Generator Intervenors[4] using modeling conducted by Calpine and overseen by Energyzt (hereinafter Energyzt/Calpine modeling); and the third study was conducted by the PUC's own independent consultant, London Economics International (LEI). These experts all modeled how generators would be dispatched with and without the NECEC in service and calculated the GHG emissions reductions that would result from the NECEC's injection of 9.45 TWh of clean hydroelectric energy into ISO-NE. While the precise levels of GHG emissions reductions from the Project varied, all of these expert studies found that the NECEC will drive significant GHG emissions reductions in Maine, Massachusetts, and the entire New England region.

Specifically, in the Daymark Report attached hereto as **Attachment I,** Daymark concluded that adding the NECEC-delivered hydropower to the supply mix in New England will induce CO2 emission reductions of approximately 3.1 million metric tons across New England each year, and the net emissions from the portion of regional generation serving Maine load will be reduced by approximately 264,000 metric tons annually.[5] This is roughly equivalent to taking 56,051 passenger vehicles off the road in Maine each year.[6]

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[4] The existing thermal generator intervenors collectively referred to as the Generator Intervenors consist of Calpine Corporation (Calpine), Bucksport Generation LLC, and Vistra Energy Corporation. NextEra Energy Resources, LLC (NextEra) is also an existing thermal generator, but NextEra intervened separately in the PUC proceeding and thus was referred to separately.

[5] Rebuttal Testimony of Daymark Energy Advisors, PUC Docket No. 2017-00232, at 40:18-41:2 (July 13, 2018) (Daymark Rebuttal) (citing CMP PUC Exhibit NECEC-5, Daymark Energy Advisors, NECEC Transmission Project: Benefits To Maine Ratepayers: Quantitative and Qualitative Benefits (Sept. 27, 2017) (Daymark Report) at 4 of 98), attached hereto as **Attachment II**.

[6] GHG metric ton reduction equivalencies calculated using the U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator (updated Dec. 2018), *available at* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

The Energyzt study, attached hereto as **Attachment III**, was based on the Calpine/Energyzt modeling and likewise found that the NECEC-delivered clean energy will result in an annual reduction of 3 million metric tons of CO2 emissions in New England.[7] Finally, LEI, the Commission staff's independent expert, found even greater emissions reductions from the NECEC-delivered clean energy, stating that the Project could reduce CO2 emissions in New England by approximately 3.6 million metric tons per year.[8] LEI's analysis is attached hereto as **Attachment IV**.

Neither LEI's analysis nor Energyzt's analysis included a specific finding as to the GHG reductions in Maine, but using Daymark's approach of calculating the Maine GHG reductions based on a ratio of Maine load to New England load (no party objected to this methodology in the PUC proceeding),[9] the NECEC would result in approximately 255,000 metric tons of GHG reductions per year in Maine using the results of Energyzt's analysis, and approximately 306,000 metric tons of GHG reductions per year in Maine using the results of LEI's analysis.[10] This is roughly equivalent to taking between 54,140 to 64,968 passenger vehicles off the road in Maine each year.[11] Accordingly, the evidence in the record of the PUC proceeding establishes that the NECEC will significantly reduce CO2 emissions in all of New England, including Maine.

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[7] Attachment II (Prepared Direct Testimony of James M. Speyer, PUC Docket No. 2017-00232 (Speyer Direct), Exhibit JMS-4 (Energyzt Advisors, LLC, Technical Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts) (Apr. 30, 2018)) at 3.

[8] Attachment III (London Economics International, LLC, Independent Analysis of Electricity Market and Macroeconomic Benefits of the New England Clean Energy Connect Project, PUC Docket No. 2017-00232 (May 21, 2018) (LEI Report)) at 12 of 85.

[9] Attachment I (Daymark Report) at 21 of 98.

[10] CMP Post-Hearing Brief at 104, PUC Docket No. 2017-00232 (Feb. 1, 2019), attached hereto as **Attachment V**.

[11] U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator (updated Dec. 2018), *available at* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

Notably, even Calpine's Director of Government and Regulatory Affairs, John Flumerfelt, whose company vigorously opposed the NECEC during the PUC proceeding, testified in the hearing on the February 21, 2019 settlement between certain parties in the PUC Proceeding (Stipulation)[12] that the NECEC will reduce carbon emissions in Maine and New England.[13]

B. Hydro-Québec has Sufficient Clean Energy Available for Export to Meet its Obligations to New England without Shifting Exports Away from other Regions.

Setting aside the Generator Intervenors' findings of NECEC's facilitation of GHG emission reductions in New England, the NECEC opponents in the PUC proceeding argued that the NECEC will result in increased total carbon emissions across the Northeast region, because, they claimed, Hydro-Québec will have to divert exports to other energy markets such as New York or Ontario to supply to New England over the NECEC transmission line 9,450,000 megawatt hours (MWh) (9.45 terawatt hours (TWh)) of clean hydropower energy. As discussed below, this claim is unfounded and contradicted by information provided directly by Hydro-

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[12] On February 21, 2019, the following parties entered into a Stipulation to achieve an agreed upon resolution of CMP's Petition for a CPCN for the NECEC: Central Maine Power Company, the Maine Office of the Public Advocate, the Governor's Energy Office, Industrial Energy Consumer Group, Conservation Law Foundation, Acadia Center, Western Mountains & Rivers Corporation, City of Lewiston, Maine State Chamber of Commerce, and International Brotherhood of Electrical Workers.

[13] 3/7/19 PUC Docket No. 2017-00232 Hearing Tr. at 75:18-22, attached hereto as **Attachment VI**. Specifically, Mr. Flumerfelt testified at the Stipulation hearing that the NECEC would have the effect of reducing carbon emissions in Maine and in New England, softening the demand for RGGI allowances, thereby reducing the State's RGGI revenues and the ability of Efficiency Maine Trust to continue to fund its programs at the same level. 3/7/19 PUC Docket No. 2017-00232 Hearing Tr. at 74:21-75:3. In response to Mr. Flumerfelt's statements, PUC Hearing Examiner Mitchell Tannenbaum asked Mr. Flumerfelt the following question:

> MR. TANNENBAUM: But would that mean that the NECEC will reduce carbon emissions?
>
> MR. FLUMERFELT: NECEC will certainly reduce carbon emissions in New England by displacing existing fossil fuel generation both in Maine and across New England.

3/7/19 PUC Docket No. 2017-00232 Hearing Tr. at 75:18-22.

Québec in the PUC proceeding that demonstrates that Hydro-Québec has more than enough clean hydropower energy to supply the 9.45 TWh of energy via the NECEC without diverting energy from other regions.

Hydro-Québec has been pursuing a long-range plan of investment in clean energy generation to increase its existing hydropower capacity, including the addition of the 395 MW Romaine 3 unit that went into service in 2017.[14] With its existing hydroelectric generation capacity, Hydro-Québec has sufficient excess generation capacity to generate energy for the NECEC without diverting electricity from other markets. In fact, in a letter from Hydro-Québec submitted by CMP in the PUC proceeding, Hydro-Québec stated that in 2017 and 2018 it spilled substantial amounts of water due to lack of economic transmission.[15] Specifically, Hydro-Québec stated that it spilled 4.5 TWh of energy in 2017 due to lack of economic transmission and that in 2018 it spilled water equaling approximately 10.4 TWh of energy for that same reason.[16] Hydro-Québec also stated in the letter that it expects that, without additional transmission export capability, the quantity of spilled water in future years will be comparable to the quantity of spilled water in 2018 under comparable market and operational conditions.[17]

The 10.4 TWh worth of energy that Hydro-Québec did not generate due to lack of economic transmission is more energy than the 9.45 TWh of energy required to supply the NECEC. This additional clean energy, currently being wasted, could be used to serve New

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[14] Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo Escudero, PUC Docket No. 2017-00232 (July 13, 2018) (Dickinson, Stinneford and Escudero Rebuttal) at 30-31, attached hereto as **Attachment VII**.

[15] PUC Data Response Kelly-004-001, Attachment 1 (December 14, 2018 Hydro-Québec Letter submitted to the PUC in response to data requests from Dot Kelly, citizen intervenor), attached hereto as **Attachment VIII**.

[16] *Id.*

[17] *Id.*

England load through deliveries over the NECEC, as purchased by the Massachusetts Electric Distribution Companies, thereby displacing fossil-fuel-fired generation in New England without the need for the construction of any additional generation resources in Quebec.

Furthermore, Hydro-Québec is installing additional capacity in the near future. Specifically, Hydro-Québec is constructing a new 245 MW hydropower generation facility, the Romaine 4 unit, that is expected to be in service in 2020, and it is adding 500 MW of capacity upgrades at existing hydro facilities (such as the replacement of aging turbines with more efficient, new equipment) that are expected to be in service by 2025.[18] This 745 MW of additional Hydro-Québec generation capacity will be capable of generating 3.8 TWh of additional energy per year on top of the 10.4 TWh of energy that Hydro-Québec expects to continue to have to waste, through spilled water, unless additional transmission capacity to New England, like the NECEC, is developed. This is a driving reason for Hydro-Québec's long-standing interest and efforts to support the development of an additional transmission link to New England.[19]

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[18] Dickinson, Stinneford and Escudero Rebuttal at 30-31; *see also* Corrected Supplemental Testimony of William S. Fowler and Tanya L. Bodell, PUC Docket No. 2017-00232 (Dec. 10, 2018) (Fowler and Bodell Supplemental) at 27:1-9 (referencing Romaine-4 coming online in 2020 and Hydro-Québec Production's anticipated upgrades of 500 MW in 2025); Speyer Direct Testimony, Exhibit JMS-3 (Technical Report, Hydro-Québec Exports) at 10, Figure 8 ("Romaine-4 would add another 245 MW of capacity and 1.3 TWh of energy.") (Apr. 2018). All of footnote 18 is attached hereto as **Attachment IX**.

[19] In fact, Hydro-Québec President and CEO Eric Martel in a television interview by the Journal de Québec stated (as translated from French) "we are in surplus. It takes U.S. lines to export that. I don't want to throw ten terawatt-hours of water away every year and not monetize it. It's the lack of lines." See Le Journal de Quebec, Video Interview With Eric Martel (in French), "Hydro-Québec donne la priorité à l'exportation" [Hydro-Québec gives priority to exportation] (Nov. 21, 2018), available at https://www.journaldequebec.com/2018/11/21/entrevue-avec-eric-martel--hydro-quebec-donne-la-priorite-a-lexportation, with translated English transcript, attached hereto as **Attachment X**.

The opponents have suggested that Hydro-Québec's spillage in 2017 was due to a high water year. The evidence shows, however, that there has been a trend of increased precipitation in Québec in recent years.[20] Additionally, further precipitation increases in the coming years are forecast due to the impacts of climate change on Canada.[21] These expected increases mean that Hydro-Québec will likely have even more water to produce more hydroelectric energy in the future. Thus, it is reasonable to conclude that, without additional transmission capacity such as the NECEC, Hydro-Québec will be forced to increase spillage of water in the future. Accordingly, Hydro-Québec has enough incremental energy to export to New England via the NECEC without diverting energy exports from other markets.

In light of the fact that the energy that Hydro-Québec will export to New England will be additional incremental energy and not just exports that are diverted from other markets, the energy that flows over the NECEC will result in GHG reductions not only in New England, but also in export markets in the Northeast and in Canada.[22] As Daymark explained in their July 2018 Rebuttal Testimony in the PUC proceeding, the Generator Intervenors' own Energyzt analysis, buried in the analyses that Energyzt provided in response to a data request, shows that if you assume that the NECEC energy is incremental, the NECEC will result in GHG reductions

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[20] PUC Docket No. 2017-00232 Exhibit CLF-11 (Vincent, *et al. Observed Trends in Canada's Climate and Influence of Low-Frequency Variability Modes*) at 4550 (June 2015) (finding that annual precipitation in all seasons in northern Québec has increased over the period 1948-2012, as well as throughout northern Canada and in some areas of southern Canada, including portions of Ontario and Atlantic Canada), attached hereto as **Attachment XI**.

[21] PUC Docket No. 2017-00232 Exhibit NECEC-97 (Climate Risks & Adaptation Practices for the Canadian Transportation Sector 2016, Ottawa, ON: Government of Canada (Palko, K. and Lemmon, D.S.) (2017)) at 205-206 of 320; PUC Docket No. 2017-00232 Exhibit NECEC-98 (2013-2020 Government Strategy for Climate Change Adaptation, Québec in Action Greener by 2020, Government of Québec) at 11 of 50. All of footnote 21 is attached hereto as **Attachment XII**.

[22] Daymark Rebuttal at pages 42-43.

not only in New England, but also in other markets such as the New York ISO, PJM, and Ontario.[23] Thus, the net impact of the NECEC's injection of 9.45 TWh of clean hydroelectric energy into New England is a substantial reduction in CO2 emissions, not only throughout New England, but also in the larger Northeast region, including Ontario.

II. The NECEC-Enabled Hydropower Generation Will Provide Many of the Same Benefits as Hydropower that Satisfies Maine's Definition of a Renewable Resource, at No Cost to Maine Customers.

The NECEC-enabled hydropower generation does not fall within the definition of a renewable resource or a new renewable capacity resource under Title 35-A because the NECEC energy will come primarily from dams with more than 100 MW of production capacity.[24] Accordingly, the NECEC generation will not be eligible to meet Maine's renewable generation goals as set forth in Maine's renewable portfolio standard (RPS).[25]

Nevertheless, the NECEC-enabled generation provides many of the same benefits as hydropower resources that fall within Maine's definition of a renewable resource. For example, in Maine's 2015 Comprehensive Energy Plan Update the Governor's Energy Office stated that "Maine's hydropower provides clean baseload generation" and included a policy

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[23] *Id.*

[24] See 35-A M.R.S. § 3210(2)(C) (defining a "Renewable resource" as "a source of electric generation . . . [w]hose total power production capacity does not exceed 100 megawatts" and that relies on one or more specified generation sources, including "[h]ydroelectric generators"); 35-A M.R.S. § 3210(2)(B-3) (defining a "Renewable capacity resource" as "a source of electric generation . . . [w]hose total power production capacity does not exceed 100 megawatts" and that relies on one or more specified generation sources, including "[h]ydroelectric generators that meet all state and federal fish passage requirements applicable to the generator").

[25] *See* 35-A M.R.S. § 3210(3) (setting forth the Class II renewable portfolio standard for eligible resources (Class II), which are either a renewable resource or an efficient resource (a qualifying cogeneration facility that meets the statutory efficiency standard)) and 35-A M.R.S. § 3210 (3-A) (setting forth the Class I renewable portfolio standard for new renewable capacity resources).

recommendation that the State "encourage hydropower."[26] Although the NECEC energy does not come from generation facilities located in Maine, the Project will deliver at least 1,090 MW of hydropower energy from Québec into New England in all hours of the year for at least the next twenty years, backed by the HQ Production[27] system of reservoirs.

Additionally, in enacting the Maine Waterway Development and Conservation Act,[28] the Maine Legislature found that in-state hydropower makes a "significant contribution to the general welfare of the citizens of the State" because hydropower "is the state's only economically feasible, large-scale energy resource which does not rely on combustion of a fuel, thereby avoiding air pollution, solid waste disposal problems and hazards to human health from emissions, wastes and by-products."[29] As set forth above, the NECEC will avoid air pollution from fossil-fuel based generation sources and significantly reduce GHG emissions levels in Maine, New England, and the Northeast region. Accordingly, although the NECEC is not a "renewable resource" under Maine law, it provides many of the same benefits as in-state hydropower under the 100 MW cap, which is considered a renewable resource.

Certainly, regardless of whether the NECEC clean energy generation is renewable under Maine's statutory definition of a renewable resource, the NECEC will combat climate change by

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[26] Maine Comprehensive Energy Plan Update, State of Maine, Governor's Energy Office at 46 (Feb. 2015) (Policy Recommendations: "Encourage hydropower. Maine's hydropower provides clean, baseload generation."), *available at* https://www.maine.gov/energy/publications_information/index.html.

[27] The hydropower that will be delivered on the NECEC will be generated by Hydro-Québec Production (HQ Production), the business unit within Hydro-Québec that operates Hydro-Québec's hydro generation units and markets the energy and capacity produced by those units within Québec and regionally.

[28] P.L. 1983, ch. 458, § 18 *et seq.* The Maine Waterway Development and Conservation Act sets forth the permitting requirements for constructing or reconstructing a hydropower project or structurally altering a hydropower project in ways that change water levels or flows. 38 M.R.S. § 633.

[29] 38 M.R.S. § 631(1).

reducing GHG emissions across New England and the entire northeastern United States and Canada from fossil-fuel fired generation, through greater reliance on clean hydropower generated in Québec.

Dated this 25th day of March, 2019.

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Lisa A. Gilbreath

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Attachments:

Attachment I: CMP PUC Exhibit NECEC-5, Daymark Energy Advisors, NECEC Transmission Project: Benefits To Maine Ratepayers: Quantitative and Qualitative Benefits (Sept. 27, 2017).

Attachment II: Rebuttal Testimony of Daymark Energy Advisors, PUC Docket No. 2017-00232, at 40:18-41:2 (July 13, 2018) (Daymark Rebuttal) (citing CMP PUC Exhibit NECEC-5, Daymark Energy Advisors, NECEC Transmission Project: Benefits To Maine Ratepayers: Quantitative and Qualitative Benefits (Sept. 27, 2017) (Daymark Report) at 4 of 98).

Attachment III: Prepared Direct Testimony of James M. Speyer, PUC Docket No. 2017-00232, Exhibit JMS-4 (Energyzt Advisors, LLC, Technical Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts) (Apr. 30, 2018).

Attachment IV: London Economics International, LLC, Independent Analysis of Electricity Market and Macroeconomic Benefits of the New England Clean Energy Connect Project, PUC Docket No. 2017-00232 (May 21, 2018).

Attachment V: CMP Post-Hearing Brief at 104, PUC Docket No. 2017-00232 (Feb. 1, 2019).

Attachment VI: PUC Docket No. 2017-00232 Hearing Tr. at 75:18-22 (Mar. 7, 2019).

Attachment VII: Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo Escudero, PUC Docket No. 2017-00232 (July 13, 2018) (Dickinson, Stinneford and Escudero Rebuttal) at 30-31.

Attachment VIII: December 14, 2018 Hydro-Québec Letter submitted to the PUC in response to data request Kelly-004-001.

Attachment IX: Dickinson, Stinneford and Escudero Rebuttal at 30-31; Corrected Supplemental Testimony of William S. Fowler and Tanya L. Bodell, PUC Docket No. 2017-00232 (Dec. 10, 2018) (Fowler and Bodell Supplemental) at 27:1-9 (referencing Romaine-4 coming online in 2020 and Hydro-Québec Production's anticipated upgrades of 500 MW in 2025); Speyer Direct Testimony, Exhibit JMS-3 (Technical Report, Hydro-Québec Exports) at 10, Figure 8 ("Romaine-4 would add another 245 MW of capacity and 1.3 TWh of energy.") (Apr. 2018)

Attachment X: Translated English transcript of Le Journal de Quebec, Video Interview With Eric Martel (in French), "Hydro-Québec donne la priorité à l'exportation" [Hydro-Québec gives priority to exportation] (Nov. 21, 2018), video interview available at https://www.journaldequebec.com/2018/11/21/entrevue-avec-eric-martel--hydro-quebec-donne-la-priorite-a-lexportation.

Attachment XI: PUC Docket No. 2017-00232 Exhibit CLF-11 (Vincent, *et al. Observed Trends in Canada's Climate and Influence of Low-Frequency Variability Modes*) at 4550 (June 2015) (finding that annual precipitation in all seasons in northern Québec has increased over the period 1948-2012, as well as throughout northern Canada and in some areas of southern Canada, including portions of Ontario and Atlantic Canada).

Attachment XII: PUC Docket No. 2017-00232 Exhibit NECEC-97 (Climate Risks & Adaptation Practices for the Canadian Transportation Sector 2016, Ottawa, ON: Government of Canada (Palko, K. and Lemmon, D.S.) (2017)) at 205-206 of 320; PUC Docket No. 2017-00232 Exhibit NECEC-98 (2013-2020 Government Strategy for Climate Change Adaptation, Québec in Action Greener by 2020, Government of Québec) at 11 of 50.

DAYMARK ENERGY ADVISORS

NECEC TRANSMISSION PROJECT: BENEFITS TO MAINE RATEPAYERS

Quantitative & Qualitative Benefits

SEPTEMBER 27, 2017

PREPARED FOR

Central Maine Power

PREPARED BY

- Daniel E. Peaco, Principal Consultant
- Douglas A. Smith, Managing Consultant
- Jeffrey D. Bower, Senior Consultant

EXECUTIVE SUMMARY

Central Maine Power (CMP or the Transmission Sponsor) has proposed to build the New England Clean Energy Connect Transmission Project (NECEC Transmission Project) as part of an offering of two project bids (NECEC Project Bids) in response to the "*Request for Proposals for Long-Term Contracts for Clean Energy Projects*" (Massachusetts RFP) issued jointly by the Massachusetts Department of Energy Resources (MA DOER) and the Distribution Companies of the Commonwealth of Massachusetts[1], collectively referred to herein as the Soliciting Parties.

Each bid requires the construction of the NECEC Transmission Project in order to deliver clean energy to Massachusetts via the CMP transmission system from the point of delivery in Lewiston, Maine. At no cost to Maine ratepayers, each bid will, as a consequence of providing clean energy to Massachusetts, result in significant benefits to Maine ratepayers, as well. The significant benefits to Maine ratepayers are the focus of this report.

A. NECEC Transmission Project

The NECEC Transmission Project provides for the reliable delivery of up to 1,200 megawatts (MW) of energy per hour into the New England grid. The total cost of the project will be paid for in two ways. The NECEC Project Proponents[2] have included the cost of REDACTED MW of the transmission capacity from the NECEC Transmission Project as part of their bid. This represents the portion of the transmission capacity needed to deliver the clean energy included in their bid. Hydro Renewable Energy, Inc., an affiliate of Hydro-Québec, has agreed to be financially responsible for the remaining REDAC MW of transmission capacity on the line. None of the cost of the NECEC Transmission Project will be borne by Maine ratepayers.

B. NECEC Project Bids to Massachusetts

The two NECEC Project Bids (collectively referred to as Bids, individually as Bid 1 and Bid 2) have been offered as separate and exclusive offers to deliver a minimum of REDACTED gigawatt-hours (GWh) and up to REDACTED GWh of clean energy generation per year, each to be delivered via the NECEC Transmission Project to a delivery point at the existing Larrabee Road substation in Lewiston, Maine.

Bid 1 includes firm delivery of incremental hydroelectric generation, and Bid 2 includes Class I RPS eligible energy from REDAC MW of new wind generation, firmed by incremental hydroelectric generation.

[1] Per Section 1.1 of the Massachusetts RFP, the Distribution Companies are: Fitchburg Gas & Electric Light Company d/b/a Unitil, Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid, NSTAR Electric Company and Western Massachusetts Electric Company d/b/a Eversource.

[2] The NECEC Project Proponents includes CMP, Hydro Renewable Energy, Inc., and SBx, a joint venture of Gaz Metro Limited partnership (Gaz Metro) and Boralex Inc. (Boralex).

C. NECEC Benefits to Maine Ratepayers

The Transmission Sponsor retained Daymark Energy Advisors (Daymark) to evaluate the NECEC Project and provide an analysis of the benefits of the project to Maine ratepayers associated with the public benefits determination required for a Certificate of Public Convenience and Necessity (CPCN) from the Maine Public Utilities Commission (the Commission). This report and its associated appendices provide Daymark's estimation of these benefits, as well as our methodology and assumptions used to derive the benefit values.

The benefits analyzed are:

- Energy and Capacity price impacts;
- Greenhouse gas (GHG) reductions;
- Additional hedging benefits;
- Impacts on Ancillary Services; and
- Other benefits.

Price Impacts

In consideration of a CPCN petition, the Commission may consider many factors, including the economics associated with the proposed project.[3] In addition, Maine has a long-established goal of reducing energy prices and volatility for ratepayers in Maine.[4] The delivery of low-cost, firm power will exert downward pressure on both energy and capacity market clearing prices throughout New England. While Massachusetts Distribution Companies are contracting for the energy, all New England ratepayers will see lower energy prices with the NECEC Project in place due to the reduction in locational marginal prices (LMPs) system-wide.

Depending on the amount of energy ultimately delivered by the NECEC Project, Maine ratepayers will benefit from between $40 million and $44 million annually in levelized LMP savings. The LMP reduction and cumulative NPV benefits of both the minimum contract and the additional clean energy potential can be seen in Figure 1.[5]

Considering only the assumed additional energy associated with the RFP contract, Maine ratepayers will yield levelized benefits of $40 million per year (present value $454 million) resulting from LMP reductions averaging $3.38/MWh. When including energy from the full capacity of the line, the additional energy that may be imported on a market price basis will increase total benefits to Maine ratepayers $44 million per year (present value $496 million) resulting from LMP reductions averaging $3.70/MWh.

[3] 35-A M.R.S. § 3132(6).

[4] CPCN Petition, Section IV.B.3. provides a detailed discussion of Maine policy regarding energy prices and volatility.

[5] Present value savings are provided in 2023 dollars, the first full year the project is expected in service.

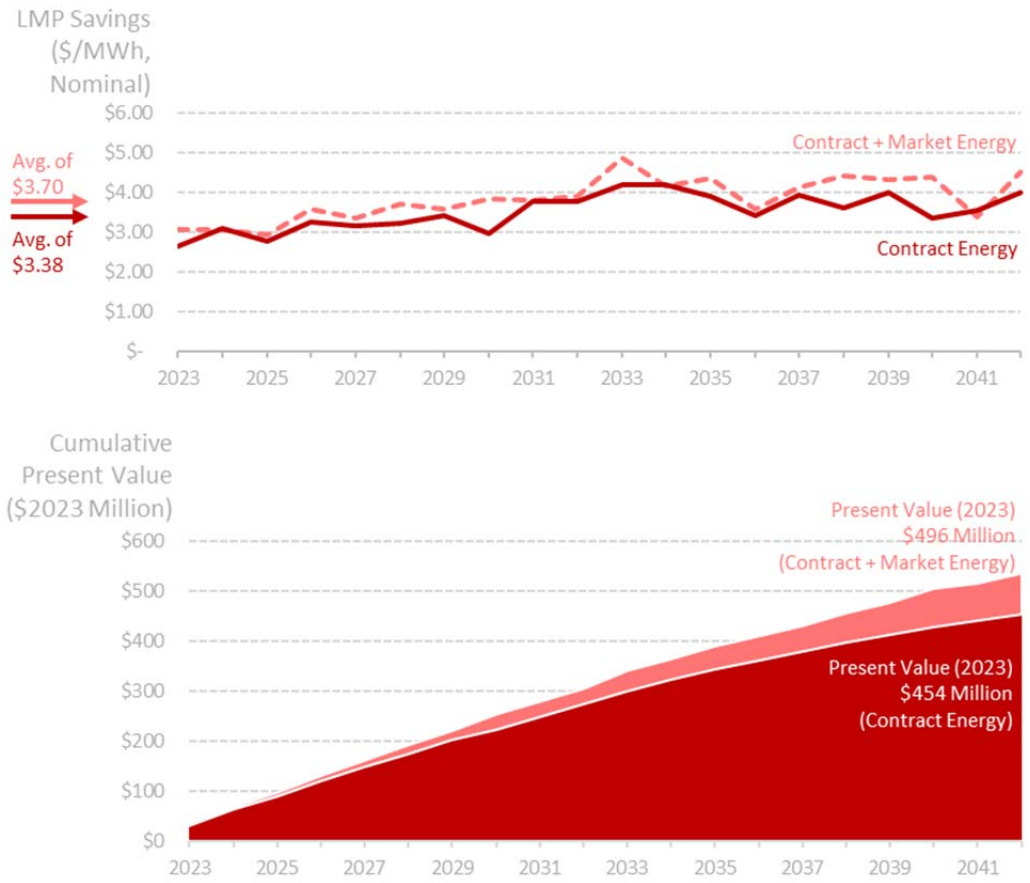

Figure 1. LMP Savings Benefit ($/MWh) and Present Value of Cumulative Benefit to ME Ratepayers ($2023 Millions).

Greenhouse Gas Reductions

Maine has established public policies and actions to mitigate climate change by reducing greenhouse gas (GHG) emissions.[6] As a large source of non-emitting generation, the NECEC Project will help contribute to Maine's efforts to achieve its policy goals.

The NECEC Project will provide clean, inframarginal energy, displacing significant generation from primarily GHG-emitting resources in the ISO New England (ISO-NE) system. Our analysis concludes that the NECEC Project will induce annual CO_2 emission reductions of approximately 3.1 million metric tons across New England. As a result, the net emissions from the portion of regional generation serving Maine load is reduced by approximately 264,000 metric tons per year.

[6] CPCN Petition, Section IV.B.2. provides a detailed discussion of Maine GHG reduction policy.

Additional Hedging Benefits

The generation portfolio in ISO-NE has become dominated by natural gas in recent years. Natural gas provides nearly half of the total electric energy produced in New England and is the marginal fuel setting electric market prices in more than three-fourths of the year.[7] As a result, volatility in the cost of fuel has exposed ratepayers in Maine and across the region to higher electric energy prices when the natural gas prices are high. The addition of a large source of firm, unconstrained, low-cost renewable energy and capacity provides a valuable hedge against natural gas price swings.

Energy from the NECEC Project reduces the portion of the resource mix that is subject to fluctuating fuel prices, allowing greater market flexibility under high gas prices that can drastically impact energy prices. As natural gas prices impact energy prices system-wide, the hedging benefits will be shared by Maine ratepayers, as well as ratepayers throughout the region.

On the capacity side, the ISO-NE capacity market may be experiencing thermal and nuclear resource retirements in the coming years, potentially exposing ratepayers to capacity price escalation. The NECEC Project also represents incremental clean, low-cost capacity that provides hedging benefits in the capacity market.

Impacts on Ancillary Services

Backed by Hydro-Québec's significant hydroelectric facilities, the resources available to provide the clean energy under the NECEC contract will be available in all hours. This firmness provides several benefits to the New England Ancillary Services markets. Firm power will provide strong value by being available when it is most needed, such as in stress conditions due to high load or outages. The firm power of the NECEC Project may also free up other resources to provide more reserve or other ramping capabilities, ensuring a more robust grid.

Ancillary services are centrally coordinated and procured by ISO New England, with load in each state paying for its proportional share of the costs. By providing firm energy, the NECEC Project will likely reduce the cost of providing ancillary services to the grid. Maine ratepayers will benefit proportionally from the consequent reduction in ISO-NE ancillary services costs.

[7] *2016 Annual Markets Report, ISO New England's Independent Market Monitor*, May 30, 2017. The IMM reports that, in 2016, 49% of total generation was fired by natural gas (page 14) and was the marginal fuel 77% of the time (page 91).

Other Benefits

The NECEC Project provides several other benefits to Maine ratepayers, including the following:

Reduction in Natural Gas Consumption

The NECEC Project will help displace some natural gas consumption. This is particularly impactful in winter months, when gas pipeline constraints can have severe impacts on pricing for electricity generation.

Congestion

The NECEC Transmission Project includes system upgrades sufficient to ensure deliverability of the energy and capacity to southern New England. The project creates virtually no congestion and allows the full delivery of the energy and capacity.

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ACRONYMS AND DEFINED TERMS

AEO	Annual Energy Outlook
AURORA	AURORAxmp®
CMP	Central Maine Power
CPCN	Certificate of Public Convenience and Necessity
Daymark	Daymark Energy Advisors
Distribution Companies	Distribution Companies of the Commonwealth of Massachusetts
EIA	U.S. Energy Information Administration
ETU	Electric transmission upgrade
FCA	Forward Capacity Auction
FCM	Forward Capacity Market
GHG	Greenhouse gas
GWh	Gigawatt hours
GWSA	Global Warming Solutions Act
HRE	Hydro Renewable Energy
HVDC	High Voltage Direct Current
IMM	Internal Market Monitor
Incremental Transmission Capacity	Remaining REDACT MW of transmission capacity on the line
LCOE	Levelized cost of energy
LDCs	Local Distribution Companies
LMP	Locational Marginal Price
MA DOER	Massachusetts Department of Energy Resources
MassDEP	Massachusetts Department of Environmental Protection
MMBtu	Millions of British Thermal Units
MW	Megawatts
MWh	Megawatt hours
NECEC Project	New England Clean Energy Connect
NECEC Wind Developer	A Joint venture of Gaz Metro Limited Partnership and Boralex Inc.
Net CONE	Net Cost of New Entry
NPV	Net present value
REC	Renewable energy credit
Solar PV	Solar photovoltaic
Soliciting Parties	MA DOER and Distribution Companies
Transmission Sponsor	Central Maine Power

I. INTRODUCTION

A. The NECEC Transmission Project

The Transmission Sponsor is proposing, as part of the NECEC Project Bids discussed below, to develop the NECEC Transmission Project designed to reliably deliver the clean energy from either Bid to Massachusetts and the region.

The NECEC Transmission Project consists of a high voltage direct current (HVDC) transmission line that runs from the Québec-Maine border in Beattie Township to a substation in the Lewiston area, a new HVDC converter station and related alternating current (AC) interconnection facilities in Lewiston, and all related transmission network upgrades on the U.S. side of the border. The NECEC Transmission Project includes upgrades to the AC transmission system in Maine that will increase the transfer capability at the Surowiec-South interface by approximately 1,000 MW and provide a pathway for up to 1,200 MW of new clean energy resources from Québec via the proposed HVDC transmission line.[8]

B. The NECEC Projects Bids to Massachusetts

Each Bid offers a minimum of REDACTED GWh and up to REDACTED GWh of firm service clean energy to be delivered to Massachusetts.

In Bid 1, Hydro Renewable Energy LLC (HRE)[9] provides the energy being delivered to Massachusetts ratepayers from incremental hydroelectric resources at a fixed price for energy and transmission.

In Bid 2, SBx, a joint venture of Gaz Metro Limited Partnership and Boralex Inc. (collectively, the "NECEC Wind Developer") provides REDACTED MW of Class I qualifying wind generation, producing 1,100 GWh of clean energy generation and 1.1 million renewable energy credits (RECs) backed by firm service hydroelectric generation. The remaining clean energy generation is hydroelectric energy offered by HRE. Bid 2 is also a fixed price to Massachusetts for energy, RECs and transmission.

The NECEC Project Bids include the use of and the cost for sufficient NECEC Transmission Project transfer capability to deliver the contracted energy without constraint. HRE has agreed to pay for any remaining MW of the Transmission Project capacity, which will be available to HRE to deliver additional energy and capacity to the New England. This could include additional deliveries of clean energy to the Soliciting Parties or to others in the New England market. Thus, all the transmission cost will be borne by Massachusetts or HRE and none of the cost will be borne by Maine ratepayers.

[8] For a full description of the NECEC Transmission Project attributes, refer to the NECEC CPCN Petition, Section V.

[9] HRE is an affiliate of Hydro-Québec.

C. Evaluation of NECEC Project Benefits to Maine Ratepayers

This report presents the results of our evaluations of the economic and environmental benefits that will accrue to Maine ratepayers from the development of the NECEC Project and is presented for consideration by the Commission in the evaluation of the NECEC CPCN submission.

Our quantitative analysis simulates the regional electric market operations, comparing market price and environmental performance changes in cases with and without the NECEC Project. This analysis uses a current Reference Case analysis in a zonal model of the regional markets using the AURORAxmp® (AURORA) software. Using this model, we provide quantitative analysis to assess the impact of the NECEC Project Bids on regional market prices, production cost, GHG emissions, and congestion at key interfaces in the region.

For purposes of this report, the amount of contracted energy was assumed to be 8,600 GWh, derived from a contracted capacity of REDACTED MW, operating at a REDACTE capacity factor. This was modeled as 981 MW of clean energy delivered over the NECEC Transmission Project in each hour. Except where noted, no additional energy from the last REDAC MW of transmission reservation was included in the determination of benefits. There are additional benefits to Maine ratepayers that will likely result from this extra REDACTE MW of capacity.

D. Maine CPCN and Public Policy Objectives

This report supports the Transmission Sponsor's CPCN petition. In considering the petition, Maine's CPCN statute requires the Commission to consider a variety of factors, including economics, reliability, public health and safety, scenic, historic and recreational values, state renewable energy generation goals, the proximity of the proposed transmission line to inhabited dwellings, and alternatives to construction of the transmission line, including energy conservation, distributed generation or load management.[10]

In addition, Maine has established public policies of lowering electricity prices for the benefit of customers, as well as public policies to encourage development of renewable energy resources and to reduce greenhouse gas emissions to mitigate the effects of climate change.

This report demonstrates the value of the NECEC Project in the context of several of these CPCN factors and public policies, as described below.

Electric Energy Price Reductions

The Maine CPCN statute lists "economics" as a primary factor in considering a petition. In addition, Maine has a long-established goal of reducing energy prices and volatility for ratepayers in Maine.[11]

[10] 35-A M.R.S. § 3132(6).

[11] See, e.g. Maine's capacity resource adequacy statute, 35-A M.R.S. § 3210-C(2). See also the 2013 Maine Energy Cost Reduction Act, P.L. 2013, Ch. 369, Part B (codified at 35-A M.R.S. § 1901 *et seq*.).

As our analysis shows, the provision of nearly 1,000 MW of low-cost, firm power will exert downward pressure on both energy and capacity market clearing prices throughout New England. Market prices in central Maine will be most directly affected, as the ISO New England energy market design is locational, causing reduced market prices at the delivery point and in Maine pricing zones. Analysis of the impact on energy and capacity market clearing prices is discussed in Section III.

GHG Reductions

In addition to the goal of reducing energy prices, Maine has established public policies to support of the reduction of GHG. In 2003, the Maine Legislature enacted the Act to Provide Leadership in Addressing the Threat of Climate Change (the "Climate Change Act"), which established GHG reduction goals for 2010, 2020, and beyond. As part of that Act, Maine set the following objectives:

- In the short term, by January 1, 2010 to 1990 levels;
- In the medium term, by January 1, 2020 to 10% below 1990 levels; and
- In the long term, reduction sufficient to eliminate any dangerous threat to the climate. To accomplish this goal, reduction to 75% to 80% below 2003 levels may be required.

In addition, Maine participates in the Regional Greenhouse Gas Initiative (RGGI) CO_2 Cap-and-Trade Program, which establishes multistate CO_2 budgets designed to reduce regional GHG emissions.

The NECEC Project contributes to these goals by inducing reductions in GHG emissions region-wide. Our analysis quantifies these benefits in Section IV.

Renewable Energy

Maine has a mandatory Renewable Portfolio Standard (RPS) requiring any competitive energy provider (CEP) serving load in Maine to procure Class I RECs at an increasing percentage of its portfolio over time. The required percentage currently tops out at 10% from "new" resources[12] in 2017. NECEC Bid 2 includes significant generation from Class I qualifying wind resources. While the RECs associated with the contracted energy would be committed to Massachusetts for the contract term, there may be the potential for additional Class I energy to be imported over any portion of the NECEC Transmission Project not contracted for under the Massachusetts RFP.

To the extent that load growth, changes in Maine RPS policy, or retirement of other REC producing resources lead to future needs for Maine CEPs, the addition of incremental REC supply to the regional REC markets also may produce a future beneficial effect for Maine ratepayers.

[12] 35-A M.R.S. § 3210(3-A)

II. EVALUATION METHODOLOGY

This section provides a description of the analysis methodology used to conduct our evaluation of the NECEC Transmission Project and associated clean energy Bids. We evaluated the broad range of benefits of the NECEC Project to Maine. The models, evaluation methodology, and key assumptions are described in this section.

A. Methodology & Tools Used

The quantification of benefits of the NECEC Project is derived from analysis using the AURORAxmp® zonal model for the Eastern Interconnect (AURORA), developed by EPIS, Inc. The results of the market simulation performed with AURORA provided the data upon which we relied to prepare estimates of the following benefits:

- Changes in LMPs and wholesale costs of energy for the ratepayers; and
- Reductions in greenhouse gas emissions in Maine.

Other benefits assessments were derived using our proprietary market modeling and spreadsheet models, including our New England Forward Capacity Market (FCM) model.

Appendices A, B, and C provide documentation of the models, methodologies, and assumptions used for the benefits evaluations presented in this report.

B. Key Assumptions

Our analysis relies on a set of Reference Case assumptions on future market conditions in New England. The analytical basis of our analysis reflects a reasonable set of reference assumptions, derived from public sources, including ISO-NE and the U.S. Energy Information Administration (EIA). The results of the modeling form the foundation of our analysis of the full range of benefits of the NECEC. This section provides summary-level descriptions of key assumptions and methods. Appendix A to this report provides a full description of our assumptions.

Natural Gas

Natural gas is the predominant marginal fuel in New England and is a significant factor in determining LMPs, wholesale energy costs, and production costs. Our analysis used natural gas price forecasts from the 2017 Annual Energy Outlook (AEO)[13] published by the EIA. The AEO forecasts used in this analysis include ISO-NE's Algonquin Citygates pricing index, the Henry Hub index, as well as the primary trading markets neighboring ISO-NE that are represented in our model.

For our Reference Case, we used the AEO's "Reference" forecasts. Figure 2 below depicts the key natural gas price assumptions.

[13] https://www.eia.gov/outlooks/aeo/

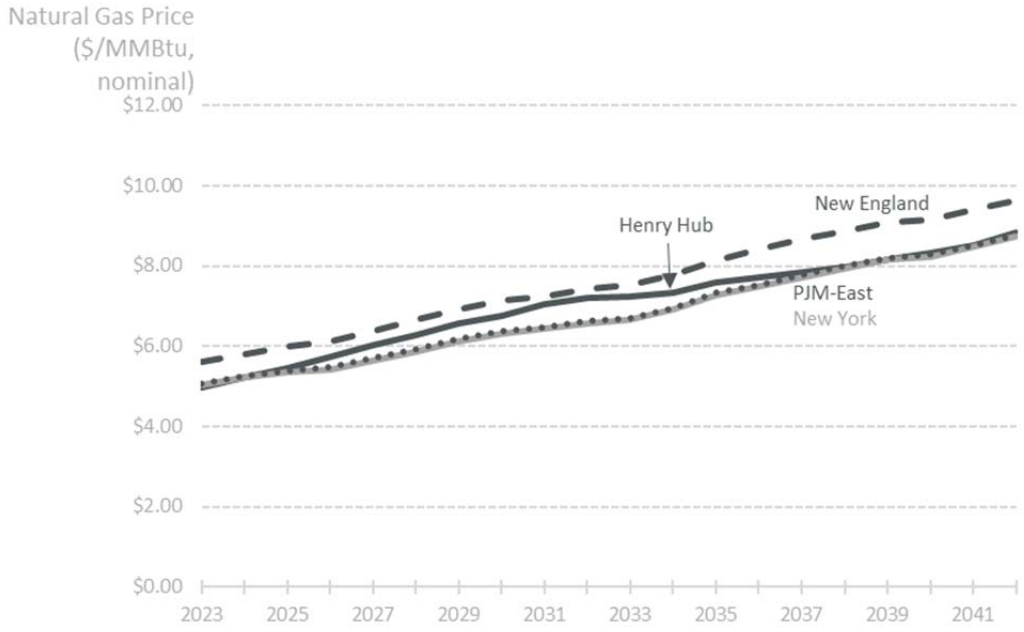

Figure 2. Natural Gas Price Assumptions ($/MMBtu, nominal)

Generator Additions and Retirements

Our analysis relies on assumptions of generator retirements and additions based on known and forecasted retirements and additions for generators in the ISO-NE market. The primary sources of the known resource designations are the results of the ISO-NE Forward Capacity Auctions (FCA), the most recent of which (FCA11) determined capacity obligations for the 2020-2021 commitment period. In addition to the generators that cleared in that most recent auction, further retirements and additions are based on results of analysis conducted with our New England FCM model. This model is described in Appendix C.

Renewable Resources

Our Reference Case assumptions of utility-scale renewable resources include all existing projects, projects currently under construction, and the approximately 460 MW of renewable projects selected under the 2015-16 Three State Clean Energy RFP jointly conducted by Massachusetts, Connecticut, and Rhode Island. These projects are all assumed to be in service by the beginning of the evaluation period. We have also assumed a total of 1,600 MW of new offshore wind capacity contracted under the upcoming Massachusetts Offshore Wind RFP[14], phased in as 400 MW tranches every other year beginning in 2024.

[14] For details on the MA Offshore Wind RFP see https://macleanenergy.com/83c/

In addition, we assumed a solar photovoltaic (solar PV) buildout that is consistent with the ISO-NE solar forecast conducted as part of the CELT report process, and a continued growth of distributed solar deployment for the years beyond the end of the ISO-NE forecast period.

III. PRICE IMPACTS

The NECEC Project includes the construction of a 1,200 MW HVDC line and the injection of firm clean energy into the New England markets. The addition of these firm, low-cost resources will have significant impacts on both the energy and capacity markets of ISO-NE.

A. Energy Market Impacts

Maine ratepayers will receive substantial energy market benefits from the NECEC Project. The cost of energy supply in Maine is based on the hourly ISO-NE Maine Load Zone LMP, which is derived from the more granular prices at dozens of load and generator nodes across the state. The addition of low marginal cost energy will deliver the greatest LMP reductions in nodal prices at and near the injection location (Larrabee Road in Lewiston, Maine), but will also reduce LMPs throughout the state and larger ISO-NE region.

We evaluated the energy market benefits of the NECEC Project Bids, and the potential additional energy, through market simulation with AURORA. As noted above, the NECEC Project Bids were simulated in the model as delivering 981 MW of clean energy each hour. For the analysis evaluating the potential benefits of the additional energy that could be delivered using the full capacity of the NECEC Transmission Project, the energy delivery was modeled as 1,086 MW of clean energy each hour.

By comparing simulations with and without the NECEC Project Bids in service, we quantified the change in LMPs that results from the incremental clean energy. This reduction in LMPs directly reduces the wholesale energy costs of serving New England customers. Figure 3 below depicts the cumulative NPV of LMP savings for each state in New England, corresponding to the lower estimate of delivered energy.

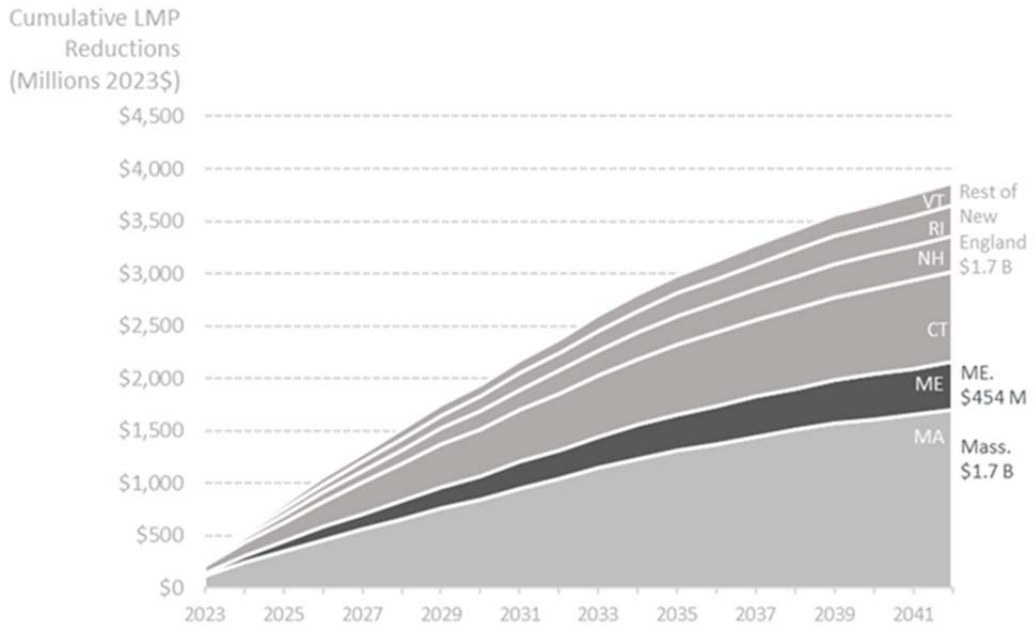

Figure 3. Cumulative LMP reductions by state, 981 MW Scenario

Figure 4 below depicts the reductions in Maine LMPs and the resulting cumulative NPV of the benefits resulting from the addition of the NECEC Project. The dark red corresponds to the benefits associated with the 981 MW portion of the project, whereas the light red corresponds to the additional benefits from the additional [redacted] MW portion of the project.

The injection of clean energy from the NECEC Project will yield significant price impacts to ISO-NE energy prices that will benefit ratepayers, with the impacts being most pronounced in Maine.

Considering only the assumed additional energy associated with the RFP contract, Maine ratepayers will yield levelized benefits of $40 million per year (present value $454 million) resulting from LMP reductions averaging $3.38/MWh. When including energy from the full capacity of the line, the additional energy that may be imported on a market price basis will increase total benefits to Maine ratepayers $44 million per year (present value $496 million) resulting from LMP reductions averaging $3.70/MWh.

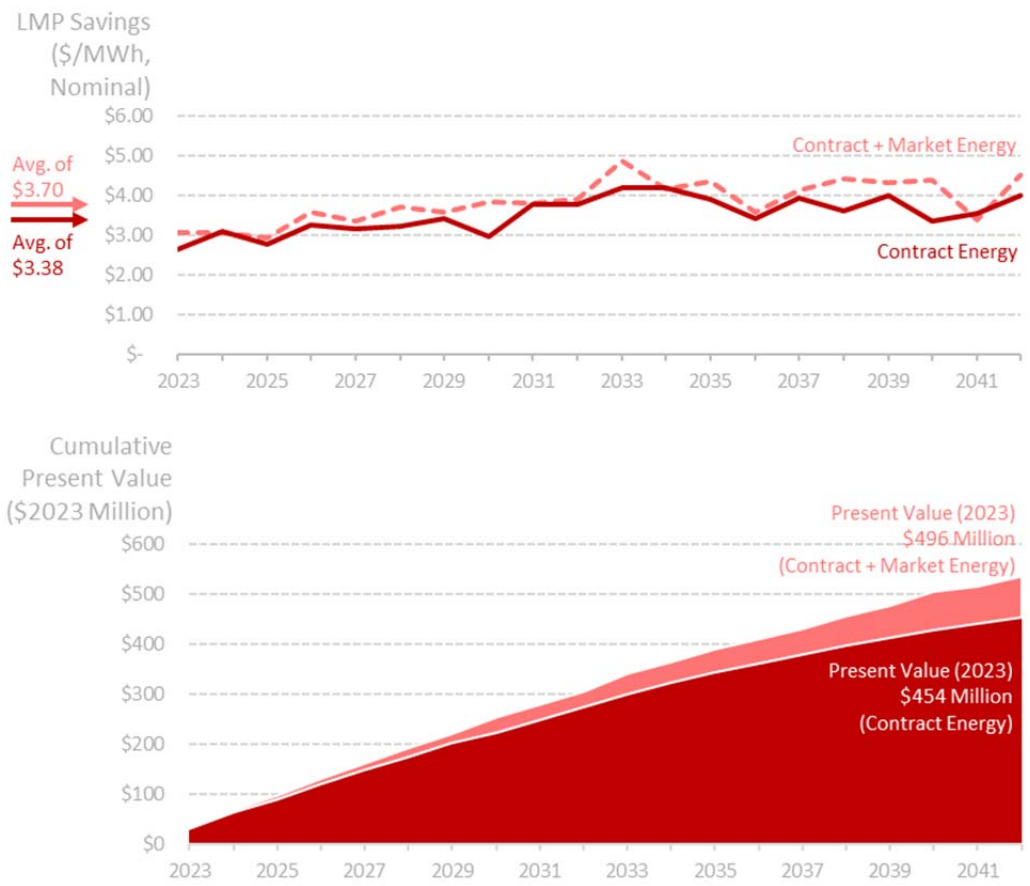

Figure 4. LMP Savings Benefit ($/MWh) and Present Value of Cumulative Benefit to ME Ratepayers ($2023 Millions)

B. Capacity Market Impacts

As a large source of clean, firm, low-cost generation, the NECEC Project Bids have the potential to provide significant benefits to the ISO-NE capacity market. The Massachusetts RFP requires that all proposed projects satisfy the Capacity Capability Interconnection Standard.[15] For capacity market purposes, either of the NECEC Project Bids would be considered an import resource associated with an elective transmission upgrade[16] and, given that the Bids are being offered in accordance with the appropriate interconnection standards, would be eligible to offer incremental capacity into the ISO-NE FCM. The offer price for the capacity would be subject to review and potential mitigation by the ISO-NE Internal Market Monitor (IMM).[17]

We analyzed the potential impact of the NECEC Project Bids on the ISO-NE capacity market and the resulting benefits to Maine ratepayers. Each year, ISO-NE procures capacity through the Forward Capacity Auction (FCA) and allocates the cost of that capacity – determined primarily by clearing price and amount procured – based on the load-ratio share of the system's coincident peak.[18]

For the purposes of this analysis, we assumed that the NECEC Project Bids result in REDACTED MW of incremental qualified capacity starting in FCA14, with a capacity delivery period of June 2023 – May 2024. The NECEC Project will be subject to several tests in order to qualify to participate in the market, and then must offer its capacity at a competitive price in order to clear the market. To assess the potential impact of the capacity for this analysis, we assumed that the capacity qualifies and offers at a price that clears the market in every year. We used our New England FCM model to determine the changes in the types and timing of capacity supply (imports, resource retirements, new generation additions) and changes in market clearing prices due to the addition of REDACTED MW from the NECEC Project Bids.

Our New England FCM model is a standalone tool used to simulate future FCAs. The model incorporates several generator-specific cost and revenue components, including energy revenue data from the AURORA production cost modeling, to compile resource going-forward costs (also known as "delist bids"). The model incorporates these delist bids along with forecasts of Cost of New Entry (CONE) to clear or retire resources using the ISO-NE demand curve.[19]

Our analysis found that the addition of the new low-cost capacity initially displaces other price-sensitive import resources. The impact of the additional capacity supply also advances the retirement of a small amount of capacity in the region that was dependent on capacity revenue for viability.

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[15] The Capacity Capability Interconnection Standard (CCIS) ensures that a new resource can interconnect into the New England transmission system and fully deliver its capacity without compromising the reliability, stability, and operability of the larger grid.

[16] An elective transmission upgrade (ETU) is generally comprised of a transmission element with interconnection points within the New England Control Area tied to one or more generation resources.

[17] Appendix C discusses these interconnection, qualification, and offer pricing issues in more detail.

[18] The ISO-NE CELT report forecasts Maine's portion of system coincident peak to average 7.5%.

[19] Appendix C provides additional detail on the FCM model.

The addition of either NECEC Project Bid yields benefits due to reduced capacity clearing prices for the first 8 years of the project. After this point, the market approaches equilibrium, with the cost of new incremental capacity (also known as the Net Cost of New Entry, or "Net CONE") setting the market clearing prices. Once the market reaches this point and new supply is clearing the market, the NECEC Project Bids no longer yield benefits over a market future without the NECEC Project Bids.

Based on the results of this analysis, we calculated the FCM-related benefits of the NECEC Project Bids on Maine ratepayers by comparing the Maine allocations of ISO-NE capacity costs between the two cases (with and without NECEC Project Bids).

During the first 8 years of the project, assuming it clears in each year, the NECEC Project Bids produce an average of $50 million per year in benefits to Maine ratepayers, and a total NPV of $312 million (2023$) over the study period.

Since the FCA clearing price determines capacity costs across the ISO-NE region, there are even broader benefits to New England as a whole. The NPV of benefits to the region total $4.17 billion over 8 years.

This analysis is subject to key uncertainties including inherent market uncertainty. While we have assumed that the NECEC Project Bids will clear REDACTED MW beginning in 2023, this assumption depends on factors such as the ISO-NE IMM review of bid prices, the amount of qualified capacity that can be sold in the market, and the price and amount that clears in the market. Furthermore, potential ISO-NE Market Rule changes in the qualification and capacity auction clearing process – such as the proposed two-tiered auction – can change how an import resource associated with an ETU will participate in the market and its likelihood of obtaining a capacity supply obligation. Nevertheless, our analysis indicates that under plausible assumptions, the benefits of reduced capacity costs of the NECEC Project Bids to Maine and New England ratepayers could be substantial.

IV. GHG REDUCTIONS

As discussed in Section I.D., Maine has established goals for long term GHG reductions. The NECEC Project will contribute to the state's efforts to achieve those goals through the guaranteed delivery of emission-free energy.

Maine is part the New England Control Area, an integrated system where generation from units in Maine may be needed to serve load outside of Maine. Likewise, Maine electricity demand can be served by units located outside Maine.

Therefore, to determine Maine's share of the New England emissions reductions caused by the NECEC Project, we first derived New England-wide emissions reductions and then allocated to Maine based on the ratio of Maine load to total New England load. Compared to a case without the NECEC Project, New England-wide CO_2 emissions are reduced by approximately 3.1 million metric tons of carbon emissions annually. Since Maine represents just over 8.5% of New England load, the NECEC Project would lead to approximately 264,000 fewer metric tons of carbon emissions annually from electric load in Maine as compared to a status quo case. This is roughly a 10% reduction in carbon emissions related to Maine electric load.

V. ADDITIONAL PRICE BENEFITS FROM A REGIONAL CLEAN ENERGY HEDGE

As the ISO-NE market has become more reliant on natural gas as the primary marginal fuel, Maine customers have been impacted by volatile fuel prices in recent years. This impact has been felt both on a short-term basis (daily or weekly price spikes typically experienced in winter months) and a medium-term basis (months or years with higher prices). There have been several state and regional efforts to increase supply of natural gas to the region, but many have so far been delayed. The NECEC Project's delivery of firm, unconstrainted, clean energy into New England reduces reliance on energy from natural gas generators, allowing greater market flexibility under high gas prices that can drastically impact energy market prices, such as have occurred in the recent past in New England. While a firm price contract serves as a hedge for Massachusetts load, the NECEC Project will also serve as a hedge for the rest of New England load through the delivery of firm, all hours inframarginal clean energy. This delivery will help protect Maine customers from multiple high gas price scenarios, as described below.

A. Sustained High Gas Price Scenario

To calculate the potential for the NECEC Project to hedge against high gas prices, we first analyzed a scenario with systematic high natural gas prices persisting throughout the contract period. For this scenario, we utilized the highest gas price scenario included in U.S. EIA's 2017 AEO.[20] The figure below compares the Reference and High prices for gas delivered to New England.

[20] The AEO's highest gas price scenario is termed "Low Oil and Gas Resource and Technology", and represents a future in which oil and gas supply is low, and technological advancement in recovery techniques is delayed, causing high prices.

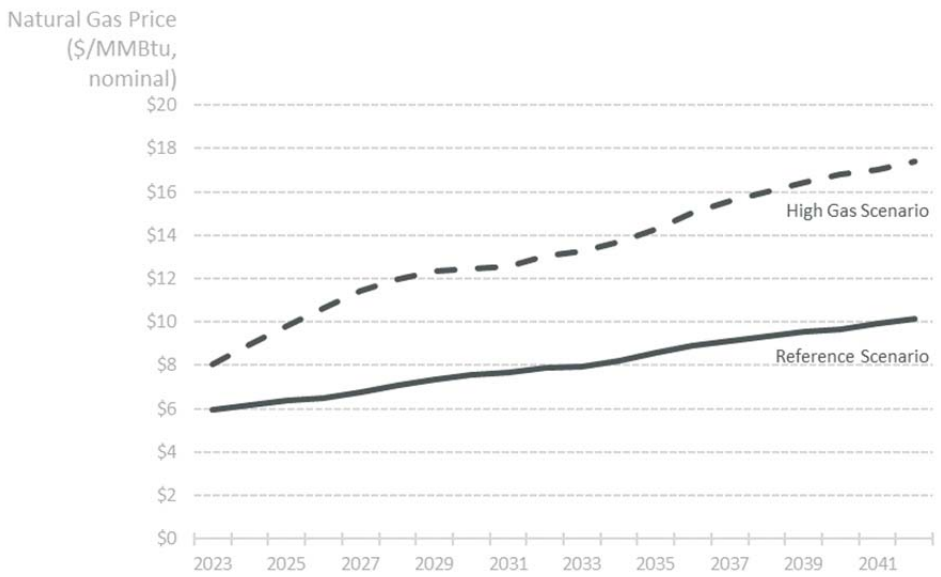

Figure 5. Algonquin Citygates, Reference and High Gas Scenarios

In a high gas future, the value of low-cost firm energy increases. We calculated the incremental LMP-related savings to Maine ratepayers in this kind of future; the additional savings totaled $83 million (2023$ NPV) over the study period. These additional savings illustrate the benefit that Maine ratepayers receive even without being the purchaser of the clean energy low-cost clean energy.

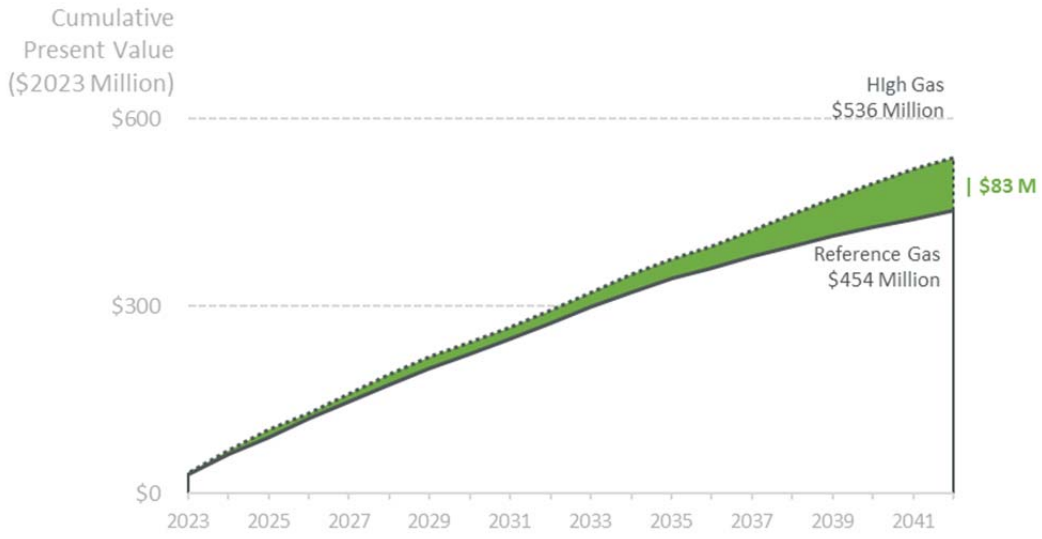

Figure 6. Present Value of Cumulative Benefit to ME Ratepayers, Reference and High Gas Price Scenarios ($2023 Millions)

B. Temporary High Gas Price Scenario (i.e., Polar Vortex)

The second scenario analyzed relates to recent winter price spikes experienced in the region. The ISO-NE market has been subject to severe winter electricity price spikes in several recent years. In many cases these price spikes have been temporary and episodic, but have exposed Maine ratepayers to extreme volatility and high wholesale energy prices.

This condition arises most frequently during cold winter periods when the natural gas pipeline capacity is being used by the natural gas Local Distribution Companies (LDCs) for space heating purposes, resulting in a lack of available supply for natural gas generators in the region. With insufficient supply, natural gas prices spike and less-efficient and normally higher-priced oil units are dispatched to meet demand. This ultimately results in an escalation in electricity market clearing prices.

This market condition is distinct from the persistent high natural gas price scenario described in the context of firmness benefits in Section V.A. above. Long-term high natural gas prices are the result of broader market conditions impacting supply and demand. These short-term spikes, by contrast, are the result of acute system conditions, but can have severe customer impacts in only a small number of days or hours.

We evaluated the benefits that the NECEC Project Bids would provide under these high winter price spike conditions. For the Reference Case analysis, the monthly natural gas price shape modeled reflects average conditions, with no extreme price conditions. For the analysis of the impact of NECEC Project Bids on winter electricity price spikes, we modeled the 2024-2025 winter period assuming that natural gas prices mimicked the daily price shape for the 2013-2014 winter period, when “polar vortex” conditions caused extreme natural gas and electricity prices in New England.

The figure below compares the winter natural gas basis (difference between the Henry Hub and Algonquin Citygates prices) used in the Reference Case analysis with the daily basis used to replicate the conditions of the 2013-2014 winter. No other changes were made to the model assumptions.

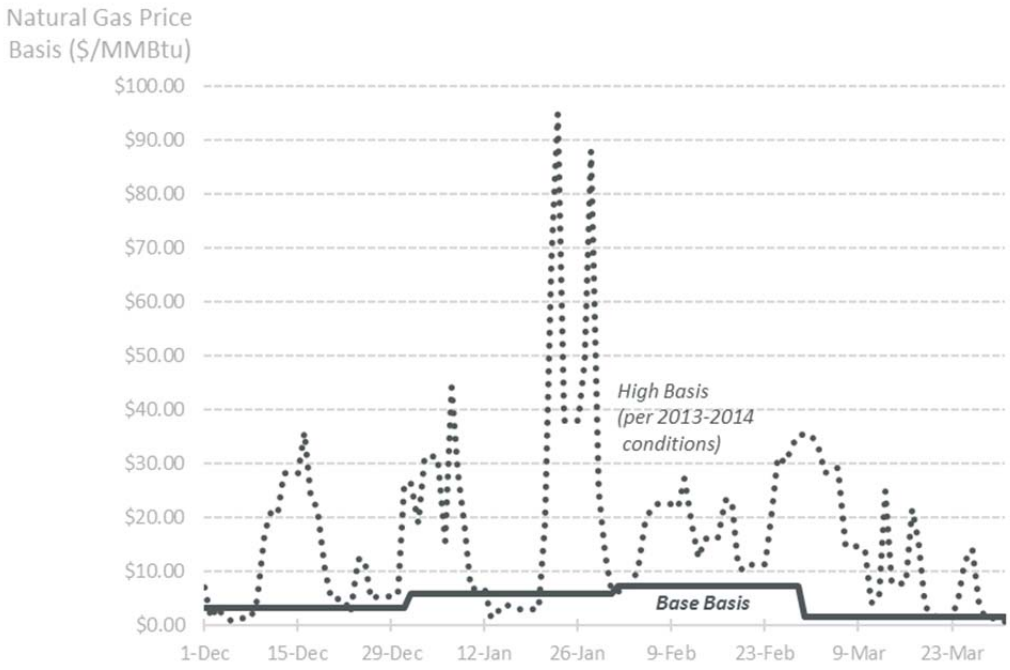

Figure 7. Natural Gas Price Basis from Henry Hub to Algonquin Citygates ($/MMBtu)

We evaluated the NECEC Project under both conditions for the 2024-2025 winter to assess the value of the project under these extreme conditions. The results show that in the high winter price spike scenario, the NECEC Project Bids produce LMP-related savings to Maine ratepayers of $51 million (nominal) for the period from December through March, as compared to $9 million in the Reference Case for the same period. The figure below depicts the Maine LMPs for the modeled futures, each with and without the NECEC Project.

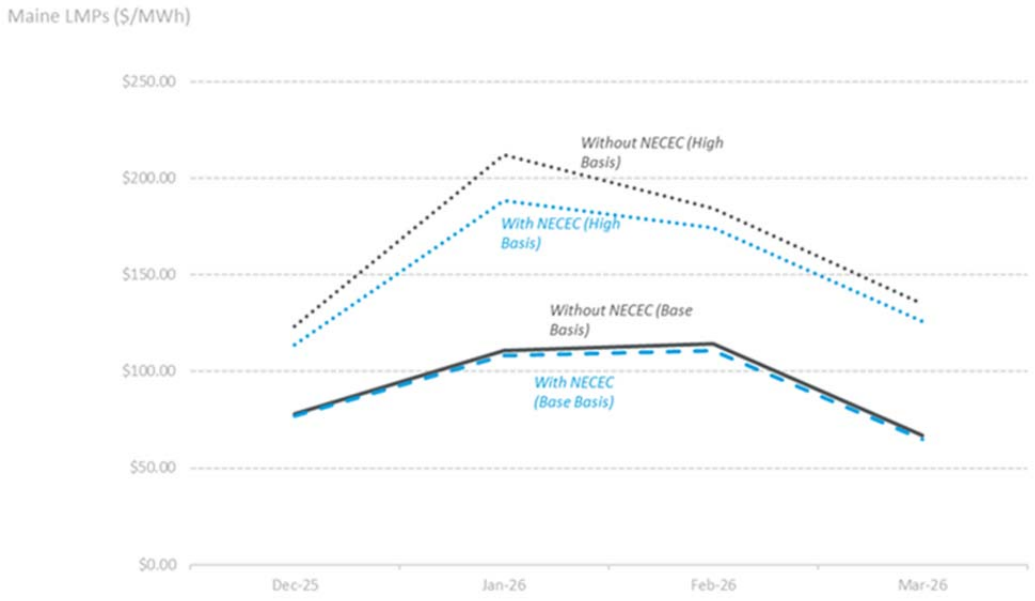

Figure 8. Maine Locational Marginal Prices under Base and High Basis Assumptions ($/MWh)

Because it is unlikely that the conditions of the winter of 2013-14 will be precisely replicated, these results should be viewed as directional and indicative of the possible scale of savings. These indicative results demonstrate, however, the value of the NECEC Project Bids as a hedge against extreme gas price conditions. When gas prices spike and LMPs escalate, the NECEC Project's value in reducing LMPs also increases. Spread across all load in Maine, these LMP reductions can generate large benefits over a short period of time.

The beneficial impact on ratepayers of the hedge provided by the NECEC Project Bids could be very substantial for Maine load in the short run and, as noted above, reduce the long-term costs for ratepayers by reducing the impact of price volatility.

C. Hedging Value Against Thermal Generation Retirements

The NECEC Project provides additional hedging value as a large source of clean, firm capacity that is not subject to volatile fuel prices, and therefore can mitigate the impact of potential future thermal generation retirements.

Maine and New England customers are exposed to ongoing electricity supply cost risk due to the potential for conventional thermal and nuclear resources in the region to retire in coming years. The regional supply of dispatchable thermal resources predominantly consist of natural gas resources. There are just a small number of coal units remaining online in New England and a larger number of oil-fired generators, though many of these resources are older.

Several of the non-gas generators are potentially at risk of retirement in the near future due to increasing operating and maintenance costs and a potential decline in energy and capacity revenues. As these units retire, the further dependence of the ISO-NE market on natural gas generators exposes Maine and New England customers to increased risk of the high gas price scenarios discussed above.

The NECEC Project serves as a hedge against the market effects of these potential resource retirements by adding a large source of firm capacity while enhancing the fuel diversity of the ISO-NE supply mix.

Additionally, retirements put upward pressure on the ISO-NE FCM. The addition of REDACTED MW of low-cost firm power that, by the requirements of the Massachusetts RFP, must pass the necessary tests for deliverability into the capacity market will act a hedge against increases in capacity costs to ratepayers.

VI. IMPACT ON ANCILLARY SERVICES

One of the issues frequently discussed in relation to renewable energy is the impact on ancillary services. Intermittent resources can, depending on circumstances, place extra burden on a system's ability to ramp up or down, leading to the need for more fast start resources to provide regulation and operating reserves. The NECEC Project avoids this potential issue by providing firm power to the grid based on an agreed upon schedule that will be part of the contracts with the Massachusetts electric Distribution Companies. Backed by Hydro-Québec's significant hydroelectric facilities, the resources available to provide the clean energy under the NECEC contract will be available in all hours.

As ancillary services are centrally coordinated and procured by ISO-NE, system-wide costs for these services are allocated to the system on a load-ratio share basis. As a large source of firm energy with a predictable schedule, the NECEC Project will likely reduce the cost of providing ancillary services to the grid. Maine ratepayers will therefore benefit proportionally from the reduction in ISO-NE ancillary services costs.

We have not quantified these benefits for this report, but have described the impacts below.

A. Operating Reserves

Units that provide operating reserves in New England are generally unavailable to provide energy, as they are required to bid at a level well above their cost, therefore ensuring they only dispatch rarely. This means that the operating reserve and energy markets compete for resources. Providing a large block of firm, low-cost power will move higher-cost units further up the supply stack, leading some to seek revenue by providing operating reserves instead of energy. The provision of firm energy will therefore exert downward pressure on the various operating reserve markets in New England by increasing supply.

Highly reliable power such as is provided by the NECEC Project, will also assist ISO-NE operations with non-performance issues when the system is under stress. ISO-NE has experienced high system stress instances in the past, where resources fail to respond to instructions due to various reasons such as gas limitations, weather induced derates, or other issues. By having roughly 1,000 MW of highly reliable power, the impact of these non-performing assets will be reduced because ISO-NE may be able to rely on them less.

B. Ramping

In addition to pushing units up the supply stack and out of the energy market, the NECEC Project will also allow some units to operate at levels that will allow for more ramping capability in New England. This is a significant benefit, as more ramping capability in any given hour means that it is easier to absorb more intermittent resources. So not only will the NECEC Project provide a large block of firm clean energy, but it will assist the system in absorbing even more clean energy over time.

VII. OTHER BENEFITS

In addition to the benefits discussed in Sections III. through VI. above, we studied the following additional benefits and issues that the Commission may wish to consider as it evaluates the NECEC Project:

- Regional and Maine reductions in electric sector natural gas consumption; and,
- Energy congestion mitigation considerations.

A. Energy Sector Reductions in Consumption of Natural Gas

In addition to the impacts on energy, capacity, and REC prices, plus the reductions in Maine and New England CO_2 emissions, the NECEC Project Bids will help reduce the electric sector demand for natural gas. This reduction in natural gas demand will provide downward pressure on the spot market for natural gas. Because New England marginal wholesale electric costs are based almost exclusively on natural gas, this will also provide an additional benefit in the form of further lowering LMPs. In addition, lower regional natural gas prices will benefit all natural gas consumers, including those that use natural gas for heating or other residential, commercial, or industrial purposes.

While we do not attempt to quantify these additional benefits in this report, we did quantify the reduction in natural gas burn in Maine and in the region resulting from the addition of the NECEC Project. The NECEC Project induced an average annual reduction of 54.2 million MMBtu of natural gas burn in the ISO-NE region, and an average of nearly 8 million MMBtu annually in Maine.

Figure 9 provides the monthly natural gas burn in ISO-NE in 2023 to illustrate the shape of the impact of the NECEC Project.

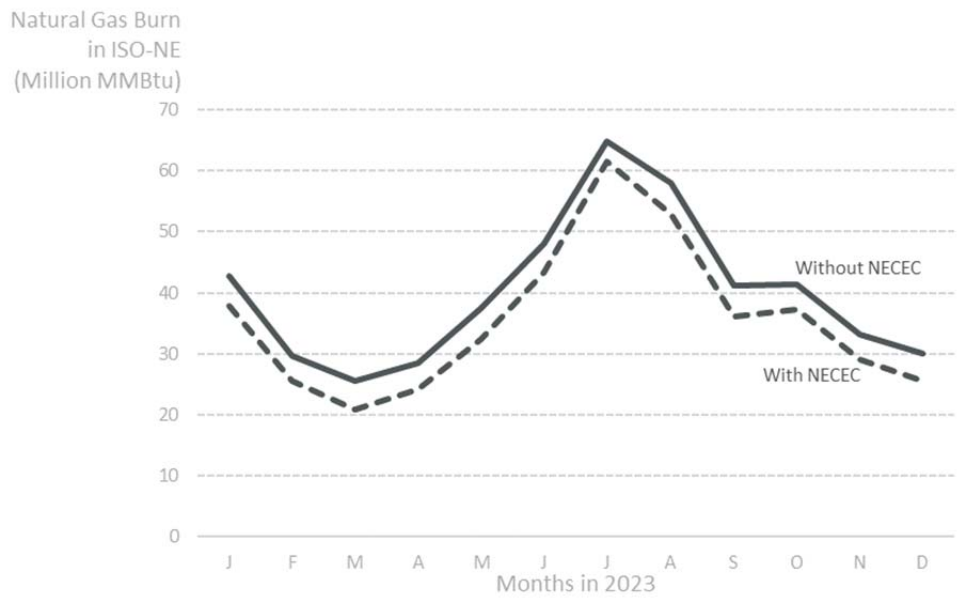

Figure 9. ISO-NE Natural Gas Consumption, 2023 (Million MMBtu)

As can be seen in Figure 10 below, the impact, on a percentage basis, is greatest in the winter. This is beneficial, as the supply of natural gas to electric generators is tightest in the winter months, making a larger reduction in those months desirable.

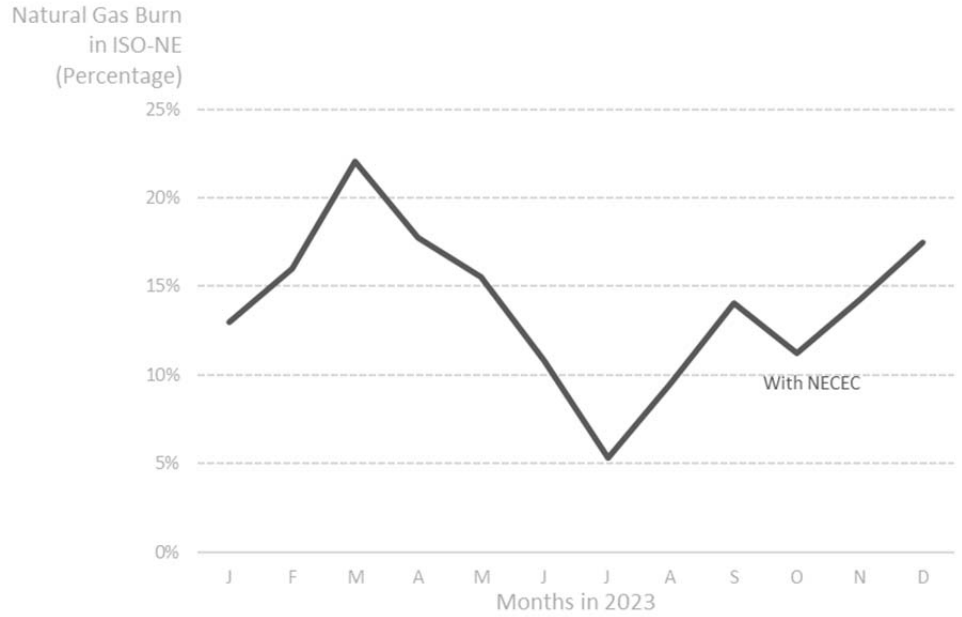

Figure 10. Monthly Natural Gas Consumption by ISO-NE Generators, Percent Reduction With NECEC Project, 2023

B. Energy Congestion

We performed two analyses designed to review the impact of the NECEC Project on regional and Maine-specific congestion. First, we reviewed the annual results for the 20-year Reference Case at two key interfaces:

- Surowiec South Interface; and
- Maine-New Hampshire Interface.

The results of the long-term analysis shows that the NECEC Project Bids do not create material congestion at Maine interfaces, with results showing: (1) uncongested deliveries on the Surowiec South interface more than 99.9% of all hours; and (2) uncongested deliveries on the Maine-New Hampshire interface more than 99.2% of all hours.

In addition to the zonal analysis, we reviewed the hourly data for key interfaces that could represent bottlenecks for new renewable energy deliveries from western Maine to southern New England. The interfaces reviewed in this detailed manner included:

- Surowiec South Interface;
- Maine-New Hampshire Interface;
- NNE-Scobie+394 Interface; and
- New England North-South Interface.

These interfaces were evaluated using a nodal representation of the New England grid, modeling an "all lines in" condition for one year (2025). In all cases, following the construction of the NECEC Project, the key interfaces were unconstrained a minimum of 99% of the hours in the year.[21] To provide a conservative estimate of potential congestion, the DC line was assumed to be running at its full 1,200 MW capability all hours of the year for this test. No congestion resulted at Surowiec South. Figure 11 through Figure 14**Error! Reference source not found.** below depict duration curves of the hourly flow over each of the four tested interfaces for 2025, with and without the NECEC Project in place.

[21] See Technical Appendix A, Section V for discussion of these calculations.

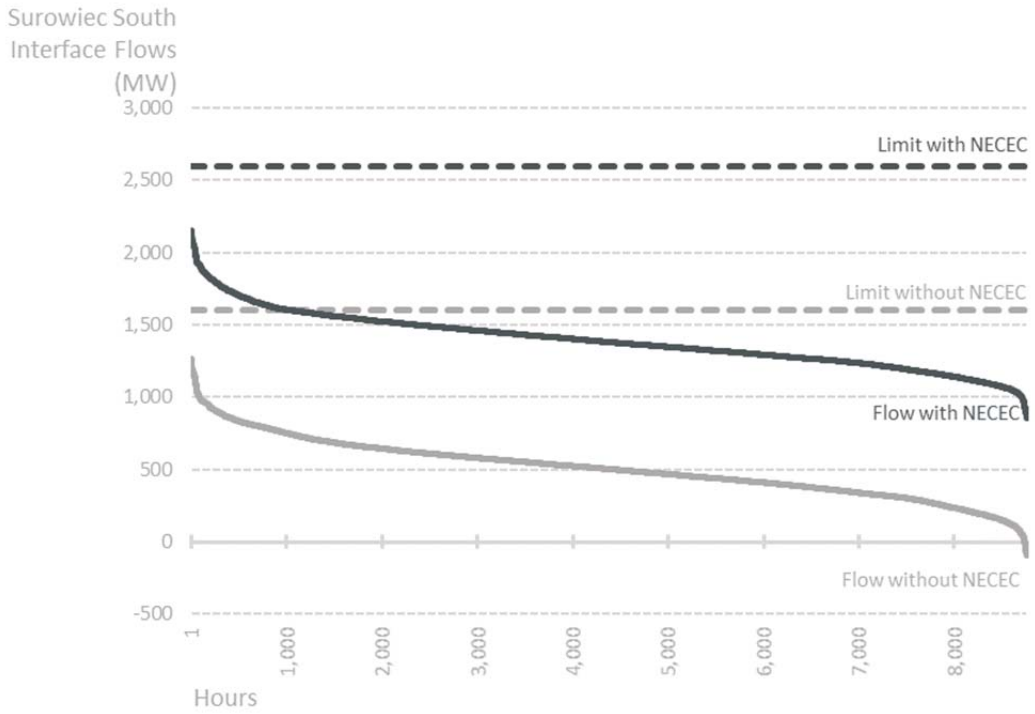

Figure 11. Surowiec South Interface Hourly Flow Duration Curve (2025)

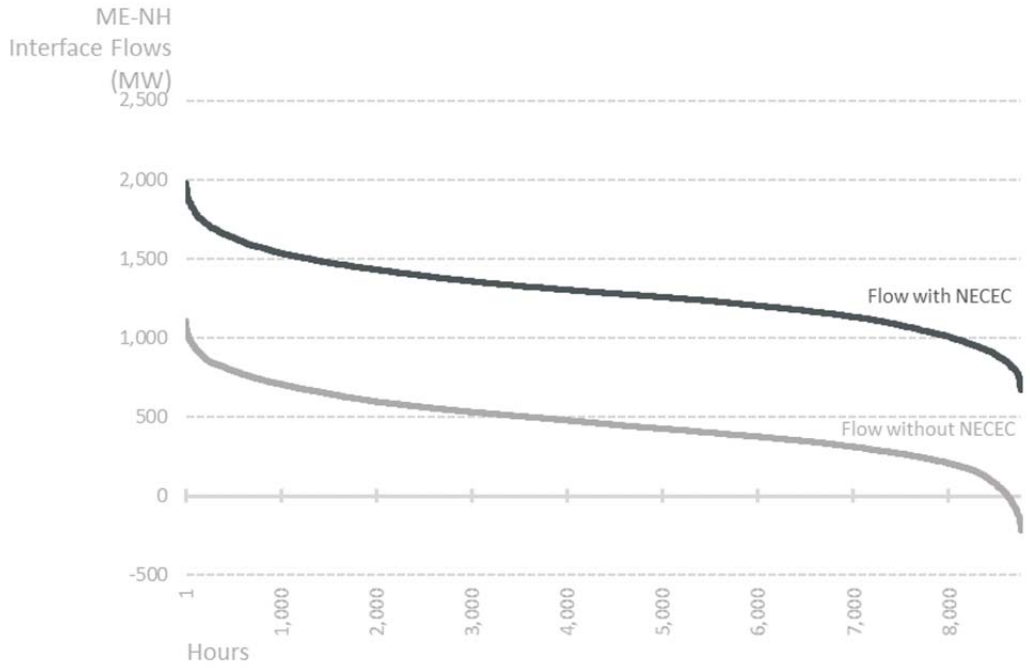

Figure 12. Maine-New Hampshire Interface Hourly Flow Duration Curve (2025)

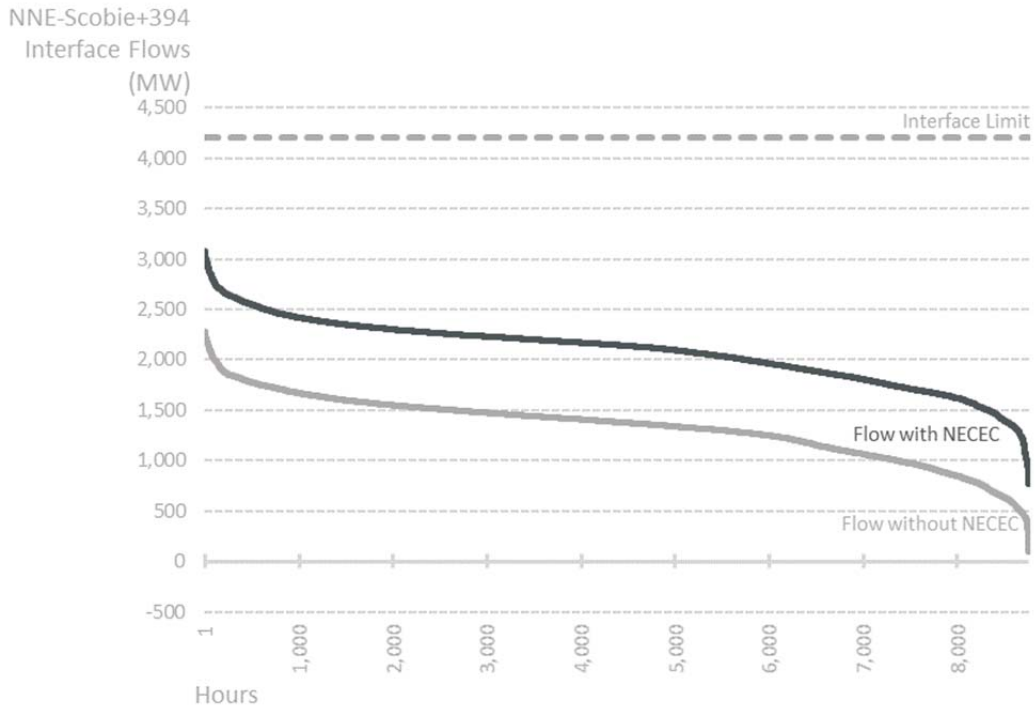

Figure 13. NNE-Scobie+394 Interface Hourly Flow Duration Curve (2025)

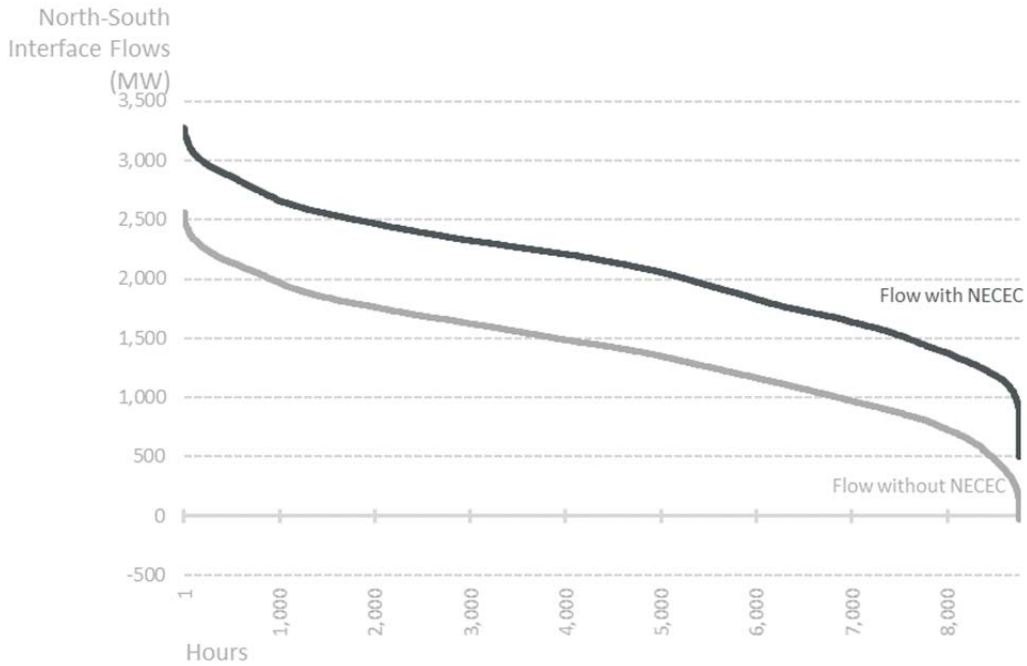

Figure 14. North-South Interface Hourly Flow Duration Curve (2025)

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APPENDIX A: ENERGY MARKET MODELING DETAILS AND METHODOLOGY

SEPTEMBER 27, 2017

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I. INTRODUCTION

Daymark Energy Advisors performed energy market analysis in support of the New England Clean Energy Connect (NECEC) Project Bids. The analysis utilizes production cost modeling to examine the benefits of the proposed transmission upgrades and incremental hydroelectric and wind generation capacity.

The two NECEC Project Bids (collectively referred to as the Bids, individually as Bid 1 and Bid 2) are being offered as separate and exclusive offers of Clean Energy Generation, each to be delivered via the NECEC Transmission Project. Each Bid includes a combination of Clean Energy Generation and the NECEC Transmission Project.

In Bid 1, Hydro Renewable Energy LLC (HRE)[1] is sponsoring firm service hydroelectric generation. Bid 1 includes [redacted] megawatts (MW) of hydroelectric energy, offered at a [redacted] capacity factor, providing approximately 8,600 gigawatt hours (GWh) of firm service clean energy being delivered to the Commonwealth's ratepayers at a fixed price for energy and transmission.

In Bid 2, HRE is joined by a joint venture of Gaz Metro Limited Partnership and Boralex Inc. (collectively, the "NECEC Wind Developer") to offer a combined bid of wind energy and renewable energy credits (RECs) and firm service hydroelectric generation. Bid 2 includes [redacted] MW of wind energy backed by firm service hydroelectricity, collectively offered at a [redacted] capacity factor by the NECEC Wind Developer and [redacted] MW of hydroelectric energy, offered at a [redacted] capacity factor by HRE. The combination of these two elements of Bid 2 provide approximately 8,600 GWh of firm clean energy plus the delivery of approximately [redacted] million Massachusetts Class 1 renewable energy credits (RECs).

Central Maine Power (CMP or the Transmission Sponsor) joins each bid offering the NECEC Transmission Project to deliver the Clean Energy Generation[2]. The NECEC Transmission Project provides for the reliable delivery of up to 1,200 MW of Clean Energy per hour into the New England grid. The NECEC Project Proponents include the costs for the [redacted] MW of transmission capacity from the NECEC Transmission Project needed to deliver the Clean Energy Generation proposed in Bids 1 and 2. HRE has agreed to be financially responsible for the remaining [redacted] MW of transmission capacity on the line.

Daymark's NECEC Project Benefits report (the "Daymark Report") provides a discussion of the results of our analysis. This appendix to the Daymark Report provides additional detail on the evaluation and describes the energy market modeling methodology and analysis which informed our conclusions. The analysis described in this appendix yielded the following results and conclusions in the Daymark Report:

[1] HRE is an affiliate of Hydro Québec.

[2] CMP proposes to develop, construct and own the NECEC transmission facilities on the U.S. side of the border. The transmission facilities located on the Canadian side of the border will be developed, constructed and owned by Hydro Québec TransEnergie, Inc. (HQT), an affiliate of Hydro Québec and HRE, in accordance with HQT's Open Access Transmission Tariff.

- Direct Contract Benefits – RFP Section 2.3.1.1
- Other Costs and Benefits to Retail Customers
  - LMP impact – RFP Section 2.3.1.2(i)
  - Production cost impact – RFP Section 2.3.1.2(i)
  - GWSA impacts – RFP Section 2.3.1.2(iii)
  - Resource firmness benefits – RFP Section 2.3.1.2(iv)
- Qualitative Benefits of Reliability – RFP Section 2.3.2(iv)
  - Contribution to reducing winter electricity price spikes
- Other Benefits and Considerations
  - LMP reductions in other states in region
  - Reduced natural gas consumption

This appendix describes the energy market analytical methodology and provides details on key assumptions.

II. ANALYTICAL FRAMEWORK

Daymark was retained, in part, to conduct an evaluation of the NECEC Project Bids using the quantitative and qualitative criteria and methodologies specified in the RFP, and using methods and assumptions that are representative of those that are likely to be used by the Soliciting Parties in evaluation of the proposals. To evaluate the impacts on the New England energy markets and fully account for the combined benefits of the NECEC Transmission Project and a combination of incremental clean energy projects proposed in conjunction with the NECEC Transmission Project, we performed production cost modeling using our in-house zonal energy model, the Daymark Energy Advisors Northeast Market Model (NMM). We have also conducted nodal modeling to assess the deliverability of the Bids.

To evaluate the benefits of the NECEC Bids, we analyzed multiple scenarios, each featuring a "Without NECEC Case" and "With NECEC Case". Each Without NECEC Case includes a set of our "status quo" assumptions (described below). Each With NECEC Case makes two changes to the associated Without NECEC Case. First, the Surowiec South interface limit is increased to 2,600 MW, attributable to the upgrades from the NECEC Transmission Project. Second, each With NECEC Case includes delivery of incremental clean energy generation via the NECEC Transmission Project, delivered into the Central Maine Zone.

By comparing the results of each pair of runs – LMPs, production cost, emissions, fuel burn, etc. – we calculate the economic benefits of the NECEC Bids.

The following sections describe the NMM and provide details on our key modeling assumptions.

A. NMM Overview

The Daymark Energy Advisors NMM uses an hourly chronologic electric energy market simulation model on the AURORAxmp® software platform ("AURORA"). The model provides a zonal representation of the electrical system of New England, New York and the neighboring regions.

The underlying technology, AURORA, is a well-established, industry-standard simulation model that uses and captures the effects of multi-area, transmission-constrained dispatch logic to simulate real market conditions. AURORA captures the dynamics and economics of electricity markets.

AURORA realistically approximates the formation of hourly energy market clearing prices on a zonal basis using all key market drivers, including fuel and emissions prices, loads, demand-side management (DSM), generation unit operating characteristics, unit additions and retirements, and transmission congestion and losses.

The NMM utilizes a comprehensive database representing the entire Eastern Interconnect (the North American interconnected power system east of the Rocky Mountains), including representations of power generation units, zonal electrical demand and transmission

configurations. Daymark constructed this database from a number of established sources of information, including:

1. A comprehensive database issued by EPIS, Inc., the developer of AURORA.
2. The U.S. Department of Energy's Energy Information Administration (EIA).
3. The Independent System Operator of New England (ISO-NE).
4. The New York Independent System Operator (NYISO).
5. The New York Mercantile Exchange (NYMEX).

Daymark supplements the EPIS database with custom updates and revisions of key inputs for the New England and New York markets, as well as more limited updates to neighboring control areas.

III. SYSTEM TOPOLOGY

The NMM is a zonal model, where each defined zone represents a "bubble" of load and generation. Transmission is represented as single composite links between zones with constraints on certain combinations of links to represent interfaces. Key attributes that can be defined for each individual link are wheeling costs, transfer losses and transfer capability. The topology of ISO-NE and contiguous areas used to model the NECEC Project is shown in Figure III-1 below.

The zones modeled in Maine include:

- Southern Maine (SME): Generation and load between New Hampshire and the Surowiec South interface.
- Central Maine (CME): Generation and load bounded by the Surowiec South interface to the south and Orrington South to the northeast. The NECEC Clean Energy is delivered to this zone.
- Bangor Hydro Electric (BHE): All ISO-NE generation and load north and east of the Orrington South interface. This zone is also interconnected to the New Brunswick zone.
- Northern Maine Independent System Administrator (NMISA): Primarily the Emera territory known as the Maine Public District, this zone includes all Maine load not interconnected with ISO-NE. This zone is only connected to the New Brunswick zone.

The zonal topology remains the same in both the Without NECEC and With NECEC model runs. As noted above, the only change in the With NECEC cases is an increase in the Surowiec South transfer limit due to the upgrades associated with the NECEC Transmission Project.

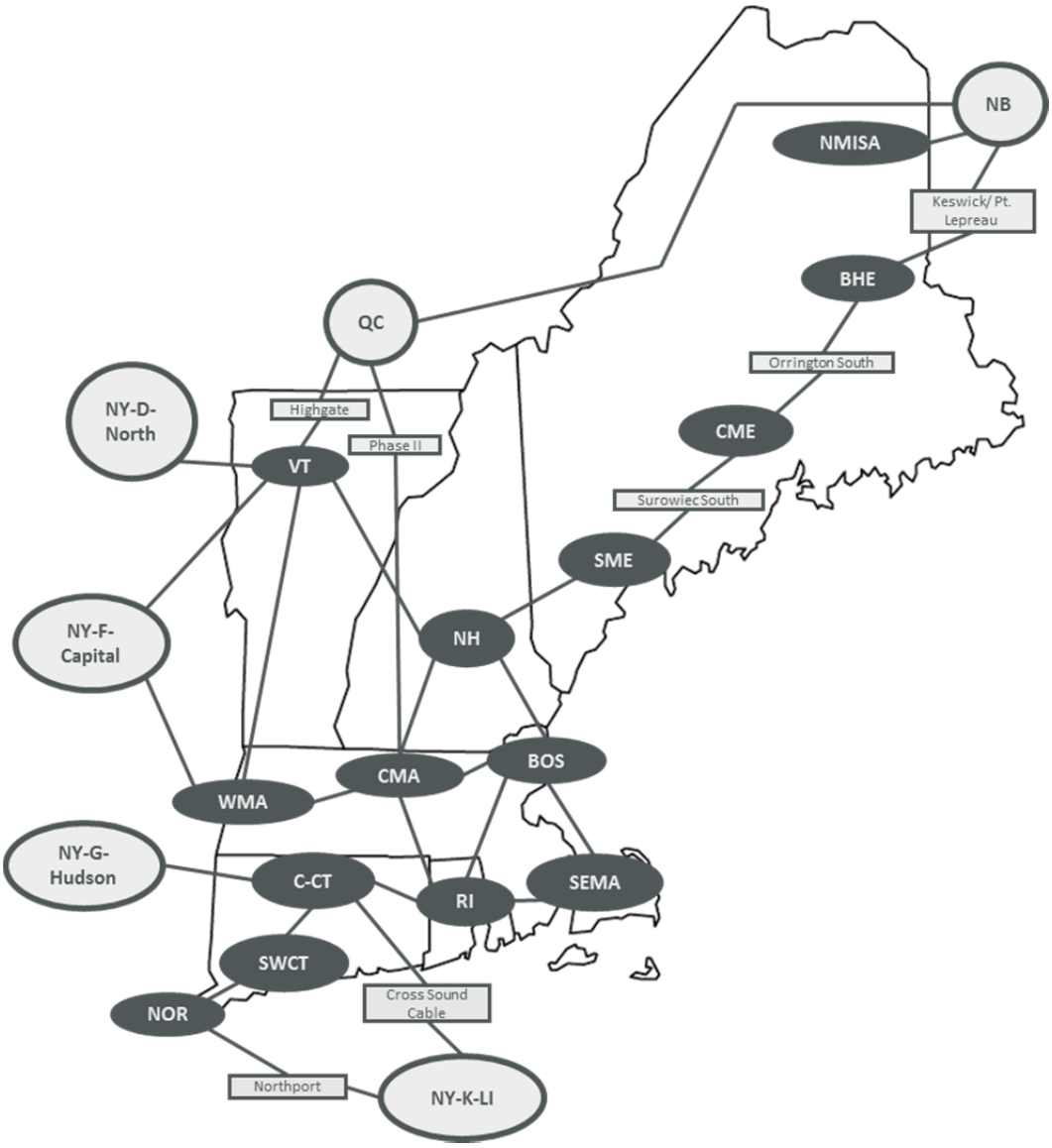

Figure III-1. NMM Model Topology: ISO-NE and regional interconnections

IV. KEY INPUTS

As discussed in the Daymark Report, Section II.C., the goal of Daymark's analysis is to conduct an evaluation of the NECEC Project using the quantitative and qualitative criteria and methodologies specified in the RFP, using methods and assumptions that are representative of those that are likely to be used by the Soliciting Parties in evaluation of the proposals.

This section provides details on the key modeling inputs and assumptions used in the NMM energy market analysis.

A. Load

Section 2.3.1.2 of the RFP notes that "[t]he reference case system topology will be based on the 2016 ISO New England Capacity, Energy, Load and Transmission (CELT) report."

Therefore, the load forecast used in the NMM for New England is based on the 2016 CELT report. Since the zones modeled in the NMM align with the RSP zones, we used the forecast values directly from the CELT report.

For the forecast years through 2025, the 2016 CELT report provided gross peak and energy load and peak and energy load net of energy efficiency (EE).[3] ISO-NE's EE forecast in the CELT report includes estimates based both on the resources cleared in the ISO-NE FCM and the load reduction projected due to state-sponsored EE programs. For extrapolation in modeled years after 2025, gross load is assumed to grow at the compound annual growth rate from 2020-2025. EE reductions are extrapolated such that EE's percent of gross load, both peak and energy, in 2025 remains constant through the rest of the study period. These extrapolations are done separately for each zone in the system.

Figure IV-1 below shows the 2016 CELT forecasts of gross and net coincident peak load and Figure IV-2 shows the gross and net energy demand for the New England Control Area.

[3] ISO-NE refers to EE as "passive demand resources" (PDR).

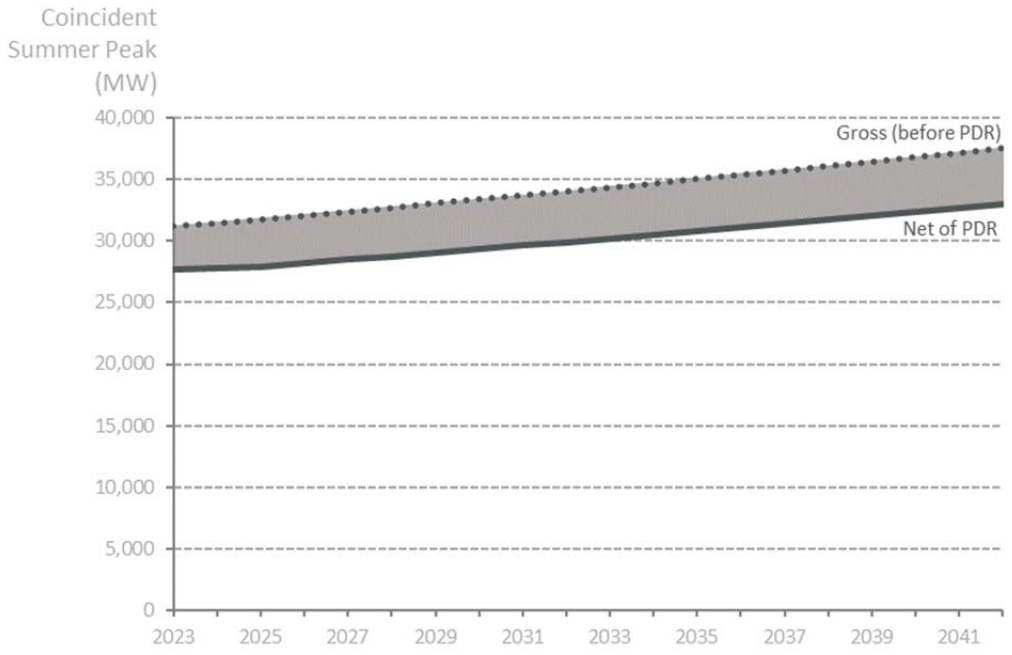

Figure IV-1: New England Coincident Peak Load, Gross and Net of Energy Efficiency

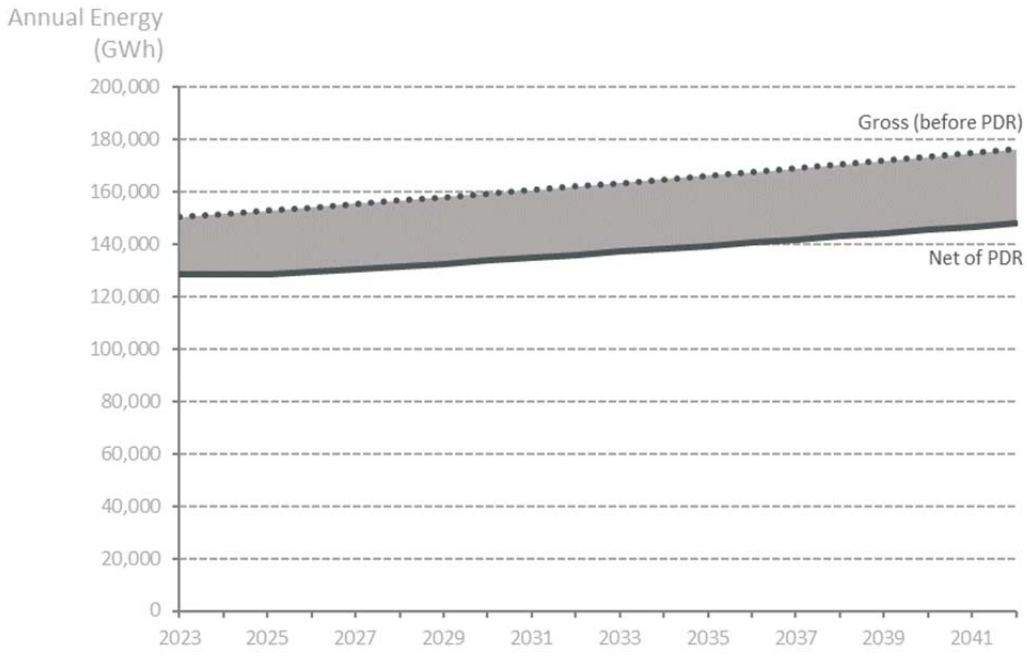

Figure IV-2: New England Energy Load, Gross and Net of Energy Efficiency

Dispatchable Demand Response (DR) units are added to New England in the NMM based upon the level of DR that has cleared in the ISO-NE Forward Capacity Market (FCM). In the market's Forward Capacity Auction (FCA) 7, the level of DR dropped precipitously from the level that had been clearing previously, and continued to decline in FCA 9 and FCA 10. Total cleared DR has declined from approximately 1,000 MW in FCA 8 to only 378 MW in FCA 10. DR capacity (in MW) for years beyond the last FCA period is assumed to remain constant at the level of the last FCA. Therefore, for the NECEC modeling, the assumption is that this lower level of 378 MW of DR persists through the end of the study period. These units are modeled as "load control" units in the NMM, and therefore when dispatched they act to reduce load instead of providing generation.

B. Fuel Prices

Fuel prices are key assumptions for the NMM, and are subject to a large amount of uncertainty. As a key component of dispatch cost, fuel prices are an important to price formation and regional market dynamics. In the NMM production cost model, each generator is assigned a fuel price based on the type of fuel, unit type, and plant location.

The following sections describe how fuel price assumptions are developed.

Natural Gas Index Prices

The ISO-NE market is currently dominated by natural gas generation and will likely remain so throughout the study period. Therefore, the natural gas price assumptions are a critical driver to our modeling and results.

For this analysis, Daymark utilized the U.S. EIA's 2017 Annual Energy Outlook (AEO) Reference Case assumptions of natural gas price indices. The AEO is a publicly available long-term forecast that is commonly used in the energy industry.

Daymark used the AEO forecast for the Henry Hub Index, as well as region-specific indices for New England, New York, and the PJM RTO (Figure IV-3 below).

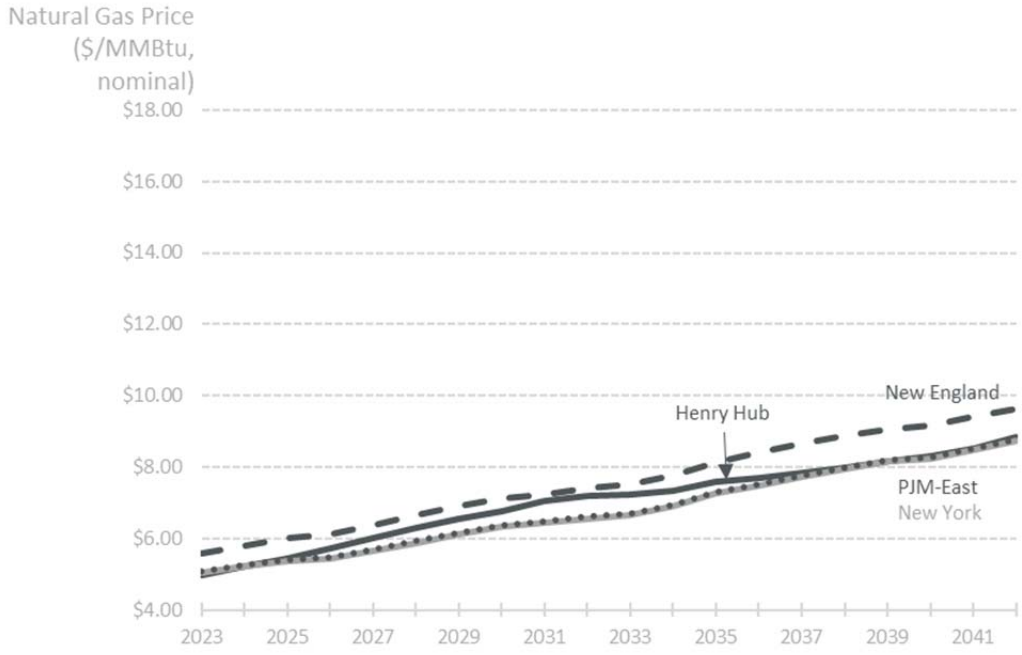

Figure IV-3. Natural Gas Price Assumptions ($/MMBtu, nominal)

In addition to the AEO Reference Case, Daymark also used AEO's high gas forecast[4] for the analysis of the value of firmness (see Section IV.D. of the Daymark Report). Figure IV-4 below depicts the price assumptions for the four indexes.

[4] The highest natural gas scenario in the 2017 AEO is the "Low Oil and Gas Resource and Technology". This scenario represents a future in which there are low physical reserves available for recovery, and the speed of technological advancement in recovery techniques is slow, resulting in low supply and high prices.

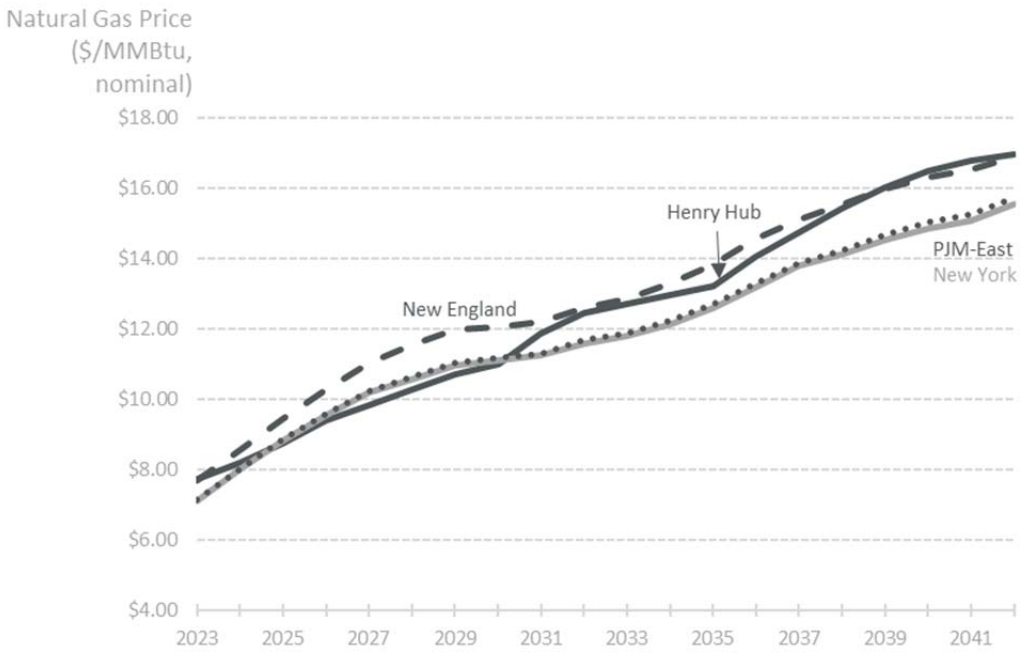

Figure IV-4. High Natural Gas Price Assumptions ($/MMBtu, nominal)

Figure IV-5 below compares the Reference Case assumption with the High Case natural gas price assumption.

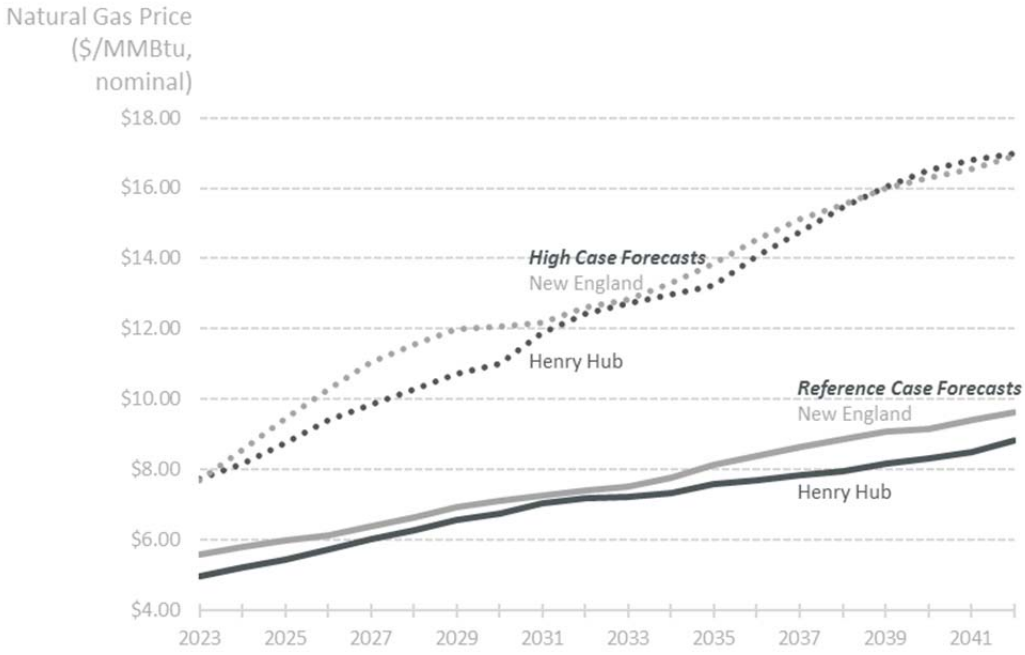

Figure IV-5. Comparison of Reference and High Natural Gas Cases

The index prices represent one component of the actual gas price used by the production cost model in each hour to determine economic dispatch of resources. For example, the price of natural gas for each New England generator is constructed according to the following basic formula for year *y*, month *m*:

$$\mathbf{DP}_{y,m} = (\mathbf{IP}_y * \mathbf{MS}_m) + \mathbf{R}_m + \mathbf{p}$$

Where:

DP	=	Delivered price to generator
IP	=	Index price, annual average
MS	=	Monthly shape factor for index price
R	=	Regional adder, if any
p	=	Peaking unit adder

The index price is sourced from the AEO as described. The derivation of each of the remaining components of the equation above is explained in the sections below.

Monthly Shape Factor for Index Prices

Annual average natural gas prices are shaped monthly to reflect seasonal trends and variation in The monthly shape vector for the index prices is based on analysis of historical trends. These values are applied to the annual index prices to yield monthly values. Figure IV-6 below displays the monthly shapes for the four primary indexes used in this analysis.

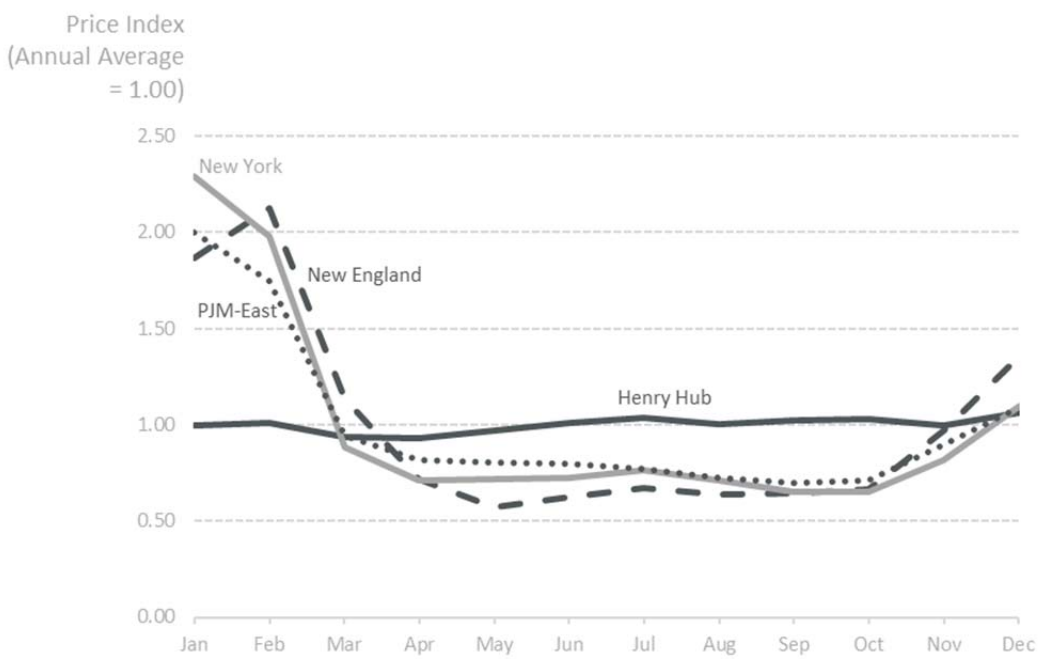

Figure IV-6. Natural Gas Index Monthly Shapes

Regional Adder

The Algonquin Citygates price provides a reasonable proxy for delivered natural gas prices for generators in southern New England. However, natural gas-fired generators in northern New England (Maine, New Hampshire, and Vermont) face additional expense due to the additional distance from gas supplies to the southwest. The NMM forecast of this additional basis is $0.59/MMBtu on an annual average basis, with seasonal range of $0.35 - $0.88/MMBtu (see Figure IV-7). The forecast is based on backhaul usage rates on the Maritimes and Northeast Pipeline and Portland Natural Gas Transmission System short term reservation rates.

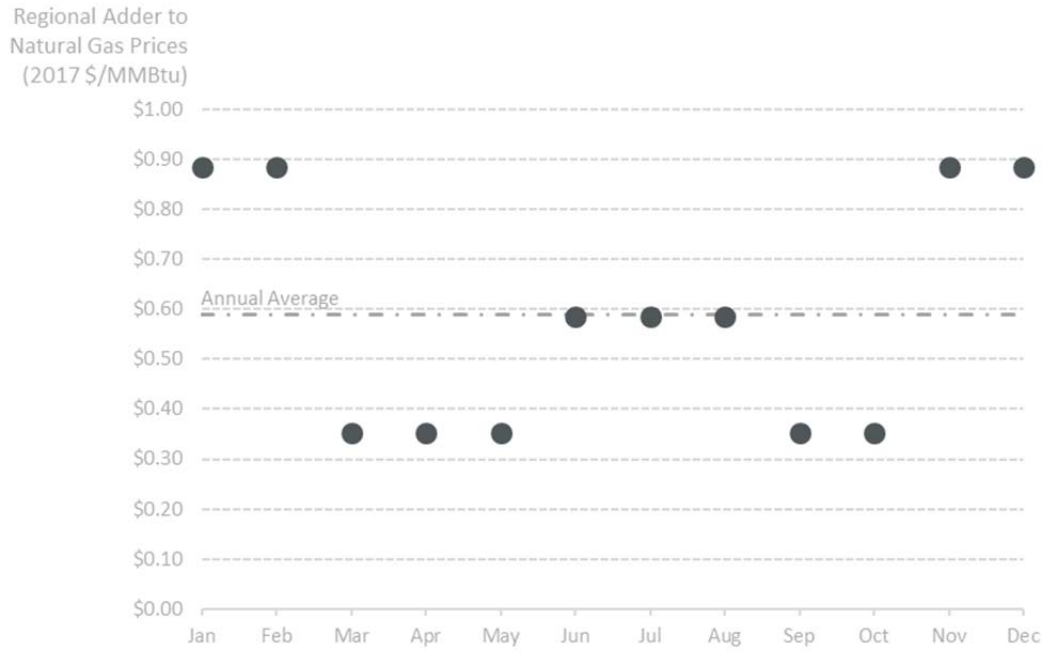

Figure IV-7. Northern New England Basis Differential to Rest of New England (Algonquin Citygates)

Peaking Unit Adder

Some units are assumed to pay for fuel at prices above the monthly average price for delivered natural gas because they tend to only be dispatched on peak days when the daily gas price is likely higher. Our assumptions are summarized in the table below.

Natural Gas Delivery Class	Fuel Adder (2017$/MMBtu)	Resources in Class
Peaking	$0.89	New Haven Harbor Units 2-4 (151MW); Androscoggin Energy Center CT03 (51MW); Swanton Peaking Generation Project #10 (40MW); Algonquin Windsor Locks (38MW); Lowell Cogeneration #GEN1-2 (32MW); Capital District Energy Center STG (29MW); Waters River #1 (20MW); Pawtucket Power #1 (20MW); 15 smaller units totaling 33MW.
Super Peaking	$1.74	Devon 11-14 (161MW); Cleary Flood #9a (106MW).
Standard (Non-Peaking)	$0.00	All Remaining units.

Table IV-1. NMM Peaking Unit Fuel Price Adder Assumptions

C. Emission Prices

The NMM incorporates emission prices into the production cost and commitment/dispatch of units in the model. We incorporate prices for CO_2, NOx, and SO_2 into the NMM.

All New England states currently participate in Regional Greenhouse Gas Initiative (RGGI) program, a cap-and-trade program aimed at reducing CO_2 emissions from the power sector. Pricing carbon emissions affects New England electric energy prices by increasing the variable costs of fossil fuel-fired generators that are almost always on the margin. RGGI allowance prices have been minimal since the program began in 2009 because actual CO_2 emission levels have fallen well below the initial program caps. On February 7, 2013, the RGGI states announced their commitment to an Updated Model Rule that tightened caps significantly in 2014.

Daymark assumes that the New England states will continue to be subject to CO_2 emission prices through the study period, either through the RGGI program or a national CO_2 emissions program. Consistent with industry estimates, we assume a price for carbon emissions of $15/ton in 2022, escalating to $30/ton at the end of the study period in 2042 (values in 2016$).[5]

NOx and SO_2 emission prices are a relatively minor component of LMPs in New England because of the low emission rates of marginal generators (mostly gas units). We have assumed that NOx and SO_2 emission prices decline to $0 by 2020, the start of the study period.

[5] Source: Synapse Energy Economics, Inc. *Spring 2016 National Carbon Dioxide Price Forecast*. March 16, 2016. Available at: http://www.synapse-energy.com/sites/default/files/2016-Synapse-CO2-Price-Forecast-66-008.pdf

D. Retirements and Thermal Capacity Additions

Daymark's modeling analysis relies on assumptions of generator retirements and additions. These resource changes impact the efficiency of marginal units and can impact pricing, emissions, and net imports to the region, among other factors.

Our assumptions on retirements are based on known and forecasted retirements the ISO-NE market. The primary source of the known resource designations is the results of the ISO-NE Forward Capacity Auctions (FCA), the most recent of which (FCA11) determined capacity obligations for the 2020-2021 commitment period. In addition to these resources, further retirements and resource additions are based on results of analysis conducted with Daymark's ISO-NE FCM model.

Daymark's ISO-NE FCM model forecasts the economics of existing generators in New England, incorporating revenues from energy and capacity sales, and netting out resource costs including fuel, operation and maintenance (O&M), emission allowance costs, etc. The model determines relative economics of over 12,000 MW of generation in ISO-NE to determine the timing of resource retirements and construction of new plants.

Appendix C provides a full description of the FCM model methodology.

Figure IV-8 details the cumulative capacity additions and resource retirements assumed in the NMM.

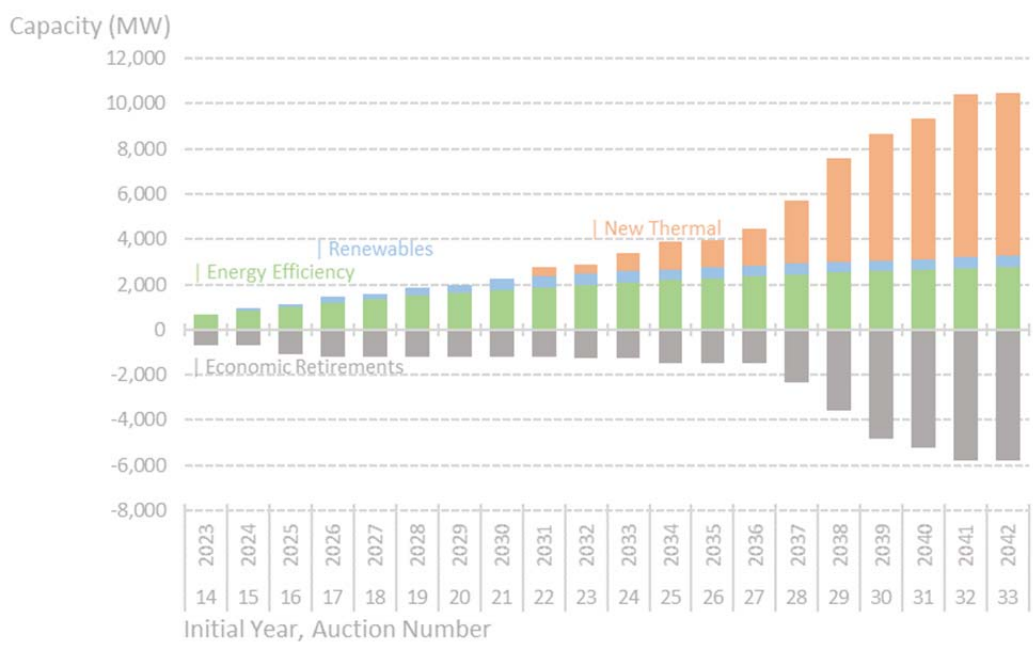

Figure IV-8. Cumulative Capacity Additions and Retirements

E. Renewable Additions

As noted above, our assumptions on renewable resources follow a "status quo" approach. Renewable projects modeled include:

- Existing and operational projects.
- Projects currently under construction.
- Projects with contracts resulting from the 2015-16 Clean Energy RFP issued by Massachusetts, Connecticut, and Rhode Island.
- New offshore wind assumed to be contracted as a results of Massachusetts Section 83C procurements.

With the exception of the offshore wind, we assume that all projects that fall under the preceding categories will be online at the start of the study period. Offshore wind is assumed to be added in 400 MW tranches every two years beginning in 2024. We also assume that all existing renewable projects will remain online through the end of the study period.

Distributed Solar Assumptions

The NMM includes a forecast of distributed, behind-the-meter solar. Our forecast is based on the ISO-NE distributed solar forecast, conducted as part of the annual load forecast and CELT report process.

The figure below summarizes our assumptions of distributed solar buildout by state.

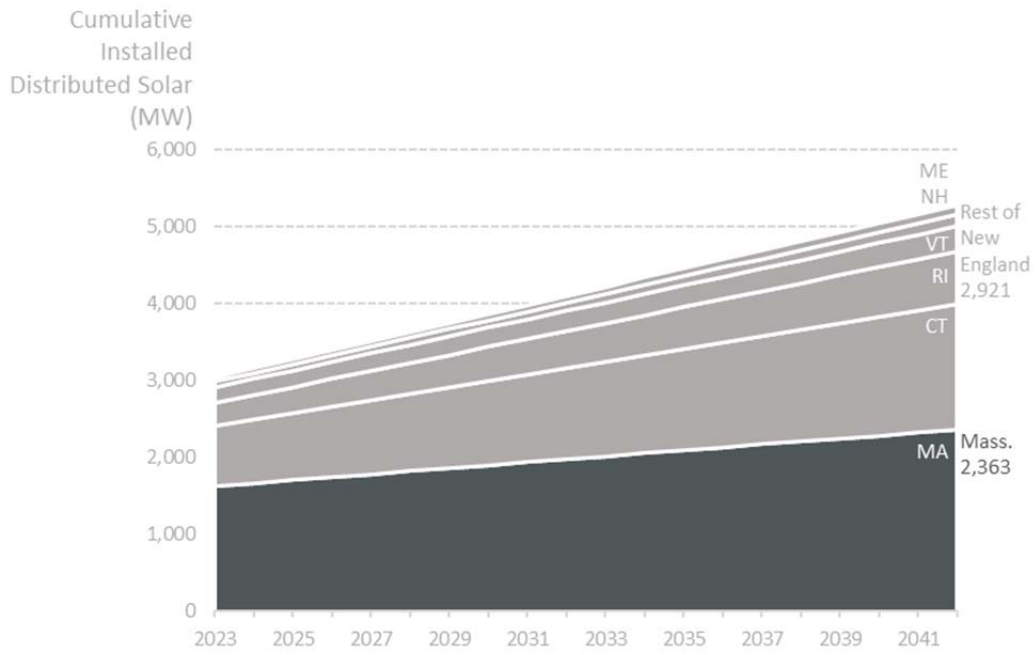

Figure IV-9. Distributed Solar Buildout (Cumulative MW)

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APPENDIX B: RENEWABLE ENERGY CERTIFICATE MARKET ANALYSIS DETAILS AND METHODOLOGY

SEPTEMBER 27, 2017

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I. INTRODUCTION

Daymark Energy Advisors (Daymark) performed extensive benefits analysis in support of the New England Clean Energy Connect (NECEC) Project Bids. One component of our analysis is the mark-to-market analysis of the value of the renewable energy credits (RECs), as described in Section 2.3.1.1 of the RFP. Daymark's NECEC Project Benefits report (the "Daymark Report") provides a discussion of the results of our analysis. This appendix provides the details and analytical methodology supporting our analysis.

The two NECEC Project Bids (collectively "Bids", individually Bid 1 and Bid 2) are being offered as separate and exclusive offers of Clean Energy Generation, each to be delivered via the NECEC Transmission Project. Each Bid includes a combination of Clean Energy Generation and the NECEC Transmission Project. Bid 1 includes [redacted] megawatts (MW) of hydroelectric energy, offered at a [redacted] capacity factor, providing approximately 8,600 gigawatt hours (GWh) of energy. Bid 2 provides the same total quantity of clean energy, but instead of all hydro generation, it includes the output of [redacted] MW of new wind capacity, firmed up by the hydro to provide the same energy shape. The energy provided by the wind energy will generate approximately [redacted] million RECs that will be sold to the Distribution Companies at a fixed price.

Section II of this appendix provides an assessment and forecast of REC demand in New England. Section III provides Daymark's evaluation of existing and potential future REC supply in the region. Finally, Section IV of this appendix provides a review of historical pricing and describes Daymark's methodology for developing a REC price forecast.

II. NEW ENGLAND RENEWABLE ENERGY DEMAND FOR CLASS I RESOURCES

This section summarizes Daymark's forecast of demand for Premium Class I RECs in the New England region.

As used in this report, "Premium Class I RECs" refers to RECs eligible for compliance with Massachusetts (MA) Class I, Connecticut (CT) Class I, Rhode Island (RI) New, and New Hampshire (NH) Class I and II.[1] There are different eligibility requirements across each class and each state. Though some significant eligibility differences exist (particularly CT Class I), the markets sufficiently overlap to be thought of generally as a single market. While Maine and Vermont also have mandatory RPS standards, prices in these states are generally lower. Maine has made allowances for some existing biomass to qualify for Class I that does not qualify elsewhere, resulting in a significantly lower REC price than the other New England Class I markets. Vermont's new RPS is less stringent in its requirements than the other states as it has a low Alternative Compliance Payment (ACP) and allows large hydropower to fulfill requirements.

These premium REC classes generally contain more restrictions for eligibility and should carry higher prices due to the smaller pool of resource types that are eligible.[2] At the current time (and over the foreseeable future), Premium Class I RECs are the highest priced RECs in New England, but supply/demand dynamics for each of the REC classes ultimately determines prices. Not all classes permit participation by imported power as some classes require in-state locations (e.g., CT Class III) and have older vintage requirements (e.g., MA Class II) that reduce the applicability of the class to potential imports. Table II-1 summarizes the relevant definitions of the eligible resources for the premium classes, which are most relevant to import of certificates from outside of New England.

[1] Maine Class I was previously considered as a "premium" market but recent loosening of eligibility requirements has reduced the value of these RECs.

[2] Another factor is that the Alternative Compliance Payment, which is effectively a statutory or regulatory ceiling on prices for RECs, is generally set higher for Class I compared to other RPS classes.

RPS Class	Definition
CT Class 1[3]	Includes "energy derived from solar power, wind power, a fuel cell, methane gas from landfills, ocean thermal power, wave or tidal power, low emission advanced renewable energy conversion technologies, small (<5MW) run-of-the-river hydropower facility provided such facility has a generating capacity of not more than five megawatts, does not cause an appreciable change in the river flow, and began operation after July 1, 2003, or a sustainable biomass facility with an average emission rate of equal to or less than .075 pounds of nitrogen oxides per million BTU of heat input for the previous calendar quarter"
MA Class 1	New Renewable Generation Units are facilities that began commercial operation after 1997 and generate electricity using any of the following technologies: Solar photovoltaic, Solar thermal electric, Wind energy, Small hydropower, Landfill methane and anaerobic digester gas, Marine or hydrokinetic energy, Geothermal energy, Eligible biomass fuel
NH Class 1	Class I resources include generation facilities that began operation after January 1, 2006 and produce electricity from: wind energy; geothermal energy; hydrogen derived from biomass fuel or methane gas; ocean thermal, wave, current, or tidal energy; methane gas; or biomass Displacement of electricity by end-use customers from solar hot water heating systems, incremental new production from Class III and IV sources, and existing hydropower and biomass facilities that began operation as a new facility through capital investment also qualify as class I sources.
NH Class 2	Includes production of electricity from solar technologies, provided the source began operation after January 1, 2006.
RI New	Eligible renewable resources initially placed into commercial operation after December 31, 1997 that use direct solar radiation, wind, movement or the latent heat of the ocean, or the earth's heat; hydroelectric facilities up to 30 megawatts (MW) in capacity, Biomass facilities using eligible biomass fuels and maintaining compliance with current air permits (eligible biomass fuels may be co-fired with fossil fuels, provided that only the renewable-energy portion of production from multi-fuel facilities will be considered eligible), Fuel cells using renewable resources

Table II-1. Premium RPS Classes in New England (Definition Excerpts)

Compliance entities must purchase class-eligible RECs equivalent to a certain percentage of obligated load by a certain date each year. All four states allow some form of REC "banking", enabling compliance entities to apply a limited number of surplus RECs from one compliance year toward future obligations. The table below summarizes the minimum percentage requirements by class and by year for the 2020-2035 time period and beyond.

[3] CT Class 1 now has some allowance for large hydro to offset RPS requirements under certain conditions.

Year	CT Class 1	MA Class 1	NH Class 1	NH Class 2	RI New
2020	20.0%	15.0%	10.5%	0.3%	14.0%
2021	20.0%	16.0%	11.4%	0.3%	15.5%
2022	20.0%	17.0%	12.3%	0.3%	17.0%
2023	20.0%	18.0%	13.2%	0.3%	18.5%
2024	20.0%	19.0%	14.1%	0.3%	20.0%
2025	20.0%	20.0%	15.0%	0.3%	21.5%
2026	20.0%	21.0%	15.0%	0.3%	23.0%
2027	20.0%	22.0%	15.0%	0.3%	24.5%
2028	20.0%	23.0%	15.0%	0.3%	26.0%
2029	20.0%	24.0%	15.0%	0.3%	27.5%
2030	20.0%	25.0%	15.0%	0.3%	29.0%
2031	20.0%	26.0%	15.0%	0.3%	30.5%
2032	20.0%	27.0%	15.0%	0.3%	32.0%
2033	20.0%	28.0%	15.0%	0.3%	33.5%
2034	20.0%	29.0%	15.0%	0.3%	35.0%
2035	20.0%	30.0%+[4]	15.0%	0.3%	36.5%

Table II-2. Premium RPS Class Minimum Percentage Requirements, 2020-2035+

RPS policies in most states escalate annual until a certain target percentage is reached, with percentage requirements remaining static thereafter. By contrast, the Massachusetts RPS policy requires 15% renewable supply by 2020, and an additional 1% each following year, with no statutory end to the escalation. Figure II-1 shows the demand levels for the 2020-2035 period. Region-wide demand is expected to increase from 16 million RECs to almost 27 million Premium Class I RECs in 2035.

[4] After 2020, an additional 1% per year with no stated expiration date. Percentages include in-state solar carve-out.

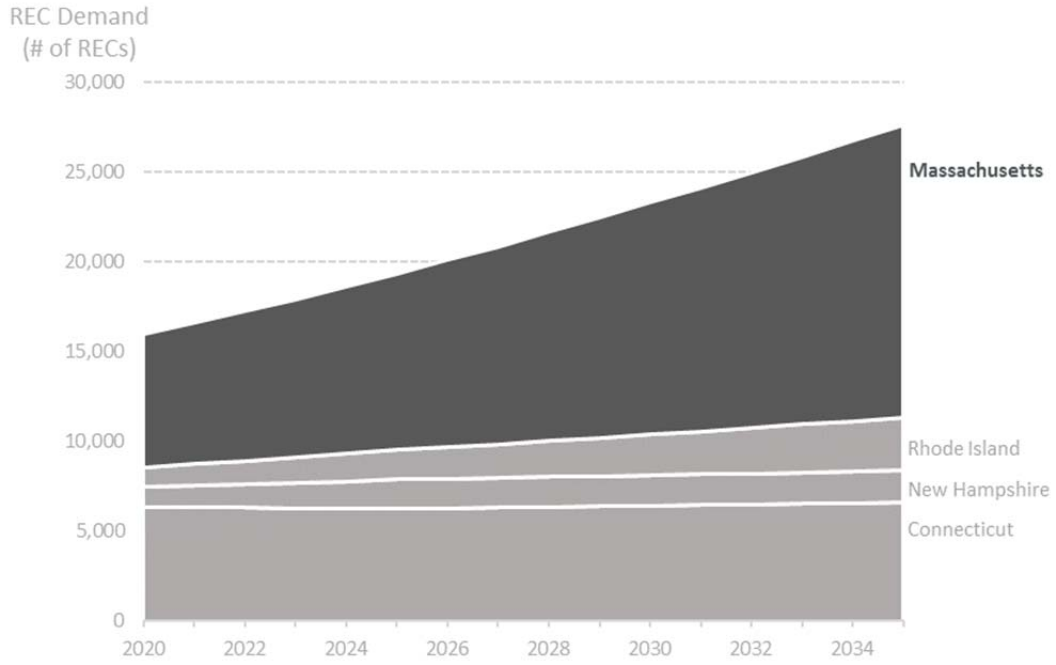

Figure II-1. Forecasted Premium Class I REC demand, 2020-2035

III. NEW ENGLAND REC SUPPLY

This section describes the existing and committed Premium Class I REC supply, the need for new supply to meet demand, and the potential impact of the NECEC project on that need.

A. Existing and Committed Premium Class I REC Supply

The New England Premium Class I REC supply includes RECs generated in New England and those generated in neighboring states or provinces that are delivered into the ISO-NE Control Area. Currently there are over 9 million Premium Class I RECs produced in New England annually and more than 2 million Premium Class I RECs imported from neighboring regions, which is approximately equal to the region's demand. Our baseline assumption is that solar installations in New England will continue over the study period at the rate predicted by ISO New England's 2016 solar forecast. We have also assumed that New York and Canadian renewable resources currently under contract to New England buyers will continue to provide Premium Class I RECs through the study period. Finally, we have also assumed that resources procured during the 2015-16 Three State Clean Energy RFP will be constructed and have included those resources in the baseline.

Figure III-1 below shows the gap between the baseline level of class I REC supply and demand in the region between 2020 and 2035. This shows a deficit of about 2,000 GWh of renewable energy in 2020 growing to about 9,000 GWh of renewable energy in 2035.

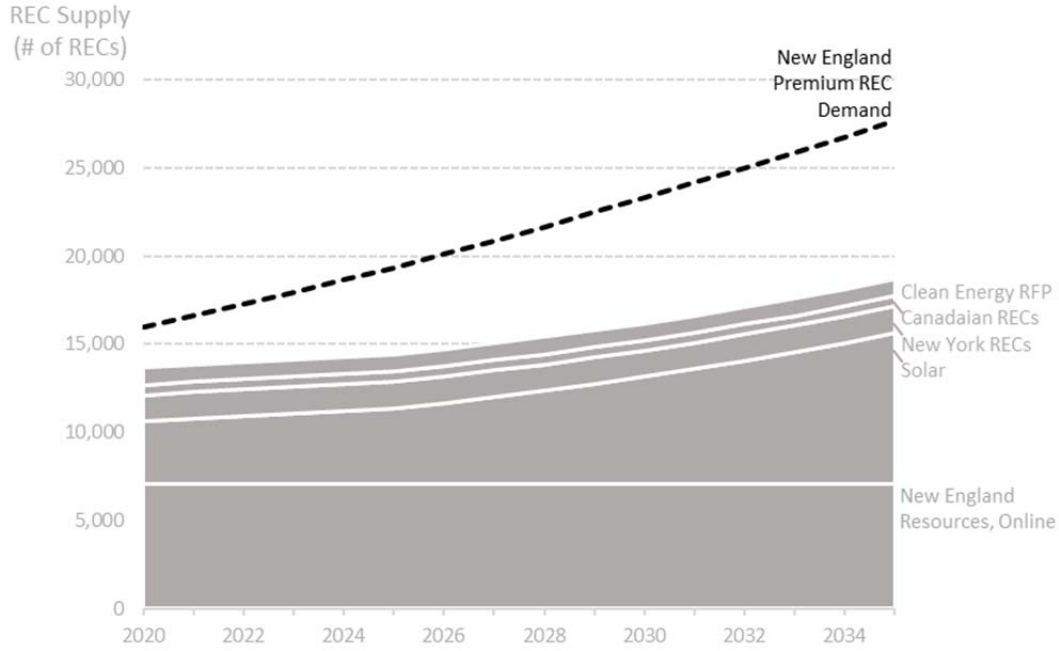

Figure III-1: Baseline REC Supply and Demand, 2020-2035

B. Potential Future Sources of Premium REC Supply

Beyond the baseline of projects currently online in New England and neighboring regions and forecasted solar, there are several categories of projects which could meet future growth in demand for Premium Class I RECs. These include:

- Additional imports from New York due to expiring NY REC contracts;
- Offshore wind projects procured by Massachusetts under Section 83C of the 2016 Energy Diversity Act; and
- Class I renewable energy procured by Massachusetts under Section 83D of the 2016 Energy Diversity Act.

We assessed the potential for RECs from each of the above categories individually and in combination. This analysis is described more fully below.

New York Imports

As part of the compliance with the New York RPS, the New York State Research and Development Authority (NYSERDA) conducted nine solicitations for renewable energy between 2005 and 2016. Each solicitation resulted in NYSERDA signing 10-year REC contracts with projects that will likely be in operation well beyond the contract period. As these contracts expire between 2016 and 2026, a significant potential new source of Premium Class I RECs for export from New York to New England may become available. The majority of the projects procured under the NYSERDA process would qualify for Premium Class I RECs in New England if they are successfully delivered to ISO New England and these would not meet the eligibility requirements for Tier 1 of New York's newly adopted Clean Energy Standard if they were online before January 1, 2015.[5] This means that there is a group of New York projects that could sell RECs to the New England market as their contracts with NYSERDA expire.

There is significant uncertainty regarding the likelihood of these Premium Class I RECs from New York resources entering the New England market. There is currently no path for these resources to continue to sell RECs to entities complying with the New York RPS, and some resources have already started selling RECs into New England. However, New York's aforementioned Clean Energy Standard has and aggressive target of a supply portfolio consisting of 50% renewable energy by 2030. It is possible that rules or regulations may be adopted to allow these older renewable projects to contribute to these goals, in which case they would not be able to sell Premium Class I RECs into New England.

Massachusetts 83C Offshore Wind

Section 83C of the Energy Diversity Act requires the distribution utilities in Massachusetts solicit proposals for 1,600 MW of offshore wind energy between 2017 and 2027. The first RFP was

[5] New York State Clean Energy Standard RES Tier 1 Certification: Application Instructions and Eligibility Guidelines, page 9. https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard/Renewable-Generators-and-Developers/RES-Tier-One-Eligibility

issued on June 29, 2017[6] and states that the distribution utilities are looking to procure 400 MW of offshore wind energy, but would procure up to 800 MW if a larger project is likely to produce significantly greater benefits to ratepayers than a 400 MW project. For the purposes of future REC supply, we have assumed that 400 MW tranches of offshore wind will come online in 2024, 2026, 2028 and 2030.

Massachusetts 83D Clean Energy

The Section 83D RFP seeks bids for supplies of incremental Clean Energy, including resource eligible for Class I RECs. NECEC Bid 2 has the potential to contribute [redacted] million RECs to the regional market supply from the [redacted] MW of incremental wind capacity.

C. Summary of Premium Class I REC Supply and Demand

For this analysis, Daymark has assumed New England Premium Class I REC demand is met by a supply portfolio consisting of the baseline resources, new offshore wind under Section 83C, and New York resources described above. These resources are sufficient to meet regional RPS requirements in nearly all years, with a small shortage in the early years. The addition of the NECEC RECs reduces the need for NY RECs to comply with the RPS requirements. In this approach, the NECEC RECs represent the last Premium Class I RECs needed for the region to comply with RPS requirements. This approach is similar to the evaluation method used for the Three State Clean Energy RFP.

Figure III-2 below shows the New England Premium Class I REC supply and demand balance assumed for this analysis, including the 1.1 million Premium Class I RECs offered in NECEC Bid 2.

[6] https://macleanenergy.com/2017/06/29/section-83c-rfp-for-long-term-contracts-for-offshore-wind-energy-projects-issued/

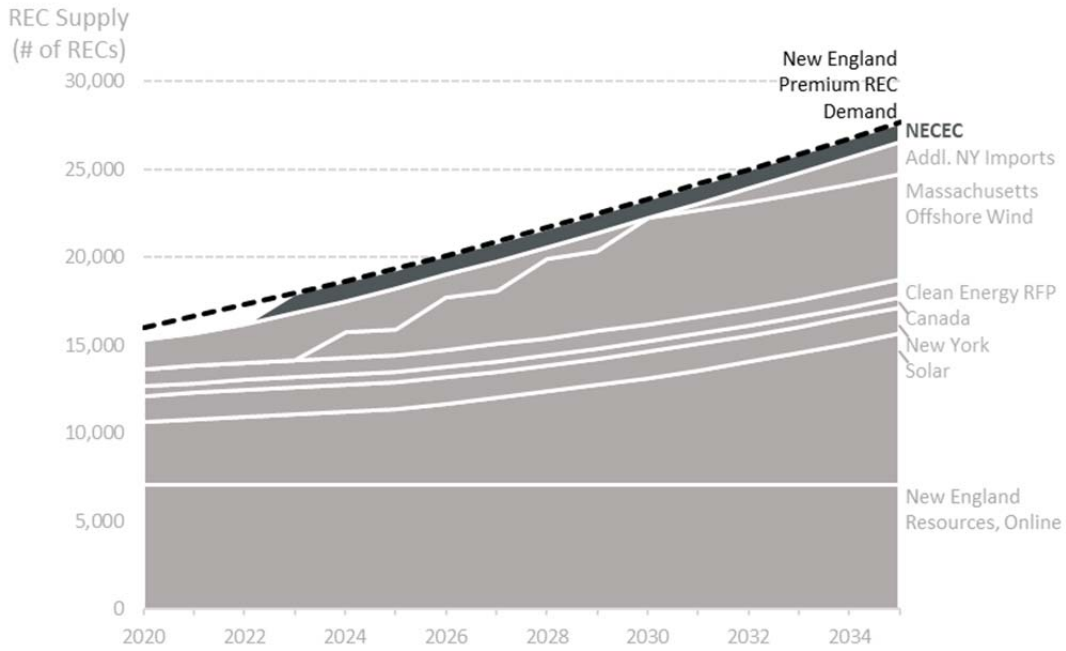

Figure III-2. New England Premium Class I REC Supply and Demand, with NECEC RECs

IV. REC PRICES

This section provides detail on market pricing for Premium Class I RECs and describes Daymark's methodology for determining prices used in the REC mark-to-market analysis in the Daymark Report.

The Premium Class I REC market is a bilateral market with trades generally occurring between two parties facilitated by a broker. Transactions on the bilateral market can be a onetime deal or longer term deals for RECs from a Class I facility. Pricing for these transactions is influenced by traditional market economics (supply and demand), as well as policy provisions, including the statutory ACP price.

A. Alternative Compliance Payments

ACPs provide a way for compliance entities to meet their requirement levels without the purchase of RECs and were instituted to provide a cap on the cost exposure of load-serving entities (LSEs) during shortage conditions. Use of ACP increases as conditions approach or are at shortage conditions. In most states, ACPs are set at a rate that increases with inflation; Connecticut is the exception, where the ACP is static at $55/MWh. Table IV-1shows ACP levels for 2017.

Premium RPS Class	2017
CT Class I	$55.00
MA Class I	$67.70
NH Class I	$56.02
NH Class II	$56.02
RI New	$67.71

Table IV-1. Premium RPS Class ACP rates ($/MWh)

B. Historical New England Short-Term Bilateral Market REC Prices

Historically the short term bilateral market REC prices in New England have hovered just below ACP in times of shortage and have dropped considerably below ACP in times of surplus. This is apparent in the graph of Massachusetts, Connecticut and Rhode Island Premium Class I REC prices included as Figure IV-1, below. REC prices were close to ACP in early 2008 and between 2011 and 2014 when there were shortages of RECs, and the price dropped as low as $12 per MWh between 2009 and 2010 when there was a surplus. Since the beginning of 2014, prices have trended lower, and currently the New England REC prices are between $20-$30/MWh.

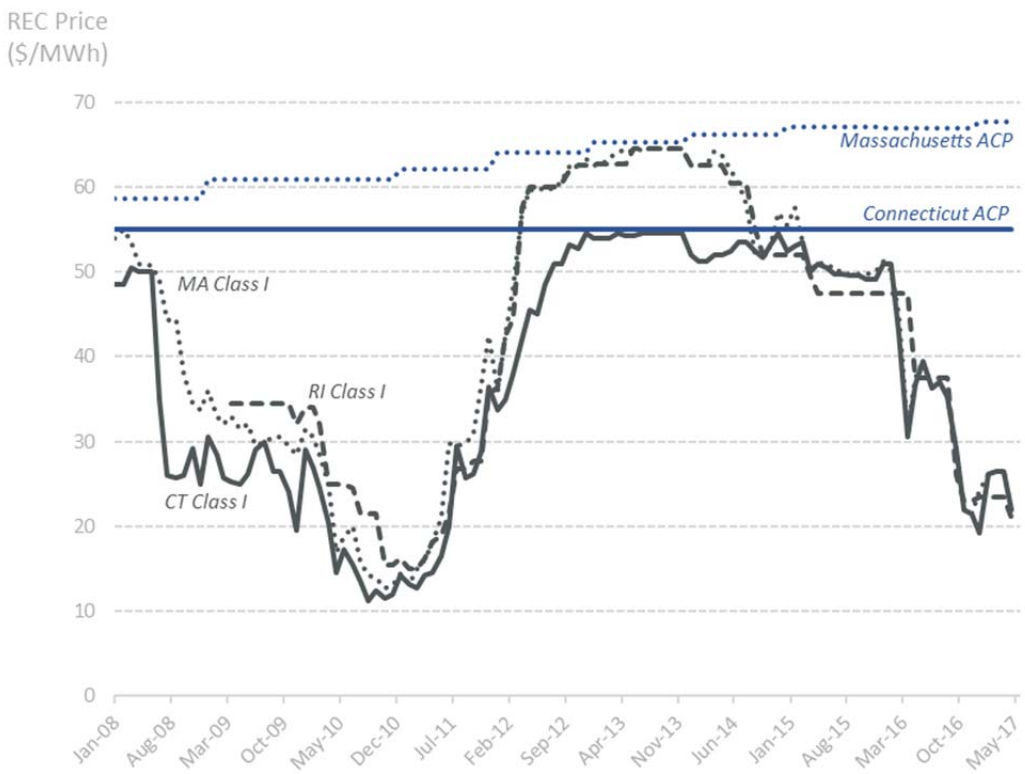

Figure IV-1: Historic Premium Class I REC Prices 2008-Present

C. Projected REC Prices During Study Period

The historical view of REC pricing in New England shows significant volatility over time. This volatility was generally caused by alternating periods of REC shortage and surplus. As the market matures, prices will tend towards a cost-based equilibrium price. In this future state, the REC market prices will reflect the revenue needed for a renewable project to be financially viable. Essentially, this will be the cost of the construction and ongoing operation of the project, net of the revenue the project will receive in the energy market.

Daymark developed a forecast of future REC market prices using this approach.[7] For the cost of the project, we used an estimate of levelized cost of energy (LCOE) for a new wind project published by the U.S. National Renewable Energy Lab (NREL).[8] This LCOE value is $73.20/MWh (2015$), assuming a cost premium for project in the northeast.

Using the results of Daymark's production cost modeling, we forecasted the energy revenue a wind project would receive. The difference between the LCOE and the energy revenue yield the forecasted cost-based REC price. The long-term decline in REC prices reflects the overall increase in energy revenue over time.

The resulting values are used in the REC mark-to-market analysis that is a component of the Direct Contract Benefits determination in Section V. of the Daymark Report.

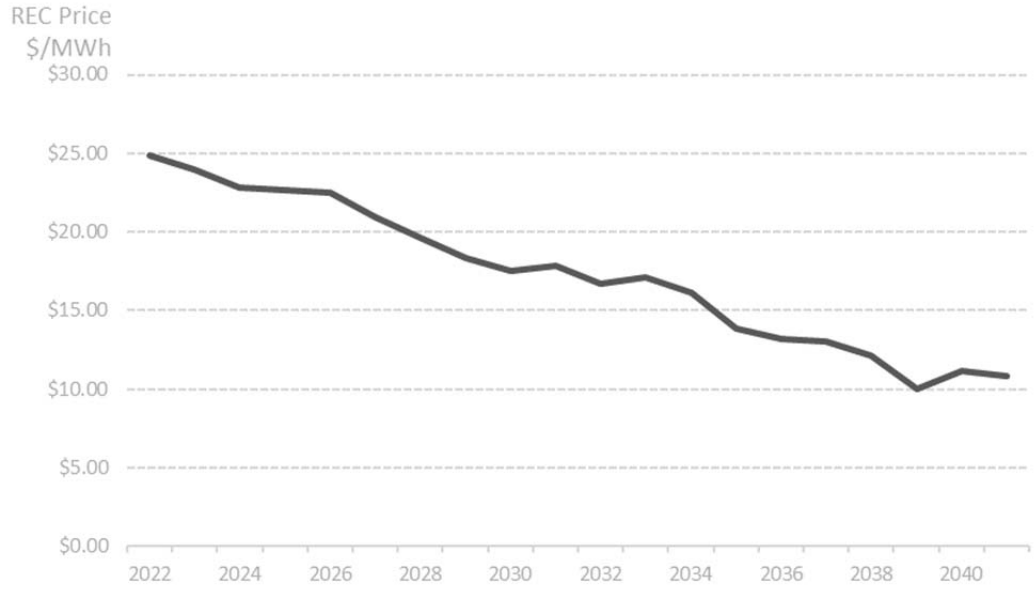

Figure IV-2. New England Premium REC price forecast

[7] This approach is designed to mimic the approach used in the evaluation of the Three State Clean Energy RFP.

[8] NREL. *2015 Cost of Wind Energy Review.* May 2017. http://www.nrel.gov/docs/fy17osti/66861.pdf

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APPENDIX C: CAPACITY MARKET MODELING AND ANALYSIS

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I. INTRODUCTION

Daymark Energy Advisors performed comprehensive analysis of the benefits and potential impacts of the New England Clean Energy Connect Project Bids (NECEC Bids) on ISO-NE wholesale markets, including an evaluation of the potential impact of the NECEC Bids on the ISO-NE capacity market. Daymark's NECEC Project Benefits report (the "Daymark Report") provides a high-level discussion of the results of our analysis, and this appendix provides additional detail supporting the analysis.[1]

Section II of this appendix provides additional details on the relevant ISO-NE Forward Capacity Market (FCM) rules and procedures that pertain to the opportunities for the NECEC Project to participate in the market.

Section III of this appendix describes the modeling methodology used to prepare the capacity market analysis in the Daymark Report. Daymark has developed a proprietary capacity market model to simulate the ISO-NE Forward Capacity Auction (FCA) process and forecast the impact of various market conditions or new resources (such as NECEC) on FCA outcomes.

[1] See Section IV.E of the Daymark Report.

II. ISO-NE CAPACITY MARKET PROCEDURES

The NECEC Bids will provide a large source of clean, firm, low-cost capacity which will be eligible to be offered into the ISO-NE FCM. The NECEC Bids will be new capacity located outside the ISO-NE market that relies on an Elective Transmission Upgrade (ETU) to deliver capacity to New England, and are supported by long-term contracts for their energy output. The FCM rules have several special processes that apply to capacity resource offerings of this type and this section describes the FCM provisions that would apply to the NECEC Bids and the process of qualifying and clearing the capacity market.

A. Resource Qualification

The first key step for participation in the ISO-NE FCM is to qualify the resource capacity for the market. ISO-NE has established a multi-step qualification process. Each type of capacity resource (generation, demand or imports) has a distinctive qualification process designed to certify the reasonableness of the resource's availability at the beginning of the period and to determine the amount of qualified capacity it can supply after adhering to various ISO-NE requirements.

In 2015, ISO-NE updated it capacity market rules to incorporate the participation of ETUs. An ETU is generally comprised of a transmission element with interconnection points within the New England Control Area tied to one or more generation resources.

To qualify as an ETU, the entity that will provide capacity must demonstrate that there is either sufficient capacity across the entire exporting system or a dedicated resource to deliver capacity to New England up to the requested capacity supply obligation at any time throughout the year.

An ETU must also satisfy the reliability criteria mandated by the ISO-NE tariff. Schedule 25 of the ISO-NE Open Access Transmission Tariff describes the interconnection standards for ETUs: (i) the Network Capability Interconnection Standard (NCIS) and (ii) the Capacity Capability Interconnection Standard (CCIS). ISO-NE conducts transmission evaluation studies to assess compliance with each standard upon request from the owner of the facility. The studies for the NCIS – also known as Minimum Interconnection Standard – assess the impact to the New England Transmission system's reliability, stability, and operability from the construction of the ETU or ETU incremental upgrades. The studies for the CCIS assess the incremental impact of the new resource associated with an ETU on the New England Transmission system's reliability, stability, and operability under the assumption that all existing resources are operating without a need for redispatching and the capacity from this new resource is deliverable to the rest of the load zone. The results of these studies provide a list of network upgrades needed to meet the NCIS and/or the CCIS.

The NCIS is assessed in the Interconnection System Impact Study (SIS) while the CCIS is evaluated in the Capacity Network Resource Group Study (CNR Study). In order to participate in ISO-NE's FCM and eventually obtain a Capacity Supply Obligation, a facility must adhere to the CCIS in addition to meeting the NCIS requirements.

Once the resource and the ETU have been evaluated under the relevant standards and have demonstrated that the subject capacity is available to be delivered to New England, ISO-NE will qualify the import resource associated with an ETU.

B. Capacity Offer Pricing and Mitigation

As with all capacity bidding into the ISO-NE FCM, the import capacity associated with the ETU must submit an offer price for the capacity. After the completion of the qualification process, ISO-NE requires the submission of the ETU's capacity offer to be reviewed and possibly mitigated by ISO-NE's Internal Market Monitor (IMM). The purpose of the IMM's review is to prevent capacity from offering at uncompetitively low prices while being subsidized by out-of-market contracts.

All resources have specific offer price review thresholds set in the FCM rules that have been deemed as the lowest price resources can offer their capacity in without being reviewed by the IMM. These prices are called Offer Review Trigger Prices (ORTP). If a developer of a specific resource seeks to offer its capacity in the market at a price below the ORTP, it must provide documentation to the IMM that justify that action. The rules establish the highest ORTP price for resources associated with ETUs, effectively making all ETU price offers subject to review by the IMM. The table below provides the ORTP for different resources including those associated with ETUs for FCA 11:

Technology Type	**Offer Review Trigger Price ($/kW-mo)**
FCA 11 Starting Price: $18.624/kW-mo	
Combustion Turbine	$13.933
Combined Cycle Gas Turbine	$9.465
On-shore wind	$5.698
All other technology types	Starting price
Import associated with an ETU	Starting price + $0.01
Single new resource with a transmission investment to increase the import capability to New England	Based on generation technology type
Import capacity resource backed by a pool or an existing resource that is not associated with an increase in transmission	Starting price + $0.01

Table 1. FCA 11 Offer Review Trigger Prices

ETU project developers provide detailed net cost projections for both transmission and generation assets included in the proposed resource associated with the ETU and will be utilized in delivering the offered capacity. Some of the critical elements included in the offer are capital and other fixed costs of the transmission in both regions (if external) and the cost of any new generation capacity needed to support the transaction, both amortized over some reasonable time-period.

This net cost of providing capacity to New England is adjusted by the net energy revenues realized by the new or incremental transmission and generation. Based on the current methodology, the IMM calculates these revenues based on projected wholesale market prices for energy in New England minus any variable cost or opportunity cost for the entity to provide the energy in other regions. Under the existing ISO-NE process, any probable contract prices for clean energy attributes or energy delivered by the ETU if any, cannot be counted in place of the wholesale market price. One exception exists if the clean energy attributes available to the ETU are considered "broadly available" to other resources such as Renewable Energy Certificates (RECs). In that case, the IMM may consider these additional streams of revenues in place of the projected wholesale energy prices.

The last step in the capacity offer review process is translating the annual net cost from the previous step into a capacity supply offer in terms of cost per kW-month. This calculation includes the division by the number of kW-months the resource can be relied on to serve the New England power system.

When the IMM completes its review, it will set a minimum capacity offer price for the resource associated with the ETU. The developer can offer this resource at a price at or above the IMM minimum capacity offer price but not below.

C. Capacity Clearing Process

Once the resource associated with the ETU has qualified its capacity and has received an approved minimum capacity offer price, the resource can bid its capacity into the FCA. The resource only receives a capacity supply obligation if it clears, based on its offer price. Depending on the specific parameters of the capacity offers, the amount of MW cleared can be affected by whether this resource is the marginal resource in the FCA or not. If the resource only clears a portion of its capacity, it will only receive payments for the MWs cleared in the FCA and not for the entire qualified capacity.

Import resources associated with ETUs must bid in and clear the capacity market each year in order to receive an obligation.[2] This treatment is consistent with how ISO-NE treats other imports into New England from neighboring regions that do not have an executed long-term contract. In order for an import capacity resource associated with an ETU to maintain its Capacity Network Import Interconnection Service as described in the qualification section above, it must

[2] This differs from new conventional supply generators that are guaranteed to receive a locked-in capacity price for the first seven years after it first clears.

offer into each FCA. Otherwise, the qualified MWs may be adjusted by the ISO depending on activity by other bidders in the market.[3]

D. Capacity Market Uncertainty

Daymark conducted its analysis on the participation in and impact of the NECEC Bids on the ISO-NE FCM based on the best information currently available regarding the market rules. However, there are a number of key uncertainties about the future operation of the market that could significantly impact this analysis, with two examples of such uncertainties described below.

First, FCA results are fundamentally the result of discrete decisions by individual market actors. Perceptions of market opportunity and risk can impact bidding behavior and determine future market results. For example, the new Pay for Performance rules impose penalties on cleared capacity resources that fail to perform when called. The implementation of these rules introduces new risk to resources participating in the market, particularly older resources that may not be as reliable. This has the potential to affect market behavior in the future in ways not fully captured in this analysis.

Second, in an effort to address the participation of renewable resources in the FCM, ISO-NE has recently proposed a modification to the FCM to add a secondary auction, called a "substitution auction". The point of this auction would be to allow new renewable resources, which may be subsidized under a policy mechanism such as the Production Tax Credit, to receive a capacity supply obligation transferred from an existing resource that wishes to retire. The substitution auction would determine the price paid to the renewable resource for its capacity. A rule change such as this could impact the market in various ways, but one result could be that older resources may be more inclined to retire if they can transfer their obligation for less than the clearing price and retain a portion of the capacity revenue.

[3] Section III.13.1.3. Import Capacity of ISO-NE Market Rule 1

III. DAYMARK CAPACITY MARKET MODELING

Using a proprietary simulation model, Daymark has evaluated future expectations for the New England capacity position, with and without the NECEC in service. This modeling and analysis contributed to Daymark's evaluation in two ways: First, the capacity market modeling generates the capacity buildout and retirement schedule for the production cost modeling described in Appendix A; and second, the Daymark model is used to calculate the indirect impact of the project on the capacity market.[4]

This section of the appendix describes the model's operation and key assumptions.

A. Model Overview

The Daymark ISO-NE FCM model simulates the annual FCAs that ensure sufficient capacity is available to meet peak demand in the region. The model uses inputs reflecting resource economics for new additions and existing generation units to determine the timing and quantity of new additions and retirements in the market, incorporating several additional factors which reflect actual components of the market, such as capacity imports, energy efficiency, and renewables.

The model uses the ISO-NE demand curve to determine the market clearing price for each auction, which in turn determines the retirements and buildout. As the auctions progress through the study period, clearing prices impact the economics of existing units, and when going-forward costs exceed the capacity revenue, a resource may be retired. The loss of that capacity has a consequent impact on the clearing price. When the clearing price is sufficient to attract new entrants to the market, additional capacity is added, again impacting the FCA clearing price.

The result of the model is a schedule of retirements of existing resources and additions of new generic capacity in the region, as well as the annual FCA clearing prices.

The Section B below provides additional detail on the key elements of the model.

B. Key Components

Net Installed Capacity Requirement

The key component of the model on the demand side is ISO-NE's reliability requirement for capacity, known as the Net Installed Capacity Requirement (NICR). NICR is fundamentally a forecast of peak system load, plus an additional reserve margin. For FCA 11 (delivery in June 2020 through May 2021), ISO-NE established an NICR of 34,075 MW, which results in a 15% reserve margin above the 29,600 MW projected summer peak load for 2020, net of behind-the-

[4] See the Daymark Report, Section IV.E.

meter solar photovoltaics. For subsequent years, we estimate the NICR based on the ISO-NE's peak load forecast, assuming approximately the same reserve margin (15%) found in FCA 11. The resulting NICR grows by an average of 320 MW per year from 34,075 MW in 2020 (FCA 11) to 37,280 MW in 2030 (FCA 21).

Existing Cleared Capacity

As a starting point for FCA 12, the model uses the cleared FCA 11 capacity quantities, both on an aggregate system-wide basis, and for individual resources. The total cleared capacity in FCA 11 was 35,835 MW, including in-region capacity as well as imports. The actual qualified capacity for an individual resource can change year-to-year according to the resource's reliability performance (based on forced outage history) and the resource owner's designation of offered capacity. These changes can impact the overall capacity supply in the region and therefore impact clearing prices, timing of retirements, new capacity build, etc. However, since these changes are based on actual unit operation and bidding decisions, we have not attempted to forecast such changes and instead assume that the qualified and offered capacity of existing units remains the same as FCA 11.

New Energy Efficiency and Renewable Capacity

New energy efficiency (EE) and renewable capacity are eligible to participate in the FCM and receive CSOs, and have been significant sources of new supply in recent auctions.

The development of these resources and their participation in the FCM is dependent on dynamics that are distinct from the supply and demand curves that generally determine how conventional resources participate in the market. Therefore, rather than incorporate these resources in the annual market-clearing process, we have treated these resources separately in our model.

For EE, we have assumed that the existing capacity quantity cleared in FCA 11 persists, and that new EE capacity clears the FCAs in quantities based on the ISO-NE EE forecast prepared as part of the 2016 CELT report. The ISO-NE forecast extends through 2026, with new incremental EE declining each year. We have assumed a continuation of the forecasted trajectory.

Renewable capacity has some additional requirements for qualifying and clearing in the FCA due to its intermittency and any subsidies received (such as the Production Tax Credit). In addition, ISO-NE has proposed changes to the FCM to implement a secondary auction for subsidized resources that may impact the participation of renewables in the market going forward. As a result, there is significant uncertainty regarding the participation of renewables in the FCM.

For this analysis, we have assumed that new renewable capacity associated with the offshore wind projects procured under Section 83C will clear the market. We have assumed a 30% capacity credit for this capacity.

Imports

Capacity from regions interconnected with ISO-NE, including Quebec, New Brunswick, and New York, is eligible to participate in the FCM and receive CSOs, subject to certain rules and processes. In FCA 11, the following imports cleared the market.

External Interface	Capacity Supply Obligation
New York AC Ties	539.4 MW
New Brunswick	200 MW
Phase I/II HQ Express	441 MW
Hydro-Quebec Highgate	55 MW

Table 2. FCA 11 Cleared Import Capacity

Our model uses a supply curve of imports reflecting recent FCA results, such that the amount of imports increases with the clearing price.

Net Cost of New Entry (CONE)

The key assumption determining the timing and quantity of new capacity additions is the Net CONE. This price represents the estimated capacity revenue that would be needed for a new resource to be economically viable in the ISO-NE market, calculated as the cost to develop and construct the resource, plus ongoing operating expenses, minus energy market revenues. In Daymark's model, it is the price that is compared to the clearing price to signify when it is economic to build new capacity.

ISO-NE periodically conducts a study to calculate the Net CONE for various types of new resources. The most recent study, completed in January 2017, determined that for FCA 12, the Net CONE of a new combined cycle would be $10.00/kW-mo and the Net CONE for a combustion turbine would be $8.04/kW-mo. This is an administratively-determined price that is used to define the points of the demand curve and create the starting price.

The ISO estimates reflect generic assumptions and forecasts of costs and revenues, and generally does not reflect actual bids from market entrants. In fact, several new resources cleared the market in FCA 10, when the clearing price was just over $7.00/kW-mo. This indicates that new generation projects are viable when clearing prices are lower than the ISO-NE Net CONE value.

For the purposes of our modeling, Daymark assumed an annual Net CONE value for new resources equal to the $7.00/kW-mo value, escalated at inflation over time. Therefore, the model will clear new capacity when the clearing price exceeds Net CONE.

Demand Curve

The ISO-NE FCM demand curve determines the clearing price at various capacity levels. In recent years, ISO-NE has modified its demand curve multiple times in attempts to better reflect the value of increased reliability resulting from additional procured capacity.

Most recently, in 2016, ISO-NE revised how it constructs the demand curve from a downward-sloping straight line, to a Marginal Reliability Impact (MRI) curve that is convex to the origin and generally shifted to the left (lower price at the same capacity level). Daymark's model incorporates this new MRI curve into the auction simulation.

Resources at Risk of Retirement

Daymark's capacity model evaluates the going-forward cost and potential retirement of 86 existing generators in New England with a total qualified capacity of more than 12,000 MW. Daymark identified the list of units to be evaluated by filtering out units by age, resource type, and primary fuel.

After defining the list of resources that would be evaluated in the model, Daymark created annual going-forward cost (or "delist bid") estimates representing the revenue needed by the resource to be economically viable. This delist bid is constructed using annual net energy revenue (energy revenue net of all variable costs of generation) forecasts from our production cost modeling, and forecasts of fixed O&M expense for each resource.

C. Simulation Process

The key assumptions and components outlined in the previous section provide the basis for the model simulations. The Daymark FCM model dynamically generates annual FCA clearing prices incorporating these various influencing factors.

For each annual auction simulated, the model incorporates resource retirements when delist bids exceed clearing prices, new resource additions when the clearing price exceeds Net CONE, and changes in imports based on the import supply curve described above. Since each of these changes in cleared capacity also impact the clearing price, the process dynamically determines the appropriate capacity changes for each auction.

Once the final schedule of retirements and buildout is determined, the final stage is to allocate the new capacity buildout by type (CC or CT) and location. This process incorporates zone-specific conditions, such as load growth and cumulative capacity resource retirements throughout the study period, to determine the most appropriate location for the buildout. The type of capacity addition is similarly determined based on market conditions (primarily energy price) such that when energy prices are high, more CCs are built, and when prices are low, more CTs are added.

DAYMARK
ENERGY ADVISORS

APPENDIX D: RESUMES

SEPTEMBER 27, 2017

I. DANIEAL E. PEACO

DAYMARK
ENERGY ADVISORS

Daniel E. Peaco

Principal Consultant

SUMMARY

Daniel Peaco is a Principal Consultant, Chairman, and Past-President at Daymark Energy Advisors, a leading provider of integrated policy, planning and strategic decision support services to the North American electric and natural gas industries.

Mr. Peaco has 35 years of experience in the electric industry, both as a utility planning practitioner and, for the past 20 years, as a consultant to the industry. His consulting practice has included engagements relating to strategic planning, competitive electric markets, integrated resource planning evaluation of generation asset investments, renewable energy policy, transmission planning, competitive procurement and power contracts, and industry restructuring.

Prior to joining Daymark Energy Advisors, he held management and planning positions in power supply planning at Central Maine Power, CMP International Consultants, Pacific Gas & Electric, and the Massachusetts Energy Facilities Siting Council. He holds degrees from M.I.T. and Dartmouth College.

EMPLOYMENT HISTORY

Daymark Energy Advisors, Inc.	*Boston, MA*
Chairman	Aug 2015-current
President	2002-July 2015
Managing Director	*1996-2002*
Central Maine Power Company	*Augusta, ME*
Manager, Industrial Marketing and Economic Development	1995-96
Principal, CMP International Consultants	*1993-95*
Director, Power Supply Planning	1987-93
Power Supply Planning Analyst	1986-87
Pacific Gas & Electric Company	*San Francisco, CA*
Power Supply Planning, Hydropower Planning, Cogeneration Contracts	1981-86
Massachusetts Energy Facilities Siting Council	Boston, MA
Planning Engineer	*1978-79*

EDUCATION

Thayer School of Engineering, Dartmouth College	*Hanover, NH*
M.S. in Engineering Sciences, Resource Systems and Policy Design	1981
Massachusetts Institute of Technology	*Cambridge, MA*
B.S. in Civil Engineering, Water Resource Systems	1977

PUBLICATIONS, PRESENTATIONS & CONFERENCES

MCPC Project Benefits; Quantitative and Qualitative Benefits, Confidential Report prepared for Central Maine Power regarding the benefits of the Maine Clean Power Connection, a 345 kV transmission expansion accompanied by 1100 MW of wind energy project development offered in the Massachusetts RFP for Clean Energy Resources, July 27, 2017. Lead Consultant and Principal Author.

NECEC Project Benefits; Quantitative and Qualitative Benefits, Confidential Report prepared for Central Maine Power and H.Q. Energy Services regarding the benefits of the New England Clean Energy Connection, 1200 MW HVDC transmission expansion accompanied by 1090 MW of hydropower and wind energy project development offered in the Massachusetts RFP for Clean Energy Resources, July 27, 2017. Lead Consultant and Principal Author.

Evolving Practices in Electric Company Resource Planning: Key Insights from a Review of 15 Recent Electric Company Resource Plans, report prepared for the Electric Power Research Institute. May 2017. Lead Consultant and Principal Author.

Clean Energy Procurement Mechanisms, instructor for Post-Conference Workshop at the EUCI 3rd Annual U.S./Canada Cross-Border Energy Trade Summit, Boston, Massachusetts, March 2, 2017.

CHP Economic Factors: Electric and Natural Gas Market Trends, keynote presentation for the Efficiency Maine Combined Heat & Power Conference, Portland, Maine, September 29, 2016.

Changes in IRP in Market Transitions, Where Has It Happened?, presentation to the EUCI 16th Annual Integrated Resource Planning Conference, Long Beach, March 22, 2016.

MREI Project Benefits; Direct, Indirect, Qualitative and Other Benefits, prepared for Central Maine Power Company and Emera Maine regarding the benefits of the Maine Renewable Energy Initiative, a 345 kV transmission expansion accompanied by 1200 MW of wind energy project development. January 28, 2016. Lead Consultant and Principal Author.

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Independent Valuation Opinion for the Bellows Falls Station in the Town of Rockingham, VT, prepared for the TransCanada Hydro regarding the value of a 49 MW hydropower asset. July 2013 (Updated April 2015). Lead Consultant and Principal Author.

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Need For and Alternative To (NFAT) Review of Manitoba Hydro's Proposal for the Keeyask and Conawapa Generating Stations, Initial Expert Analysis Report prepared for the Manitoba Public Utilities Board. January 24, 2014. Supplemental Report. February 28, 2014. Lead Consultant and Principal Author.

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Regarding Tri-State G&T's Cost to Serve Its Nebraska Loads and the Nebraska Power Supply Issues Group Loads, prepared for the Nebraska Power Supply Issues Group, two public power districts and two member-owned electric utilities in Western Nebraska. December 2012. Lead Consultant and Principal Author.

Independent Valuation Opinion for the Vernon Station in the Town of Hinsdale, NH, prepared for the TransCanada Hydro regarding the value of a 32 MW hydropower asset. November 2012. Lead Consultant and Principal Author.

Independent Valuation Opinion for the Comerford and McIndoes Stations in the Town of Monroe, NH, prepared for the TransCanada Hydro regarding the value of 179 MW hydropower assets. November 2012. Lead Consultant and Principal Author.

Independent Opinion Regarding the Market Value of Brassua Hydro LP Assets, prepared for the Owners of Brassua Dam regarding the value of a 4 MW hydropower asset. November 2012. Lead Consultant and Principal Author.

Independent Opinion Regarding Amortization Reserve of Brassua Hydro LP, prepared for the Owners of Brassua Dam regarding the amortization reserve value of a 4 MW hydropower asset. November 2012. Lead Consultant and Principal Author.

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2010 Comprehensive Plan for the Procurement of Energy Resources, Report prepared for the Connecticut Energy Advisory Board. April 27, 2010. Lead Consultant and Principal Author.

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Connecticut's Long-Term Electric Capacity Requirements, Report of the Connecticut Energy Advisory Board. April 7, 2006. Lead Consultant and Principal Author.

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Preliminary Market Value Assessment of PP&L Maine Hydroelectric Plants, August 2001. Proprietary report prepared for American Rivers, the Atlantic Salmon Federation, the Natural Resources Council of Maine, the Penobscot Indian Nation, and Trout Unlimited. Principal Author.

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Need for Power Supply: The New England Power Pool and the State of Rhode Island, March 1999, prepared for Indeck – North Smithfield Energy Center.

Vermont Electricity Prices: Regional Competitiveness Outlook; Implications of Restructuring in Northeast States, a Report to the Working Group on Vermont's Electricity Future, November 1998, prepared for Central Vermont Public Service. Principal Author.

EXPERT TESTIMONY

Public Service Commission of Utah Docket No. 17-035-39	Division of Public Utilities Department of Commerce	Expert testimony regarding PacifiCorp's application for pre-approval of its proposed repowering of 999 MW of existing wind turbines, including issues regarding PTC qualification, economic benefits analysis, and project risks.	
		Preflied Testimony	September 20, 2017
Superior Court Windham Unit State of Vermont	TransCanada Hydro Northeast, Inc.	Expert testimony regarding the headwater benefits value of Moore Station, a 190 MW hydropower facility in appeal of appraised value in the Town of Waterford, Vermont.	
		Valuation Report	November 11, 2016
		Deposition testimony	December 13, 2016
Superior Court Windham Unit State of Vermont	TransCanada Hydro Northeast, Inc.	Expert testimony regarding the valuation of a Harriman Station, a hydropower facility (39 MW) in appeal of appraised values in the town of Whitingham, VT.	
Docket No. 413-9-13 Wmcv		Valuation Report	September 19, 2016
		Deposition	November, 2016
Massachusetts Energy Facilities Siting Board Docket No. EFSB 15-06	NRG Energy NRG Canal 3 Development LLC	Testimony regarding NRG's application for siting approval of a proposed 350 MW duel-fueled combustion turbine. Testimony addressed alternative technology assessment and consistency with energy and environmental policies of the Commonwealth, considering reliability, regional fuel diversity, global warming solutions policy, and renewable energy integration.	
		Direct Testimony	December 2, 2015
		Pre-filed Testimony	April 4, 2016
		Oral Testimony	September 9 & 14, 2016
Georgia Public Service Commission Docket No. 40161	Georgia Public Service Commission Public Interest Advocacy Staff	Witness sponsoring testimony regarding integrated resource planning methods, renewable energy economics and policy, fuel diversity considerations in resource planning.	
		Written Testimony	May 6, 2016
		Oral Testimony	May 18, 2016
Superior Court Windham Unit State of Vermont	TransCanada Hydro Northeast, Inc.	Expert testimony regarding the headwater benefits value of the Somerset Reservoir in the Deerfield River. Headwater benefits determination were raised as a key issue in the Town of Somerset's valuation of the facility for property tax assessment.	
Docket No. 470-10-13 Wmcv		Headwater Benefits Report	November 13, 2015
		Deposition testimony	February 2, 2016
Superior Court Windham Unit State of Vermont	TransCanada Hydro Northeast, Inc.	Expert testimony regarding the valuation of a the Bellows Falls hydropower facility (49 MW) in appeal of appraised values in the town of Rockingham VT.	
Docket No. 547-11-12 Wmev		Valuation Report	April 23, 2015
		Deposition	February 4, 2014
		Oral Testimony	May 11, 12 and 13, 2015

Rhode Island Superior Court PC No. 2012-1847	TransCanada; Ocean States Power Holdings, Ltd.	Expert testimony regarding the valuation of a 540 MW combined cycle power plant in appeal of an appraisal conducted for the Town of Burrillville, RI. Prepared analysis of unit operations and revenue forecasts.	
		Report for 12/31/2010	December 19, 2012
		Report for 12/31/2011	July 17, 2014
		Deposition Testimony	May 2, 2015
Oklahoma Corporation Commission Cause No. PUD 201400229	OK Cogeneration	Testimony regarding Oklahoma Gas & Electric Company Application for pre-approval of its Mustang Modernization Plan, addressing planning for retirement of 430 MW of gas-fired steam generation and addition of 400 MW of Combustion turbine generation, cost pre-approval, and Requirements for competitive procurement and alternatives analysis.	
		Pre-filed Testimony	December 16, 2014
		Oral Testimony	March 18-19, 2015
Maine Public Utilities Commission Docket No. 2014-048	Central Maine Power	Testimony regarding CMP's application for approval Maine Power Connection Transmission Project. Testimony addressed economic benefits associated with Interregional transmission connection and associated wind energy development benefits. .	
		Expert Report	September 5, 2014
		Rebuttal Report	February 27, 2015
		Oral Testimony	September 18, 2014 March 31, 2015
US District Court Colorado Civil Action No. 10-CV-02349-WJM-KMT	Nebraska Power Supply Issues Group	Expert testimony regarding Tri-State G&T cost to serve five Nebraska members.	
		Expert Report	December 31, 2012
		Deposition Testimony	February 27, 2013
		Oral Testimony	May 19, 2014
Public Utilities Board Manitoba, Canada Needs For and Alternatives To (NFAT)	PUB NFAT Panel	Independent Expert (IE) for the review of Manitoba Hydro's Hydropower and Transmission Development Plan for 2,160 MW of hydro capacity at two locations, a 500 kV transmission line to Minnesota, and associated export contracts.	
		Expert Reports I	January 24, 2014
		Expert Reports II	February 28, 2014
		Oral Testimony	April 8, 9, 10, 11, 2014
Superior Court State of Vermont Docket No. 423-9-12 Wmcv Docket No. 547-11-12 Wmev Docket No. 244-9-12 Cacv Docket No. 245-9-12 Cacv	TransCanada Hydro Northeast, Inc.	Expert testimony regarding the valuation of a four hydropower facilities totaling 260 MW in appeal of appraised values in the towns of Vernon, Rockingham, and Barnet VT.	
		Valuation Report	July 15, 2013
		Deposition	February 4, 2014

Arbitration AAA Case No. 11 198 Y 002014 12	City of Burlington, VT Burlington Electric Dept.	Expert testimony regarding the valuation of a 7 MW hydropower facility and the determination of fair value for transfer of ownership of the asset.	
		Valuation Report	June 21, 2013
		Rebuttal Report	July 26, 2013
		Deposition Testimony	September 12, 2013
		Oral Testimony	October 4, 2013
Arkansas Public Service Commission Docket No. 12-069-U	General Staff of the AK Public Service Comm.	Testimony regarding the evaluation of Entergy Arkansas's proposed divestiture of its transmission business to ITC Holdings.	
		Direct Testimony	April 19, 2013
		Surrebuttal Testimony	June 7, 2013
		Supplemental Testimony - Rate Mitigation	Aug 15, 2013
Arbitration AAA Case No. 11 153 Y 02133 11	Owners of Brassua Dam FPL Hydro Maine LLP Madison Paper Industries Merimil Ltd Partnership	Expert testimony regarding the valuation of a 4 MW hydropower facility and the determination of amortization reserve obligations under FERC license provisions.	
		Valuation Report	November 1, 2012
		Amortization Reserve Report	November 1, 2012
		Amortization Reserve Rebuttal	November 15, 2012
		Oral Testimony	December 5, 2012
Arkansas Public Service Commission Docket No. 10-011-U	General Staff of the AK Public Service Comm.	Testimony regarding the evaluation of Entergy Arkansas's strategic reorganization options and request for authorization to transfer control of its transmission asset to the Midwest ISO.	
		Oral Testimony	May 31, 2012
		Surrebuttal Testimony	April 27, 2012
		Direct Testimony	March 16, 2012
Burrillville Board of Review	TransCanada; Ocean States Power Holdings, Ltd.	Expert testimony regarding the valuation of a 540 MW combined cycle power plant in appeal of an appraisal conducted for the Town of Burrillville, RI.	
		Valuation Report	January 4, 2012
		Oral Testimony	March 1, 2012
Oklahoma Corporation Commission Cause No. PUD 201100186	OK Corporation Commission OK Attorney General	Testimony regarding a 60 MW Wind Energy Purchase Agreement and Cogeneration deferral Agreement proposed by Oklahoma Gas & Electric Company, addressing cost pre-approval, and a requested waiver from competitive procurement requirements.	
		Pre-filed Testimony	February 8, 2012
Arkansas Public Service Commission Docket No. 10-011-U	General Staff of the AK Public Service Comm.	Testimony regarding the evaluation of Entergy Arkansas's strategic reorganization options upon its exit from the Entergy System Agreement.	
		Oral Testimony	September 9, 2011
		Surrebuttal Testimony	August 18, 2011
		Supplemental Initial Testimony	July 12, 2011
		Initial Testimony	February 11, 2011

State Corporation Commission of the State of Kansas	The Landowner Group	Testimony regarding the application of ITC Great Plains for a siting permit for a 345-kV Transmission Line addressing project need and route selection methodology.	
		Initial Testimony	April 18, 2011
Federal Energy Regulatory Commission (FERC) RM10-23-000	Maine Public Utilities Commission, et. al.	Expert Affidavit regarding economic analysis methodology for transmission project evaluation. Provided in reply comments on the FERC Transmission Planning and Cost Allocation NOPR.	
		Affidavit	November 12, 2010
Maine Public Utilities Commission Docket No. 2008-255	Central Maine Power	Testimony regarding CMP's application for approval the Lewiston Loop 115kV Transmission Project. Testimony addressed non-transmission alternatives.	
		Oral Testimony	November 16, 2008 December 14, 2010
		Rebuttal Testimony	November 8, 2010 August 27, 2010
Oklahoma Corporation Commission Cause No. PUD 201000092	OK Corporation Commission OK Attorney General	Testimony regarding a 99.2 MW wind farm power purchase agreement and green energy choice tariff proposed by Public Service Company of Oklahoma, addressing cost pre-approval, resource need, and competitive procurement requirements.	
		Pre-filed Testimony	October 5, 2010
		Oral Testimony	November 3, 2010
Oklahoma Corporation Commission Cause No. PUD 201000037	Oklahoma Attorney General	Testimony regarding a 198 MW wind farm proposed by Oklahoma Gas & Electric, addressing cost pre-approval, resource need, and competitive procurement requirements.	
		Pre-filed Testimony	June 11, 2010
Connecticut Dept. of Public Utilities Control (DPUC) Docket No, 10-02-07	Connecticut Energy Advisory Board (CEAB)	Lead witness sponsoring the CEAB's *2010 Comprehensive Plan for the Procurement of Energy Resources*.	
		Oral Testimony	June 2 & 3, 2010
Georgia Public Service Commission Docket No. 31081	Georgia Public Service Commission Public Interest Advocacy Staff	Witness sponsoring testimony regarding integrated resource planning methods, renewable energy, solar PV demonstration projects, and uncertainty analysis.	
		Written Testimony	May 7, 2010
		Oral Testimony	May 18, 2010

Maine Public Utilities Commission Docket No. 2008-255	Central Maine Power	Testimony regarding CMP's application for approval $1.5 B Maine Power Reliability Transmission Project. Testimony addressed non-transmission alternatives and economic benefits, economics of proposed solar alternative, wind energy development benefits. .	
		Oral Testimony	October 10, 2008 November 19, 2008 December 21, 2009 February 4, 2010
		Rebuttal Testimony	December 4, 2009 April 3, 2009
Oklahoma Corporation Commission Cause No. PUD 200900167	Oklahoma Attorney General	Testimony regarding a 102 MW wind farm proposed by Oklahoma Gas & Electric, addressing cost pre-approval, resource need, and competitive procurement. requirements.	
		Pre-filed Testimony	Sept 29, 2009
Oklahoma Corporation Commission Cause No. PUD 200900099	Oklahoma Industrial Energy Consumers (OIEC)	Testimony regarding a power contract pre-approval and recovery of Independent Evaluator costs of Public Service Company of Oklahoma.	
		Pre-filed Testimony	July 14, 2009
Connecticut Dept. of Public Utilities Control (DPUC) Docket No, 09-05-02	Connecticut Energy Advisory Board (CEAB)	Lead witness sponsoring the CEAB's *2009 Comprehensive Plan for the Procurement of Energy Resources*.	
		Oral Testimony	June 30, 2009
Connecticut Dept. of Public Utilities Control (DPUC) Docket No, 08-07-01	Connecticut Energy Advisory Board (CEAB)	Lead witness sponsoring the CEAB's *2008 Comprehensive Plan for the Procurement of Energy Resources*. This Plan is the first prepared under the State's new integrated resource planning statute.	
		Oral Testimony	August 28, 2008 September 22, 2008 October 3, 2008
Maine Superior Court Civil Action Docket No. cv-06-705	Worcester Energy Co., Inc.	Expert opinion regarding renewable energy and power procurement services.	
		Pre-filed Report	January 30, 2008
		Oral Testimony	March 18, 2009
Massachusetts Dept. Of Telecommunications And Energy Docket No. DTE/DPU-06-60	Russell Biomass	Testimony regarding economic, reliability and environmental need for renewable power in the Massachusetts and New England in support of Russell Biomass petition for a zoning exemption.	
		Pre-filed Testimony	June 2007
		Oral Testimony	October 30, 2007
Hawaii Public Utilities Commission Docket No. 04-0046	Hawaii Division of Consumer Advocacy	Testimony regarding Hawaii Electric Light Company's integrated resource plan.	
		Pre-filed Testimony	September 28, 2007
		Oral Testimony	November 26, 2007

Nevada Public Utilities Commission Docket No. 06-12002	Nevada Attorney General Bureau of Consumer Protection	Testimony regarding the prudency of Sierra Pacific Power Company in its purchased power expenses for the period December 2001 through November 2002.	
		Pre-filed Testimony	September 14, 2007
Oklahoma Corporation Commission Cause No. PUD 2005516 Cause No. PUD 2006030 Cause No. PUD 2007012	Oklahoma Attorney General	Testimony regarding a 950 MW coal-fired generation facility proposed by Public Service of Oklahoma and Oklahoma Gas & Electric, including IRP, competitive procurement, and construction financing issues.	
		Pre-filed Testimony	May 21, 2007
		Rebuttal Testimony	June 18, 2007
		Oral Testimony	July 26, 2007
Oklahoma Corporation Commission Cause No. PUD 2002-038 REMAND	Oklahoma Industrial Energy Consumers (OIEC)	Testimony regarding a power contract proposal of Lawton Cogeneration and the pricing analysis of Public Service Company of Oklahoma.	
		Pre-filed Testimony	October 28, 2005
		Rebuttal Testimony	March 17, 2006
		Oral Testimony	May 9, 2006
New Brunswick Board of Commissioners of Public Utilities (PUB) Ref: 2005-002	New Brunswick Power Distribution Company	Testimony regarding La Capra Associates' three technical audits of the NBP-Disco purchased power budget and variance analyses for FY 2004 – 2006.	
		Oral Testimony	February 14-22, 2006
Connecticut Department of Public Utility Control Docket No. 05-07-14 Phases I and II	Connecticut Energy Advisory Board	Testimony regarding Connecticut's need for electric capacity to meet reliability requirements and to mitigate congestion charges in the wholesale markets.	
		Oral Testimony	February 14-22, 2006 May 1, 2006 June 15, 2006 September 26, 2005
Hawaii Public Utilities Commission Docket No. 03-0372	Hawaii Division of Consumer Advocacy	Testimony regarding competitive bidding rules and integrated resource planning.	
		Oral Testimony	December 12-16, 2005
Oklahoma Corporation Commission Cause No. PUD 2005-151	Oklahoma Industrial Energy Consumers (OIEC)	Testimony regarding resource planning, prudency of generation investment of Oklahoma Gas & Electric Company.	
		Pre-filed Testimony	September 12, 2005
		Rebuttal Testimony	September 29, 2005
		Oral Testimony	October 18, 2005
Oklahoma Corporation Commission Cause No. PUD 2003-076	Oklahoma Industrial Energy Consumers (OIEC)	Testimony regarding resource planning, prudency of generation investment and fuel and purchased power expenses of Public Service Company of Oklahoma.	
		Pre-filed Testimony	January 4, 2005

Oklahoma Corporation Commission Cause No. PUD 2003-633/4	Oklahoma Industrial Energy Consumers (OIEC)	Testimony regarding power contract proposal for Blue Canyon wind development and avoided costs of Public Service Company of Oklahoma.	
		Pre-filed Testimony	August 16, 2004
Civil Litigation Maine Superior Court Docket No. CV-01-24	Central Maine Power Co.	Factual and expert witness in litigation regarding pricing provisions of a purchased power agreement between Central Maine Power and Benton Falls Associates.	
		Deposition Testimony	April 28, 2004
Oklahoma Corporation Commission	Oklahoma Attorney General	Testimony regarding power contract proposal for PowerSmith Cogeneration and avoided cost analysis of Oklahoma Gas & Electric Company.	
		Pre-filed Testimony	February 18, 2004
		Rebuttal Testimony	March 16, 2004
		Oral Testimony	August 4, 2004
Nevada Public Utilities Commission	Nevada Attorney General Bureau of Consumer Protection	Testimony regarding the Nevada Power Company's Integrated Resource Plan and associated financial plan.	
		Pre-filed Testimony	September 19, 2003
		Oral Testimony	October 15, 2003
Massachusetts Energy Facilities Siting Council Docket No. EFSB-02-2	Cape Wind	Testimony regarding economic, reliability and environmental need for power in the Massachusetts and New England power markets regarding the need for new wind power facility.	
		Pre-filed Testimony	February 14, 2003
		Oral Testimony	August 6&7, 2003
Maine State Board of Property Tax Review	United American Hydro	Testimony regarding the Maine and New England power market prices pertaining to the valuation of a hydro-electric power facility in Winslow, Maine.	
		Oral Testimony	June18, 2003
Nevada Public Utilities Commission Docket No. 03-1014	Nevada Attorney General Bureau of Consumer Protection	Testimony regarding the prudency of Sierra Pacific Power Company in its purchased power expenses for the period December 2001 through November 2002.	
		Pre-filed Testimony	April 25, 2003
Oklahoma Corporation Commission Cause No. PUD 2002-038	Oklahoma Attorney General	Testimony regarding a power contract proposal of Lawton Cogeneration and the pricing analysis of Public Service Company of Oklahoma.	
		Pre-filed Testimony	December 16, 2002
		Oral Testimony	May 22, 2003
Arkansas Public Service Commission	General Staff of the AK Public Service Comm.	Testimony regarding the Development of Competition in Electric Markets and the Impact on Retail Consumers in Arkansas.	
		Pre-filed Testimony	September 4, 2001
Arkansas Public Service Commission	General Staff of the AK Public Service Comm.	Testimony regarding the Development of Competition in Electric Markets and the Impact on Retail Consumers in	

		Arkansas.	
		Pre-filed Testimony	September 29, 2000
Arkansas Public Service Commission	General Staff of the AK Public Service Comm.	Testimony regarding the establishment of uniform Policies and guidelines for a Standard Service Package.	
		Staff Proposal and Comments	June 13, 2000
		Reply Comments	July 21, 2000
		Sur reply Comments	August 2, 2000
		Oral Testimony	August 8, 2000
		Petition for Rehearing	
		Rebuttal Testimony	November 15, 2000
		Oral Testimony	November 29, 2000
Arkansas Public Service Commission	General Staff of the AK Public Service Comm.	Testimony regarding the determination of the merits of declaring retail billing services competitive effective At the start of retail open access.	
		Oral Testimony	June 27, 2000
		Pre-filed Rebuttal Testimony	June 23, 2000
		Pre-filed Testimony	June 16, 2000
		Oral Testimony	May 10, 2000
Arkansas Public Service Commission	General Staff of the AK Public Service Comm.	Testimony regarding the minimum filing requirements for market power studies to be filed by the Arkansas Electric utilities and affiliated retail companies.	
		Oral Testimony	June 1, 2000
Amer. Arb. Assoc. No. 50T 198 00197-98	Vermont Joint Owners	Testimony regarding economic damages resulting from alleged breach of a long-term purchase power agreement between Hydro-Quebec and Vermont utilities (VJO).	
		Oral Testimony	May 25, 2000
		Pre-filed Rebuttal Testimony	February 10, 2000
		Pre-filed Testimony	August 13, 1999
Rhode Island Energy Facilities Siting Board	Indeck-North Smithfield, L.L.C.	Testimony regarding economic, reliability and environmental need for power in the Rhode Island and New England power markets regarding the need for new, merchant power facility.	
		Pre-filed Testimony	August 16, 1999
		Oral Testimony	August 17, 2000
		Pre-filed Testimony	January 26, 2001
		Oral Testimony	March 23, 2001
Civil Litigation Maine Superior Court Docket No. CV-98-212	Central Maine Power Co.	Factual and expert witness in litigation regarding pricing provisions of a purchased power agreement between Central Maine Power and Regional Waste Systems.	
		Deposition Testimony	May 5, 1999
Connecticut Energy Facilities Siting Council Docket No. 190	PDC – El Paso Meriden LLC	Testimony regarding economic, reliability and environmental need for power in the Connecticut and New England power markets regarding the need for new, merchant power facility.	
		Pre-filed Testimony	January 25, 1999

Rhode Island Energy Facilities Siting Council Docket No. SB-98-1	R. I. Hope Energy, L. P.	Testimony regarding economic, reliability and environmental need for power in the Massachusetts and New England power markets regarding the need for new, merchant power facility.	
		Oral Testimony	November 4, 1998
		Pre-filed Testimony	October 30, 1998
Massachusetts Energy Facilities Siting Council Docket No. EFSB-91-101A	Cabot Power Corp.	Testimony regarding economic, reliability and environmental need for power in the Massachusetts and New England power markets regarding the need for new, merchant power facility.	
		Oral Testimony	May 27, 1998
		Pre-filed Testimony	August 15, 1997
Massachusetts Energy Facilities Siting Council Docket No. EFSB-97-2	ANP Blackstone Energy	Testimony regarding economic, reliability and environmental need for power in the Massachusetts and New England power markets regarding the need for new, merchant power facility.	
		Oral Testimony	April 6, 1998
		Pre-filed Testimony	January 23, 1998
Massachusetts Energy Facilities Siting Council Docket No. EFSB-97-1	ANP Bellingham	Testimony regarding economic, reliability and environmental need for power in the Massachusetts and New England power markets regarding the need for new, merchant power facility.	
		Oral Testimony	February 3, 1998
			January 28, 1998
Rhode Island Energy Facilities Siting Board Docket No. SB-97-1	Tiverton Power Associates LP	Testimony regarding economic, reliability and environmental need for power in the Rhode Island and New England power markets regarding the need for new, merchant power facility.	
		Oral Testimony	October 15, 1997
		Pre-filed Testimony	October 1, 1997
Maine Public Utilities Commission Docket No. 92-102	Central Maine Power	Testimony regarding CMP's avoided cost methods and practices pertaining to the prudency of power purchase contract decisions with regard to contract awards and contract management.	
		Oral Testimony	July 1993
		Deposition Testimony	February 25, 1993
			March 1, 1993
		Pre-filed Rebuttal Testimony	June 7, 1993
		Pre-filed Testimony	June 15, 1992
Maine Public Utilities Commission Docket No. 92-315	Central Maine Power	Testimony regarding CMP's avoided cost methods and practices pertaining to the setting of long-term avoided costs, CMP's Energy Resource Plan, and the relationship of marginal costs of generation to embedded costs.	
		Supplemental Pre-filed Testimony	April 20, 1993
		Pre-filed Testimony	February 17, 1993

Maine Public Utilities Commission Docket No. 87-261 Docket No. 88-111	Central Maine Power	Testimony regarding CMP's avoided cost methods and practices pertaining to the setting of long-term avoided costs, CMP's Energy Resource Plan, and the proposal for a 900 MW power Contract with Hydro Quebec.	
		Oral Testimony	Summer 1988
		Pre-filed Testimony	October 31, 1987

II. DOUGLAS A. SMITH

DAYMARK
ENERGY ADVISORS

Douglas A. Smith

Managing Consultant and Treasurer

Doug Smith has over thirteen years of experience in the electric industry, bringing diverse strengths to Daymark's project teams by applying his extensive technical and analytical skills. A business professional with over twenty years of increasing responsibility as a consultant to multiple industries, Mr. Smith has a solid background in analysis, finance and accounting, database and software development, quality assurance, and project management.

Mr. Smith leads the firm's Market Analytics team which is responsible for maintaining Daymark's wholesale power market model and wholesale market outlook, researching energy and capacity markets throughout North America, and producing a variety of forecasts used to provide decision support for client needs including asset valuation, integrated resource planning, non-transmission alternative analysis and other similar projects. He has strong experience in market and power system dispatch analysis, and has been responsible for projecting market valuation, power costs, and emissions impacts for a number of clients.

SELECTED PROFESSIONAL EXPERIENCE

- Led an analysis of wind energy congestion for a potential New England wind and transmission project; reported on potential local and regional congestion
- Led an offshore wind siting feasibility study related to a potential investment in offshore leasing. Investigated interconnection and market risks and opportunities
- Led an analysis of the regional benefits related to a proposed dual-fuel fired peaker plant in New England; assisted the team in analyzing and reporting on emissions impact scenarios, with the plant operating as either an energy unit or a reserve unit; investigated state emissions policies and their potential impact on plant operations
- Led an analysis of a combined proposal for wind energy and transmission in northern New England; assisted team members in understanding the impacts of various quantities of wind energy and the respective transmission needed to deliver wind energy and provided scenario analysis to quantify the range of potential benefits, which resulted in two public reports as components of responses to a regional energy procurement effort
- Managed the creation of a proof of concept model of the Southern Company balancing authority and surrounding areas, including benchmarking to available public data and forecasting of potential future capacity expansion futures
- Assisted in asset valuation modeling work, including modeling of long term energy and capacity values for a number of coal, natural gas and hydro facilities
- As an input to several economic studies for NYSERDA, provided review and analysis of a third-party, long-term forecast of New York's energy and capacity markets
- Managed the review of a large generation owner's price forecasting process; provided recommendations for process improvements designed to more-closely align forecasting efforts with internal requirements and updated and extended the client's New York modeling capabilities

using the AURORA production cost model; recommended key benchmarking tools for evaluation of specific forecasting results

- Assisted in the assessment of a request to the Arkansas Public Service Commission for a declaratory order; the request sought a finding that installation of environmental controls at the Flint Creek power plant was in the public interest
- Assisted in assessing requests to the North Dakota Public Service Commission for Advanced Determinations of Prudence; requests were sought by the Montana Dakota Utilities GT and the Big Stone Air Quality Control System
- Assisted in a review of Entergy Arkansas's strategic planning for post-System Agreement operation on behalf of the General Staff of the Arkansas Public Service Commission
- Assisted a Vermont-based utility in the evaluation of a potential generation purchase; designed an analytical model for use in evaluating potential revenue and cost streams under a variety of scenarios
- Assisted in evaluating non-transmission alternatives (NTAs) as compared to a set of proposed transmission upgrades in Vermont; assisted in the development of an economic scorecard designed to facilitate the comparison of transmission and non-transmission solutions on equal footing and compared potential rate impacts of the proposed solutions
- Assisted in evaluating non-transmission alternatives (NTAs) as compared to a set of proposed transmission upgrades in Maine; evaluated the economics of transmission and non-transmission solutions and leveraged market simulation models to estimate the impact of solutions on energy clearing prices in Maine and in New England
- On behalf of Vermont-based utility, developed and analyzed non-transmission alternatives (NTAs) to a set of proposed transmission upgrades that would impact the distribution-level supply system; developed an economic tool to evaluate the cost of operating "pre-contingency" generation options
- Analyzes budgetary and other cost-related data on behalf of the National Railroad Passenger Corporation (Amtrak); interacts with the client on a monthly basis to provide analysis of power cost drivers, track monthly power costs, and deliver other accounting and electric consulting services; provides assistance in periodic power procurement activities
- Assisted in planning, managing, and performing an audit of actual and hypothetical purchased power costs for a Michigan utility; issues included market valuation of potential sales, proper treatment of a pumped storage unit, and validation of commitment/dispatch logic; this project also involved a process audit and the review of large volumes of data involved in determining hypothetical system costs
- Assisted in maintaining an Allocated Cost of Service model, including modifying allocators and introducing new methodology
- Researched issues related to state, regional, and Federal environmental regulations and their impacts on energy generation; modeled environmental variables including current SO_2, NO_X and CO_2 rates and allowance prices, emission control technologies, and likely future changes
- Participated in developing revenue projections for valuation of power plants

PUBLICATIONS

MCPC Project Benefits; Quantitative and Qualitative Benefits, Confidential Report prepared for Central Maine Power regarding the benefits of the Maine Clean Power Connection, a 345 kV transmission expansion accompanied by 1100 MW of wind energy project development offered in the Massachusetts RFP for Clean Energy Resources, July 27, 2017. Lead Analyst and Contributing Author.

NECEC Project Benefits; Quantitative and Qualitative Benefits, Confidential Report prepared for Central Maine Power and H.Q. Energy Services regarding the benefits of the New England Clean Energy Connection, 1200 MW HVDC transmission expansion accompanied by 1090 MW of hydropower and wind energy project development offered in the Massachusetts RFP for Clean Energy Resources, July 27, 2017. Lead Analyst and Contributing Author.

MREI Project Benefits; Direct, Indirect, Qualitative and Other Benefits, prepared for Central Maine Power Company and Emera Maine regarding the benefits of the Maine Renewable Energy Initiative, a 345 kV transmission expansion accompanied by 1200 MW of wind energy project development, January 28, 2016. Lead Analyst and Contributing Author.

MCPC Project Benefits; Direct, Indirect, Qualitative and Other Benefits", prepared for Central Maine Power Company regarding the benefits of the Maine Clean Power Connection, a 345 kV transmission expansion accompanied by nearly 600 MW of wind energy project development, January 28, 2016. Lead Analyst and Contributing Author.

EMPLOYMENT HISTORY

Daymark Energy Advisors Inc.	Boston, MA
Treasurer	2016 – Present
Managing Consultant	2017 – Present
Senior Consultant	2008 – 2017
Analyst	2004 – 2008
The Sports Authority	Ft. Lauderdale, FL
Senior POS/EDP Programmer/Analyst	2002 – 2004
University of Colorado	Boulder, CO
*Instructor, Oracle SQL*Plus Class*	2001 – 2001
SHL USA Inc.	Boulder, CO
Software Engineer	2000 – 2001
Strategic Technologies Group	Boulder, CO
Senior Consultant	1995 – 2000

EDUCATION

Syracuse University	Syracuse, NY
B.S., Accounting, Summa Cum Laude	1991

STATE OF MAINE PUBLIC UTILITIES COMMISSION

DOCKET NO. 2017-00232

CENTRAL MAINE POWER COMPANY REQUEST FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF THE NEW ENGLAND CLEAN ENERGY CONNECT (NECEC) TRANSMISSION PROJECT

NEW ENGLAND CLEAN ENERGY CONNECT

CENTRAL MAINE POWER

REBUTTAL TESTIMONY OF DAYMARK ENERGY ADVISORS: DANIEL PEACO, DOUGLAS SMITH AND JEFFREY BOWER

On Behalf of Central Maine Power Company

July 13, 2018

[redacted] **End Confidential PO 9]**

Based on all of the evidence related to potential impacts of the NECEC on Maine generators, it is highly unlikely that the NECEC will induce any Maine generators to retire, as both Daymark and LEI models have demonstrated. In addition, if any Maine generators do retire, it will be a voluntary choice of the generator and not an action that is imposed on the generator by the NECEC or ISO-NE. And finally, there is no credible evidence that the NECEC will produce materially different impacts on Maine generator economics as compared to any other state sponsored resource of the same size and characteristics.

VIII. CO_2 EMISSIONS IMPACT OF THE NECEC

A. Review of Daymark Analysis

The Daymark analysis found that adding the NECEC to the supply mix in New England yielded reductions in regional CO_2 emissions. Using the results of the previously discussed energy market modeling, we determined that the NECEC Project will induce annual CO_2 emission reductions of approximately 3.1 million metric tons across New

England and the net emissions from the portion of regional generation serving Maine load will be reduced by approximately 264,000 metric tons per year.[89]

B. LEI Analysis and Conclusions

In similar fashion to the Daymark modeling, LEI produced an analysis of NECEC induced reductions in CO_2 emissions in New England. Their energy model results determined that the "NECEC could reduce CO_2 emissions in New England by approximately 3.6 million metric tons per year."[90]

C. GI Analysis and Conclusions

The energy market model used by Mr. Speyer in his analysis of the impact of the NECEC on CO_2 emissions shows reductions in New England emissions. In fact, according to the Technical Report Mr. Speyer sponsored, "[i]n all cases, the results for New England match the analysis performed by Daymark, coming in at around a 3 million MT reduction in carbon emissions."[91]

Despite the savings in New England emissions, Mr. Speyer states that "[u]nder all scenarios, NECEC increases total carbon emissions." He reaches this conclusion by assuming the NECEC generation will not be incremental to current Hydro-Québec exports, instead reducing New York imports of Hydro-Québec hydropower in amounts equal to the imports of NECEC power. He then states that, "[a]ny reduction in carbon emissions

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[89] **Exhibit NECEC-5** at 4 of 98.

[90] LEI Report at 12 of 85.

[91] Speyer Direct Testimony, **Exhibit JMS-4**, Technical Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts, at 3.

ATTACHMENT III

Exhibit No. JMS-4

TECHNICAL REPORT

NEW ENGLAND CLEAN ENERGY CONNECT (NECEC) REGIONAL CARBON EMISSIONS IMPACTS

Prepared by: Energyzt Advisors, LLC

April 2018

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ENERGYZT

TECHNICAL REPORT:
NEW ENGLAND CLEAN ENERGY CONNECT (NECEC)
REGIONAL CARBON EMISSIONS IMPACTS

This technical report provides background, assumptions, and results supporting the analysis of the potential impact of the proposed New England Clean Energy Connect (NECEC) project on regional carbon emissions.

Conclusion:

Due to offsetting effects, NECEC would not generate any significant carbon emissions benefits and may even increase total carbon emissions under certain conditions. Model runs holding Québec energy sales into the United States constant with and without NECEC indicate that carbon emissions could increase by more than 375,000 metric tons on an annual basis.

1. CARBON EMISSIONS ON A REGIONAL AND GLOBAL BASIS

The purpose of this analysis is to determine the potential impact of the New England Clean Energy Connect (NECEC) proposed high voltage direct current transmission line on carbon emissions. NECEC runs from Windsor, Québec through Maine where it would interface with the New England power grid.

Understanding the impacts of carbon emissions must be made on a broad regional and even global basis. Carbon is unlike other pollutants emitted by the electrical plants (such as sulfur, mercury, ash and particulates) that are more of a local problem. Sulfur emissions however, are also a regional but not global since sulfur dioxide are emitted into the lower levels of the atmosphere turn into sulfuric acid that has down-wind affects in a broader region.

Carbon emitted from power plants, automobiles, industrial facilities and mother nature itself moves into the atmosphere where it can accumulate over time, reaching levels of concentration that affect the world's environment. Emissions from New York or New England's generating plants, for example, have impacts both broadly across the NYISO and ISO-NE areas as well as internationally.

Likewise, the benefits of reducing carbon will have broad consequences regionally and internationally, and therefore should be analyzed on a broader basis to understand the true extent of impacts.

2. APPROACH

To conduct an analysis of the impact of NECEC, a number of model runs were developed to understand the impact of different assumptions on carbon emissions. Each set of conditions included the following scenarios for the year 2023:

1. **Without NECEC:** Assumes NECEC would not be built and New England operates according to the assumed market conditions.

2. **With NECEC:** Assumes that NECEC would be operational by 2023, and Hydro-Québec energy sales into the United States would be held constant between scenarios so that energy delivered by NECEC is sourced through reduced exports into other U.S. markets.

Each of these scenarios is run assuming a different combination of natural gas and carbon prices. The results of the model runs were then compared to estimate the net impacts on dispatch and carbon emissions.

3. KEY ASSUMPTIONS

A number of key assumption were made and held constant across both scenarios. The assumptions basically replicate the Daymark study as closely as possible, modify the natural gas price assumption, and modify the carbon price assumption.

For purposes of maintaining Québec exports to the United States constant in both scenarios, scheduled energy flows were removed from the lowest-priced period in the base case without NECEC. Flows across other New England Interties were held constant, reflecting the Massachusetts requirement that the energy supply be incremental to New England. It is possible that the same condition could apply to New Brunswick which can serve as a conduit for energy flows from Québec into New England.

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The contractual arrangements in place between Québec and Ontario to achieve lower carbon emissions in Ontario through power and energy purchases between the provinces limited the potential reduction in Québec sales to Ontario. It also would seem politically difficult for Québec to remove a substantial amount of energy sales from Ontario or New Brunswick and divert those sales to the United States.

4. RESULTS

Figure 1 summarizes the net carbon increase in metric tons for each set of assumptions.

Figure 1: Net Change in Carbon Emissions in 2023 for Each Set of Assumptions

Assumptions	Natural Gas Price ($/mmBtu)	Carbon Price ($/MT)	Net Carbon Increase (Metric Tons)
Daymark Reproduction	5.95 $4/MMBTu - $11.50/MMBTu	15	384,252
Daymark Reproduction with Lower Gas Price	4.65 $3.50/MMBTu - $11/MMBTu	15	341,892
Current Conditions	4.65 $3.50/MMBTu - $11/MMBTu	5	54,314

Under all scenarios, NECEC **increases** total carbon emissions. The magnitude of the increase reflects how steep or flat the supply curve is based on a two key assumptions. The steeper the supply curve (i.e., higher gas and higher carbon price), the greater the impact of NECEC on total carbon emissions.

5. UNDERLYING DETAIL

The basis for the summary table is provided in charts that tally the total carbon emissions by electricity market.

In all cases, the results for New England match the analysis performed by Daymark, coming in at around a 3 million MT reduction in carbon emissions. Once offsetting impacts associated with other areas are incorporated into the analysis, however, NECEC would increase total emissions across the northeastern energy markets.

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5.1 Daymark Replication

Assumptions: UPLAN model maintained by Calpine with replication of key Daymark assumptions in 2023:

- Natural Gas: $5.95/mmBtu
- Carbon Price: $15/MT
- Renewable Build-out: Consistent with Daymark stated RPS requirements

Figure 2: Regional Results – Daymark Replication

State/Region	Carbon Emissions (MT)		Net Carbon Emissions Impact
	Without NECEC	With NECEC	MT
ISONE	**26,808,907**	**23,795,605**	**(3,013,302)**
NYISO	25,820,742	28,127,560	2,306,818
PJM	396,772,050	397,847,160	1,075,110
MISO	351,004,059	350,890,414	(113,645)
Ontario	3,600,282	3,729,553	129,271
NE+NY+PJM+MISO+IESO	**804,006,040**	**804,390,292**	**384,252**

5.2 Daymark Replication with Lower Natural Gas Prices

Assumptions: UPLAN model maintained by Calpine with replication of key Daymark assumptions in 2023 and lower natural gas price:

- Natural Gas: $4.65/mmBtu
- Carbon Price: $15/MT
- Renewable Build-out: Consistent with Daymark stated RPS requirements

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Figure 3: Regional Results - Daymark Assumptions with Lower Gas Price

State/Region	Carbon Emissions (MT)		Net Carbon Emissions Impact
	Without NECEC	With NECEC	MT
ISONE	**24,938,218**	**21,838,538**	**(3,099,680)**
NYISO	28,333,277	30,370,800	2,037,523
PJM	373,320,687	374,150,495	829,808
MISO	344,100,279	344,573,575	473,296
Ontario	2,784,640	2,885,585	100,945
NE+NY+PJM+MISO+IESO	**773,477,101**	**773,818,993**	**341,892**

5.3 Current Conditions

Assumptions: UPLAN model maintained by Calpine with assumptions that are more reflective of current conditions anticipated for 2023:

- Natural Gas: $4.65/mmBtu
- Carbon Price: $5/MT
- Renewable Build-out: Per scheduled operations date

Figure 4: Regional Results – Current Market Conditions Anticipated for 2023

State/Region	Carbon Emissions (MT)		Net Carbon Emissions Impact
	Without NECEC	With NECEC	MT
ISONE	**25,533,455**	**22,212,625**	**(3,320,830)**
NYISO	33,408,823	35,685,592	2,276,769
PJM	373,855,409	374,373,845	518,436
MISO	340,179,476	340,659,823	480,347
Ontario	2,643,966	2,743,558	99,592
NE+NY+PJM+MISO+IESO	**775,621,129**	**775,675,443**	**54,314**

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6. CONCLUSIONS

There are conditions under which NECEC will actually result in higher total carbon emissions across the northeast electricity markets.

In particular, New York tends to have a higher carbon emissions intensity on the margin than New England. Therefore, moving energy sales from New York into NECEC results in higher carbon emissions. The magnitude of the impact, however, will depend on market conditions and how those conditions affect the slope of New England's supply curve.

Although energy from existing hydroelectricity plants owned and operated by Hydro-Québec may seem to be the least costly option compared to other renewables, it could have an adverse consequence on the environment. In contrast, purely incremental clean energy sources such as new solar, new wind turbines, new biomass or new hydroelectric would serve to displace existing carbon-generating resources without the perverse consequences of shifting existing energy supply across boundaries.

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Independent Analysis of Electricity Market and Macroeconomic Benefits of the New England Clean Energy Connect Project

May 21, 2018

Prepared for

Maine Public Utilities Commission

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Disclaimer

London Economics International LLC ("LEI") was retained by the Maine Public Utilities Commission to develop an independent electricity market and macroeconomic impact analysis of the New England Clean Energy Connect Project and to conduct an independent review of the benefits that were included as part of Central Maine Power's ("CMP") Request for Approval of a Certificate of Public Convenience and Necessity ("CPCN") application. LEI has made the qualifications noted below with respect to the information contained in this report and the circumstances under which the analysis was prepared.

While LEI has taken all reasonable care to ensure that its analysis is complete, wholesale electricity markets are highly dynamic, and thus certain recent developments may or may not be included in LEI's analysis. Interested parties should note that:

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1 Executive Summary

On September 27, 2017, Central Maine Power Company ("CMP") filed a Request for Approval of a Certificate of Public Convenience and Necessity ("CPCN") with the Maine Public Utilities Commission ("PUC" or "Commission") for the New England Clean Energy Connect ("NECEC" or the "project"). This project consists of the construction of a 1,200 MW high-voltage direct current ("HVDC") transmission line from the Quebec-Maine border to Lewiston, and related network upgrades. Pursuant to Maine Statute, the Commission shall take in to account the costs and benefits of the project to determine the public need for the CPCN.

As part of the process for evaluating whether a CPCN should be awarded, the Commission retained London Economics International LLC ("LEI") to prepare an independent analysis of the wholesale electricity market and macroeconomic impacts of the NECEC, and a review of the project benefits developed by CMP's consultants, including Daymark Energy Advisors ("Daymark") for the wholesale electricity market benefits and University of Southern Maine ("USM") for the macroeconomic benefits.[1] Specifically, the Commission asked LEI to analyze the impact of NECEC on the ISO New England wholesale energy and capacity market costs to Maine electric ratepayers as well as the economic benefits to the state from direct spending and economic activity, job creation, and municipal tax revenues.[2] LEI also analyzed the level of CO_2 emissions reduction, as well as the "insurance value" of the NECEC against high energy market costs for New England (including Maine) electric ratepayers as consequence of extreme summer and winter weather conditions. However, LEI's analysis did not include estimation of all possible market impacts, such as the project's impacts on ancillary services markets, Renewable Energy Credit ("REC") markets, fuel diversification benefits, gas market savings for non-power sector customers, long-term reliability and resiliency benefits, and socio-economic impacts of decarbonization. These benefits were also not quantitatively analyzed by CMP's consultants.

1.1 Overview of the NECEC Transmission Project

The NECEC transmission project is a $1 billion HVDC transmission infrastructure project that can bring up to 1,200 MW of additional transmission capacity between Hydro Québec's system and the New England Control Area ("NECA"). Energy and capacity sales on the project will be sourced from Hydro Quebec's hydroelectric fleet and will flow into NECA through the interconnection point in Maine, starting in 2023. CMP is the developer of the Maine portion of the project, which runs from Beattie Township in the northwest corner of Maine to Lewiston, Maine. The Québec portion will be constructed by Hydro Québec TransEnergie, Inc. ("HQT").

NECEC's bid (specifically, the 100% hydroelectric power-based bid) was selected by Massachusetts as the winner of the Request for Proposal ("RFP") pursuant to Section 83D of the

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[1] CMP's CPCN application includes Exhibit 5 (Peaco, Daniel E, Douglas A Smith, and Jeffrey D Bower. *NECEC Transmission Project: Benefits to Maine Ratepayers Quantitative and Qualitative Benefits*. September 27, 2017.) by Daymark Energy Advisors ("Daymark"), and Exhibit 7 (Wallace, Ryan D, and Charles S Cogan. *The Economic and Employment Contributions of the New England Clean Energy Connect in Maine*. September 2017) by The Maine Center for Business and Economic Research, University of Southern Maine ("USM").

[2] LEI did not estimate the impact on Maine consumers in Northern Maine, given that region is not part of the ISO New England market. Northern Maine is part of the New Brunswick System Operator's control area.

Green Communities Act ("83D RFP") March 2018. According to CMP, construction is set to begin in 2019 and the project life is approximately 40 years based on the RFP application form submitted by NECEC.[3]

1.2 LEI's approach

LEI began by reviewing Exhibit 5 ("Daymark Report") and Exhibit 7 ("USM Report") of the CPCN application, past data responses,[4] oral data requests[5] from other intervenors, and the transcript from Daymark's December 11, 2017 technical conference. LEI also participated in a technical session hosted by the Commission on April 5, 2018, where CMP, Daymark, and USM sponsored witnesses that answered questions from LEI, Commission staff, and other parties. In parallel to LEI's review of the CPCN application and discovery materials, LEI undertook its own simulation-based modeling analysis to determine the potential wholesale energy and capacity market cost impacts, as well as a macroeconomic impacts analysis on jobs and GDP. In addition, LEI re-estimated the municipal taxes that would be payable by the project across the affected towns in Maine.[6]

LEI developed its own estimate of the electricity market and macroeconomic impacts from NECEC using its own proprietary suite of wholesale energy and capacity models and the REMI PI+ models, respectively. To derive the wholesale electricity market and CO_2 emissions impacts, LEI began by developing a "Base Case" in which LEI projected operations of the New England market from 2023 through 2037 without the project. Importantly, the project is assumed to not be built, and no other similar HVDC transmission project is built either (so that the benefits attributable to NECEC could be isolated). Next, LEI modeled a "Project Case" in which NECEC is developed and put into service by 2023. The existence of NECEC also changes the course of other supply decisions – triggering some changes in capacity supply, such as 750 MW of permanent retirements and the deferment of 350 MW of generic new investment. The wholesale electricity market benefits of NECEC are measured as a function of the difference in wholesale energy and capacity market costs between the Base Case and the Project Case.

The Base Case is built upon conservative and reliable market-oriented expectations, which are detailed in Section 7. This includes ISO-NE's 50/50 weather-normal load forecast from its capacity, energy, loads, and transmission ("CELT") 2017 report[7] and a delivered natural gas price forecast based on forwards as well as market trends in the near term and growth trends from the

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[3] Section 83D RFP Application form, pg. 185. Provided by CMP in ICEG-001-034, Attachment 3.

[4] In addition to the data requests issued by LEI on March 9, 2018, LEI also reviewed CMP data responses EXM, CLF, IECG, OPA, and KELLY.

[5] LEI reviewed the oral data requests issued to Daymark following its December 11, 2017 technical conference. LEI also issued its own oral data requests following the April 5, 2018 technical conference.

[6] LEI adopted several key assumptions from CMP, including the commercial operation date ("COD") of 2023 the assumed pattern of energy flows ([redacted] TWh distributed evenly across all hours), the internal New England interface transfer limit upgrades, as well as the updated project costs and local spending information, which was provided in the form or data requests and oral data requests by LEI and other parties.

[7] CELT 2018 was released in early May 2018; however, LEI had already begun modeling the project and estimating the wholesale electricity market impacts. Total demand in CELT 2018 is approximately 3% lower than CELT 2017, and peak demand is approximately 1% lower.

Energy Information Agency's ("EIA") Annual Energy Outlook ("AEO") 2018.[8] In addition, LEI adopted ISO-NE's most recent estimate of the Net Cost of New Entry ("Net CONE"), which has been vetted by stakeholders through the ISO-NE Markets Committee. Furthermore, LEI also adapted its capacity market model to account for ISO-NE's Competitive Auctions for Sponsored Policy Resources ("CASPR") beginning in Forward Capacity Auction ("FCA") #13 (see Section 2 for discussion of CASPR).

The Base Case forecast began with an annual average energy price of [redacted]/MWh in 2023, escalating over time to [redacted]/MWh in 2037 (in nominal dollars). The wholesale capacity price under the Base Case started at [redacted]/kW-month for FCA #14 and converges towards Net CONE in the $11/kw-month range by 2037. While not specifically relevant to the analysis of NECEC, LEI's Base Case outlook in the short term (2018-2020) is consistent with current forward prices and congruent with historical market price trends, normalized against future supply, demand and fuel price assumptions.

LEI engages in extensive benchmarking to ensure the robustness of its forecasts. In addition to considering the congruency of the forecast with recent trends and also market forwards, LEI staff perform backcasts of the New England model using actual historical data every 12-24 months. For more details, of LEI's modeling tools see Section 6.

LEI routinely forecasts future market conditions in New England as part of its various consulting engagements in the region. New England market price outlooks are also included in the company's semi-annual multi-client studies of electricity market trends across deregulated markets in North America. The Base Case and Project Case prepared for this report are customized and extended versions of LEI's multi-client outlooks. LEI's POOLMod simulation model has been used to support millions of dollars in merger and acquisition ("M&A") deals, market design support, and contract evaluations.[9]

1.3 Summary of LEI's independent analysis of the wholesale electricity market impacts and environmental benefits of NECEC

LEI estimates that the 1,090 MW NECEC project (with energy flows of [redacted] TWh per year) would provide $346 million in wholesale electricity market benefits to Maine during the first fifteen years of operation (2023-2037) on a Net Present Value ("NPV") basis in 2023 dollars.[10] Of this, $122 million comes from wholesale energy market benefits and $223 million comes from wholesale capacity market benefits from the sale of 1,090 MW of capacity. This presumed NECEC would clear the primary auction or FCA (its unit-specific Minimum Offer Price Rule ("MOPR")

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[8] These assumptions do not assume sudden spikes in demand or natural gas prices because of heat waves and cold spells which occasionally occur in New England and could increase the value of the wholesale energy market benefits of the project.

[9] In addition to bespoke consulting engagements, LEI performs semi-annual forecasts using POOLMod for 12 wholesale power markets. These forecasts, known as LEI's Continuous Modeling Initiative ("CMI"), examine recent market developments, draw on the latest information and data available, and apply LEI's proprietary modeling tools to provide a 10-year energy, and where applicable, capacity market price outlooks.

[10] Unless otherwise stated, LEI used a 7% discount rate for all the NPV estimates in this report.

would be sufficiently low as to permit it to clear).[11] If NECEC is unable to clear the FCA and then clears the substitution auction (as a Sponsored Policy Resource), then there would be no wholesale capacity market benefits from the project. Therefore, the wholesale electricity market benefits would fall to $122 million in NPV terms for Maine load.

To put the size of these benefits into context, the annual average wholesale electricity market benefits of $346 million constitute approximately 4.4% of the total expected electricity market costs (energy and capacity) between 2023-2037. For Maine retail customers specifically, the annual average retail electricity market benefits constitute approximately 4.2% of the total expected retail market costs over the same timeframe. Figure 1 below shows a summary of the wholesale and retail electricity market and environmental benefits for Maine and for the entire New England region (all six states) under the assumption the NECEC would be able to clear the FCA and create wholesale capacity market benefits.

Figure 1. LEI's analysis of wholesale and retail electricity market benefits and regional CO_2 impacts of NECEC (assuming NECEC clears the FCA)

	Wholesale Impacts		Retail Impacts	
	Maine	New England	Maine	New England
15-yr NPV, $2023 million				
Energy market benefits	$122	$1,197	$119	$1,046
Capacity market benefits	$223	$2,962	$221	$2,734
Total electricity market benefits	$346	$4,160	$341	$3,780
15-yr annual average, $nominal million				
Energy market benefits	$14	$134	$13	$117
Capacity market benefits	$19	$255	$19	$2,734
Total electricity market benefits	$33	$388	$32	$2,851
Potential insurance value against extreme weather (five-day average)				
Summer 2013 heat wave	$6	$52	Not modeled	Not modeled
Winter 2013/14 polar vortex	$4	$72	Not modeled	Not modeled
Annual average CO_2 emissions reduction, million metric tons				
CO_2 reduction	Not modeled	3.58	Not modeled	Not modeled

Note: The energy market results are based on the average of 20 iterations (see Section 6.1) and were found to be statistically significant in all years of the modeling horizon. The retail electricity market benefits are slightly lower than wholesale electricity market benefits for New England as LEI took into account limitations on retail load's exposure to wholesale market conditions, including the generation units that self-supply or are under a long-term contract with fixed prices.

1.3.1 Extreme weather cases

In addition to ISO-NE's 50/50 weather-normal load forecast, LEI considered the impact of more extreme weather conditions on wholesale energy prices and then estimated the energy market cost savings that NECEC could create for electric ratepayers in the face of such extreme conditions. New England on occasion experiences extreme swings in weather, which can cause spikes in natural gas prices during the winter months, or high electricity demand during the

[11] LEI did not attempt to estimate the MOPR of NECEC to determine whether NECEC would clear the primary as auction. CMP did not provide sufficient cost data for LEI to perform such an estimation.

summer months, both of which can drive up wholesale energy prices. To analyze the market impact that NECEC could provide during these events, LEI estimated the impact NECEC would have had on ISO New England's wholesale energy market costs in two past weather-related events over a five-day period – the summer heatwave of July 2013 and the polar vortex of winter 2013/14. LEI's analysis found that NECEC (with [redacted] MW of energy flows per hour) could have resulted in $6.0 million in wholesale energy market savings for Maine between the five-day period from January 24-28, 2014, and $4.3 million in wholesale energy market savings between July 15-19, 2013. These savings represent a 12% and 21% reduction, in wholesale energy market costs during the January 24-28, 2014 and July 15-19, 2013 timeframes, respectively. These savings are a form of "insurance" that the project can provide electric ratepayers in the region and would be incremental to the annual wholesale energy market benefits identified in LEI's analysis under weather-normal conditions. These benefits are discussed in Section 2.4.

1.3.2 Environmental impacts

In terms of environmental benefits, LEI estimates that [redacted] TWh of hydroelectric-based energy flows on NECEC could reduce CO_2 emissions in New England by approximately 3.6 million metric tons per year. For this analysis, LEI did not monetize the social benefits of the CO_2 emissions reduction, nor did it analyze the emissions changes in other jurisdictions as a result of NECEC. These results are in line with Daymark's estimate of carbon emission reduction by 3.4 million metric tons.[12] The results of the CO_2 reduction are discussed in Section 2.5. Other greenhouse gas ("GHG") emissions include NO_X and SO_2 (which largely come from oil and coal generation). While LEI was not specifically asked to analyze the reductions in these pollutants, LEI expects the reductions to be small, as oil-fired electric production is minimal under normal weather conditions and coal-fired generation is expected to be phased out in LEI's Base Case forecast in the first few years.

1.4 Summary of LEI's independent analysis of the macroeconomic impacts to Maine

During the development and construction period of 2017 to 2022, the installation of the new transmission line and associated equipment is expected to generate 1,631 total new jobs per year and $98.2 million increase in GDP in Maine, as presented in Figure 2, LEI's analysis for the development and construction period's macroeconomic impacts is based on $567.8 million total local spending, and the year-by-year construction cost schedule was provided by CMP in response to ODR-003-011.[13]

For the first 15 years of the project's commercial operations (assumed to be 2023 to 2037), 291 new jobs will be created in Maine, according to LEI's analysis. Across all of New England, LEI's modeling suggests 1,826 new jobs on average per year. In addition, the Maine economy will also enjoy an increase in GDP of $29.1 million per year. In New England, LEI's results show an increase in the six states' GDP of $205.3 million per year on average. These benefits to the region accrue

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[12] Although Daymark's analysis noted 3.1 million metric tons were attributable to NECEC in its report, 3.4 million metric tons was the approximate value for the 1086 Case based on Daymark's response to IECG-004-001, attachment 4.

[13] LEI did not adjust the project cost estimates provided by CMP. However, LEI is concerned about the local spending might have been over-estimated. Please see Section 5.2.1.

primarily due to lower wholesale electricity market costs. The project's wholesale electricity market savings are enjoyed by electric ratepayers across the region, roughly proportionally to their electric consumption due to the generally uncongested nature of the transmission system (except that Massachusetts retail consumers will see a smaller share of these benefits as compared to its overall load share of the New England regional load, because its electric ratepayers are responsible for the contract costs associated with the project, pursuant to the award made under the 83D RFP).

Figure 2. LEI's independent analysis of macroeconomic benefits (annual average)

Benefit categories	LEI Analysis	
	Maine	New England
Jobs - development and construction period (Annual average for 2017-2022)		
Direct	856	N/A
Indirect and Induced	775	N/A
Total	1,631	N/A
Jobs - operations period (Annual average for 2023-2037)		
Total	291	1,826
GDP - development and construction period (Annual average for 2017-2022), fixed 2009$ million		
	$98.2	N/A
GDP - operations period (Annual average for 2023-2037), fixed 2009$ million		
	$29.1	$205.3

Note: "N/A" signifies "not applicable." LEI did not estimate any macroeconomic benefits to other states in New England during the development and construction period. Economic impacts - new jobs and GDP increases - presented in the table are reported in annual average terms over the relevant modeling period (2017-2022 for the construction period and 2023-2037 for the operations period). The incremental new jobs and GDP impacts in New England during the operations period do not include those created by O&M activities related to the operations of the NECEC. Those pare modeled using the REMI PI+ model for Maine, rather than the REMI PI+ model for New England, to be in consistent with the USM analysis.

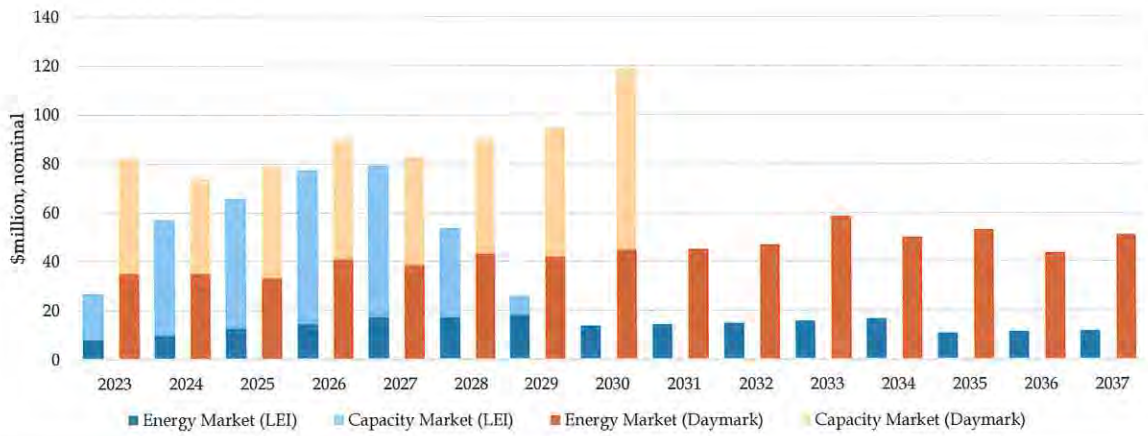
1.5 Comparison of LEI's analysis and Daymark's analysis

LEI's estimate of total wholesale electricity market benefits is approximately 58% lower than Daymark's analysis, and the estimate for total wholesale capacity market benefits is approximately 24% lower as shown in the figure below (in NPV terms).[14] The biggest difference lies in relation to Daymark's forecast of energy market benefits, specifically as it relates to the assumed natural gas price levels and generation availability during the summer months.[15] Capacity market differences between LEI and Daymark relate primarily to the FCA parameters for new entry, the slope of the demand curve, and the assumed quantity of cleared capacity in the FCM. In both LEI's and Daymark's analysis of NECEC, capacity market benefits dissipate over time as the capacity market supply-demand balance equilibrates over time, and capacity prices in the Project Case catch up to the capacity price levels forecast under the Base Case.

[14] LEI compared its analysis to Daymark's "1086 NECEC Case", as this case is the most similar in terms of total annual energy output.

[15] As noted in Section 7.6.2 of this report, new generation resources in LEI's analysis are in the form of combustion turbines (peakers). If baseload new entry, such as combined cycle gas turbines, were built in lieu of peakers in the long run, energy market benefits would dissipate over time and tend to zero as well.

Figure 3. LEI's and Daymark's estimate of wholesale electricity market benefits associated with NECEC



LEI identified four key drivers (see Section 4.1) that account for most of the differences in the wholesale energy market benefits projected by LEI versus Daymark:

1. Daymark's simplified modeling approach to account for maintenance and forced outages in AURORA resulted in artificially low supply availability when demand conditions peaked in the summer months and therefore overstated energy prices in those periods;

2. Daymark's delivered natural gas price outlook for generators was an average $1.3/MMBtu higher than LEI's outlook because Daymark's was based on an outdated projection for wellhead gas prices;

3. Daymark's energy prices – and therefore energy market benefits – were also affected by the unnecessary addition of "regional" and plant-specific ("peaker") adders to gas prices, which increased delivered gas prices for some units by $2-4/MMBtu above New England delivered gas prices;

4. Daymark used an outdated demand forecast from ISO-NE, which was 4-5% higher than the 2017 demand forecast that LEI relied on.[16]

As for capacity market benefits, LEI identified three key drivers (see Section 4.2) that account for the differences between LEI's and Daymark's capacity market price levels:

1. Daymark assumed a static slope of the demand curve by not adjusting the penalty factor over time. This resulted in slowly rising capacity prices, which prolonged the duration of the capacity market benefits. In addition, the penalty factor was calibrated for an outdated

[16] LEI recognizes that the use of 2016 CELT forecast was required by the MA RFP for purposes of bid submission. However, there is no basis to suggest that this MA RFP requirement should bind the MPUC in its decision-making in this case.

Net CONE of $10.95/kW-month (in January 2017, FERC approved the current Net CONE of $8.04/kW-month for FCA #12. LEI began its forecast with this Net CONE value);

2. Daymark assumed more generic entry at a lower price, which resulted in lower long-run capacity prices;

3. Daymark's analysis exhibited a high level of oversupply, which resulted in lower short-term capacity prices than LEI.

Figure 4 below compares LEI's wholesale electricity market benefits to Daymark's analysis.

Figure 4. Comparison of LEI's analysis and Daymark's analysis of wholesale electricity market benefits

	LEI Analysis		Daymark Analysis (1086 Case)	
	Maine	New England	Maine	New England
15-yr NPV, $2023 million				
Energy market benefits	$122	$1,197	$384	$2,839
Capacity market benefits	$223	$2,962	$292	$3,891
Total electricity market benefits	$346	$4,160	$676	$6,730
15-yr annual average, $nominal million				
Energy market benefits	$14	$134	$44	$384
Capacity market benefits	$19	$255	$27	$355
Total electricity market benefits	$33	$388	$71	$739

Note: LEI's energy market results are based on the average of 20 iterations (see Section 6.1) and were found to be statistically significant in all years of the modeling horizon.

1.6 Comparison of LEI's and USM's macroeconomic benefits

LEI compared its projection of macroeconomics benefits against the projection made by USM and included in the CPCN application (see Figure 5). LEI's analysis of the development and construction period is based on the updated project cost provided by CMP and USM,[17] and the results are generally close to the findings presented by USM. However, LEI notes that the development and construction benefits for Maine are highly correlated to the amount of local spending CMP expects during the installation of the project. CMP provided an estimate that is higher than what LEI has observed in other engagements involving other HVDC transmission projects. LEI recognizes that local spending around the capital costs for an HVDC transmission project will vary depending on location, amount of site preparation, availability of local skilled labor, as well as custom design elements of the project itself. That said, if the local spending amount for NECEC is lower than what CMP has estimated, then the macroeconomic benefits to Maine will be lower, and vice versa.

For the operations period, LEI's estimated macroeconomic benefits are similar to USM's for the State of Maine. A comparison of the results shows that LEI's estimated incremental jobs are lower than those estimated by USM by only 11%, or 37 jobs, per year (329 from the USM study vs. 291

[17] ODR-003-011_Attachment_1_CONFIDENTIAL (2017-232). In the updated construction cost estimate, the development period is 2017 and 2018, and the construction period is 2019-2022. In the original cost estimates, the development period was 2017 and the construction period was 2018-2022.

from the LEI study). In terms of GDP, LEI's results are slightly higher than USM's, primarily because of the additional wholesale capacity market benefits included in LEI's study. However, the inclusion of wholesale capacity market benefit is predicated on NECEC clearing the FCA. If NECEC fails to clear in the FCA (due to MOPR or other circumstances), the wholesale electricity market benefits will be much smaller (due to $0 wholesale capacity market benefits). Under such circumstances, the macroeconomic benefits will be further reduced by about 70% in both Maine and New England. Moreover, if NECEC fails to clear in the FCA but clears in the SA, it would trigger an additional 340MW retirement in New England, which will negatively impact both the New England and Maine economies.

New England wide, LEI's estimated economic benefits are much lower than USM's results. LEI estimated an annual average of 1,826 incremental jobs for all six states, which is 1,909 jobs, or 51%, less than USM's results. LEI's estimate for annual average GDP increase is $205.3 million, which is $200.9 million (or 50%) lower than USM's results. This difference arises mainly because LEI's analysis includes an estimate of the contract cost of the project, to be paid by Massachusetts retail electric ratepayers, as well as the macroeconomic impacts related to early power plant retirement (in Connecticut), triggered by the project's sale of capacity.

Figure 5. Comparison of LEI's analysis and USM's analysis

Benefit categories	LEI Analysis		USM Analysis	
	Maine	New England	Maine	New England
Jobs - development and construction period (Annual average for 2017-2022)				
Direct	856	N/A	868	N/A
Indirect and Induced	775	N/A	824	N/A
Total	1,631	N/A	1,691	N/A
Jobs - operations period (Annual average for 2023-2037)				
Total	291	1,826	329	3,735
GDP - development and construction period (Annual average for 2017-2022), fixed 2009$ million				
	$98.2	N/A	$94.1	N/A
GDP - operations period (Annual average for 2023-2037), fixed 2009$ million				
	$29.1	$205.3	$25.8	$406.2

Note:

1. Economic impacts in terms of incremental jobs and GDP presented in the table are the annual average of the modeling periods in LEI's study, namely 2017-2022 for the construction period and 2023-2037 for the operations period.
2. The incremental jobs and GDP in New England do not include those created by O&M activities of the NECEC project (indicated in the table as "N/A"), since the macroeconomic impacts of O&M spending is modeled within Maine, to be consistent with USM's approach.

The discrepancies in the macroeconomic benefits over the operations period between the two studies are driven by multiple factors as LEI and USM used different policy variables in the REMI PI+ model.[18] However, the biggest difference in the USM and LEI results stems from the inputs.

First, USM's analysis of the electricity cost savings was based on wholesale energy price reductions and these reductions were estimated based on inflated fuel price assumptions. LEI's

[18] For modeling electricity cost savings, LEI used "Consumer Price – Electricity" whereas USM used "Consumer spending – Reallocate consumption: Electricity."

analysis was based on the most up-to-date and realistic fuel price assumptions, and considered changes in both wholesale energy and capacity markets caused by the project.

Second, LEI estimated retail electric cost savings that capture the actual electricity cost reductions that end-users (electric ratepayers) will experience in the region. USM's electricity market benefits were based solely on wholesale energy price reductions, which are higher than retail price reductions, and hence resulted in overestimated macroeconomic benefits across the New England region.[19]

Third, LEI also considered the macroeconomic impacts of the contract costs borne by Massachusetts ratepayers by way of the contract award done for 83D RFP, and the impact of early power plant retirement triggered by the NECEC.[20] See Section 5 for a detailed comparison of LEI and USM analyses.

[19] Over the modeling period, LEI's analysis shows that New England retail customers are exposed to 88% of wholesale energy price changes and 93% of capacity market price changes. Although LEI assumed that Maine retail consumers are exposed to 100% of wholesale price changes, reduced electricity market benefits in other states in New England will also have some negative impacts on the Maine economy.

[20] LEI has also forecasted deferred new entry of generation plants in New England due to the project. Such impacts were not modeled in LEI's analysis, because the deferred investment is only for a few years, whereas plant closures imply permanent reduction in employment.

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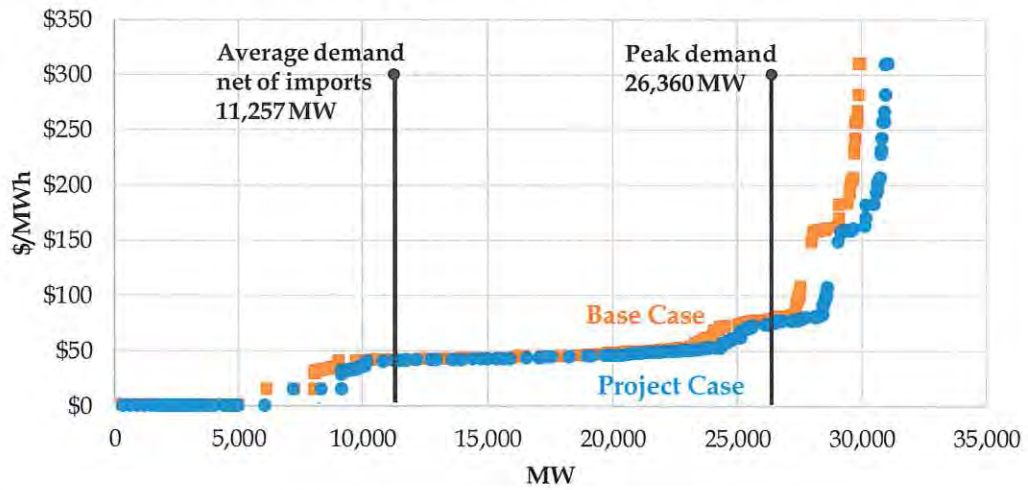
2 Wholesale Electricity Market and Environmental Benefits of NECEC

LEI estimates that NECEC would provide Maine $346 million (in 2023 dollars) in wholesale electricity market benefits over the first 15 years of operation (2023-2037). Of this amount, $122 million is expected to come from wholesale energy market savings (average of $14 million per year in nominal dollars) and $223 million is expected to come from capacity market savings (average of $19 million per year in nominal dollars), assuming NECEC clears the primary auction in FCA #14. LEI estimates that if the severe weather conditions that occurred in 2013 were to re-occur in the future, NECEC would have the ability to reduce wholesale energy market costs for Maine ratepayers by $4.3 million over a five-day period during the summer 2013 heat wave and $6.0 million over a five-day period during the winter 2013/14 polar vortex. LEI also estimates that NECEC would reduce CO_2 emissions from New England generators by approximately 3.6 million metric tons.

ISO New England ("ISO-NE") oversees and administers the competitive wholesale electricity markets for the six states of New England. It operates a day-ahead and real-time energy market, a forward capacity market ("FCM"), an ancillary services market, and a market for financial transmission rights. LEI's analysis focused on the most significant cost components of the wholesale electricity markets, which include the wholesale energy and capacity markets. Pursuant to Avangrid's commitment under the MA RFP, LEI assumed that NECEC delivers energy around the clock, totaling [redacted] GWh per year (spread evenly across all hours).[21] LEI also assumed that the shippers on NECEC would offer as price takers in the wholesale energy market in order to fulfill their contractual obligations to Massachusetts. By virtue of these energy sales, other more expensive generation resources will not be dispatched and consequently, the market clearing price for energy (i.e., Locational Marginal Prices ("LMPs")) will decline, as suggested in the illustrative supply curve diagram below.

Figure 6. Example of the internal supply curve for New England in 2027



[21] LEI understands that NECEC was selected as part of the Massachusetts 83D RFP, providing up [redacted] GWh of energy annually into the New England wholesale energy market; this value was also confirmed by Mr. Jared des Rosiers during the April 5, 2018 Technical Conference.

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LEI understands that NECEC is not selling capacity as part of the long-term commitment under Massachusetts' 83D RFP.[22] LEI evaluated the possibility of wholesale capacity market benefits using the latest capacity market rules as of the first quarter of 2018. Recently, FERC approved ISO-NE's proposed CASPR rules.[23] The objective of CASPR is to develop a transparent, market-based approach that results in competitive capacity pricing and accommodates the entry of new capacity resources that have been sponsored through various state policy initiatives, without shifting the costs of one state's subsidies to another state's consumers.[24] To best satisfy these objectives, ISO-NE proposed conducting the capacity market in two stages. In the first stage (known as the primary auction), the ISO would clear the FCA as it does today, with new resources subject to the existing MOPR rules.[25] In the second stage, which immediately follows the primary auction, ISO-NE would administer a new, voluntary secondary market known as a substitution auction. In the substitution auction, existing capacity resources that obtained capacity supply obligations ("CSOs") in the primary auction and are willing to exit all ISO-NE-administered markets permanently may transfer their CSOs (in their entirety) to Sponsored Policy Resources ("SPRs") that did not acquire a CSO in the primary auction. The transferring resources must pay the SPR a portion of their capacity revenue (the clearing price in the substitution auction), and then permanently retire from all ISO-NE-administered markets. As such, existing resources represent the "demand" in the substitution auction, and new SPRs represent the "supply."

As a result of being selected for the Massachusetts 83D RFP, NECEC would qualify as a SPR. LEI did not conduct an analysis to estimate NECEC's MOPR. Such an analysis could be used to determine whether a new resource could clear the FCA. CMP did not provide sufficient data for LEI to perform such analysis. LEI's capacity market benefits assume that NECEC's MOPR is sufficiently low that the project would clear the primary auction at the [redacted]/kW-month estimated price level for FCA #14. However, if NECEC does not clear the primary auction and has to go into the substitution auction, then the FCA price would not be affected and there would not be any wholesale capacity market benefits from NECEC. Because an equivalent amount of capacity would need to exit all ISO-NE administered markets in the substitution auction in order for an SPR to clear, adding 1,090 MW of capacity from NECEC would result in 1,090 MW of permanent retirements.

2.1 LEI's Base Case view of wholesale energy and capacity prices

LEI employed its proprietary simulation model, POOLMod, to develop a wholesale energy price forecast for the Base Case and Project Case. The FCA Simulator, a proprietary modeling tool created by LEI, was used to forecast capacity market prices under the Base Case and Project

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[22] The Energy Diversity Act directs Massachusetts Electric Distribution Companies ("EDCs") to jointly and competitively solicit proposals for and to enter long-term contracts for Clean Energy Generation and/or RECs only, associated with clean energy in an annual amount of [redacted] MWh.

[23] ER18-619-000 Revisions to ISO-NE Tariff Related to Competitive Auctions with Sponsored Policy Resources. <https://www.iso-ne.com/static-assets/documents/2018/01/er18-619-000_caspr_filing.pdf>

[24] ISO-NE. *Competitive Auctions with Subsidized Policy Resources: ISO Discussion Paper*. April 2017. < https://www.iso-ne.com/static-assets/documents/2017/04/caspr_discussion_paper_april_14_2017.pdf>

[25] Under the MOPR, capacity market bids below the minimum price thresholds set by the ISO will clear only if they passed a unit-specific review by the ISO's market monitor where any "out-of-market" revenues – such as bilateral contracts with Massachusetts – would be excluded in its bid analysis. Under CASPR, the Renewable Technology Resource ("RTR") MOPR exemption would be phased out.

Case.[26] In order to isolate and estimate the potential benefits that NECEC can provide to Maine, LEI developed energy and capacity price forecasts in New England without the addition of any large Elective Transmission Upgrade ("ETU") such as NECEC or any equivalent project.

2.1.1 Gas prices are a key factor driving future energy price trends in New England

Because the dominant fuel in New England is natural gas (therefore in most hours, natural gas-fired generation is marginal), energy price levels are mostly impacted by natural gas prices. LEI relied on the Algonquin Citygate price as the estimate of the delivered natural gas price for gas-fired generators in New England. LEI relied on the forward markets for projecting the starting values for Algonquin Citygate gas prices for 2018 and 2019.[27] From 2020 and onward, LEI projected the Algonquin Citygate gas price based on a supply hub price plus a transportation adder to New England calculated by LEI's proprietary Levelized Cost of Pipeline ("LCOP") model.[28] To derive that monthly profile, LEI applied the historical five-year (2013-2017) seasonality of Algonquin Citygate prices.[29] Figure 7 below shows the monthly delivered natural gas prices used in LEI's wholesale energy market modeling.

Figure 7. Monthly Algonquin Citygate prices (historical and LEI's outlook)

Source: SNL (2014-2017) and LEI's LCOP (2018-2037)

[26] Detailed descriptions of POOLMod and FCA Simulator can be found in Section 6 and detailed assumptions used in the modeling can be found in Section 7.

[27] LEI used the three-month average of daily forwards (January 1, 2018 – March 31, 2018), as reported by OTC Global Holdings ("OTCGH") for the 2018 and 2019 monthly prices.

[28] The LCOP model assumes that price spreads between any two gas pricing hubs cannot, in the long run, persist above the levelized cost of building a new pipeline between the two hubs. The LCOP model assumes that if the price spread rises above the levelized cost of building a pipeline between any two hubs for three consecutive years, then a pipeline will be built between the two hubs to reduce the price spread.

[29] LEI used historical seasonality in monthly prices rather than the seasonality of the forward curve. Historical seasonality reflects the actual experience in the market; using an average of 2013-2017 captures warmer-than-normal, colder-than-normal, and normal winters. The difference between using the historical method versus using the seasonality of the current forward curve is very small, except for February, when the historical method projects slightly higher prices (e.g., $10 per MMBtu for Algonquin Citygate in 2018 and 2019) than the forward curve projects (about $9 per MMBtu for Algonquin Citygate in 2018 and 2019). The historical method captures the larger impact of cold weather at the end of the season (in February), when gas inventories tend to be relatively depleted.

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The Base Case energy price forecast for the ISO-NE control area largely resembles the trend in natural gas prices as shown below in Figure 8. Two factors, however, should be noted, which affect the energy market trends slightly. Between 2023 and 2029, implied market heat rates improve as a result of the addition of offshore wind resources (as a consequence of Massachusetts' 83C RFP) and also as a result of declining total demand. Then, beginning in 2030, a reduction in New York import volumes due to the retirement of Ginna (2030) and Fitzpatrick (2035) nuclear stations necessitates more local gas-fired generation in New England and increases the implied market heat rates. LEI also retired Millstone 2 in 2035[30] when its nuclear license expires; this plant retirement has a similar effect on energy market prices as the New York retirements (and changing pattern of imports).

Figure 8. LEI's Base Case energy and natural gas price forecasts

2.1.2 Peak demand growth and CONE are key determinants of capacity price in New England

LEI's capacity market analysis requires a forecast of future Net Installed Capacity Requirement ("NICR"), Net CONE, and consideration of supply changes (new entry and retirements). LEI's NICR is a function of ISO-NE's CELT 2017 peak demand net of behind-the-meter solar PV.[31] The Base Case and Project Case rely on the same peak demand forecast (CELT 2017) and therefore have the same NICR.

LEI's Net CONE is based on ISO-NE's estimate of Net CONE for a combustion turbine in its latest published Net CONE and Offer Review Trigger Price ("ORTP") study.[32] LEI then forecasted the Net CONE by escalating the gross CONE by the inflation rate from the Bureau of Labor Statistics's Producer Price Index for Turbine and Turbine Generator Set Units Manufacturing, and inflating the energy and ancillary services offset by the trend in wholesale energy price growth from LEI's simulation modeling results. As a result of these calculations, the Net CONE differs slightly between the Base Case and the Project Case.

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[30] Millstone 3's nuclear license expires in 2045, and Seabrook is currently looking to extend its license to 2050.

[31] ISO-NE, CELT 2017.

[32] ISO-NE FERC Filing ER-17- 795-000. January 13, 2017.

For supply assumptions, results from New England's most recent FCA, FCA #12, showed that New England is oversupplied for the 2021-2022 capability period by approximately 1,103 MW. The amount of oversupply has grown over time - after FCA #9, New England was only oversupplied relative to NICR by 506 MW for the capability period of 2018-2019. Because much of the peak demand (net of behind-the-meter solar PV) growth is offset by the growth in energy efficiency, LEI's analysis projected that even in the Base Case, no new generation would be needed until FCA #18 (2027). This projection assumed offshore wind SPRs would clear in the substitution auction, and therefore would not impact capacity clearing prices. In the short-term, LEI assumed that coal would exit the Base Case by FCA #14, based on LEI's estimate of coal units' net going-forward costs. LEI also assumed that Mystic 7 would exit in FCA #13, as it has already submitted a retirement de-list bid. ISO-NE is seeking to retain Mystic 8 and 9 for fuel security reasons, based on the latest available information at the time that LEI was conducting its independent analysis. Therefore, LEI assumed Mystic 8 and 9 would participate in the ISO-NE markets in FCA #13 and onwards.[33]

In the long-run, capacity prices are expected to converge towards Net CONE as shown below in Figure 9. New entry in the form of combustion turbines (in 50 MW increments) was added to the New England power system. As such, the long run qualified capacity is almost identical to the NICR.

Figure 9. LEI's Base Case capacity prices and Net CONE

2.2 Projected energy market benefits

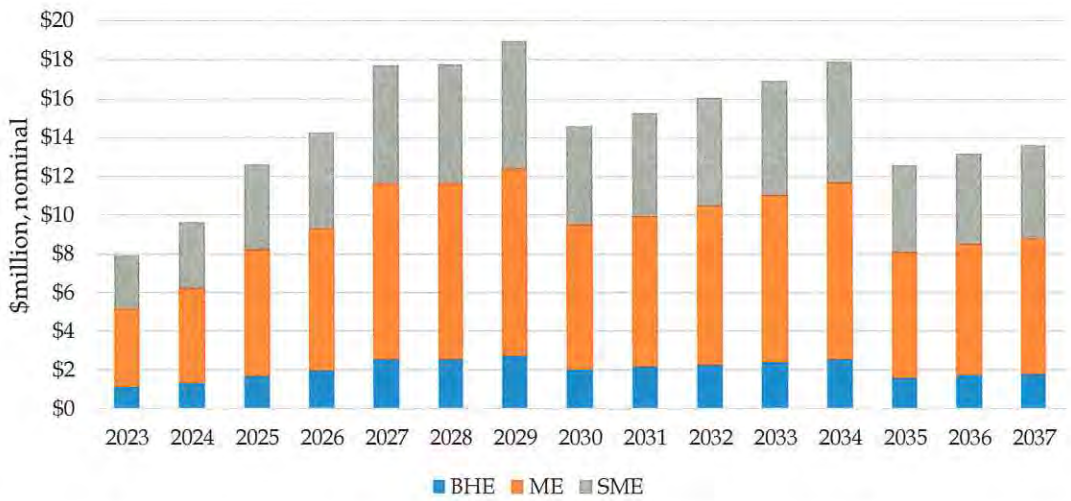
After developing the Base Case, LEI ran a simulation model to estimate the LMP impact of injecting [redacted] GWh of energy into New England over NECEC. LEI estimates that wholesale energy prices will decline by approximately [redacted] per MWh across New England in nominal dollars over the first 15 years of operations (2023-2037). For Maine, wholesale energy prices are

[33] On April 3, 2018, ISO-NE released a memo to the NEPOOL Participants Committee citing near-term fuel security concerns. These concerns prompted ISO-NE to request FERC to waive ISO's Tariff to allow the ISO to retain Mystic 8 and 9 to maintain fuel security on the system.

expected to decline by a weighted average of [redacted] per MWh in nominal dollars (load-weighted average of Bangor Hydro Electric, Maine, and Southern Maine) over the same timeframe. This is equivalent to wholesale energy market benefits of roughly $14 million annually (nominal dollars) for Maine, or $134 million annually (nominal dollars) for all wholesale load across the six states in New England on average for the forecasted timeframe.

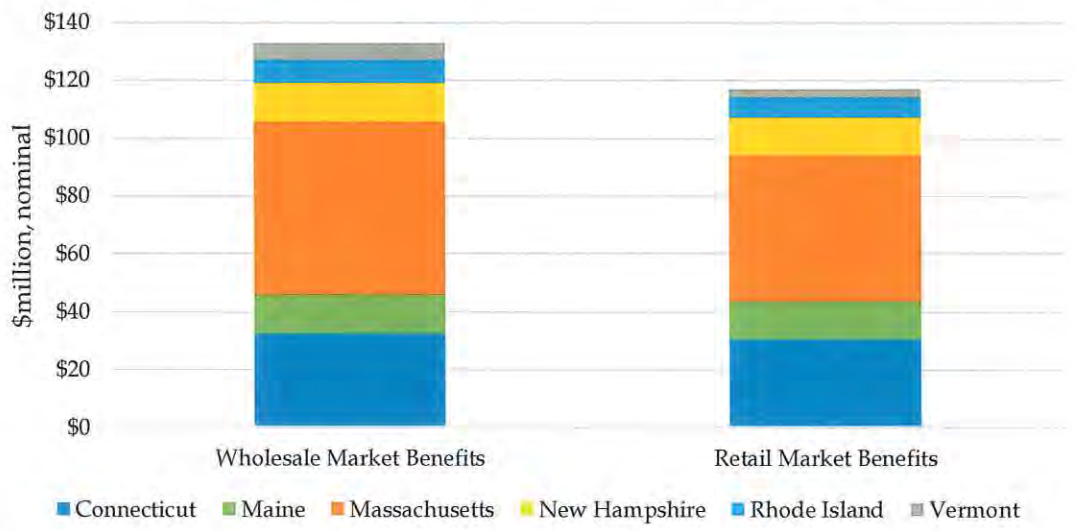
The 15-year NPV of NECEC's wholesale energy market benefit over the same timeframe is $122 million (in 2023 dollars) for Maine and $1.2 billion (in 2023 dollars) for all of New England. Figure 10 below shows the annual energy market benefits for the Maine zones over the first 15 years of operations. LEI also estimated the market impacts for retail customers in Maine and New England, which is shown in Figure 11. This accounts for the energy and capacity under long-term contracts or self-supply.

Figure 10. Annual wholesale energy market benefits in Maine



Note: The three Maine zones modeled include Bangor Hydro Electric ("BHE"), Maine ("ME"), and Southern Maine ("SME").

Figure 11. Annual average wholesale versus retail energy market benefits by state



Note: Retail energy market benefits in New England are lower than wholesale market benefits because some portion of energy or capacity is under contract or self-supply.

As indicated in ISO-NE's CELT 2017 forecast, overall energy demand is expected to decline as a result of energy efficiency and solar PV resources. Against this backdrop of falling demand, LEI also expects that Massachusetts will procure 1,600 MW of offshore wind between 2024 and 2027, resulting in even less need for thermal generation within New England. During the shoulder months (September – November, and April – May), off-peak demand in New England can be particularly low (about 8,000 MW in some hours). When coupling the large amounts of renewable energy with low demand, LEI found that the injection of nearly 1,090 MW around the clock through NECEC can reduce average off-peak prices considerably, as opposed to just average peak prices. LEI, therefore, observed increasing energy market benefits during that period.

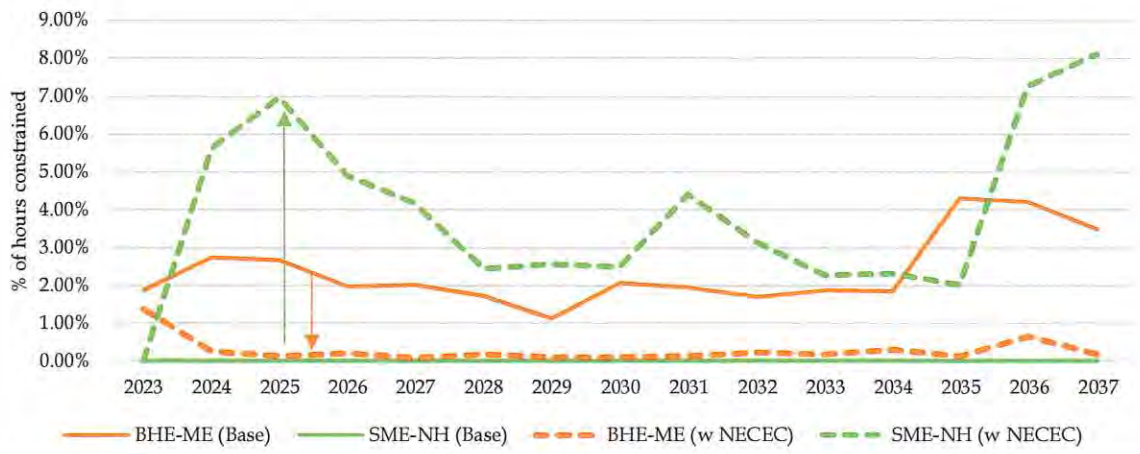
LEI also found that the nuclear retirements in New England and New York will require higher-cost generation to run in New England. This caused LMPs in the Project Case to rise slightly faster than in the Base Case, particularly during the off-peak hours. As such, even though the nuclear retirements cause price levels to rise in both the Base Case and Project Case, the energy market benefits decline in 2030 and 2035, because of the higher *relative* price level increase in the Project Case.

In LEI's wholesale energy market analysis, the energy market benefits do not fully dissipate because new resources added in the Base Case (combustion turbines) are not inframarginal in most hours. If inframarginal generation resources (i.e. baseload resources such as combined cycle gas turbines) were added in the Base Case, LEI expects that the energy market benefits would dissipate over time towards zero (if, over time, [redacted] TWh of baseload energy is added in the Base Case, the LMP would be the same as in the Project Case).

As noted above, the LMP reduction in Maine is slightly higher than the rest of New England. The reason is that LEI's modeling indicated that some minor congestion would occur along the Maine – New Hampshire interface. LEI adopted Daymark's assumptions of increasing the transfer limit

of the SME-NH interface by 1,000 MW from 1,600 MW to 2,600 MW.[34] LEI's flow duration curve indicates that on average, approximately 4.3% of hours are constrained along this interface. Figure 12 shows the congestion along the Orrington South and SME-NH interfaces.

Figure 12. Percentage of hours BHE-ME and SME-NH interfaces are binding



2.3 Projected capacity market benefits

LEI's modeling results indicate that 1,090 MW of qualified capacity from NECEC clearing in the primary auction of the FCM will decrease capacity prices by an average of [redacted] per kW-month (nominal dollars) in New England for six years between FCA #12 - #19 (2023–2029). This represents wholesale capacity market benefits of roughly $19 million annually for Maine (nominal dollars), or $255 million annually for all wholesale load across the six states in New England over the 15-year modeling timeframe (nominal dollars). In NPV terms, the 15-year wholesale energy market benefit is equivalent to $223 million for Maine, and $2.9 billion for all of New England (in 2023 dollars). If NECEC's MOPR price is higher than the clearing price and NECEC is cleared in the substitution auction, then there would be no capacity market benefits. Figure 13 below shows the capacity market benefits split between Maine and the rest of New England. Maine's benefits are relative to its share of peak load, which is approximately 7.5% on average.

[34] CMP response to ODR-003-019

Figure 13. Annual wholesale capacity market benefits

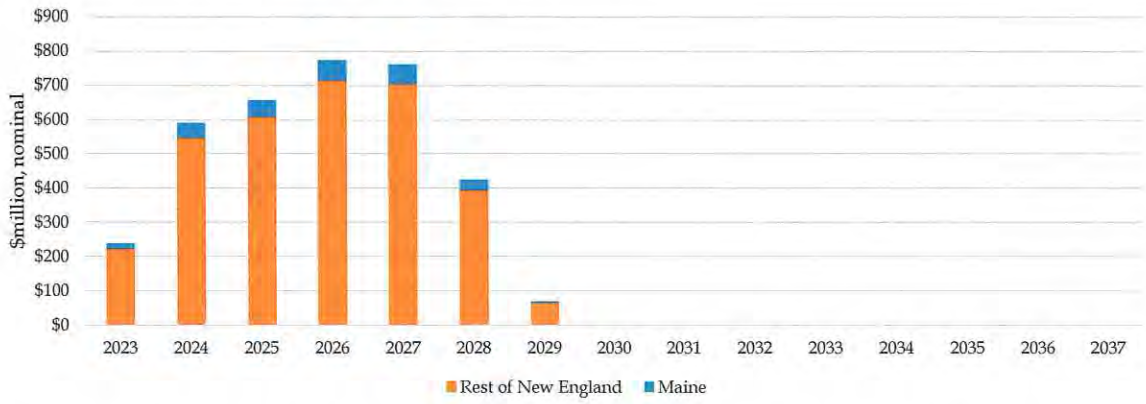
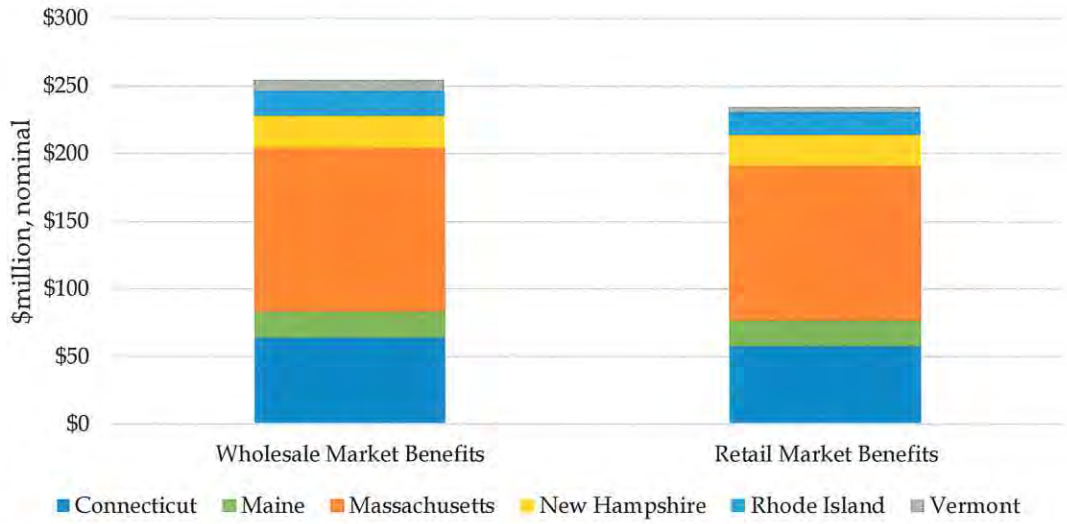


Figure 14. Annual average wholesale versus retail capacity market benefits by state



Note: Retail capacity market benefits in New England are lower than wholesale market benefits because some portion of capacity is under contract or self-supply.

As noted previously, NECEC may need to clear in the substitution auction, for example, if its custom MOPR price turns out to be above the capacity market clearing price ([redacted]/kW-month in LEI's estimate). It may also qualify in subsequent primary auctions (FCAs), and result in capacity market benefits in the future (although the magnitudes of those benefits have not been studied in this report). However, if NECEC were to clear in the primary auction of FCA #14, LEI estimates that given the current level of supply and demand in the FCM, NECEC would displace approximately 750 MW of existing capacity resources in the FCM. This is because New England is currently already oversupplied, particularly given the growth in energy efficiency in the past two auctions, FCA #11 and #12. The most recent FCA, FCA #12, cleared at $4.63/kW-month, which is the lowest price in five years. However, this low price was sustained due to ISO-NE retaining Mystic 7 and 8 for local reliability needs in Boston. Were Mystic 7 and 8 allowed to exit FCA #12, capacity prices would have been higher.

In order to estimate the level of market response, LEI prepared proxy retirement de-list bids (taking into account future expected energy and capacity revenues as specified in ISO-NE's retirement de-list workbook). These bids include fixed O&M, risk premiums, and incremental capital expenditures based on a mix of publicly available information, third-party commercially available data, and LEI's original research. While there is uncertainty about the exact price of the retirement de-list bids for New England generators, FCA #12 does provide some indication that at least some plants are looking to retire or de-list in the $2/kW-month to $5/kW-month range.

In LEI's modeling, supply and demand are expected to rebalance over the next few FCAs and supply (total CSO) roughly equals demand (NICR). By ISO-NE's design, the resulting capacity price at this level of supply would equal the Net CONE. The Net CONE represents the break-even price that the most cost-effective resource would require to be economic. Therefore, in the long run, new resources should enter the market when it is economic, which is when the capacity price is at Net CONE.

Similar to the Base Case, the capacity market under the Project Case would also rebalance. Because 1,090 MW of new capacity from NECEC is only offset by 750 MW of retirements, approximately 340 MW of *incremental* capacity is added. The size of this incremental capacity relative to peak load growth means that it will take *longer* for the capacity price to reach long-run equilibrium. By 2030, both the Base Case and the Project Case rebalance towards the net CONE in LEI's modeling of NECEC, and the capacity market benefits end.[35]

2.4 Insurance value from NECEC due to weather-driven events

In periods of system stress, NECEC can provide significant additional value to electric ratepayers across New England because they can extinguish or partially dampen the higher energy prices associated with extremely high demand or high fuel prices. New supply projects like NECEC could offset very high-cost generation. For example, when load peaks over repeated days during New England's summertime or when the gas infrastructure is highly constrained and gas supply is limited (and expensive), the energy flows on NECEC can provide a source of lower-cost energy that cannot otherwise be generated by local resources in New England. NECEC can serve as a form of "insurance" against the financial impact of such events, protecting consumers from at least a portion of the higher market costs that are a consequence of such events. Through backcast simulation modeling, LEI recreated past market conditions that exhibited very high energy prices under summer and winter stress events. LEI then added expected energy imports that would be available through NECEC into the backcast supply mix and thereby evaluated the wholesale market cost savings produced by NECEC under such system stress conditions.

2.4.1 Summer system stress event

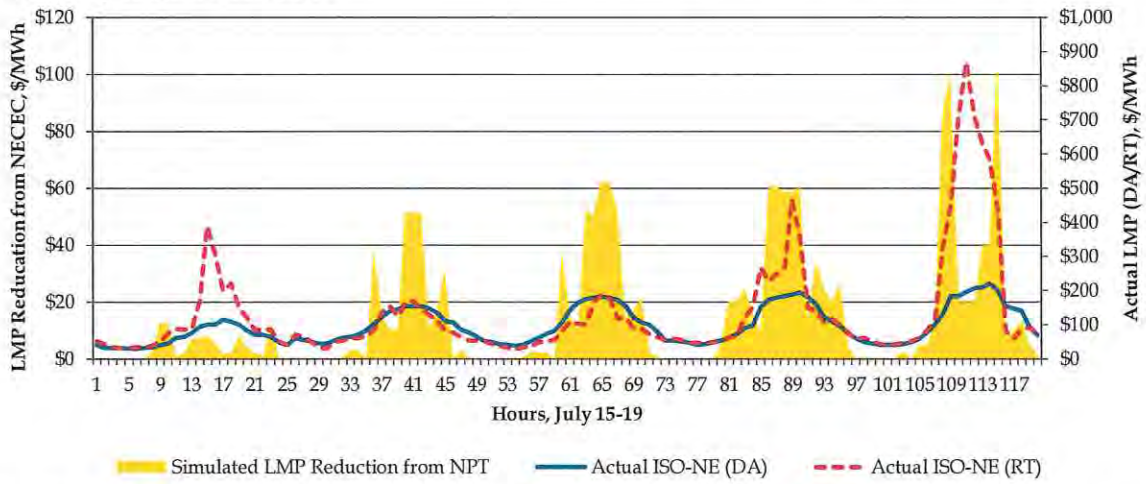
Between July 15 and July 19, 2013, New England experienced a prolonged heat wave. During this period, more expensive peaking units were dispatched to serve the higher electricity load in the

[35] LEI's analysis shows a very small difference of 13 MW in the total amount of cleared capacity beyond FCA #19. This results solely from the differences between the amount of capacity that enters in the Base Case (50 MW increments) and the amount of market response in the Project Case. Therefore, LEI assumes that the benefits beyond FCA #19 are zero.

region. Day-Ahead ("DA") and Real-Time ("RT") wholesale energy prices rose markedly in comparison to the normal range of energy prices for this time of the year. For example, Real-Time LMPs exceeded $400/MWh for seven hours on July 19th, while the typical LMP during this month is only $40/MWh (based on the prior two years). The weather was a big contributor to the high prices, as peak load surpassed the ISO-NE's 90/10 demand forecast from the prior year. Similar peak demand occurrences have occurred in other years – indeed, ISO-NE has recorded actual demand exceeding 90/10 expectations six times in the last 24 years.[36] In addition to high LMPs on this day, ISO-NE had a capacity deficiency, which resulted in the ISO-NE declaring an "OP4" event.[37] There were 4,724 MW of generator outages and reductions over the peak hour of the day that contributed to system stress and ultimately the OP4 declaration.[38]

If such summer extreme weather were to re-occur, energy flowing on NECEC could have reduced energy prices by more than $20/MWh on average across New England over this period. In summary, during this five-day heat wave, LEI estimates that the "insurance" value that NECEC could have provided New England consumers is approximately $51.7 million.

Figure 15. Illustration of LMP reductions associated with NECEC's energy flows during a summer system stress event



Note: The hourly DA and RT LMPs shown are sourced from actual ISO-NE data. The LMP reduction is based on market simulations using actual conditions (actual hourly levels of demand, actual hourly interchange between neighboring markets, and actual reported costs for various fuel types).

2.4.2 Winter system stress event

The winter of 2013/14 was extreme in terms of natural gas prices in New England as well as low temperatures. Periods of severe cold weather resulted in increased gas demand from Local Distribution Companies ("LDCs", entities that source natural gas on behalf of their retail

[36] ISO-NE. *2015 Regional System Plan*, pg. 34

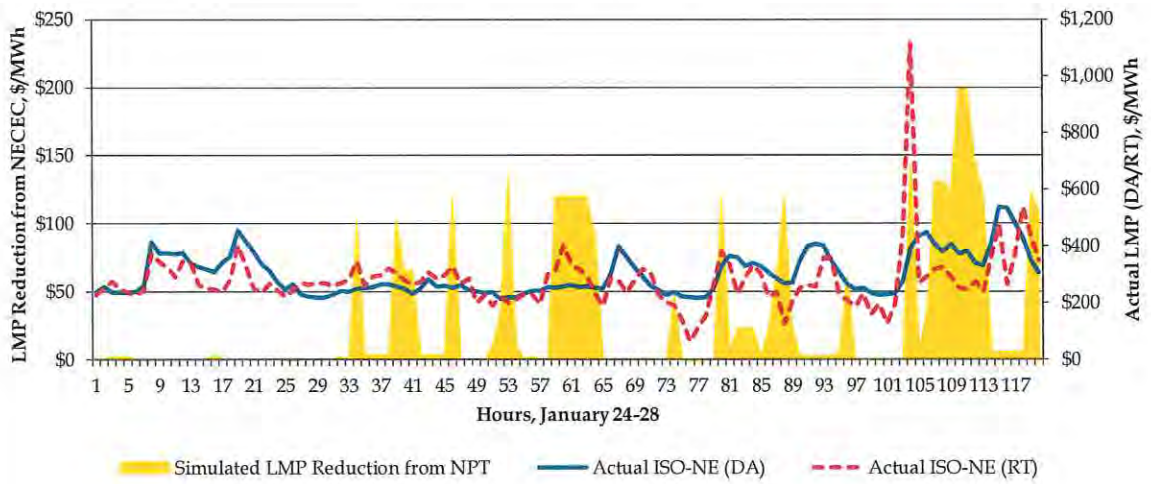
[37] Operation Procedure No. 4 ("OP4") establishes criteria and guides for actions during capacity deficiencies, as directed by ISO-NE, such as when available resources are insufficient to meet the anticipated load plus operating reserve requirements.

[38] ISO-NE. 2014 Third Quarter – Quarterly Markets Report.

customers for heating load) and, consequently, physical limits on the region's natural gas pipeline network emerged. These fuel delivery constraints, along with a number of unplanned outages at other generators, led to exceptionally high delivered natural gas prices, and, as a result, very high wholesale energy prices.[39] In addition, ISO-NE's Winter Reliability Program ("WRP") caused oil-fired generation to displace gas-fired generation during some periods, resulting in unusual changes in the generators' merit order where oil was setting prices.

The $24.5/MMBtu average price for natural gas in January 2014 was the highest average monthly price in more than 10 years, with a daily price of over $73/MMBtu on one day (occurring on January 28, 2014). As a result of high delivered gas prices, oil-fired generation became cheaper than gas-fired generation on some days and given the availability of oil on-site for those plants that signed up for the WRP, some oil-fired units were able to be dispatched. These oil-fired units contributed to system security during these Polar Vortex events, particularly in January 2014. However, emissions of various pollutants increased as a result of oil-fired generation of electricity. And, nonetheless, both DA and RT energy prices were high, relative to historical prices during the winter peak.

Figure 16. Illustration of LMP reductions associated with NECEC's energy flows during winter system stress event



Note: The hourly DA and RT LMPs shown are sourced from actual ISO-NE data. The LMP reduction is based on market simulations using actual conditions (actual hourly levels of demand, actual hourly interchange between neighboring markets, and actual reported costs for various fuel types).

Based on LEI's simulation-based backcast, NECEC could have reduced energy prices during such conditions by $37/MWh on average over this five-day period. LEI estimates that this equates to an implied "insurance" value for consumers across New England of approximately $72.3 million over a five-day period.

ISO-NE's most recent Operational Fuel-Security Analysis suggests that fuel security, particularly during the high-demand cold spells, presents the foremost risk to current and future power

[39] ISO-NE. *Cold Weather Operations*. Peter Brandien. April 1, 2014.

system reliability. ISO-NE also noted that a resource mix with higher levels of liquefied natural gas ("LNG"), imports, and renewables shows less system stress than its reference case, and that "to achieve these levels of LNG, imports, and renewables, firm contracts for LNG delivery, assurances that electricity imports will be delivered in winter, and aggressive development of renewables, including expansion of the transmission system to import more clean energy from neighboring systems, would be required."[40]

2.5 Environmental benefits

The results of LEI's modeling show that NECEC reduces annual CO_2 emissions from New England generators by approximately 3.6 million metric tons.[41] The CO_2 emissions reduction is fairly constant over time because of the assumed level of energy flows on NECEC and the similarity in the emissions footprint of the generating resources that are being displaced by the energy flows on NECEC. This average is approximately equivalent to removing 767,000 passenger vehicles from the road based on estimates by the Environmental Protection Agency.[42]

However, the 3.6 million metric tons of CO_2 reductions estimate are based on how much CO_2 is reduced from internal New England generators. There is also substantial scientific and policy debate on how to estimate possible CO_2 emissions from large hydroelectric resources that would flow through NECEC. LEI acknowledges that large hydroelectric resources may emit carbon due to the decomposition of biological material in a newly-formed reservoir. Based on studies conducted by Hydro Québec scientists, it has been forecast that a large hydroelectric complex such as Eastmain 1/1A had a lifecycle emissions profile of greenhouse gases of 136 lbs./MWh.[43] This figure is higher than the actual historical system-wide profile of CO_2 emissions reported by Hydro Québec of 239 metric tons/TWh (approximately 0.5 lbs./MWh).[44] Although the emissions profile of new large hydroelectric plants is likely to be higher in the initial years than this lifecycle figure, it is difficult and intractable to pinpoint the exact, time-specific emissions profile of the energy flows on NECEC. Based on a lifecycle rate of 136 lbs./MWh, LEI estimates that this results in approximately [redacted] metric tons based on [redacted] GWh. This value, however, still contrasts significantly with the emissions associated with a natural gas-fired generation, which can typically emit between 700-1,000 lbs./MWh (depending on the heat rate).

Figure 17 below shows the CO_2 emissions reductions for New England over the modeling timeframe. As noted previously, as a result of nuclear retirements in New York and New England, more local fossil-fuel generation is required in 2030 and 2035. As a result, similar to the

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40 ISO-NE, Operational Fuel-Security Analysis, January 17, 2018. <https://www.iso-ne.com/static-assets/documents/2018/01/20180117_operational_fuel-security_analysis.pdf>

41 According to the calculator available on the Environment Protection Agency website, this is equivalent to removing approximately 675,000 passenger vehicles per year. ***See***. "Calculations and References." <https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references#vehicles>. Accessed December 28, 2016.

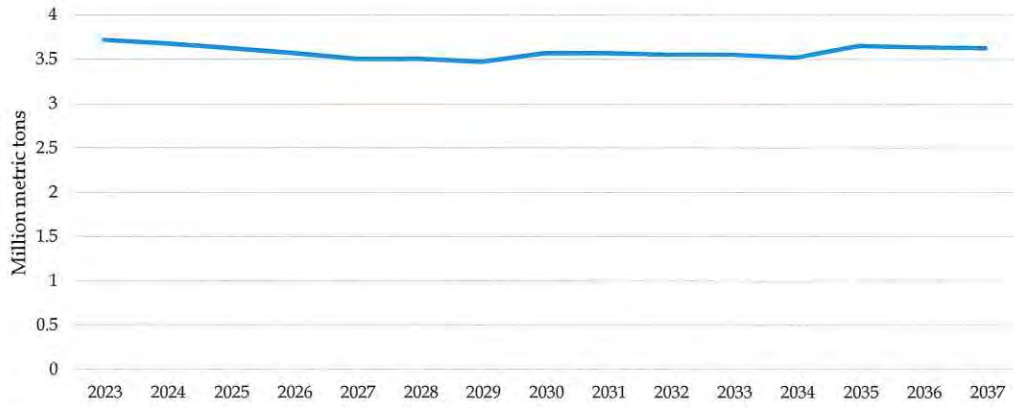
42 EPA, Greenhouse Gas Equivalencies Calculator. <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

43 Teodoru, C. R., et al. (2012), The net carbon footprint of a newly created boreal hydroelectric reservoir, Global Biogeochem. Cycles, 26, GB2016.

44 Hydro Québec Production's Electricity Facts. 2013.

energy market benefits, the emissions reductions fall slightly in 2030 and 2035 as more of that fossil-fuel generation is required in the Project Case relative to the Base Case.

Figure 17. Projected CO_2 emissions reduction for New England



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3 Macroeconomic Benefits Analysis of NECEC

This section discusses the methodology adopted by LEI in its independent analysis of the macroeconomic results surrounding the construction and operations of NECEC. LEI estimated the development and construction impacts of the project using CMP's estimate of local spending and the timetable of construction (2017-2022). Maine would expect an average 1,631 jobs per year, and a $98.2 million GDP increase over this period. LEI then estimated the macroeconomic impact of the electricity savings created by NECEC once it starts operating in 2023. During the first 15 years of operations (2023-2037), LEI projects 272 new jobs per year and a $27.1 million increase in GDP per year for Maine related to the project's O&M activities and ratepayers' electricity savings.

LEI used a suite of proprietary wholesale electricity market modeling tools (described in detail in Section 2.1) and the widely-accepted PI+ macroeconomic model by REMI to analyze the macroeconomic impact of the NECEC project on the local economy in Maine, as well as the impacts on the entire New England region. Section 3.1 below explains the modeling tools and analytical methodology used in LEI's macroeconomic analysis. Section 3.2 and Section 3.3 present the local and regional economic impacts of the project during the construction and operations periods, respectively.

3.1 The modeling tool and analytical methodology

3.1.1 REMI PI+

LEI analyzed the macroeconomic benefits of the proposed transmission investment using a regional economic modeling tool, the REMI PI+ model. The REMI PI+ model was developed by the Regional Economic Modeling, Inc. ("REMI"). REMI PI+ is a dynamic simulation-based model of local (state and county) level economic activity. It is commonly used to model and measure the impact of various supply and demand shocks (new infrastructure is like a supply shock) and policy changes on the local economic activity and labor markets.[45]

LEI used the same PI+ software (in terms of regional configuration and industry depth) as USM for analyzing the macroeconomic impacts of the NECEC project. This eliminated any discrepancies in results that may have otherwise been caused by differences in model vintages and/or granularity of the representation of local economy. Specifically, LEI used a seven-region, 70-sector regional model of the Maine economy for studying the economic impacts of construction and operations spending associated with the project in Maine, and a six-region, 20-

[45] The REMI PI+ model is a regional economic model that incorporates basic Input/ Output ("I/O") functionality in a Computable General Equilibrium model with advanced Economic Geography and other econometric time-series modeling capabilities, and regression techniques. Economic shocks and policy changes can be captured and simulated in the REMI's PI+ model through adjustment of different categories of policy variables. These variables are interconnected through geographical linkages and industrial ties, and affect each other through direct and indirect economic impacts. Such dynamic impacts are ultimately reflected in the modeling results, through changes in population, trading activities, economic outputs, employment, product prices and labor compensation rates.

sector regional model of the six New England states for estimating wholesale electricity market impacts.

3.1.2 Analytical methodology

LEI analyzed the macroeconomic impacts of the project during the development and construction period and the operations period separately, as the economic activities and the socio-economic impacts across these two periods are different.

During the development and construction period, a transmission project's capital expenditure has direct economic impacts on the local economy, through boosting demand and economic activities in the construction sector and related supporting sectors. The result of local spending to install infrastructure is increased local GDP and new jobs.

During the operations period, a transmission project's local spending on operations and maintenance ("O&M") activities creates direct local jobs and contributes to local GDP growth. Meanwhile, the reduced wholesale electricity market costs lower electricity consumers' bills, increase households' disposable income, and decrease businesses' operations costs, which can have a widespread and long-lasting positive impact on the local economy.

In estimating the macroeconomic impacts from the wholesale electricity market, LEI employed its proprietary simulation model, POOLMod, and its FCA simulator, to forecast wholesale energy and capacity prices in ISO-NE, with and without the project. After converting the wholesale electricity benefits into retail electricity savings, these results are then fed into the 6-region REMI PI+ model for New England and modeled as reductions in energy costs for commercial, industrial, and residential consumers.

3.2 LEI's independent analysis for the development and construction period

The most critical input during the development and construction period is the project cost, including the total level, how it is broken down between local and non-local spending, how it is broken down between labor and material, and how it is broken down between different industries and sectors. LEI's analysis of the development and construction period (2019-2022) is based on the most updated project cost provided by USM and CMP,[46] which is estimated to be a total of $573.9 million across the development and construction period of 2017-2022 (a 2% increase from the original estimated local project cost of $561.9 million).

The preferred approach to developing project cost is to break it down into detailed granular labor and material expenditure categories. However, LEI was limited by the lack of detail in the cost estimates provided by CMP, and therefore modeled the construction cost at a more aggregated level. LEI modeled the project costs as increased industry sales in relevant sectors, including the power and communication structures construction; management of companies and enterprises; architectural, engineering, and related services; as well as professional, scientific, and technical

[46] ODR-003-011_Attachment_1_CONFIDENTIAL_(2017-232). In the updated construction cost estimate, the development period is 2017 and 2018, and the construction period is 2019-2022. In the original cost estimates, the development period was 2017 and the construction period was 2018-2022.

services. The project expenditure is allocated by year and by region based on information provided by USM and CMP.

Results shown in Figure 18 below suggest that the project is expected to create an average of 1,631 jobs every year during the development (2017-2018) and construction periods (2019-2022) in Maine, of which 856 jobs are directly created due to the project, and 775 indirect and induced jobs are created through increased local spending by the project's construction workers and in sectors that provide supporting material and services to the development and construction activities. In addition to the new jobs, the Maine economy is expected to see a GDP surge by a total of $589 million over these years, or $98.2 million on an annual average basis.

Figure 18. LEI's estimated macroeconomic impacts of the NECEC project during the development and construction period based on the updated project cost

Economic Impact Category	Unit	Development		Construction				Annual Average
		2017	2018	2019	2020	2021	2022	
Direct Employment	Individuals	48	103	754	1,716	1,621	892	856
Indirect & Induced Employment	Individuals	67	119	653	1,409	1,500	900	775
Total Employment	Individuals	115	222	1,407	3,126	3,121	1,792	1,631
GDP	Millions of Fixed 2009 $	$8.8	$14.7	$84.8	$184.0	$189.1	$107.7	$98.2

The increase in new jobs and GDP related to the development and construction of the project is temporary. Once the construction is completed and the project enters commercial operations, such economic benefits will dissipate (and sometimes a negative employment change in the local economy can be observed as a natural effect of the economy rebounding from an economic shock).

Moreover, although the new jobs created by development and construction of the project are located in Maine, the positions are not necessarily filled by local Maine residents. The new jobs consist of a mix of full-time and temporary jobs and can be held by Maine residents or by migrant workers that move to Maine specifically for this project, and who might move out of the region right after the construction work is completed.

3.3 LEI's independent analysis of the operations period

LEI took a comprehensive view of the macroeconomic impacts of the NECEC over the 15-year modeling period. Specifically, LEI took into consideration the impacts due to O&M activities of the project, ratepayer's savings created by energy and capacity price reductions, the project's contract costs borne by the Massachusetts ratepayers, and early retirement of generating plants triggered by the project. Figure 19 and Figure 20 provide an itemized macroeconomic impact summary for Maine and for all of the New England states.

As shown in Figure 19, Figure 19. Aggregated economic benefits in Maine during the operations period (2023-2037)during the period of 2023-2037, Maine is expected to see an increase of 291 total jobs per year, of which 38 direct jobs are directly created by supporting O&M activities related to the project, and 309 jobs are generated through indirect and induced effects from ratepayers' electricity cost savings. The GDP increase in Maine during this period is expected to be on average

$29.1 million per year. The net contract costs with NECEC's award of the contract from the 83D RFP will be borne by Massachusetts electric ratepayers. However, the contract costs will reduce the retail electric savings that Massachusetts consumers would have otherwise seen. Due to the close linkages between the state economies in New England, this will have a negative impact on the Maine economy, causing an average of 55 job lost per year, and GDP loss of $4.9 million per year during the 15 years modeled. The generation units that are expected to retire early as a result of the NECEC participating in the FCM are located in Connecticut. Therefore, these generation retirements will have only a minor impact on Maine, reducing the new job count by three jobs and pulling GDP benefits down by $0.3 million per year during the modeling period.

Figure 19. Aggregated economic benefits in Maine during the operations period (2023-2037)

Economic Impact Category	Economic Impact item	Operations			2023-2037 Average
		2023-2027	2028-2032	2033-2037	
Employment (Individuals)	O&M	38	38	38	38
	Ratepayers' savings	732	263	-59	312
	Contract Cost	-112	-54	-1	-55
	Early Retirement	-3	-3	-3	-3
	Total	**655**	**244**	**-25**	**291**
GDP (Millions of Fixed 2009 $)	O&M	$2.2	$2.3	$2.4	$2.3
	Ratepayers' savings	$61.0	$30.4	$4.5	$31.9
	Contract Cost	-$8.9	-$5.2	-$0.7	-$4.9
	Early Retirement	-$0.2	-$0.3	-$0.3	-$0.3
	Total	**$54.0**	**$27.2**	**$5.9**	**$29.1**

Note: Economic impacts in terms of incremental jobs, GDP, and total compensation are presented in the form of annual average of corresponding modeling period.

As shown in Figure 20 below, during 2023-2037, an increase of 1,826 total jobs per year is expected to be created across all of the New England states, primarily through ratepayers' electric cost savings. The six states in New England are expected to see their GDPs increase by $205.3 million per year on average through the modeling period. The macroeconomic impacts from incorporating the contract cost of the project (paid by Massachusetts electric ratepayers) and the early retirement of several units (located in Connecticut) have a more significant effect on New England as a whole than Maine. Specifically, the contract cost of the project is expected to reduce 2,355 jobs and $288.3 million GDP per year in New England; the early power plant retirement triggered by the project is expected to lead to a reduction of 392 jobs and lower GDPs by $72.4 million every year in all states in New England.

LEI's results using REMI PI+ also show that during the outer years of the modeling period (2033-2037), Maine and New England are expected to see economic losses. This is primarily because LEI's electricity market modeling results show huge energy and capacity cost savings in the first five years, which immediately results in macroeconomic benefit hikes for local and regional economies. In the latter years, as the wholesale energy and capacity markets recalibrate to reach new equilibriums, the electricity market benefits will decline. As a result, the Maine and New

England economies will go through a rebound effect, meaning that after an economic shock, economies will shrink rapidly back to or even below the pre-shock status.

LEI has also analyzed the cost savings that NECEC could create for electric ratepayers by enhancing grid reliability and protecting ratepayers against energy shortages and electricity price hikes under extreme weather conditions. However, LEI cannot predict when such extreme weather conditions would materialize and therefore did not incorporate these additional wholesale electricity market benefits into any specific year of the modeling time frame. As a result, these additional wholesale electricity market benefits are not captured in the macroeconomic benefits during the operating period of the project.

Figure 20. Aggregated economic benefits from electricity market in New England (2023-2037)

Economic Impact Category	Economic Impact item	Operations			2023-2037 Average
		2023-2027	2028-2032	2033-2037	
Employment (Individuals)	O&M	N/A	N/A	N/A	N/A
	Ratepayers' savings	10,777	3,685	-742	4,573
	Contract Cost	-4,267	-2,433	-367	-2,355
	Early Retirement	-426	-394	-357	-392
	Total	**6,084**	**858**	**-1,465**	**1,826**
GDP (Millions of Fixed 2009 $)	O&M	N/A	N/A	N/A	N/A
	Ratepayers' savings	$1,091.6	$526.7	$79.5	$565.9
	Contract Cost	-$432.0	-$314.4	-$118.4	-$288.3
	Early Retirement	-$68.6	-$72.6	-$76.1	-$72.4
	Total	**$591.0**	**$139.8**	**-$115.0**	**$205.3**

Note: Economic impacts in terms of incremental jobs, GDP, and total compensation are presented in the form of annual average of corresponding modeling period.

3.4 LEI's independent analysis of municipal tax revenue

LEI estimated the potential tax revenue received by affected municipalities. As shown in Figure 21, assuming the project's taxable value (i.e. approximately $1 billion) provided by CMP is reliable, the listed municipalities are expected to receive around $18.1 million in annual tax revenue paid by the NECEC project.

LEI's analysis is based on the taxable value of the project in each municipality provided by USM in response to data request EXM-003-008 (see Column "Additional Valuation" in Figure 21) and the 2016 municipal full value tax rate[47] estimated by the Department of Administrative and Financial Services of the Maine state government.

[47] 2016 Equalized Tax Rate is derived by dividing 2016 Municipal Commitment by 2018 State Valuation with adjustments for Homestead and Business Equipment Tax Exemption ("BETE") and Tax Increment Financing ("TIF"). Full Value Tax Rates Represent Tax per $1,000 of Value.

However, the actual tax revenue is subject to the taxable valuation assessed by each municipality and the adjusted property tax rates (i.e. mill rates) in each of these municipalities. Specifically, how mill rates will change is subject to a combination of several factors, including the budget plan of the municipality (e.g. how much revenue to be collected, the amount of government spending in public services, other sources of revenue), the change in market value of other properties, etc. In fact, any estimates will only provide a proxy for the actual tax rate change and tax revenue received by each affected municipality.

Figure 21. LEI's estimated municipal tax revenue from NECEC

Municipality	Municipal Full Value Tax Rates ($ per $1000 of property value)	Additional Valuation ($Million)	Additional Tax Revenue ($Million)
Alna	$17.82	$18.91	$0.34
Anson	$19.17	$21.95	$0.42
Caratunk	$7.39	$13.96	$0.10
Chesterville	$16.23	$2.19	$0.04
Cumberland	$15.40	$15.60	$0.24
Durham	$16.49	$3.31	$0.05
Embden	$13.20	$20.23	$0.27
Farmington	$19.70	$22.62	$0.45
Greene	$14.69	$20.75	$0.30
Industry	$13.48	$10.69	$0.14
Jay	$21.24	$22.18	$0.47
Leeds	$15.86	$26.77	$0.42
Lewiston	$27.54	$304.79	$8.39
Livermore Falls	$20.75	$24.96	$0.52
Moscow	$16.50	$41.98	$0.69
New Sharon	$17.71	$4.87	$0.09
Pownal	$15.99	$85.99	$1.37
Starks	$15.46	$19.00	$0.29
Whitefield	$15.63	$56.84	$0.89
Wilton	$20.90	$2.52	$0.05
Windsor	$15.30	$8.54	$0.13
Wiscasset	$18.76	$26.61	$0.50
Woolwich	$13.01	$5.72	$0.07
Unorganized Territories and Townships	$8.08	$227.71	$1.84
Total		**$1,008.67**	**$18.09**

Sources:
Municipal Full Value Tax Rates: Department of Administrative and Financial Services of the Maine state government. < http://www.maine.gov/revenue/propertytax/municipalservices/fullvaluerates.pdf>
Additional Valuation: Provided by USM in response to data request EXM-003-008. Based on tax revenue estimated by CMP.

In addition, LEI's estimates show the potential revenues for municipalities for one year at the beginning of the project's commercial operations period. Over the life of a transmission project, once operational, its taxable value will slowly decline due to depreciation. Therefore, property tax payments by NECEC and the local tax relief it could provide will be larger in the early years and gradually decline over the life of the project.[48]

[48] There may be a residual market value which could establish a floor.

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4 Comparison of LEI and Daymark Wholesale Electricity Markets Analysis

LEI finds that key differences between LEI's and Daymark's energy market forecasts are primarily due to the compounded effect of Daymark's use of low availability of generators in the summer, high delivered natural gas prices, the inclusion of various adders to the natural gas price, and the CELT 2016 demand forecast. The differences in capacity market price forecasts are primarily due to Daymark's improper calibration of the penalty factor, the low entry prices for new capacity resources, and the level of oversupply assumed in the Base Case. However, Daymark's CO_2 emissions reductions are roughly in line with LEI's estimate.

CMP's CPCN application included the Daymark Report which estimated the wholesale market benefits (Exhibit 5). Similar to LEI's approach, Daymark looked at the differences between a Base Case without NECEC and a Project Case in which NECEC is built. The following sections discuss LEI's findings of the key differences between LEI's and Daymark's price forecasts and resulting benefits.

4.1 Comparison of electricity market and environmental benefits

At a high level, the premise of Daymark's report is that NECEC would lower wholesale energy and capacity market costs for Maine consumers through a reduction in energy market and capacity market prices. Daymark's analysis also qualitatively discussed other benefits that the project could provide, such as CO_2 emissions reductions, ancillary services cost reductions, increases in REC supply, and reduced congestion costs. Figure 22 below shows the energy market price forecasts for LEI and Daymark. On average, Daymark's Base Case energy prices are 68% higher than LEI's.

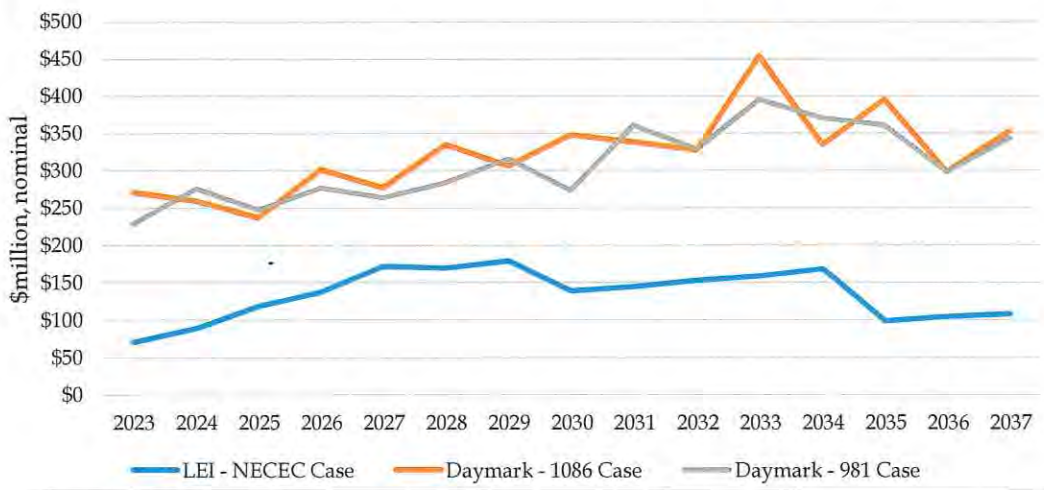
Figure 22. Comparison LEI's and Daymark's wholesale energy price forecasts for Maine

Note: LEI's prices shown above are a weighted average of the three Maine zones modeled. Daymark's price shown is for the ME zone.

Figure 23 below shows the energy market benefits for New England. It shows that on average, Daymark's 1086 NECEC Case energy market benefits are 141% higher than in LEI's. In reviewing

the detailed assumptions of Daymark's analysis, there are a number of key drivers that lead Daymark to forecast higher wholesale energy prices and therefore higher energy market benefits for NECEC.

Figure 23. Comparison of LEI's and Daymark's wholesale energy benefits for New England



4.1.1 LEI calculated the impact of Daymark's assumptions on energy prices

LEI calculated the impact of each of Daymark's assumptions on Daymark's New England energy market benefits, compared with LEI's. LEI performed this calculation by layering each of the four Daymark assumptions (or "drivers") on top of LEI's own estimate of the energy market benefits (LEI baseline) (see Figure 24).[49]

- First, LEI adopted the natural gas index price contained in AEO 2016. This increased LEI's energy market benefits by approximately 38% above LEI's baseline estimate (which relied on AEO 2017).

- Second, LEI included Daymark's "regional adder" on top of the index natural gas price from AEO 2016 for Northern New England generators. This increased the energy market benefits by 45% above LEI's baseline.

- Third, LEI found that approximately 33% of Daymark's energy market benefits were attributed to the month of July, where Daymark had modeled some extremely high energy prices. LEI determined from the implied market heat rates (see Figure 32) that this dynamic in Daymark's modeling is explained largely by a combination of a super peaker adder (on gas prices) and the simplified approach Daymark took in AURORA to represent generator availability. By applying a 33% increase in energy market benefits as a proxy

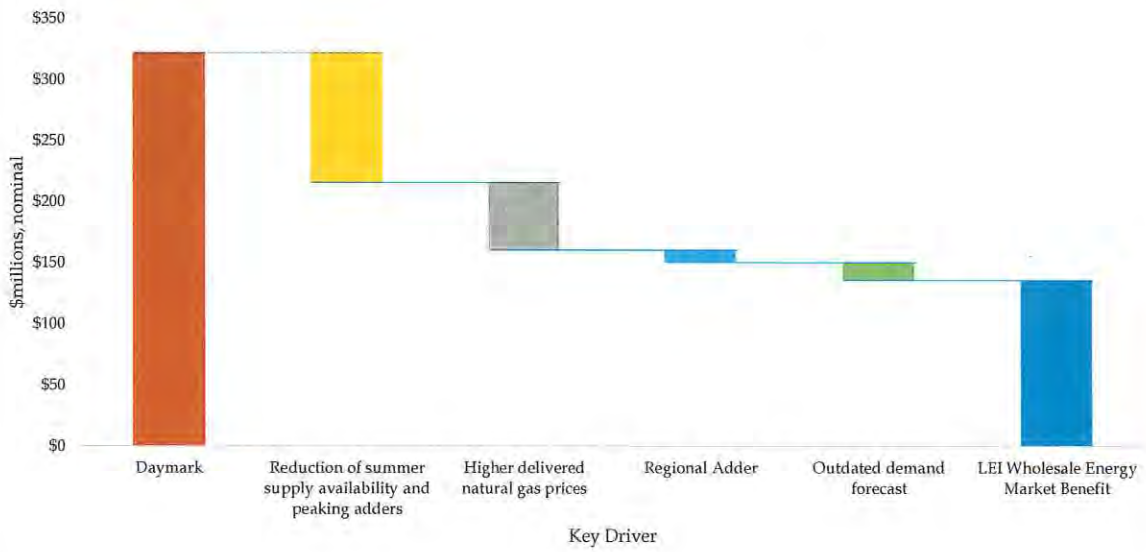
[49] In testing the impact of the various drivers of energy market benefits, LEI only conducted one single seed. Therefore, LEI's baseline shown differs slightly from the average of the 20-seeds.

for the super peaker adder and the summer availability, the energy market benefits increased to 119% above LEI's baseline estimate.

- Lastly, LEI estimated that the contribution to Daymark's energy market benefits from the higher demand forecasts in CELT 2016 increased the energy market benefits to roughly 129% above LEI's baseline estimate.

By stacking these increments on top of LEI's baseline, most of Daymark's higher energy market benefits could be accounted for. Overall, for the reasons described below, LEI believes that these four assumptions significantly overestimate the energy market benefits.

Figure 24. Illustration of LEI's estimate of the impact of key assumptions in Daymark's annual average energy market benefits in New England



Note: The key drivers shown above are scaled to illustrate the relative impact of each driver in Daymark's analysis

4.1.2 Daymark's simplified modeling of maintenance and forced outages by de-rating monthly availability creates perpetually tight summer supply conditions, high summer LMPs, and therefore high LMP reductions

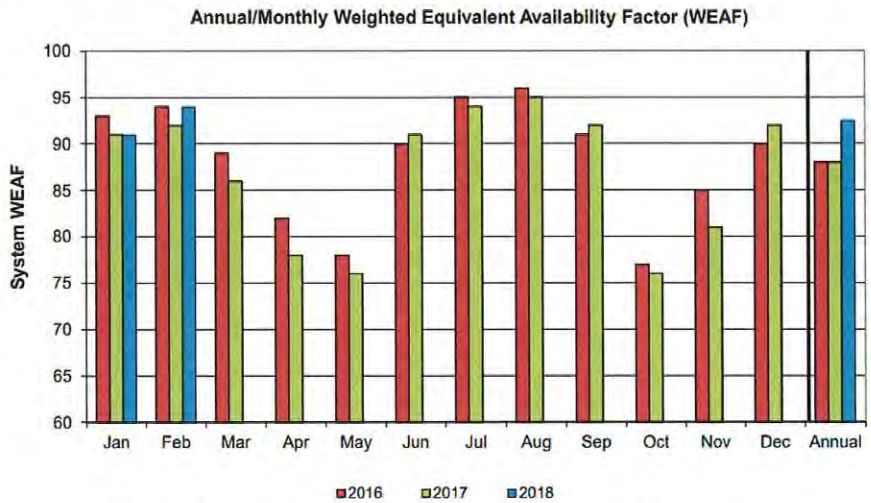
LEI understands that AURORA "limits the amount of capacity available to dispatch to reflect a normalized amount of forced outage per hour such that the annual generation of AURORA units reflect the annual forced outage rate assumed for that unit."[50] It is well understood that for thermal units, warm ambient air temperature typically reduces unit performance. As a result, the Seasonal Claimed Capability ("SCC"), which represents the amount of capacity determined by ISO-NE's capability audits during the summer and winter months, are typically lower in the summer than in the winter. However, while capacity supply is lowest during the summer, this is

[50] Daymark response to ODR-003-021. Daymark also noted in the April 5, 2018 technical session that the de-rating also reflects maintenance, not just forced outages.

when demand is highest. Therefore, most units will typically avoid maintenance during the summer – particularly intermediate resources that will run much more often during the summer and therefore earn energy market revenues.

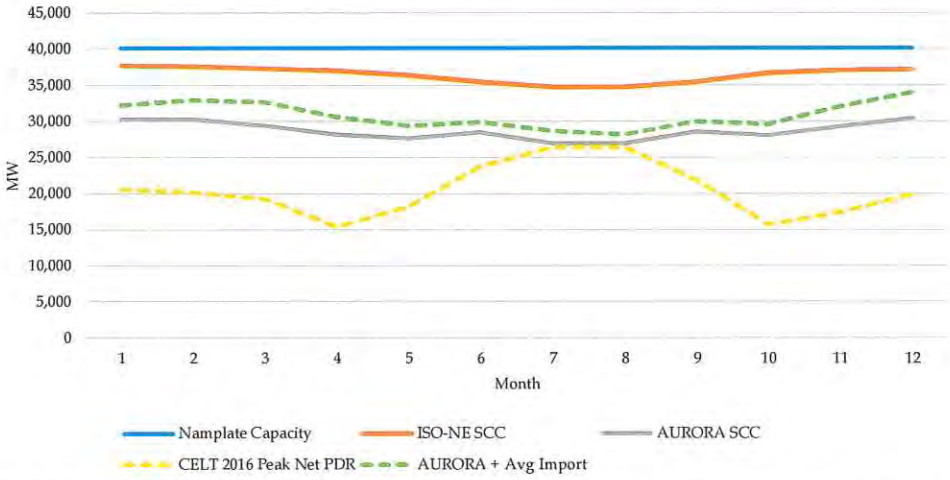
Forced outages are much less predictable than maintenance and can vary by plant and technology type. If a unit experiences a forced outage, its available capacity will fall to zero (unless it is only a partial de-rate). In other periods, when a unit is not on forced outage, then the available capacity is high. For planning purposes, ISO-NE calculates what is known as the weighted average equivalent availability factor ("WEAF") for units in New England. As shown in Figure 25, the highest rates of monthly availability typically occur in the summer when resources are needed the most to meet demand.

Figure 25. System unit availability in New England



Source: NEPOOL Committee Meeting Report, March 2018. <https://www.iso-ne.com/static-assets/documents/2018/03/20180302_npc_addl.pdf>

Figure 26. Daymark's assumed monthly supply and demand in ISO-NE's energy market, 2023



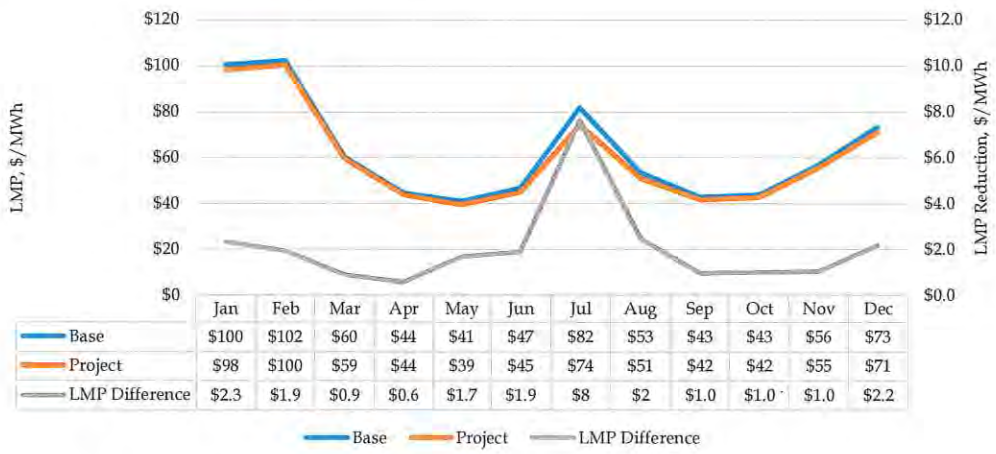
Source: ODR-003-021, CELT 2016. AURORA + Avg Import includes the average hourly import volume per hour

In analyzing the amount of capacity available in Daymark's energy market modeling against the monthly peak demand in each month based on CELT 2016, LEI found that capacity is very tight in the summer months, likely requiring highly expensive generation to run in order to meet demand. Figure 26 shows the monthly supply and demand in ISO-NE's energy market in 2023. The blue line represents total nameplate capacity, while the orange line shows the capacity based on SCC.[51] The grey line is the capacity available for dispatch based Daymark's approach to de-rating units. This represents a reduciton of 18% to 24% in capacity from the ISO-NE SCC values across all months.

The implication of having such tight supply when demand is highest is that it requires resources from the steep portion of the generation supply curve (causing high energy market prices). Because the marginal unit is from the steep portion of the curve, the flows from NECEC could have very large price reduction effects. While LEI believes such tightness is possible during extreme weather or load conditions, LEI finds it unlikely that this would reoccur every single year as Daymark's analysis implies. Daymark's high energy prices are also incongruent with historical monthly energy prices (see the implied market heat rates in Figure 32).

Figure 27 below shows an example of the average monthly LMP reductions in the first year that NECEC is in service from Daymark's analysis. Because of the very steep supply curve in July, NECEC is able to reduce LMPs much more effectively than in other months, when demand crosses the flatter part of the supply curve. This issue grows over time, as natural gas prices and demand rise.

Figure 27. LMP reductions in Daymark's analysis, 2023



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Base	$100	$102	$60	$44	$41	$47	$82	$53	$43	$43	$56	$73
Project	$98	$100	$59	$44	$39	$45	$74	$51	$42	$42	$55	$71
LMP Difference	$2.3	$1.9	$0.9	$0.6	$1.7	$1.9	$8	$2	$1.0	$1.0	$1.0	$2.2

Source: ODR-003-022.

4.1.3 Daymark's natural gas price methodology overestimates the cost of gas in New England

Both LEI's and Daymark's analysis use EIA's Henry Hub outlook albeit in different ways. In the short-term (2018 and 2019) LEI relied on the forward markets for projecting Henry Hub gas

[51] Ibid.

prices. LEI depends on forwards only to the extent they are liquid, and liquidity drops off dramatically after two years. For the longer term, the eventual increase in gas prices in the EIA's AEO 2018 Reference Case forecasts is consistent with the four key North American natural gas supply and demand trends discussed in Section 7.3. However, LEI believes that EIA's typically conservative outlooks for natural gas production growth have led it to ignore the impact of strong production on gas prices in the near term. EIA's Reference Case outlooks have shifted downward substantially in recent years (see Figure 56 in Section 7).

Daymark's New England natural gas index outlook is significantly higher than LEI's as shown below in Figure 28 because Daymark used EIA AEO prices directly (absolute levels) while LEI adjusts it forecast for near-term realities (by using forwards in the near term), and then escalates its forecast using the AEO growth rates. EIA's Reference case outlooks have been under-forecasting gas supply and over forecasting near-term Henry Hub prices for several years, which is why LEI chooses not to use Henry Hub absolute price levels in our gas price outlook.

Furthermore, Daymark has said that their model used the AEO 2017 outlook (Figure IV-3 on their report).[52] However, LEI checked Daymark's gas index price provided on April 2018 as a response to a DR (ODR-003-015_Att_1), as well as Figure IV-3 in the Daymark report, and the data in the figure is from AEO 2016 outlook and not from AEO 2017. If Daymark used the AEO 2016 outlook, their gas price outlook is 7% higher than if they used AEO 2017.

Figure 28. LEI versus Daymark Henry Hub and New England price outlook

Source: LEI and Daymark Report Exhibit NECEC-5

4.1.4 Daymark's New England natural gas index price outlook is an average market price and therefore should not include adders

Daymark's New England natural gas forecast is a New England annual average price, referred to by Daymark as an "index price," a monthly shaping factor, and a set of adders to create separate

[52] ODR-EXM-003-024.

natural gas outlooks for plants located in northern New England and for peaking plants (see Figure 29).

Figure 29. Daymark New England January and July natural gas prices in 2023 (recreated by LEI)

Source: Recreated with data from Daymark Report, Exhibit NECEC-5 and answers to DRs[53]

Regional adder

The regional adder is an additional layer of gas price cost applied to generators located in northern New England (Maine, New Hampshire, and Vermont). Daymark explained that they developed this adder in the process of calibrating their model; the added cost is needed to replicate the pattern of generation by the plants in these regions.[54] Daymark calculated the regional adder based on the annual backhaul rate for firm transmission ("FT") from the Maritimes and Northeast Pipeline ("M&NE") scaled for each month by the Portland Natural Gas Transmission System ("PNGTS") monthly rate multiplier. This approach implicitly assumes northern New England plants use FT services for natural gas delivery all the time. However, most plants use interruptible transmission ("IT"), which has lower rates than FT.

Peaking unit adder

On top of the regional adder, Daymark applied another adder to plants that they argued generate only during peak days or hours. According to Daymark, the adder aims to represent the higher cost of procuring fuel during high demand periods, when peaking units are burning gas. This adder creates a separate natural gas outlook for the peaking units in Figure 30 (column "Resources in Class").

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[53] Index Price from IECG-003-003_Att_1 CONFIDENTIAL (2017-00232); Monthly adder from EXM-002-016_Att_1; Regional adder from EXM-002-018_Attachment_1_(2017-232); and Peaking adder from Daymark Report Exhibit NECEC-5, Table IV-1 (Page 49 of 98).

[54] Transcript 5 Tech Session CONFIDENTIAL, pg. 122-123

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Figure 30. Daymark peaking unit adder

Natural Gas Delivery Class	Fuel Adder (2017$/MMBtu)	Resources in Class
Peaking	$0.89	New Haven Harbor Units 2-4 (151MW); Androscoggin Energy Center CT03 (51MW); Swanton Peaking Generation Project #10 (40MW); Algonquin Windsor Locks (38MW); Lowell Cogeneration #GEN1-2 (32MW); Capital District Energy Center STG (29MW); Waters River #1 (20MW); Pawtucket Power #1 (20MW); 15 smaller units totaling 33MW.
Super Peaking	$1.74	Devon 11-14 (161MW); Cleary Flood #9a (106MW).
Standard (Non-Peaking)	$0.00	All Remaining units.

Table IV-1. NMM Peaking Unit Fuel Price Adder Assumptions

Source: Daymark Report Exhibit NECEC-5. Table IV-1 (Page 49 of 98)

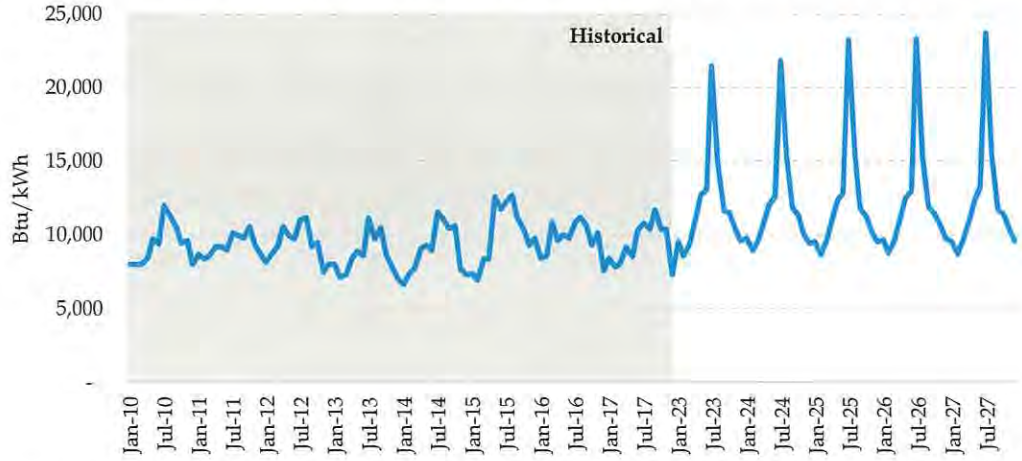
LEI believes this methodology does not accurately represent the pattern of operations of peaking units and the inherent gas (fuel) costs that these units would face. The Androscoggin Energy Center CT03, for example, operates throughout the entire year, not just at peak demand hours in the summer (see Figure 31). In fact, it has run most in September, when natural gas prices are typically low, and December when gas prices have not yet reached their seasonal (January and February) peaks. In Daymark's model, this unit is paying a premium above the monthly price for every hour it runs.

Figure 31. Androscoggin Energy Center CT03 generation profile (accumulated generation by month from 2012 to 2017)

Source: Ventyx Velocity Suite

When compounding the impact of tight summer supply, a high natural gas price for New England, and peaking adders, the result is extremely high implied market heat rates that far exceed historical evidence as shown in Figure 32 below.

Figure 32. New England monthly implied heat rate – historical and Daymark outlook



Source: SNL (2010-2017) and Daymark (2023-2027)[55]

4.1.5 Daymark used a higher energy demand forecast

One other key difference is that as described in pg. 4 of the Daymark Report, Daymark used the CELT 2016 forecast, as Section 2.3.1.2 of the MA 83D RFP notes that "[t]he reference case system topology will be based on the 2016 ISO New England Capacity, Energy, Load and Transmission (CELT) report." Total demand net of energy efficiency and behind-the-meter solar PV in CELT 2017 is approximately 4-5% lower than in CELT 2016. Because the energy market costs are a direct function of the level of energy demand, higher energy demand will result in higher energy market benefits.

4.2 Comparison of capacity market benefits[56]

Capacity market benefits stem from the fact that NECEC would result in lower capacity prices. Figure 33 below shows the capacity prices in the Base Case and Project Case in LEI's and Daymark's analysis, against the Net CONE.[57] It shows that LEI's long-run capacity prices are higher as a result of LEI's higher Net CONE assumption (based on the extrapolation of ISO-NE's Net CONE assumption) estimate for FCA #12, while Daymark extrapolated the Net CONE based on the results of FCA #10 in which the FCA concluded with new entry at $7.03/kW-month. On

[55] Historical data was calculated with the monthly average of New England Internal Hub DA LMP prices and Algonquin prices. Daymark's implied heat rate was calculated with Daymark's Base Case LMP price outlook provided on ODR-003-022_Att_1 and Daymark's gas index price outlook provided on ODR-003-015_Att_1.

[56] LEI did not conduct a MOPR analysis of NECEC to determine whether it would clear the primary auction as CMP did not provide sufficient data for LEI to perform such an analysis. In this section, all the comparisons are based on the assumption that NECEC would clear in the primary auction for FCA #14. However, if NECEC clears the through the substitution auction, then the wholesale capacity market benefits would fall to zero and therefore the electricity market benefits to electric ratepayers would be smaller.

[57] LEI understands that Daymark used the ISO-determined Net CONE for the purposes of setting the price cap. However, the assumed entry prices for new capacity used a modified Net CONE or investment trigger price, which is what is shown in Figure 33 of the Daymark Report.

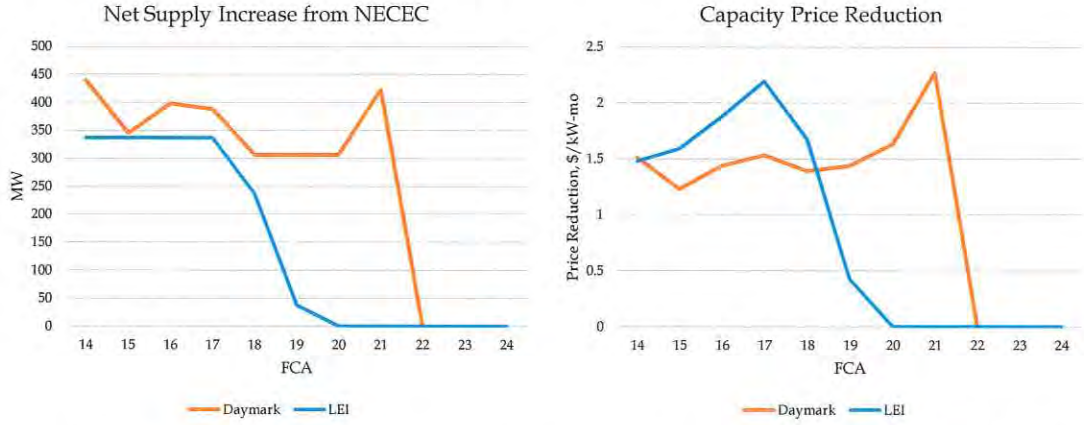
top of the lower net CONE assumption, Daymark's outlook projects that New Entry constantly clears below its "modified Net CONE" value, leading to lower long-run capacity prices.

Figure 33. Comparison LEI's and Daymark's wholesale capacity price forecasts

Note: Daymark's capacity market analysis for NECEC concluded after FCA 24. However, only eight years of benefits (up to FCA #21) were included.

Daymark's analysis projects that the capacity market benefits will end after eight years (FCA #14 - #21) when the first generic new entry enters the Base Case in FCA #22. In LEI's model, the convergence of the Base Case and Project Case converges after six years, two years earlier. As shown on the left side of Figure 34, despite 1,090 MW of capacity, NECEC only results in 300 – 400 MW of *incremental* capacity in New England because of market response. Over time, new resources will be added to the system in the Base Case first, until the point where the Base Case and Project Case reach approximate parity.

Figure 34. Comparison of net supply from NECEC and capacity price reduction



Note: For this figure, LEI applied a value of zero for FCA #23 and #24 to Daymark's figures, to account for the fact that no capacity market benefits are assumed in these years.

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The wholesale capacity price reduction on the right side of Figure 34 also shows a similar trend, whereby the highest capacity market price reductions occur when there is the greatest level of oversupply in the Project Case relative to the Base Case. Over the first few years, Daymark projects a smaller price-reducing impact than LEI. This is because Daymark's capacity market assumptions lead to a propensity to accept oversupply, as discussed in more detail below. The following sections explain the major differences in capacity market price levels, and the wholesale capacity market benefits between the LEI and Daymark reports.

4.2.1 LEI calculated the impact of Daymark's assumptions on capacity prices

Figure 15 below demonstrates LEI's calculation of approximately how much each assumption (or driver) discussed below contributed to New England capacity market benefits. LEI layered each of the three drivers on top of LEI's estimate of the capacity market benefits (LEI baseline).[58] Because the timeframe for benefits is different between LEI's and Daymark's analyses, LEI compared the *cumulative* capacity market benefits.

- First, LEI changed the price for new entry to Daymark's modified Net CONE. This lowered the long-term capacity prices and reduced LEI's cumulative capacity market benefits by 26%.

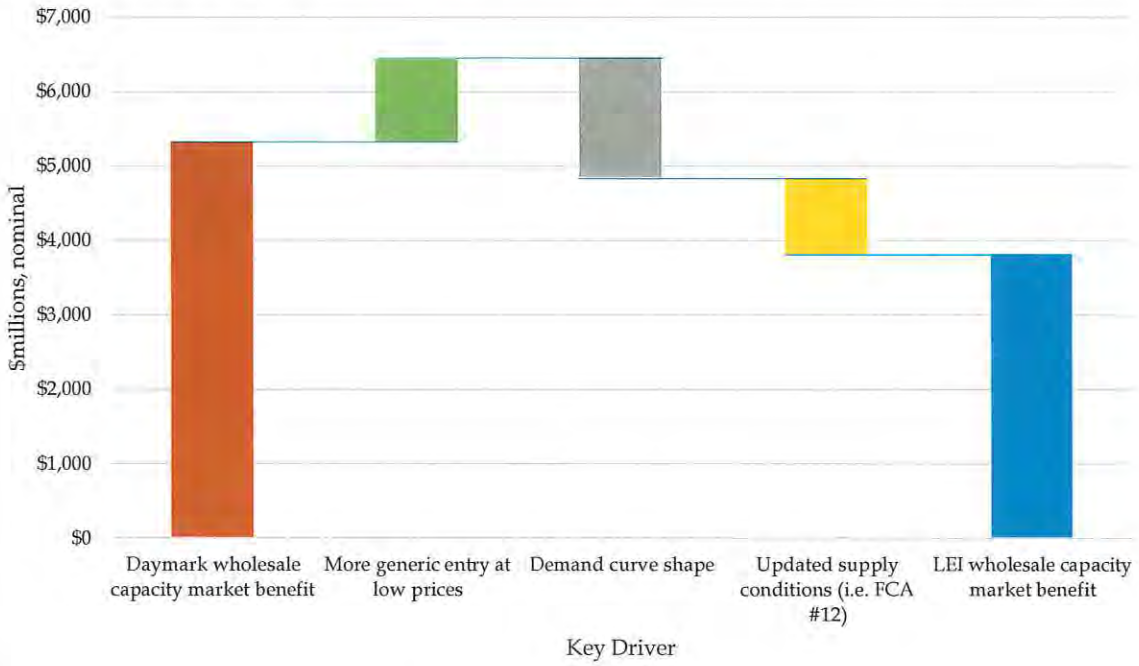
- Second, LEI use Daymark's level of cleared capacity in the Base Case and Project Case (which does not include FCA #12 results and more recent retirement de-list bids). Combined with Daymark's lower investment trigger prices for new capacity, the difference in starting points increased the capacity market benefits to 11% above LEI's estimate.

- Third, LEI adjusted the penalty factor to the constant value that Daymark used in their analysis. This increased the wholesale capacity market benefits to 35% above LEI's capacity market benefits.

By stacking these components on top of LEI's baseline, LEI obtained a similar level of capacity market benefits as Daymark. Despite the low entry prices that Daymark assumed for new generation (which has the effect of reducing the capacity market benefits), LEI believes that when the drivers are taken together, the overall capacity market benefits are overstated in the Daymark analysis, given market developments since Daymark wrote their report. In addition, if the project does not clear in the FCA, then LEI would expect capacity market benefits to go to zero, as the goal of the substitution auction under CASPR is to create a one-for-one swap of capacity such that capacity prices to ratepayers do not change.

[58] In testing the impact of the various drivers of energy market benefits, LEI only conducted one single seed. Therefore, LEI's baseline shown differs slightly from the average of the 20-seeds.

Figure 35. LEI's estimate of key driver impacts in Daymark's cumulative capacity market benefits in New England



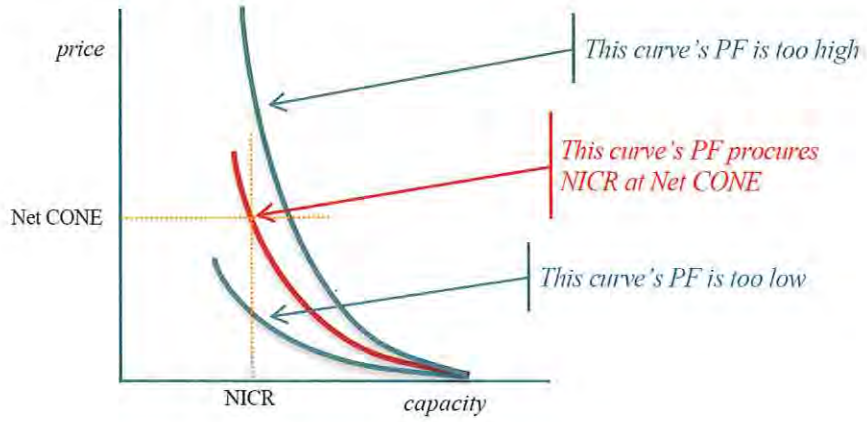
Note: The key drivers shown above are scaled to illustrate the relative impact of each driver in Daymark's analysis

4.2.2 Daymark's capacity prices are not accurately calibrated to account for changes to Net CONE and NICR over time, resulting in a capacity price that takes longer to reach long-run equilibrium and prolonging capacity market benefits

To account for changes each year, Daymark shifted the demand curve to the right by the growth in NICR. Daymark also adjusted the price cap (set at 1.6x Net CONE) to adjust for Net CONE growth over time. By ISO-NE's design, this should steepen the demand curve to properly send accurate price signals in the market, since it must attract new investment that becomes more expensive over time.

However, as described in Section 6.2, the capacity price is the penalty factor multiplied by the MRI, and therefore the penalty factor used will directly impact the capacity price. In order to scale the MRI curve properly and account for the growth of Net CONE, the penalty factor must be adjusted such that if the market procures *exactly* the same amount of capacity as NICR, the resulting capacity price should clear exactly at Net CONE. Figure 36 below is from one of ISO-NE's technical memos regarding where the penalty factor should be set.

Figure 36. Setting the penalty factor



Source: ISO-NE. FCM Zonal Demand Curve Methodology – Revised Edition. December 7, 2015.

While Daymark does increase the price cap to account for the growing Net CONE, it does not adjust the penalty factor to scale the MRI curve properly. The impact of not adjusting the penalty factor will result in capacity prices that take longer to rise (essentially, the capacity price will be too high relative to the level of cleared capacity). As shown previously in the right side of Figure 34, the capacity price reduction rises in LEI's curve even though the oversupply in the Project Case relative to the Base Case is constant. This demonstrates that the penalty factor is being adjusted along with the Net CONE growth. As a result, capacity prices rise faster in LEI's analysis, and therefore the market rebalances faster as well.

A second issue with Daymark's model is that the penalty is actually calibrated for a much higher Net CONE of $10.95/kW-month. This was easily tested by determining the clearing price when the qualified capacity is equal to NICR. This further adds to the fact that Daymark's model is not properly calibrated to develop capacity prices that are consistent with the quantity levels assumed.

4.2.3 Daymark's modified Net CONE for new entry leads to lower long-run capacity *price levels* and persistent oversupply in the capacity market

ISO-NE calculated that the Net CONE for FCA #12 was $8.04/kW-month, based on its estimate for a combustion turbine. Daymark notes that the "ISO estimates reflect generic assumptions and forecasts of costs and revenues, and generally does not reflect actual bids from market entrants. In fact, several new resources cleared the market in FCA 10, when the clearing price was just over $7.00/kW-mo. This indicates that new generation projects are viable when clearing prices are lower than the ISO-NE Net CONE value."[59] However, Daymark did not note that several of the units that cleared FCA #10 were developed at brownfield sites (i.e. Bridgeport Harbor and Canal), or have been able to make use of tax incentives in the form of bonus depreciation.[60] Because actual

[59] Daymark Report, pg. 10.

[60] 30% bonus depreciation is allowed for units in service by 2019.

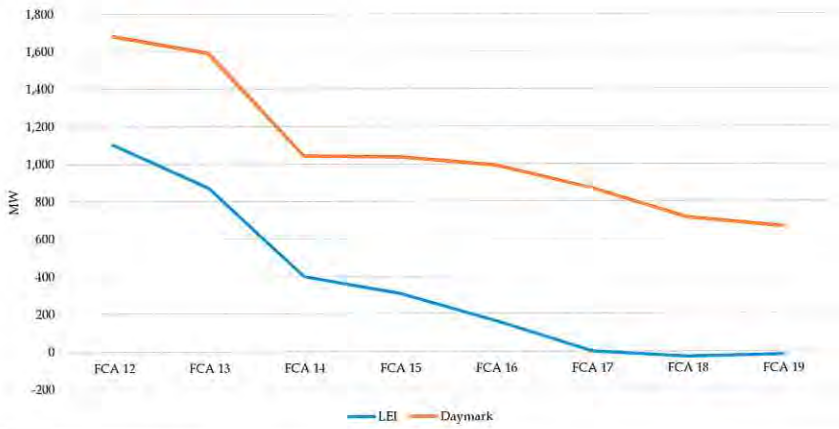
bids can vary significantly from project to project, LEI's analysis adopted ISO-NE's estimates which was vetted through the ISO Markets Committee.

The impact of using Daymark's reduced Net CONE is that the new entry enters the FCM in the Base Case sooner. Because Daymark assumes that there are no capacity market benefits after new entry enters the FCM in the Base Case, a lower Net CONE to trigger new entry actually *reduces* capacity market benefits. LEI estimates that the capacity market benefits in FCA #22 in Daymark's analysis would be even higher than in FCA #21 if they used a higher price for new investment (see Figure 34). However, this does not imply that Daymark's analysis is conservative. Rather, LEI believes Daymark's capacity market analysis is not formulating capacity prices correctly as discussed in the previous section due to the PF.

4.2.4 Daymark's analysis exhibited a high level of oversupply, resulting in lower short-term capacity prices than LEI's analysis

Another issue that LEI considered was whether Daymark's starting point for analysis (FCA #12) adopted reasonable assumptions. The latest auction that occurred at the time Daymark prepared its analysis was FCA #11. In FCA #12, total demand resources grew by 390 MW from 3,210 MW to 3,600 MW. However, this growth in demand was offset by the dynamic de-list of Mystic 9. As a result, FCA #12 was only oversupplied by 1,103 MW, while in Daymark's starting point for the analysis, FCA #12 was 1,685 MW above its assumed NICR. LEI believes that the effect of this oversupply in Daymark's analysis for FCA #12 carries into FCA #14, resulting in lower capacity prices than LEI's, particularly over the first few FCAs that NECEC is in service. This is shown below in Figure 37, whereby Daymark's oversupply is long-lasting, resulting in lower capacity market prices in their Base Case and Project Case and therefore a longer capacity price difference.

Figure 37. Comparison of net oversupply relative to NICR in LEI's and Daymark's Base Case



LEI believes that the reason Daymark's model exhibited such a high degree of oversupply is due to the fact that the penalty factor is set too high. For example, while FCA #12 cleared with 1,103 MW above NICR at $4.63/kW, Daymark's analysis suggests FCA #12 would have cleared with

1,685 MW above NICR at $[redacted]/kW-month.[61] This incorrect price formation carries over in future years.

By FCA #14, ISO-NE is expected to implement the full MRI curve. All else being equal, compared to the transition curve, LEI expects capacity prices to drop due to the convex shape of the MRI demand curve. In LEI's Base Case, this caused some resources to retire in FCA #14, namely the remaining coal units. As discussed previously, because the penalty factor in Daymark's analysis was set too high, the resulting capacity price was also too high relative to the level of oversupply. It is likely that if the penalty factor was calibrated appropriately, capacity prices (in both Daymark's Base Case and Project Case) would drop, causing more de-lists or retirements in the Base Case and Project Case.

4.3 CO_2 emissions reductions

CO_2 emissions reductions are a function of the emissions rates of the resources that NECEC will replace. By and large, New England's generation is natural gas-fired, meaning that NECEC is likely to displace [redacted] GWh of natural gas generation, which typically has emissions rates of approximately 700-1,000 lbs./MWh.

LEI finds that Daymark's estimate of 3.4 million metric tons is reasonable, but perhaps slightly conservative. Based on Daymark's own analysis, supply conditions in New England can become very tight during the summer, which would likely result in more oil-fired generation, which typically has a higher emission rate than natural gas units. Therefore, intuitively, since the energy flows are comparable, Daymark's tight supply conditions should, at least in theory, yield higher CO_2 emissions. The most likely explanation is that there are slight differences between the emissions rates assumed for the resources that are being offset by NECEC between LEI's and Daymark's models, although the results suggest that it is not much. Figure 38 below shows the CO_2 emissions reductions in LEI's and Daymark's analysis side-by-side.

[61] LEI understands that for FCA #12, Daymark used the MRI curve to establish a capacity price and added $1.6/kW-month.

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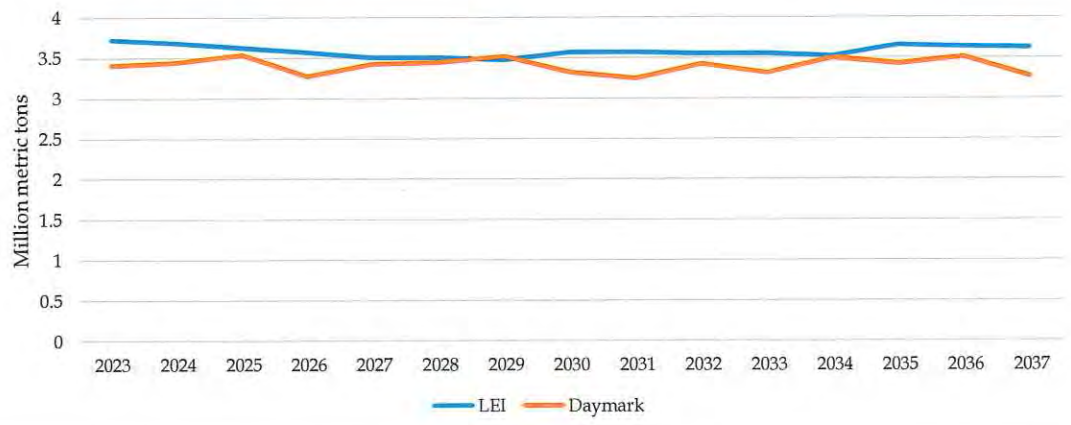
Figure 38. Comparison of CO_2 emissions reductions in LEI's and Daymark's analysis



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5 Comparison of LEI and USM Macroeconomic Benefits Analysis

This section provides LEI's evaluation of USM's analysis based on a side-by-side comparison of LEI's and USM's results. LEI finds USM's analysis for the development and construction period to be reasonable, although the relatively high local share of the development and construction cost remains subject to some uncertainty in terms of realization of those positive macroeconomic impacts to Maine. During the operations period, USM over-estimated the macroeconomic benefits of the operations of NECEC, because it relied on inflated electricity market benefits provided by Daymark. The inputs USM used in its macroeconomic model for measuring the electricity market benefits were also incomplete as they ignored the capacity market benefits, contract costs, and the impact of early retirement. During the first 15 years of operations period (2023-2037), LEI projects 272 new jobs per year and $27.1 million GDP increase per year for Maine related to the project's O&M activities and ratepayers' electricity savings.

For the macroeconomic impacts during the development and construction period, the differences between LEI's and USM's results are fairly minor. However, LEI is concerned about the assumed high share of the project cost USM attributed to activity Maine. Limited by the lack of granularity in the cost estimates provided by CMP, LEI cannot verify if the 60% local cost share is reasonable. If the local share of the project's cost turns out to be 10% lower, the estimated macroeconomic benefits in terms of incremental jobs and GDP for Maine will drop by 10%.

LEI found the macroeconomic impacts during the operations period, especially with regards to the ratepayers' benefits in USM's study are overstated in certain ways, and incomplete in other respects. First, the wholesale energy market benefits estimated by Daymark and used by USM for modeling macroeconomic benefits are based on higher fuel price forecasts and an artificially inflated supply shortfall in the summer months. These flaws in the energy market modeling results have led to an overestimation of macroeconomic impacts.

Second, USM only studied the impact of wholesale energy cost reductions and did not consider the impacts from the capacity market,[62] the contract costs borne by Massachusetts ratepayers, the early retirement of generation capacity triggered by the project, and deferred investment in local new generation due to introducing lower-cost resource to the New England power market.[63] All these factors should be considered in an integrated manner for analyzing the project's impacts on the Maine and New England regional economy. A detailed discussion of the operations period analysis is presented in Sections 5.3 and 5.4.

5.1 Comparison for the development and construction period

LEI's analysis is based on the updated project cost and is compared with USM's modeling results which are based on the original project cost. For the purpose of an apples-to-apples comparison,

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[62] As mentioned in footnote 56, in this section, all the comparisons are based on the assumption that NECEC would clear the primary auction for FCA #14. However, if NECEC clears the FCA through the substitution auction, then an equivalent amount of supply would need to exit the FCA and the capacity market benefits would be zero. And the macroeconomic benefits would be reduced.

[63] Lastly, USM did not convert the wholesale capacity impact into a retail rate impact figure, which is more appropriate in evaluating the impact of NECEC on New England's retail consumers.

LEI also modeled the original project costs using LEI's approach and compared the results with USM's approach (see Appendix C).

As shown in Figure 39, in general, LEI's estimates for macroeconomic benefits for the development and construction period are similar to USM's results. LEI's estimated annual average job creation is 4% lower than USM's results, and LEI's estimated GDP increase is 4% higher than USM's results. The difference in total compensation is marginal.

Figure 39. Side-by-side comparison of the development and construction period

Economic Impact Category	Unit	Annual Average (2017-2022)		Differences
		USM	LEI	
Direct Employment	Individuals	868	856	-1%
Indirect & Induced Employment	Individuals	824	775	-6%
Total Employment	Individuals	1,691	1,631	-4%

Economic Impact Category	Unit	Total (2017-2022)		Annual Average (2017-2022)		Differences
		USM	LEI	USM	LEI	
GDP	Millions of Fixed 2009 $	$564.8	$589.0	$94.1	$98.2	4%
Total Compensation	Millions of Nominal $	$435.7	$433.6	$72.6	$72.3	0%

The small differences in results can be explained by two factors. First, LEI's analysis is based on the updated local project cost estimates, which are 2% higher than the original project cost estimates. This may lead to slightly higher overall GDP and job increases for Maine in LEI's analysis. Second, LEI used more detailed industrial sectors for modeling the development and construction costs, based on the available cost breakdown provided by USM and CMP. This resulted in minor differences in the macroeconomic outcomes given that the project investment is captured and modeled through different interconnections among relevant sectors in the REMI PI+ model.

5.2 Drivers of differences between LEI's and USM's analysis of the development and construction period

LEI's major concern about USM's analysis for the development and construction period is the high share of the project's local spending in Maine provided by CMP, which leads to inflated macroeconomic benefits. LEI has two minor concerns with regard to the modeling methodology and how the results were presented. Aside from these, LEI finds USM's analysis for the development and construction period to be reasonable.

5.2.1 USM assumes an unusually high share of local spending of the project cost

The share of local expenditures (i.e., Maine) estimated in the original cost estimate comprises 56.2% of the project costs, while 60.4% of the updated total project costs are estimated to be local. USM compared the local share of the NECEC project cost with that of the Maine Power Reliability Program ("MPRP") project, whose share of local spending was estimated to be 67% and claimed that local share estimate of the NECEC project is reasonable. However, the two projects (NECEC and MPRP) are very different. MRPP is a 345kV line while NECEC project is an HVDC

transmission line. HVDC projects generally require more skilled labor and equipment to be sourced from other states.

Without more detailed project estimates than those provided by CMP, LEI cannot determine if the local cost estimates are reasonable. However, comparing to what LEI has observed in other engagements involving other HVDC transmission projects, this local share appears to be on the high end. If the actual project spending was to be 10% lower, then it would be expected to see a drop by approximately 10% in the projected macroeconomic benefits as well, based on LEI's prior analysis.

5.2.2 Jobs created by the project should not be considered cumulatively

USM's report shows cumulative job increases for the development and construction periods.[64] However, the REMI PI+ model outputs job increases in the term of Job-Year, meaning that a job created in the first year of the construction period and lasting for the entire four years of the construction period will appear as a job increase in every year. Therefore, showing the cumulative number of new jobs is misleading to readers who are not familiar with the characteristics of REMI PI+ models. Presenting the annual average employment change is a better and more meaningful metric to understand the macroeconomic impact of the project. Therefore, the Table 1.1 on page 1 of the USM report should read as "during the development and construction periods, the NECEC project is expected to generate 1,691 total jobs per year between 2017 and 2022" not 10,147 total jobs between 2017 and 2022.

5.2.3 USM modeled construction cost at a very general level

USM modeled project cost at a general level by using only three cost categories, namely (i) construction, (ii) management of companies and enterprises, and (iii) professional scientific, and technical services. Using general categories of inputs in the REMI modeling might result in inaccurate outcomes. For example, the REMI PI+ model will take the total amount of project spending in the construction sector and then automatically spread and allocate it to subsectors of construction based on the configurated input/output relationship among these sub-sectors, which include power infrastructure construction, residential structure construction, and educational and recreational structure, etc. Some of these sub-sectors such as residential structure construction, are not relevant to the project and may distort the modeling results.

Given that the 70-sector PI+ model allows us to model project cost with more granularity, LEI chose a set of more detailed and relevant policy variables for modeling the construction cost impacts on the Maine economy. LEI also tested modeling the original project cost at a more detailed level and compared the results with USM's estimates based on the same set of project cost estimates, for the purpose of an apples-to-apples comparison. Results show that LEI arrived at local job creation estimates that are about 6% lower than USM's estimates (see Appendix C). LEI's estimate of GDP increase is 2.5% higher while the total compensation increase is 1.5% less than USM's estimates.

In conclusion, LEI finds USM's macroeconomic analysis for the development and construction period might be over-estimated given the high assumed percentage of local (Maine) spending.

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[64] See Column "Total" in Table 1.1 on pg. 1 of the USM Report, 4.1 on pg. 9 of the same USM Report, and Table 10 on pg. 4.3 of the USM's Report.

LEI also wants to stress that the new jobs and GDP increases in the development and construction period are temporary and will dissipate once the construction is completed. Furthermore, not all the new jobs will be filled by Maine residents, but would also have migrants who would temporarily move to Maine to work on this project.

5.3 Comparison of the macroeconomic impacts during the operations period

As shown in Figure 40 and Figure 41 below, LEI's estimates for the macroeconomic impacts during the operations period due to the NECEC project is significantly higher than USM's estimates in the first five years of the operations of the project, but is lower for the latter period. In fact, LEI's modeling results show that during 2033-2037, Maine and New England are expected see economic losses. This is mainly due to the fact that LEI included the contract costs while USM did not, and is also because of the rebound effect as discussed in Section 3.3.

Figure 40. Estimated macroeconomic impacts on employment in Maine during the operations period (2023-2037)

Scenario	Economic Impact Category	Unit	Operations 2023-2027	Operations 2028-2032	Operations 2033-2037	2023-2037 Average
USM's Results (a)	Total Employment	Individuals	357	351	278	329
	GDP	Millions of Fixed 2009 $	$22.7	$27.7	$27.1	$25.8
LEI's Results (b)	Total Employment	Individuals	655	244	-25	291
	GDP	Millions of Fixed 2009 $	$54.0	$27.2	$5.9	$29.1
Differences [(b-a)/a]	Total Employment	%	83%	-30%	-109%	-11%
	GDP	%	137%	-2%	-78%	12%

Figure 41. Estimated macroeconomic impacts on GDP and compensation in New England during the operations period (2023-2037)

Scenario	Economic Impact Category	Unit	Operations 2023-2027	Operations 2028-2032	Operations 2033-2037	2023-2037 Average
USM's Results (a)	Total Employment	Individuals	4,129	3984	3091	3,735
	GDP	Millions of Fixed 2009 $	$365.1	$432.2	$421.3	$406.2
LEI's Results (b)	Total Employment	Individuals	6,084	858	-1,465	1,826
	GDP	Millions of Fixed 2009 $	$591.0	$139.8	-$115.0	$205.3
Differences [(b-a)/a]	Total Employment	%	47%	-78%	-147%	-51%
	GDP	%	62%	-68%	-127%	-49%

Note:
1. USM's results are based on wholesale energy market cost savings, while LEI's estimates are based on retail electricity market savings (including energy and the capacity markets), also adjusted for the net contract costs of the 83C RFP award being paid by Massachusetts electric ratepayers, and early retirement of generating plant.
2. Economic impacts from O&M in New England are not included in either USM's or LEI's aggregated results shown in Figure 40 and Figure 41, but are included in the Maine results, since those impacts were estimated within Maine.
3. Economic impacts in terms of incremental jobs and GDP are presented in the form of annual average of corresponding modeling period.

5.4 Drivers of differences from LEI and USM's analysis of the operations period

While the total macroeconomic benefits for Maine in terms of incremental GDP and jobs in the USM study and LEI study do not differ much, the analytical approach and results are quite different when looking at them component by component.

As illustrated in Figure 42 and Figure 43 below, including capacity market benefits significantly increase the total macroeconomic benefits in LEI's analysis. On the other hand, LEI's results show lower wholesale energy market benefits as compared to USM's study (which was based on inflated fuel prices). However, there are other opposing differences that net out the impact between two studies. For example, LEI's inclusion of capacity market benefits creates a higher job and GDP impact. On the other hand, taking into consideration the impacts from the contract cost paid by Massachusetts ratepayers lowers the macroeconomic benefits in Maine. In addition, the early retirement of generating plants will negatively impact the Maine economy as well. Although retail electricity consumers in Maine are assumed to be exposed to the entire amount of wholesale electricity price changes, retail consumers in other states in New England are expected to enjoy only a portion of the wholesale electricity cost savings and less macroeconomics benefits than if modeled with wholesale market savings. Such reduced macroeconomic benefits in other New England states will also impact the Maine economy.

Figure 42. Breakdown of macroeconomic benefits for the operations period between the USM and LEI studies in Maine, annual average jobs (2023-2037)

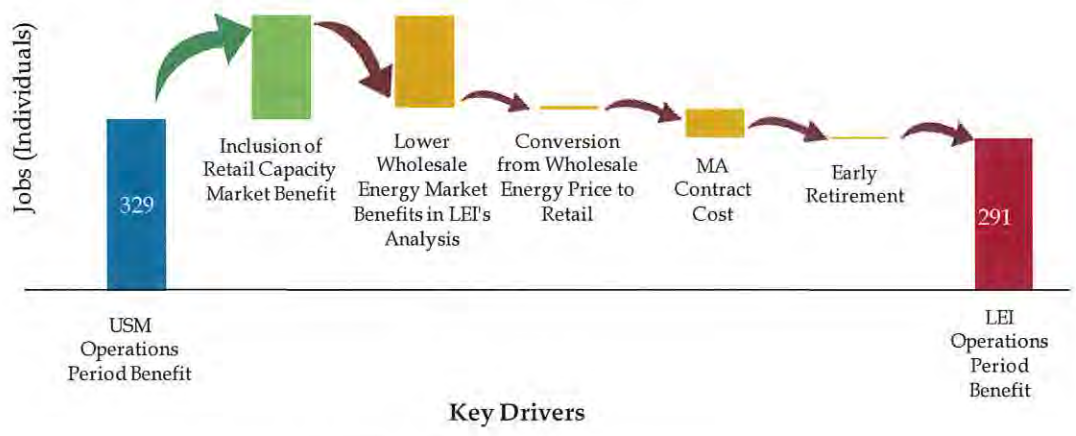

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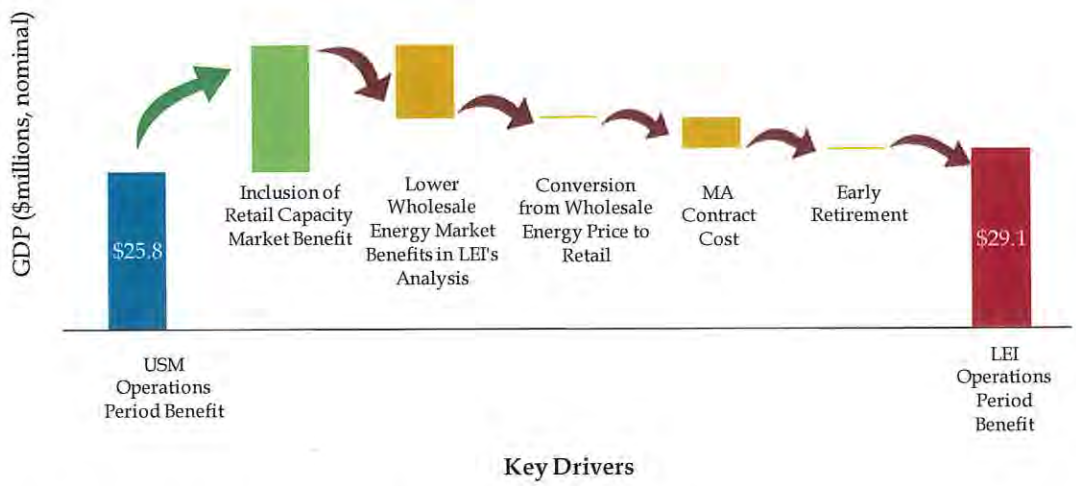
Figure 43. Breakdown of macroeconomic benefits for the operations period between the USM and LEI studies in Maine, annual average GDP (2023-2037)



Note: The "USM Operations Period Benefit" includes annual average incremental jobs and GDP during the operations period from O&M spending of the project and wholesale energy market benefit from the project. The "LEI Operations Period Benefit" includes annual average incremental jobs and GDP during the operations period from O&M spending of the project and retail electricity market benefit from the project.

5.4.1 Different components of ratepayers' savings between two studies

Figure 44 and Figure 45 provide a comparison between USM's and LEI's estimates for the electricity market benefits. [65] There are three main differences between LEI's and USM's electricity market savings and LEI documents the differences in the following sections.

<u>The wholesale vs. retail energy market savings</u>

USM adopted Daymark's wholesale energy market savings and fed that into the macroeconomic model. However, this approach is incomplete as it does not correctly reflect the electricity price change experienced by the ratepayers. In order to properly evaluate the impact of NECEC on New England's retail consumers, LEI converted the wholesale energy price impacts into a retail rate impact figure. To estimate the effect of the wholesale market changes on retail rates, LEI took into account limitations on retail load's exposure to wholesale market conditions. For example, in some states, utilities still own generation and that generation is under-regulated cost-of-service regime; therefore, through the continued operation of such regulated generation (which we also refer to as "self-supply"), the utilities' customers are shielded from wholesale market changes. Similarly, if a utility or retail load-serving entity has signed a long-term contract with fixed pricing terms (that are not indexed to the trends in the wholesale electricity market), the energy

[65] Aside from the conversion from wholesale price change to retail price changes, LEI further adjusted for net contract costs in Massachusetts, as well as potential early generation retirement triggered by the NECEC project in New England (discussed fully in Section 5.4.2 and Section 5.4.3 below).

and capacity terms of that contract would also limit retail customers' exposure to wholesale market prices. Based on LEI's research on the presence of long-term contracts in New England and regulated self-supply arrangements, LEI concluded that retail customers in Maine are exposed to 100% of the wholesale energy price changes, whereas in other five New England states, retail electricity consumers are exposed to 88% of wholesale energy price changes and 93% of capacity market price changes, on average, over the forecast timeframe. While LEI correctly used the retail electricity market benefits (including both energy and capacity markets), USM only included the wholesale energy market benefits.

Adoption of the inflated energy market savings from Daymark's "special case" analysis

USM's analysis of ratepayers' savings from the project is built upon the outputs of a "special case" of energy market modeling performed by Daymark. This special case is different from the electricity market cost savings presented in Daymark's report. On average, during the 2023-2042 period, the oil price and gas price in the "special case" is 9% and 24% higher than the oil and gas prices, respectively, that are used in the base case in Daymark's report.[66] The wholesale energy cost reduction in Maine in the "special case" is 1% higher than the results presented in Daymark's report.[67] For New England as a whole, the wholesale energy market benefits are 26% higher than what presented in Daymark's study on an annual average basis. Under a higher fuel and electricity prices scenario, injecting low or zero cost price resources into the electricity market will trigger more significant price reductions, which would then lead to greater macroeconomic benefits. Therefore, the macroeconomic benefits presented by Daymark are prone to overestimation given the higher wholesale energy market savings from the "special case."

Capacity market benefits were omitted in USM's analysis

USM assumed zero capacity market benefits even though Daymark analyzed the capacity market impacts of the project in their study, rendering their analysis for electricity market benefits incomplete.

Although USM's and LEI's results are comparable in terms of 15-year annual average for the period of 2023-2037, the components from each study are different. LEI's results present a higher benefit (almost double) than USM's during the first 5 years because of the inclusion of the capacity market benefits. Excluding capacity market benefits, LEI's results for retail energy benefit from the project will be about 70% lower for incremental jobs and GDP. Also, if the project fails to clear in the FCA but clears in the SA, it will cause an additional 340MW retirement in New England. Such early retirement, if included in the macroeconomic analysis, will result in even lower macroeconomic benefits in all the New England states.

LEI results show that during the end of the modeling period of 2033-2037, Maine and New England are expected to see economic losses. As explained earlier, this is primarily because LEI's electricity market modeling results show high capacity cost savings in the first five years, which results in economic benefits for local and regional economies. In the latter years, as the market

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[66] Results for the low gas price, 981MW committed project case.

[67] Results for the low gas price, 981MW committed project case.

recalibrates itself to reach a new equilibrium, such benefits dissipate starting from 2030 over time. Similarly, the energy price reductions start to decline from 2034 onward in LEI's modeling. As a result, the Maine and New England economies will go through a rebound effect, meaning that after an economic boost, economies will shrink back to their steady state size or even below the pre-shock status.

Figure 44. Estimated macroeconomic impacts in Maine due to electricity market savings (2023-2037)

Scenario	Economic Impact Category	Unit	Operations 2023-2027	Operations 2028-2032	Operations 2033-2037	2023-2037 Average
USM's Results (a)	Total Employment	Individuals	319	313	240	291
	GDP	Millions of Fixed 2009 $	$20.5	$25.3	$24.7	$23.5
LEI's Results (b)	Total Employment	Individuals	732	263	-59	312
	GDP	Millions of Fixed 2009 $	$61.0	$30.4	$4.5	$31.9
Differences [(b-a)/a]	Total Employment	%	129%	-16%	-125%	7%
	GDP	%	197%	20%	-82%	36%

Figure 45. Estimated macroeconomic impacts in New England due to electricity market savings (2023-2037)

Scenario	Economic Impact Category	Unit	Operations 2023-2027	Operations 2028-2032	Operations 2033-2037	2023-2037 Average
USM's Results (a)	Total Employment	Individuals	4,129	3984	3091	3,735
	GDP	Millions of Fixed 2009 $	$365.1	$432.2	$421.3	$406.2
LEI's Results (b)	Total Employment	Individuals	10,777	3,685	-742	4,573
	GDP	Millions of Fixed 2009 $	$1,091.6	$526.7	$79.5	$565.9
Differences [(b-a)/a]	Total Employment	%	161%	-8%	-124%	22%
	GDP	%	199%	22%	-81%	39%

Note:
1. Economic impacts in terms of incremental jobs and GDP are presented in the form of annual average of corresponding modeling period.
2. LEI's results represent macroeconomic benefits from retail energy and capacity market impacts, while USM's results are based on wholesale energy market impacts.

5.4.2 Contract cost borne by the Massachusetts ratepayers are not considered in USM's analysis

Under the Massachusetts 83D clean energy Request for Proposal ("Clean Energy RFP"), contract costs of the project, if selected, will be passed through and paid for by consumers of the electric distribution utilities in Massachusetts. However, the project's contract cost borne by Massachusetts ratepayers are not factored into the macroeconomic impact analysis conducted by USM.

Taking into consideration the contract costs, Massachusetts ratepayers would see less electricity price reductions brought by the project. As a result, Massachusetts would see lower job and GDP increases from electricity market savings during the modeling period, compared to the results shown in Table 5.1 of USM's report. Furthermore, as Massachusetts is the biggest economy in New England, economic shocks in Massachusetts will ripple through and impact other New England states that are economically and geographically connected with Massachusetts.

LEI has estimated how the RFP contract cost[68] of the NECEC project will affect the Maine economy as well as the New England economy as a whole. As shown in Figure 46, ratepayers in Maine are expected to see 55 jobs lost and reduction in GDP by $4.9 million per year during 2023-2037.

When looking at New England as a whole, the net contract costs will result in 2,355 job losses and a $288.3 million reduction in GDP every year during 2023-2037.

Figure 46. Estimated macroeconomic impacts in Maine and New England due to contract cost

Region	Economic Impact Category	Unit	Operations			2023-2037 Average
			2023-2027	2028-2032	2033-2037	
Maine	Total Employment	Individuals	-112	-54	-1	-55
	GDP	Millions of Fixed 2009 $	-$8.9	-$5.2	-$0.7	-$4.9
New England	Total Employment	Individuals	-4,267	-2,433	-367	-2,355
	GDP	Millions of Fixed 2009 $	-$432.0	-$314.4	-$118.4	-$288.3

[68] Net contract cost is calculated by adding up the transmission cost of the Project and the hedge benefits. Transmission cost is calculated by multiplying the committed energy [redacted] by the estimated bid price for transmission [redacted] provided by CMP in response to ODR-001-034. Then the hedge benefit of the contract is calculated by taking the hourly energy price in the Project Case netting it against the indicative bid price for energy [redacted] in the contract, as provided by CMP in response to ODR-003-016, and then multiplying all this by the committed energy. LEI modeled the indicative price of energy because CMP could not provide more accurate data. The transmission cost and the hedge benefit are added together to yield the net contract costs. LEI estimates the net contract cost to be a total of [redacted] on an annual average basis, during the modeling period of 2023-2037.

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5.4.3 Early plant retirement and deferred local investment are not included in USM's analysis

Introducing lower-cost energy and capacity into the local energy market will potentially trigger early retirement of local generation capacity. The projected early retirements are expected to prevail whether NECEC clears the primary auction (FCA) or the substitution auction.[69] Such early retirement will cause loss of employment and reduction in economic activity in the utility sector and then induced effects in other sectors of the economy.

Daymark's analysis found that "the impact of the additional capacity supply also advances the retirement of a small amount of capacity in the region that was dependent on capacity revenue for viability." Yet, such early retirement caused by the project was not factored into USM's macroeconomic impact analysis. This leads to overestimation of employment and GDP increase for the operations period of the project.

LEI modeled early retirement of generation capacity triggered by the project as loss of jobs during the year of retirement in the Project Case until the end of the modeling period (2037) or until the original planned retirement of that plant, whichever is earlier.[70] Figure 47 below shows that the impacts are not significant in Maine - about two jobs are lost and $0.2 million reduction in GDP per year is incurred. New England as a whole is expected to see on average 251 job losses per year and loss in GDP of $46.4 million per year during the modeling period of 2023-2037.

Aside from the early retirements, LEI expects a total of 550MW of new gas generation capacity in Massachusetts to be displaced or deferred due to the NECEC. Unlike closure of a plant, which will lead to permanent and certain loss in employment, deferral of investment in new entry is only for a few years and therefore is not included in LEI's modeling. These deferred or displaced investments, if incorporated in the macroeconomic modeling, will have additional negative impacts on local employment and GDP in New England and in Maine.

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[69] In the substitution auction, NECEC must swap with an equivalent amount of resources in order to obtain a CSO.

[70] LEI forecasted that [redacted] will be retired earlier than the original planned retirement date (no announced retirement date yet) in 2030 due to the NECEC. Based on employment from Bureau of Labor Statistics and the installed capacity data from the 2018 CELT ISO-NE Annual Energy and Summer Peak Forecast, LEI estimated that labor demand for fossil fuel generation sector is approximately 0.05 jobs/MW in Connecticut. Therefore, LEI modeled 39 job losses in the Utilities sector in Connecticut to estimate the macroeconomic impacts from the [redacted] retirement in the 6-region REMI PI+ model for New England.

Figure 47. Estimated macroeconomic impacts in Maine and New England due to early retirement triggered by NECEC

Region	Economic Impact Category	Unit	Operations 2023-2027	Operations 2028-2032	Operations 2033-2037	2023-2037 Average
Maine	Total Employment	Individuals	-3	-3	-3	-3
	GDP	Millions of Fixed 2009 $	-$0.2	-$0.3	-$0.3	-$0.3
New England	Total Employment	Individuals	-426	-394	-357	-392
	GDP	Millions of Fixed 2009 $	-$68.6	-$72.6	-$76.1	-$72.4

5.4.4 Jobs created by ratepayers' benefits should not be considered "direct jobs"

LEI found the direct job increase due to ratepayers' benefits presented in USM's report incorrect and misleading. USM in their report on Pg. 11, Table 5.1 showed that between 2023 and 2042, the project was expected to create 89 direct jobs per year on average. However, ratepayers' benefits do not create jobs through direct investment; rather they create local benefits through increasing households' disposable income and lowering local businesses' operations costs. Therefore, new jobs related to ratepayers' benefits should be categorized as "indirect and induced jobs" rather than "direct jobs."[71, 72]

5.5 Comparison of the tax revenue estimates

LEI's estimates for municipal tax revenue received from NECEC are $18.09 million a year for Maine communities. This is comparable with USM's estimates of $18.38 million[73]. This is because both analyses are based on the same valuation of the projects' taxable value provided by CMP, and the mill rates used by LEI and USM are about the same[74].

Again, as explained fully in Section 3.4, the actual tax payment from the NECEC will depend on the taxable valuation assessed by each municipality and the adjusted property tax rates (i.e. mill

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[71] In macroeconomic language, "direct jobs" are considered as jobs created as a result project investment (e.g. construction workers). Jobs created by increased demand in sectors that provide supporting services and goods are considered as "indirect jobs" (e.g., truck drivers that deliver cement used for the construction of the project). Jobs created through the increased spending of local residents are categorized as "induced costs" (construction workers spend the salary earned from the project in local restaurants, leading to increased demand for new workers in the restaurant).

[72] The report's author, Mr. Ryan Wallace, agreed during the technical session held on April 5, 2018, that they used different definitions for interpreting the "direct job" impacts during construction period and the operations period. He also mentioned that the jobs created by ratepayers' savings should technically be considered as "indirect and induced jobs."

[73] See USM's report, Section 6.

[74] LEI used the Estimated 2016 Municipal Full Value Tax Rates reported by the Department of Administrative and Financial Services of the Maine state government. USM used the actual mill rate for each municipality for 2016.

rates) in each of these municipalities, which is determined by a number of factors, such as the budget plan of the municipality, the change in market value of other properties, etc.

How the tax revenue will further affect the local economy in the affected municipalities and in the State of Maine as a whole is determined by the actual tax revenue received by the municipal governments and their budget plan. They can use the tax revenue to pay off government debts, which will not have direct impacts on the local economy. Alternatively, they could increase government spending in providing common goods as services (e.g. education and healthcare), which will create macroeconomic benefits. Since such budget decision is unknown and varies from municipality to municipality, LEI did not model such impacts in the REMI PI+ model.

In any case, tax payments from the NECEC project are expected to decline over the projects' life as the taxable value of the project depreciates. Therefore, in later years of the project's operations period, the actual tax revenue received by the affected municipalities is expected to be lower than the estimates presented in LEI's and USM's studies.

6 Appendix A: LEI Modeling Tools

6.1 Overview of the energy market forecasting model

LEI employed its proprietary simulation model, POOLMod, to develop the wholesale energy price forecast. POOLMod simulates the dispatch of generating resources in the market subject to least cost dispatch principles to meet projected hourly load, technical assumptions on generation operating capacity, and availability of transmission. POOLMod consists of a number of key algorithms, such as maintenance scheduling, assignment of stochastic forced outages, hydro shadow pricing, commitment, and dispatch. The initial stage of analysis requires the development of an availability schedule for system resources. First, POOLMod determines a near optimal maintenance schedule on an annual basis, accounting for the need to preserve regional reserve margins across the year and a reasonable baseload, mid-merit, and peaking capacity mix. Then, POOLMod allocates forced (unplanned) outages randomly across the year based on the forced outage rate specified for each resource.

Figure 48. POOLMod's two-stage process

In addition, POOLMod is a transportation-based model, giving it the ability to take into account transmission limits on the network. The New England Control Area is modeled on a zonal basis, consistent with ISO-NE's own economic models and analyses for system planning purposes. POOLMod has been used to support millions of dollars in merger and acquisition ("M&A") deals, market design support, and contract evaluations.[75] It is a general model that can be applied to many different markets but calibrated to suit the specific characteristics of New England and reflect ISO-NE's energy market rules.

When running POOLMod, the generation plants are modeled to take maintenance outages and forced outages. The scheduling of the forced outages is subject to a stochastic algorithm. The timing of forced outages (and maintenance) can affect LMPs – even annual average LMPs. As

[75] In addition to bespoke consulting engagements, LEI performs semi-annual forecasts using its POOLMod for 12 wholesale power markets. These forecasts, known as LEI's Continuous Modeling Initiative ("CMI"), examine recent market developments, draw on the latest information and data available, and apply LEI's proprietary modeling tools to provide a 10-year energy, and where applicable, capacity market price outlooks.

such, LEI ran 20 iterations of the energy model for 2023-2037 for the Base Case and the Project Case where the timing of these generation outages varied within each year (although the same number of outages were maintained between iteration for each plant). The observed wholesale energy prices from these iterations (including the average across all 20 iterations for each year and the standard deviation) were then used to assess whether the observed average of the annual price differences in a given year between the Project Case and the Base Case are statistically significant relative to the variance in LMPs created by stochastic variation in generation outages. In other words, LEI can test whether the price impact caused by NECEC is statistically robust relative to "modeling noise" caused by the randomness of forced outage and maintenance schedules of generation. Based on observed average price impacts from the 20 iterations and the variance in price impacts across the iterations, LEI concluded that the observed energy price differences in all years are statistically significant.

6.2 Overview of the capacity market forecasting model

For the capacity market analysis, LEI used the FCA Simulator, a proprietary modeling tool developed by LEI to replicate the offer strategy of suppliers in the auction, which includes offers from existing and new suppliers of capacity. New suppliers in the FCA are assumed to offer at their technology-specific Net CONE. As such capacity prices are projected to converge towards the Net CONE forecast associated with a gas-fired generator. This Net CONE is not kept constant but grows over time based on expected inflation, technological/cost improvements, and the change over time in future energy and ancillary services revenues. Existing suppliers will drive price outcomes in LEI's simulation of the FCA in periods when total existing supply exceeds the projected NICR, subject to retirement decisions (which may drive prices to new entry levels).

LEI's analysis also took into account the convex demand curves aimed to address the shortcomings of the linear downward sloping demand curve that was used for FCA #9 and #10. The new set of demand curves – known as Marginal Reliability Impact ("MRI") curves – take on a curved or convex shape so as to reflect the nonlinear relationship between quantity and ISO-NE's willingness to pay for the marginal improvement in reliability associated with adding new capacity.[76]

An MRI curve has a steeper slope left of the NICR value because the marginal impact of adding one additional resource is high. Once supply crosses to the right over the NICR level on the MRI, the curve has a flatter slope to signify that the marginal impact of adding one additional resource is lower. The linear demand curve assumes implicitly that each additional MW has the same marginal reliability impact. Figure 49 below shows an illustrative example of the MRI curve against the downward sloping demand curve for FCA #10 based on ISO-NE's indicative demand curve example.[77]

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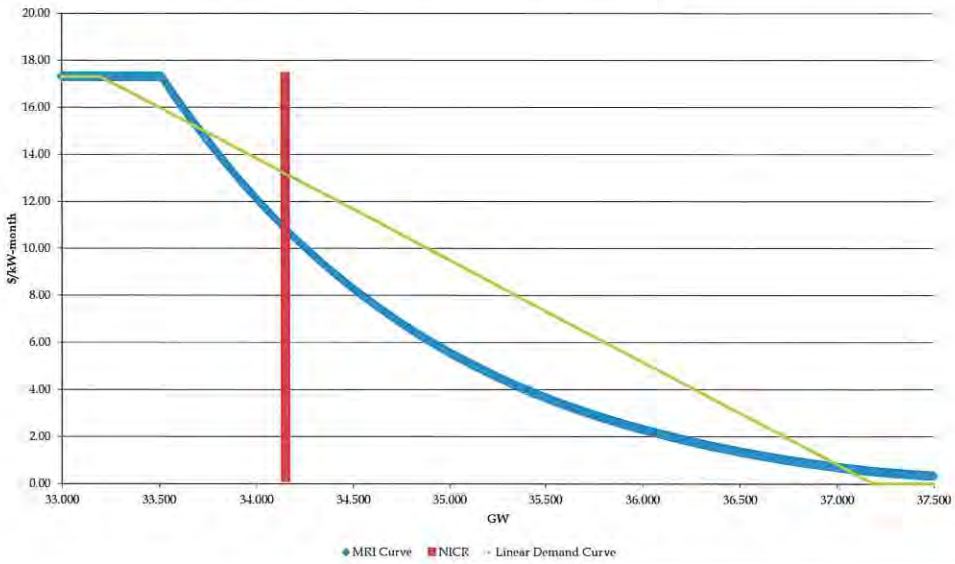
[76] For more details, see ISO-NE's December 7, 2015 technical memorandum to the NEPOOL Markets Committee on the FCM Zonal Demand Curve Methodology.

[77] ISO-NE Indicative Demand Curve Values for FCA 10 Zones. <https://www.iso-ne.com/static-assets/documents/2016/01/a02_iso_indicative_demand_curve_values_fca10_zones_01_06_16.xlsx>. Demand curves for FCA #12 have been released, however, as explained in this section, a function of the MRI curve is the Net CONE, which requires coefficients to construct a polynomial curve. These coefficients are not explicitly

Figure 49. Illustrative example of the linear demand curve and MRI curve



To obtain the capacity clearing price in the FCA, the following equation must be applied against the MRI curve:

$$Price_{System}(Quantity_{System}) = -Penalty\ Factor\ \times MRI$$

PF, refers to the Penalty Factor, which LEI sets each year such that the clearing price capacity at NICR will equal Net CONE (where the Loss-of-Load Expectation is 0.1 days/year), consistent with ISO-NE's methodology. Therefore, at any given level of Quantity (i.e. the amount of resources that clear the FCA), the price can be determined by the MRI at that particular quantity and the PF.

In practice, the MRI would change over time as new resources enter and exit the system and demand grows. ISO-NE's engineering-based approach to build up the MRI produces a set of coefficients that are used to plot the convex demand curve for each capacity zone. While the shape of the zonal convex demand curves produced for each auction may change slightly each year, ISO-NE expects these curves to be quite stable from year to year.[78] LEI therefore used the latest available coefficients from ISO-NE[79] to create the MRI demand curve, and then shifted the curves to the right each year (to account for growth in NICR), and scaled the curves using expected Net CONE values.

In order to test whether price separation would occur in the import-constrained ("NNE") or export-constrained (SENE) zones, LEI considered the representative Maximum Capacity Limit ("MCL") and Local Sourcing Requirements ("LSR") parameters calculated by ISO-NE through

published for the FCA #12 curves, and therefore LEI continues to use the coefficients for the FCA #10 MRI curve. As noted in ISO-NE's demand curve filings, the MRI is expected to remain fairly stable.

[78] See Pg. 6 of Christopher Geissler and Matthew White Testimony on behalf of ISO-NE. Docket ER16-1434-000.

[79] LEI used the coefficients from the *ISO Indicative Demand Curve Values for FCA Zones*, March 2, 2016. See footnote 77.

FCA #17.[80] LEI then shifted the local demand curve to the right by the quantity change in the MCL or LSR. For example, a 100 MW increase in the MCL would yield a rightward shift of the NNE demand curve by 100 MW. However, as a result of LEI's retirements schedule in the Project Case, LEI found that no price separation is expected to occur with the introduction of NECEC's 1,090 MW, based on the current market topology and approved zonal definition in the FCM. LEI understands that ISO-NE is currently in the process of considering Maine as a separate export-constrained zone from the rest of New England. However, LEI is unaware of any local demand curves that have been produced by ISO-NE specifically for Maine to determine whether price separation would occur and how much.

6.3 Integration of energy and capacity market models

The capacity market model is integrated with LEI's energy market simulation, POOLMod, in that decisions to introduce new resources or retire existing resources in the capacity market is then also reflected in the energy market simulations. Furthermore, the energy market outcomes (energy prices) directly affect the Net CONE for new entrants that the ISO-NE is assumed to use to calibrate the MRI curves. Therefore, checking if a new entrant is economic or whether retirements are needed is an iterative process. Similarly, potential energy market and capacity market profits, as modeled, were compared to the breakeven prices required for new entrants, in order to simulate economic new entry. New entry and retirement decisions were then accounted for in both the FCA simulations and the energy market simulations.

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[80] FCA 12 values are found in ISO-NE's *Proposed Installed Capacity Requirement (ICR) Values for the 2021-2022 Forward Capacity Auction (FCA #12)*, August 17, 2017 and FCA #13-#17 values are found in ISO-NE's *Future Representative Capacity Requirements for CCP 2022-2023 through CCP 2026-2027*, May 24, 2017 as well as the ISO-NE Draft 2017 Regional System Plan. These three zones are the ones currently defined, but in the future, there may be new boundaries for import and export constrained zones, no only one single capacity zone. However, this is not known today.

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7 Appendix B: Electricity Market Assumptions

The table below provides the key assumptions utilized in the development of the inputs for the natural gas and wholesale electricity markets forecasts, the key markets these assumptions affect, and the degree of price impacts these assumptions have.

Figure 50. Summary of key modeling assumptions

Assumption	Approach
Network Topology[i]	LEI divided the ISO-NE Control Area into 11 sub-zones, corresponding to observed historical major transmission congestion. Thermal limits were based on the operating limits provided by Daymark and CMP for the Base Case and Project Case. Apart from the Maine interfaces, all other transfer limits were based on ISO-NE data.
Load Growth[ii]	ISO-NE's 2017 CELT Report provided the demand outlook until 2026. Beyond this, LEI extrapolated the demand for each zone using a three-year rolling average growth rate.
Load Shape[iii]	Forecasted hourly load shape by ISO-NE for 2017 under ISO-NE P50 (weather normalized) forecast
Existing Resources	Summer/winter capacity for energy market simulations are taken from the CELT 2017 Report. Capacity supply obligations are taken from FCA #12 results. Plant parameters such as fuel type, heat rate, emissions rates, variable O&M, maintenance and forced outage rates were sourced from third party data providers, which aggregate data from EIA, NERC, FERC, and the EPA. Energy schedules for hydro plants were developed from 10-year average historical production profile, if reported. For smaller hydro plants that are not required to report monthly generation, an average was used as a proxy, based on profiles of neighboring, similar facilities
New Entry/ Retirements	Planned short-term thermal new entry was based on resources that cleared FCA #12. Additional thermal resources were added, when the projected economics (in the capacity and energy markets) justified such additions. Generic renewable new entry was added pursuant to states' renewable renewable portfolio standards ("RPS") goals. However, new on-shore wind in northern parts of Maine was capped at 1,000 MW to account for transmission constraints
Natural Gas	Natural gas prices were derived based on LEI's proprietary Levelized Costs of Pipeline ("LCOP") forecast model. LEI relied on the forward market for projecting locational gas prices in the near term and a fundamental analysis using a reference point plus a transportation adder to project gas prices in the long run
Other Fuels[iv]	Residual and distillate prices were based on NYMEX forwards and the AEO 2018 growth rates for crude oil. Coal prices were modeled for each coal plant based on actual historical costs and EIA's growth rate for regional coal supplies
Carbon Allowance Prices[v]	The average of January - March forward RGGI prices were used until 2020. LEI then adopted the results of No National Policy Model Rule Scenario by RGGI
Interchange[vi]	Imports and exports were modeled on based on historical interchange from recent years, 2015-2017.

Notes:
i) Daymark response to ODR-003-019
ii) ISO-NE CELT Forecast Data 2017, <https://www.iso-ne.com/static-assets/documents/2017/05/forecast_data_2017.xlsx>
iii) ISO-NE 2017-2026 *NE Region Hourly Load Forecast*, <https://www.iso-ne.com/static-assets/documents/2017/05/rsp17_iso_eei.txt>
iv) EIA, *Annual Energy Outlook 2017*. <https://www.eia.gov/outlooks/aeo/>
v) Draft 2017 Model Rule Policy Scenario Overview. September 25, 2017. <https://www.rggi.org/docs/ProgramReview/2017/09-25-17/Draft_IPM_Model_Rule_Results_Overview_09_25_17.pdf>
vii) ISO-NE, External Interface Metered Data. <https://www.iso-ne.com/isoexpress/web/reports/grid/-/tree/external-interface-metered-data>

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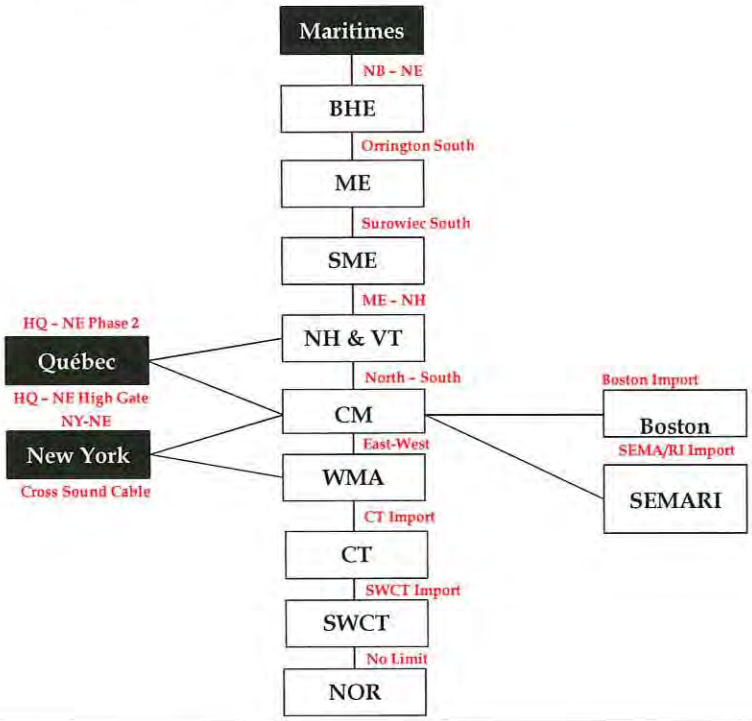
7.1 Market topology

LEI's model of the New England power grid uses 11 zones in ISO-NE as shown below in Figure 51: (i) Bangor Hydro Electric ("BHE"); (ii) Maine ("ME"); (iii) Southern Maine ("SME"); (iv) New Hampshire/Vermont ("NH/VT"); (v) Central Massachusetts ("CM"); (vi) Western Massachusetts ("WMA"); (vii) Connecticut, ("CT"); (viii) Southwest Connecticut ("SWCT"); (ix) Norwalk ("NOR"); (x) Northeast Massachusetts/Boston ("NB"); (xi) Southeast Massachusetts/Rhode Island ("SEMARI"). This is consistent with the market topology used by ISO-NE in their long-term planning models and the location of the most binding transmission constraints.[81]

LEI adopted CMP's estimates of the transfer limits along the three Maine interfaces, based on Daymark's response to response to ODR-003-019. This includes upgrades made when NECEC is in service.

Figure 51. Regional transmission interface limits



[81] For long-term planning purposes, ISO-NE models the ISO-New England Control Area ("NECA") on the basis of thirteen sub-regions defined by binding transmission constraints. For modeling, the market topology is simplified, while being consistent with ISO-NE's approach. NH and VT are modeled as one zone, and SEMA and RI are modeled as one zone.

7.2 Load Growth

LEI adopted ISO-NE's CELT forecast, which includes its 10-year forecast of peak demand and total demand. The gross demand projections are lower than previous CELT reports due to ISO-NE's revised outlook on actual consumption in recent years, and expectations of passive demand response ("PDR") and behind the meter solar PV.

LEI specifically used ISO-NE's peak demand and total demand forecasts from ISO-NE's CELT 2017 for its P50 case that represents the expected or 50/50[82] outlook; this covers the period of 2017 to 2026. Energy efficiency and behind-the-meter solar PV are treated as a reduction in demand for the energy market simulation purposes. For the capacity market, incremental energy efficiency is treated as a supply resource, not a reduction from NICR. Beyond 2026, LEI extrapolated ISO-NE's demand forecasts using a three-year rolling average growth rate.

For the hourly load profile, LEI used ISO-NE's hourly load forecast for 2017 for each sub-region under the P50 case. Based on this sub-regional hourly load shape, LEI forecasted the hourly load shape in future years by scaling the shape with the forecasted peak load and total energy demand in those years.

7.3 Natural gas projections

LEI identified four key drivers of for natural gas price in North America. Three of these point to strong growth in supply; one of them points to growth in demand:

- Continued development of Marcellus and Utica shale plays in the Eastern United States
- Continued growth in crude oil and natural gas production from Permian Basin in West Texas
- Growing gas production in Western Canada
- Growing demand for gas in the form of LNG and pipeline exports

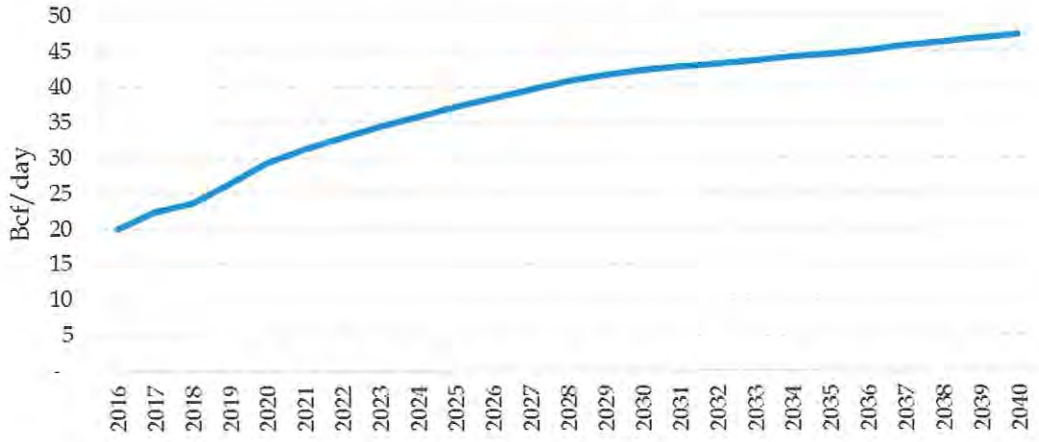
7.3.1 Supply-side drivers

Continued development of Marcellus and Utica shale plays in the Eastern US is one of the key drivers of North American gas prices. Though Energy Information Administration ("EIA") has tended to be conservative in its supply outlooks from the East region, in its Annual Energy Outlook ("AEO") 2018, EIA projected that dry gas production in the East would grow from 22 billion cubic feet ("Bcf") per day in 2017 to 47 Bcf per day in 2040, at a compound annual growth rate ("CAGR") of 3.3% (see Figure 52). These two Appalachian shale gas plays have remained

[82] By definition, the 50/50 load forecast is an expected weather forecast – peak load under the 50/50 load forecast has a 50% chance of being exceeded. Major assumptions and conditions, including weather, are assumed to approach or approximate the long run average.

resilient to low natural gas prices and are projected to continue to drive total US production in the long term, especially as pipeline takeaway capacity expands.

Figure 52. EIA AEO 2018 Reference Case outlook for dry gas production in East region



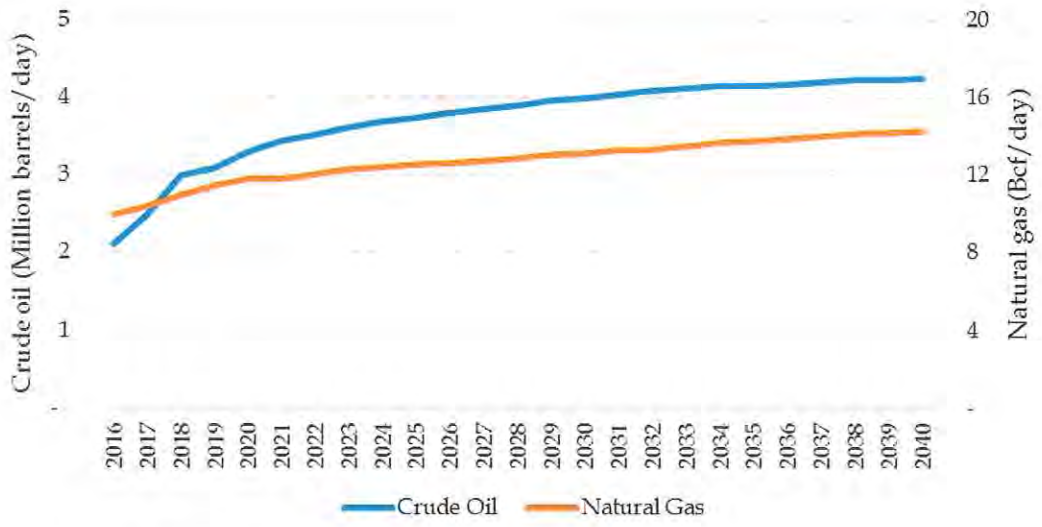
Source: EIA AEO 2018 Reference Case

In West Texas, Permian Basin recent gas production growth is based on associated gas, which is gas that is produced from oil-directed wells, essentially as a by-product. This production does not depend much on natural gas prices—the gas is recovered with the oil, and producers need to find a home for it. The US Geological Survey ("USGS") estimates that recoverable shale gas resources in the Midland Basin portion of Texas' Permian Basin could exceed 16 trillion cubic feet of natural gas, a substantial 40% of the recoverable natural gas resources from Marcellus and Utica.[83] Thus, LEI expects ongoing growth in crude oil production in the Permian Basin to keep Henry Hub gas prices in check.

As shown in Figure 53, AEO 2018 Reference Case projects that crude oil production from Southwest (the region which includes the Permian Basin) will grow from two million barrels per day to four million barrels per day from 2017 to 2040, while natural gas production is projected to grow from 10 Bcf per day in 2017 to 14 Bcf per day in 2040.

[83] USGS. Assessment of undiscovered continuous oil resources in the Wolfcamp shale of the Midland Basin, Permian Basin Province, Texas, 2016. November 2016. <https://pubs.usgs.gov/fs/2016/3092/fs20163092.pdf>

Figure 53. EIA AEO 2018 Reference Case outlook for crude oil and natural gas production in the Southwest region



Source: EIA AEO 2018 Reference Case

Furthermore, there is growing natural gas production in Western Canada's Montney and Duvernay shales which will also help maintain downward pressure on gas prices. Natural gas net exports from Canada to the US have increased from 5.4 Bcf per day in 2012 to 5.8 Bcf per day in 2017.[84] Natural gas production from Western Canada has increased from 13.6 Bcf per day in 2012 to 15.4 Bcf per day in 2017.[85]

7.3.2 Demand-side drivers

In the long term, increasing global demand for natural gas is likely to provide a potentially large market for US exports of natural gas via pipeline to Mexico, and in the form of liquefied natural gas ("LNG") to overseas markets. This demand can eventually support the recovery of US Henry Hub prices from the current low levels.

According to the AEO 2018 Reference Case, the US became a net exporter of natural gas in 2017, driven by declining pipeline imports, growing pipeline exports and growing exports of LNG.[86] In AEO 2018, EIA projects that exports of natural gas through pipelines to Mexico will increase from 4.3 Bcf per day in 2017 to 6.6 Bcf per day in 2040.[87] US natural gas exports to Mexico have doubled since 2009 and are expected to continue increasing through at least 2029 due to the

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[84] National Energy Board. *2017 Natural Gas Exports and Imports Summary.*

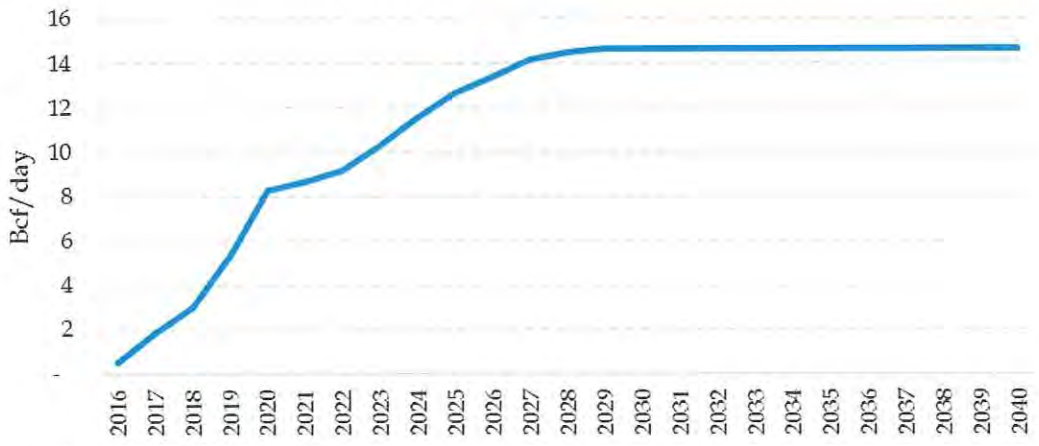
[85] National Energy Board. *Marketable Natural Gas Production in Canada.*

[86] EIA AEO 2018. Table 62. Natural Gas Imports and Exports. <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=76-AEO2017&cases=ref2017&sourcekey=0>

[87] EIA AEO 2018. Table 62. Natural Gas Imports and Exports. <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=76-AEO2017&cases=ref2017&sourcekey=0>

pipelines that are currently under construction. The growth of projected natural gas exports is also supported by new LNG terminals recently completed, and others currently under construction and in early stages of development. EIA's outlook estimates LNG exports to grow from less than 1 Bcf per day in 2017 to 15 Bcf per day in 2040, at a CAGR of 9.5% (see Figure 54).

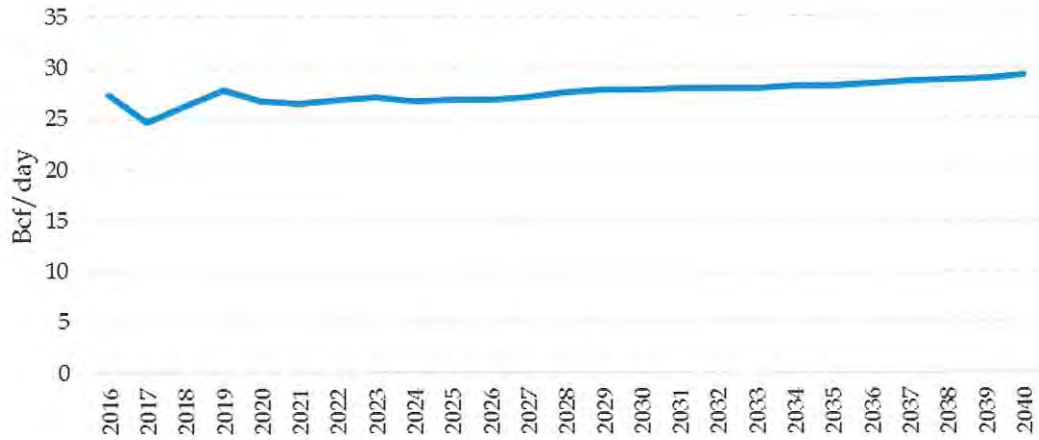
Figure 54. EIA AEO 2018 Reference Case outlook for liquefied natural gas exports



Source: EIA AEO 2018 Reference Case

With the retirement of coal and nuclear power plants, it could be assumed that demand for natural gas from the US electric power sector would be poised to increase dramatically. However, the EIA AEO 2018 does not project strong growth in gas demand from the power sector (see Figure 55). This weak growth is mainly owing to EIA's projected annual growth of power demand of 0.7% on average.

Figure 55. EIA AEO 2018 Reference Case outlook for gas consumed in electricity generation



Source: EIA AEO 2018 Reference Case

The 3.1 Bcf per day of demand growth from the power sector from 2018 to 2040 is not enough to make a dent in the abundant supply of US natural gas.

7.3.3 LEI's outlook for Henry Hub gas prices

For the longer term, the eventual increase in gas prices in the EIA's AEO 2018 Reference Case forecasts is consistent with the four key North American natural gas supply and demand trends discussed above. However, LEI believes that EIA's typically conservative outlooks for natural gas production growth have led it to miss the impact of strong production on gas prices in the near term. EIA's Reference case outlooks have shifted downward substantially in recent years (see Figure 56). AEO 2016 reference case for Henry Hub price forecast was 20% lower on average than the AEO 2015 (nominal basis, 2023-2040); AEO 2017 was 2% lower than AEO 2016, and the recently published AEO 2018 is 13% lower than AEO 2017. EIA's New England outlooks have also shifted downward. On a nominal basis, for the years 2023-2040, the AEO 2017 outlook was 7% lower than the AEO 2016; and AEO 2018 is 5% lower than AEO 2017. AEO 2018 reference case compound annual growth (nominal basis, 2023-2040) for Henry Hub is 3.4% and for New England is 3.2%.

Figure 56. Vintages of AEO Reference cases, Henry Hub and New England outlooks

There are two main drivers for the lower outlook in AEO 2018[88] compared with AEO 2017:

- greater natural gas volumes of low-cost resources available for production, particularly in the Marcellus shale gas play and the tight oil plays in the Permian Basin; and
- lower per unit cost of production to reflect increased rates of technological drilling progress.

Given the strong supply-side drivers, LEI believes that robust gas price recovery projected by AEO 2018 Reference Case in the near term (specifically, in next two to four years) may not materialize. Therefore, LEI chose to use the AEO 2018 Reference Case annual trend, but not the absolute price level, in LEI's long-term outlook for Henry Hub prices. LEI applied this trend to

[88] EIA. "Oil and Natural Gas Resources and Technology." March 26, 2018. <https://www.eia.gov/outlooks/aeo/section_issues.php#grt>

the 2019 futures market price, to create our projection of Henry Hub prices for 2020 and beyond (see Figure 57).

Figure 57. LEI's natural gas price forecast

[redacted]

7.3.4 LEI's outlook for New England gas prices

In LEI's power sector modeling, the Algonquin Citygate price serves as the delivered natural gas price for gas-fired generators in New England.

In the near term (first two years of the outlook (2018 and 2019)), LEI relied on the forward markets for projecting Algonquin Citygate gas prices. LEI used the three-month average of daily forwards (January 1, 2018 – March 31, 2018), as reported by OTC Global Holdings ("OTCGH") for the 2018 and 2019 monthly prices.

From 2020 and onward, LEI projected the Algonquin Citygate gas price based on a supply hub price plus a transportation adder to New England calculated by LEI's proprietary Levelized Cost of Pipeline ("LCOP") model. The LCOP model assumes that price spreads between any two gas pricing hubs cannot, in the long run, persist above the levelized cost of building a new pipeline between the two hubs. The LCOP model assumes that if the price spread rises above the levelized cost of building a pipeline between any two hubs for three consecutive years, then a pipeline will be built between the two hubs to reduce the price spread.

Traditionally, Henry Hub has been the reference point for the North American gas market. However, due to the relatively low-cost shale gas production from Marcellus and Utica, these locations now supply much more gas to New England than the Gulf Coast does. LEI, therefore, chose Dominion South (a hub located in the Marcellus region) as the reference point for projecting Algonquin Citygate gas prices. LEI projects Dominion South to trade at a discount to Henry Hub, reflecting the ongoing need to add pipeline capacity from the Marcellus to market regions. LEI projects Dominion South prices to increase at the same rate as Henry Hub, based on the 2018 EIA AEO, although they reflect the persistent discount.

For 2018 and 2019, the transportation adder to arrive at the Algonquin price is the difference in the futures price between Dominion South and Algonquin Citygate gas hub.

For 2020 and 2021, the LCOP indicates that new pipeline capacity will be needed. This is the result of the first three years of the outlook for Algonquin prices relative to Marcellus area prices. The difference between Algonquin and TETCO M3 prices from 2019 and 2020 is around $1.6 per MMBtu, and the cost of building a pipeline is $1.12 per MMBtu (see Figure 58). This price signal induces a pipeline expansion. The LCOP model "expands" pipeline capacity, by, in effect, reducing the basis to the LCOP, in 2021. Although in practice pipeline expansions are not perfectly timed to meet market demand, the LCOP model represents a long-term equilibrium which is appropriate for a long-time horizon such as the 2018-2037 for the NECEC analysis.

Figure 58. LCOP Algonquin and TETCO M3 price differential and pipeline cost

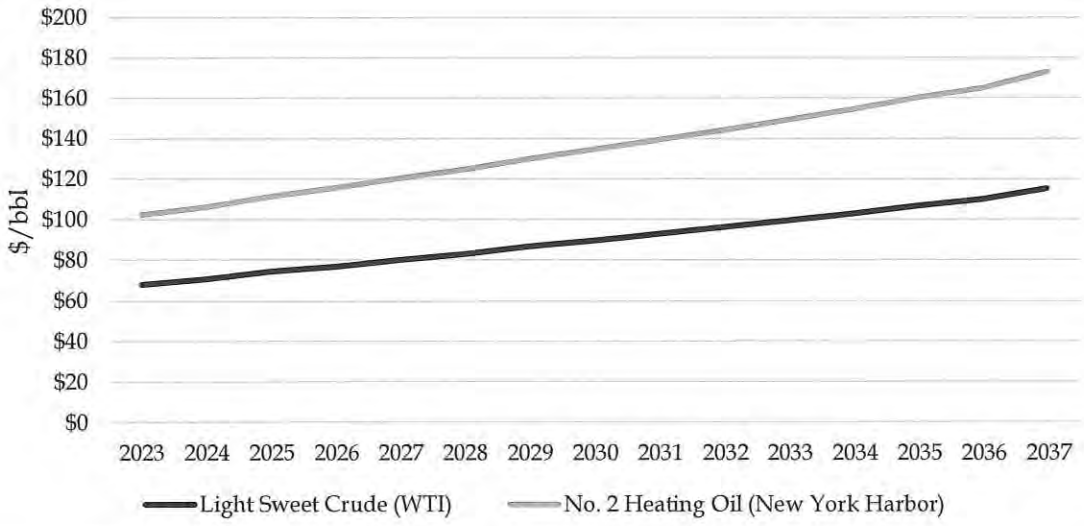
Source: LCOP

LEI projects the Algonquin Citygate price to increase from $3.6 per MMBtu in 2018 to $6.78 per MMBtu in 2037 (in nominal terms). The Algonquin Citygate prices are on average $2.0 per MMBtu higher than Dominion South (a point which is further away from Algonquin Citygate than TETCO M3, so it has a correspondingly higher cost to build a pipeline), reflecting the long-term transportation adder generated by LEI's LCOP model.

7.4 Other fuels

Although natural gas-fired resources are price setting for the vast majority of hours, oil-fired resources occasionally do run, although this typically accounts for less than 1% of total generation. The distillate oil price is based on the heating oil forwards for the first two years and escalated at the same rate as the EIA crude oil forecast in the long term. The residual oil price was developed based on a multi-year average of the ratio of residual and distillate oil prices. Figure 59 below shows the natural gas and oil prices over the modeling timeframe.

Figure 59. Forecast of various oil prices



Given the diversity in coal sourcing, quality, and price, LEI developed plant-specific coal price outlooks. LEI began with an estimate of 2017 actual delivered costs, taking into account the type of coal used at each plant (since each coal plant has different sulfur content levels and different contracts for price and transportation). LEI then escalated the estimated costs with the longer-term trends for the commodity using coal-based inflation rates from AEO 2018.[89] Notably, all coal units are projected to be retired by 2023 in the region, based on the analysis described in Section 7.7 below.

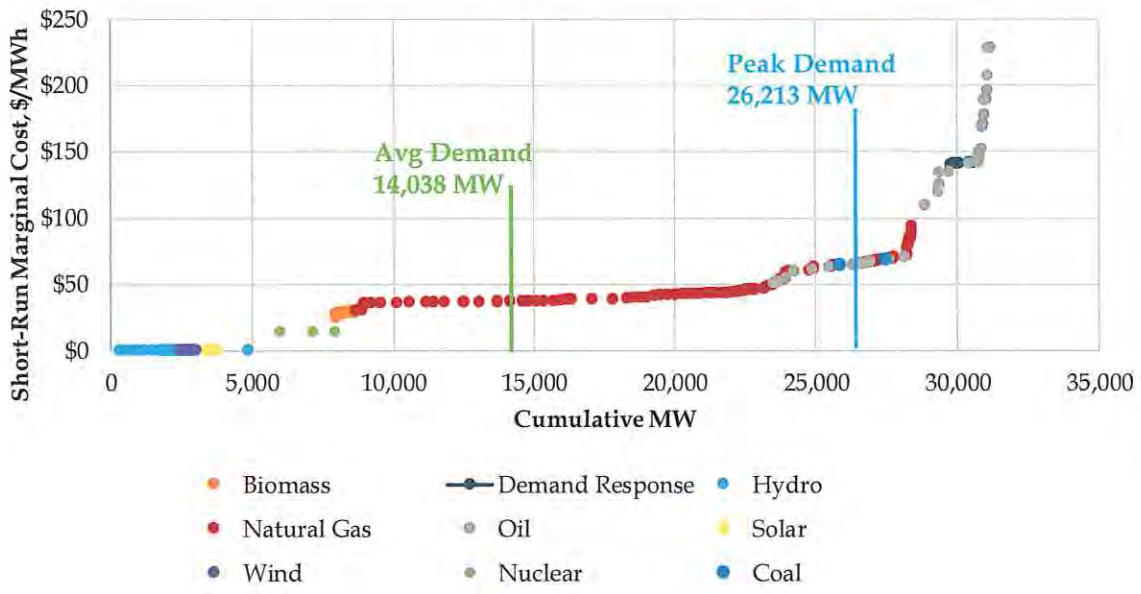
7.5 Existing Supply

Existing supply (for the energy market simulations) in New England was based on the ISO-NE 2017 CELT, which provides plant-specific demonstrated capacity ratings for both summer and winter seasons, as of May 2017. LEI supplemented this data with plant parameters (heat rates, variable O&M, forced outage rate, etc.) from commercially available databases. LEI also added in changes in the resource mix based on FCA #12 results.

The system-wide supply curve in Figure 60 shows that gas-fired plants are the main price setting units for average load, and oil is expected to set prices during the highest load hours. Note that the chart below shows the indicative internal supply curve which is adjusted (seasonal ratings, maintenance, forced outage) for availability, and therefore may understate the capacity in any given hour when units are available at full capacity. It does not incorporate imports from neighboring markets.

[89] EIA, *Annual Energy Outlook 2017*, Table 66. Coal Production and Minemouth Prices by Region.

Figure 60. Indicative energy market supply curve of New England resources for 2021



Note: Supply curve is adjusted for availability but not for transmission constraints; illustration excludes imports and exports.

For the capacity market, LEI assumed that all the resources that cleared FCA #12 (including imports and demand response) remain in the market as existing resources unless the modeling suggests units will retire. Going forward, incremental energy efficiency from ISO-NE's forecast will be included as supply in the FCA simulations.

7.6 New entry

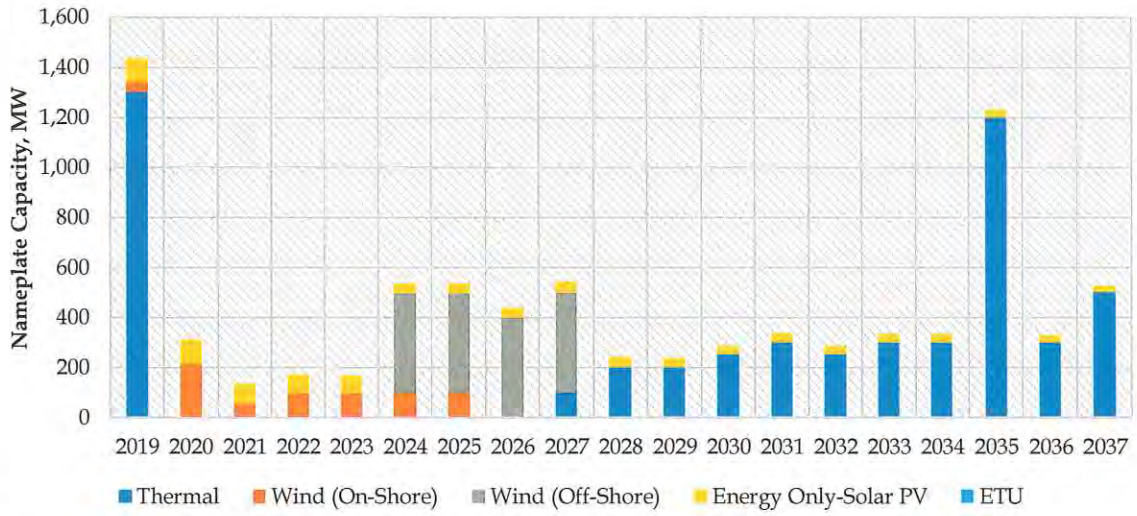
Over the long term, LEI assumed that generators make economically rational ("just-in-time") capacity investment decisions timed to load growth and earnings potential across the wholesale electricity markets. In considering new entry, the modeling has taken the following criteria into account, namely: (1) state procurements of clean energy resources and Renewable Portfolio Standards ("RPS"); and (2) the economics of new entry based on LEI's FCA Simulator and (3) the NICR (growth in demand).

7.6.1 State procurements of clean energy

LEI factored in contracted and expected resources from the various state solicitations for clean energy. This includes all renewables from the Clean Energy RFP, CT-2-20 MW, as well as any resources cleared up to FCA #12. Future resources procured in MA RFP Sections 83C will be assumed to compete in the energy market but will only participate in the capacity market if they clear through the substitution auction. Lastly, the full amount of solar PV energy only resources based on the ISO-NE's 2017 Solar PV Forecast was assumed to participate in the energy market

(only).[90] LEI found that by combining the energy output from these various solicitations and projections, New England exceeded RPS requirements by the mid-2020s. While a forecast for Renewable Energy Credits ("RECs") is not part of this report, LEI expects that the resulting REC prices would reflect that oversupply and be significantly lower than they have been over the last several years. Figure 61 below shows the schedule of new resources included in LEIs forecast.

Figure 61. New entrants included in LEI's Base Case forecast (MW)



7.6.2 Economics of new entry and Net CONE

Ultimately, the mix of new entry is a function of market economics (i.e. profitability of generators) and policy priorities, as well as political realities (i.e. coal is unlikely to be a realistic candidate for these markets given the lack of commercial capability for carbon sequestration in New England, even though it could be competitive at high gas prices). The new entry decisions are conditioned on modeled outcomes such that additional new entry is introduced if and when it is economically feasible given the simulated market dynamics.

ISO-NE posits that the Net CONE has come down based on more recent information and that a combustion turbine is, in fact, cheaper than a combined cycle power plant. The Net CONE is an important parameter in the FCM, as it directly affects the administrative price cap and impacts the slope of the demand curve. All else being equal, a lower starting Net CONE value will result in lower capacity market prices. LEI's forecast used the FERC-approved Net CONE values as an input to the FCA simulations. To calculate the Net CONE, LEI started with ISO-NE's current cost of new combustion turbines ($8.04/kW-month for FCA #12), then escalated the capital costs with inflation (plus a 2% technology efficiency improvement every four years) and inflated the energy and ancillary services offset by the trends in energy market prices.

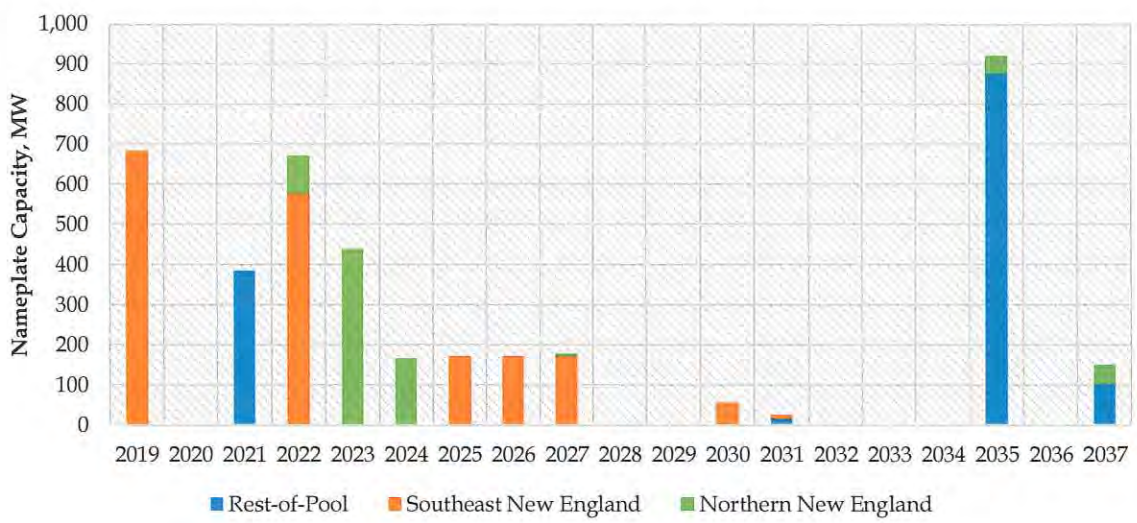
[90] Behind the meter solar PV based on ISO-NE's 2017 Solar PV Forecast will be assumed to reduce demand.

Due to the addition of nearly 2.5 GW of new gas-fired units that cleared in FCA #9 and #10, 1.7 GW clean energy resources (planned onshore wind to meet the states' RPS and offshore wind per MA RFP 83C), energy efficiency across New England states according to ISO-NE's forecast, and slow demand growth, additional generators are unlikely to enter the market in the short term without more offsetting retirements as forecasted energy and capacity prices remain below levels necessary to motivate and fully remunerate a new generation entrant.[91]

7.7 Retirements

LEI incorporated all announced retirements into the analysis as of Q1 2018, which includes Pilgrim Nuclear Power Station (retirement date of June 2019) and Bridgeport Harbor 3 (retirement date of July 2021), as well as any other de-list bids for FCA #12. Given Exelon's decision to retire Mystic 7, 8, and 9, and the fact that ISO-NE is seeking to retain Mystic 8 and 9, LEI only retired Mystic 7 in this forecast.[92]

Figure 62. Retirements included in LEI's Base Case forecast (MW)



Note: Some retirements include Active DR resources that filed for submitted retirement de-list bids for FCA #12

In addition, LEI reviewed the minimum going forward costs of existing power plants and assumed that if resources are not expected to meet their minimum going forward costs for three consecutive years, then they would retire. This approach is consistent with how the IMM reviews

[91] LEI understands that in the past, some resources have been able to clear well below the ISO-determined Net Cone values, although these resources tended to be brownfield units, had good connections to existing pipelines or transmission infrastructure, or were able to make use of certain tax advantages. LEI does not expect these opportunities to be available in the future, and therefore expects thermal units not to clear until beyond the modeling timeframe.

[92] ISO-NE memo. *Discussions of Near-Term Fuel Security Concerns*. NEPOOL Participants Committee. April 3, 2018.

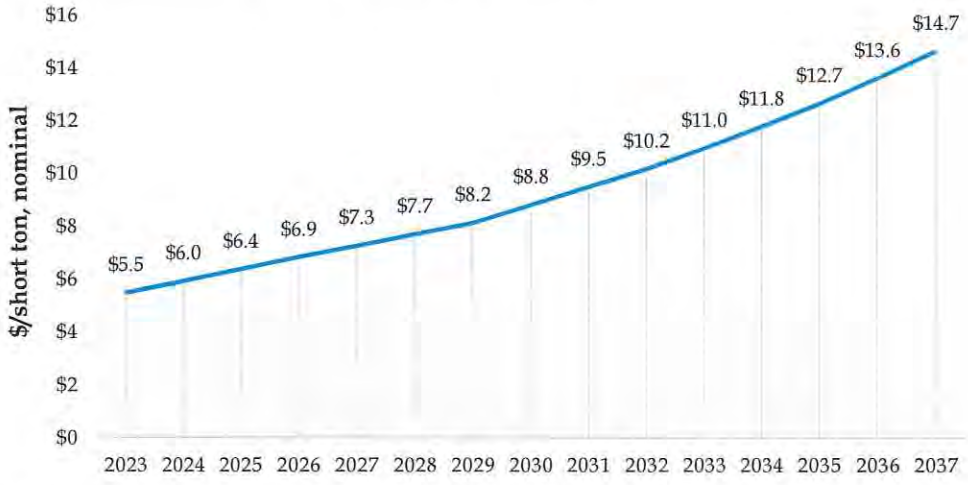
retirement de-list bids when testing for the economic life of an asset.[93] Based off this analysis, LEI found that nearly 3,100 MW of resources would retire by the mid-2020s (including the 1,250 MW that has already announced retirements or submitted retirement delist bids such as Pilgrim nuclear plant and Bridgeport Harbor 3).

However, this capacity reduction will be more than offset by the 4,200 MW of new thermal and renewable generation that is expected over the next several years in LEI's forecast (clearing in FCA #9 – FCA #18), which still results in oversupply on a net basis for New England. Figure 62 below shows the retirements by year that are included in LEI's forecast, with most retirements occurring in the early 2020s.

7.8 Carbon allowance costs

LEI expects that the regional greenhouse gas emissions trading program, RGGI, would continue over the modeling timeframe. Under RGGI, power plants with an installed capacity of over 25 MW must reduce their CO_2 emissions by 50% by the year 2020 relative to their 2005 emissions level. LEI assumes that all ISO-NE states will auction 100% of their CO_2 allowances under RGGI. Each plant is required to purchase an allowance to offset each ton of CO_2 it emits. The RGGI cap declines 2.5% each year from 2018 to 2020. Therefore, forwards for carbon allowance prices have been used in the modeling up to 2020. Beyond 2020, LEI adopted the results of "No National Policy Model Rule Scenario" forecast by RGGI in September 2017.[94] This results in a $5.5/short ton price in 2023 rising to a $14.7/short ton price in 2037, in nominal dollars, as shown below.

Figure 63. Carbon emissions allowance price projection



Sources: RGGI, Draft 2017 Model Rule Policy Scenario Overview. September 25, 2017.

[93] ISO-NE Forward Capacity Market Retirement Reforms. Docket ER16-551-000. <https://www.iso-ne.com/static-assets/documents/2015/12/er16-551-000_retire_reforms.pdf>

[94] RGGI, Draft 2017 Model Rule Policy Scenario Overview. September 25, 2017.

7.9 Import and export flows

ISO-NE is well interconnected with surrounding regions, with ties to the New Brunswick, Québec, and New York power markets. External resources available for imports are modeled on an aggregate rather than an individual unit basis. New England had traditionally been a net exporter, but since 2011 has become a net importer. LEI expects imports from Québec (mainly from hydroelectric resources) to continue into the future at historical levels. Imports from Québec to New England occur via the interties of NE-HQ Phase II and NE-HQ Highgate.

To model the interchange between ISO-NE and external regions, LEI reviewed historical hourly interchange data. Exports to New York, through the Cross-Sound Cable ("CSC") at Shoreham and Northport, are also expected to continue at historical levels due to the projected continuation of tight in-city reserve margins (New York City and Long Island) and the average between 2015-2017 were used.[95]

Over the past four years, trends in the net interchange level from ISO-NE to NYISO via the Roseton intertie have changed. For modeling purposes, the Roseton target was based on the average interchange of 2015-2017 levels until 2030, when nuclear retirements in New York are expected to reduce imports from New York on only the Roseton line by approximately two-thirds. However, this is beyond the modeling horizon for this forecast, and while LEI does not expect all nuclear plants in New York to retire within the modeling horizon, such an event may cause a reversal in flows from New England to New York in the mid-2030s.

LEI expects imports from the Canadian Maritimes to be similar to 2015-2017 levels where Point Lepreau nuclear plant resumed operation in New Brunswick in November 2012, subject to existing transmission constraints from New Brunswick to Maine, Maine to Southern Maine, and Southern Maine to New Hampshire.

Figure 64. Net annual imports with neighboring regions

	Northport (NY)	Roseton (NY)	Shoreham (CSC)	New Brunswick	Phase II (HQ)	Highgate (HQ)
Total GWh	-404	5,102	-1,675	4,411	11,382	1,821

Note: Positive numbers imply net imports, and negative numbers imply net exports. Beginning in 2030, imports along the Roseton interface drop by approximately 5.1 TWh, then reverse to a net import of 1.8 TWh in 2035.

Source: ISO-NE historical interchange data, LEI analysis

[95] In addition, the Norwalk Harbor – Northport, NY, 138 kV cable (NNC) replacement project (formerly known as the 1385 cable) was placed in service during 2008. Since its operation, a significant amount was exported from NE to NY.

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8 Appendix C: Comparison of Macroeconomic Impact Estimates

Figure 65. A year-by-year comparison of LEI's and USM's economic impact estimates based on the original project cost estimates – Incremental jobs during the development and construction period

Scenario	Category	Unit	Development 2017	Construction 2018	2019	2020	2021	2022	Annual Average
USM	Direct Employment	Individuals	48	281	569	1,775	1,811	723	868
	Indirect & Induced Employment	Individuals	67	252	585	1,517	1,695	824	824
	Total Employment	Individuals	115	533	1,154	3,292	3,506	1,547	1,691
LEI	Direct Employment	Individuals	48	268	545	1,677	1,713	680	822
	Indirect & Induced Employment	Individuals	67	239	563	1,401	1,570	758	766
	Total Employment	Individuals	115	507	1,108	3,078	3,283	1,438	1,588
% Diff	Direct Employment	%	0%	-4%	-4%	-6%	-5%	-6%	-5%
	Indirect & Induced Employment	%	0%	-5%	-4%	-8%	-7%	-8%	-7%
	Total Employment	%	0%	-5%	-4%	-6%	-6%	-7%	-6%

Figure 66. A year-by-year comparison of LEI's and USM's economic impact estimates based on the original project cost estimates – Incremental GDP during the development and construction period

Scenario	Category	Unit	Development 2017	Construction 2018	2019	2020	2021	2022	Total	Annual Average
USM	GDP	Millions of Fixed 2009 $	$ 8.8	$ 30.0	$ 69.0	$ 177.4	$ 194.2	$ 85.3	$ 564.8	$ 94.1
	Total Compensation	Millions of Nominal $	$ 5.9	$ 22.0	$ 52.6	$ 132.4	$ 150.6	$ 72.2	$ 435.7	$ 72.6
LEI	GDP	Millions of Fixed 2009 $	$ 8.8	$ 30.8	$ 70.5	$ 183.0	$ 199.3	$ 86.8	$ 579.0	$ 96.5
	Total Compensation	Millions of Nominal $	$ 5.9	$ 21.9	$ 52.6	$ 130.5	$ 148.1	$ 70.2	$ 429.2	$ 71.5
Difference	GDP	%	0.0%	2.6%	2.1%	3.1%	2.6%	1.7%	2.5%	2.5%
	Total Compensation	%	0.0%	-0.5%	-0.1%	-1.4%	-1.7%	-2.7%	-1.5%	-1.5%

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STATE OF MAINE PUBLIC UTILITIES COMMISSION

DOCKET NO. 2017-00232

CENTRAL MAINE POWER COMPANY REQUEST FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF THE NEW ENGLAND CLEAN ENERGY CONNECT (NECEC) TRANSMISSION PROJECT

NEW ENGLAND CLEAN ENERGY CONNECT

CENTRAL MAINE POWER

POST HEARING BRIEF

February 1, 2019

Attorneys for Central Maine Power Company

Jared S. des Rosiers
Sarah B. Tracy
Liam J. Paskvan
Krystal D. Williams

MDEP has stated that the shift to lower carbon fuels, such as natural gas, has driven statewide CO_2 emissions levels to at least 10% below 1990 levels and contributed significantly to Maine's progress towards its 2020 goals.[298] However, in order for Maine to meet its long-term GHG reduction goal to reduce GHG emissions "sufficient to eliminate any dangerous threat to the climate," Maine will need to take substantial steps to reduce the emissions of GHGs in the energy production and energy consumption sectors. In fact, based on the Legislature's guidance that a reduction of Maine GHG emissions "to 75% to 80% below 2003 levels may be required" to achieve the long-term GHG reduction goal,[299] the State will need to reduce its CO_2 or carbon dioxide equivalents (CO2e)(MMTCO2e) emissions by 19.94 million metric tons (to get to 75% below 2003 levels) to 21.26 million metric tons (to get to 80% below 2003 levels).[300] Accordingly, substantial action to reduce GHG emissions levels in a sufficient quantity to meet, or even to make material progress towards meeting, this long-term goal is necessary, and the NECEC represents a concrete step the State can take now to achieve this goal.

B. The Clean Hydropower Delivered by the NECEC Will Reduce Carbon Dioxide Emissions in Maine, New England, and Beyond, Consistent with Maine's Long-Term GHG Emissions Reductions Goals.

Once the NECEC goes into service in late 2022, it will significantly advance Maine's progress towards meeting the long-term GHG reduction goals set forth in 38 M.R.S. § 576

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[298] Seventh Biennial Report on Progress Toward Greenhouse Gas Reduction Goals: Report to the Joint Standing Committee on Environmental and Natural Resources 128th Legislature, Second Session at 6, 11 (Jan. 2018)(hereafter "2018 DEP GHG Biennial Report") (stating that "[t]he data in Appendix A show that in 2015, Maine's GHG emissions were 11.7% below 1990 levels, and that Maine is on track to meet the second statutory reduction target of 10% below 1990 levels by 2020.").

[299] 38 M.R.S § 576(3).

[300] In 2003, emission levels equaled 26.58 million metric tons of CO2 emissions (MMTCO2e). When calculated, the lower limits set by the Legislature equal 6.65 and 5.32 MMTCO2e, respectively (26.58*(1-0.75) or 26.58*(1-0.80)). 2018 DEP GHG Biennial Report at 12.

by substantially reducing CO_2 emissions across Maine and New England, through the delivery of clean energy into the ISO-NE Control Area that will displace fossil-fuel-fired generation. In fact, three different production cost modeling experts in this proceeding, CMP's consultant Daymark, the Commission Staff's consultant LEI, and the Generator Intervenors' consultants James Speyer and Tanya Bodell of Energyzt using Calpine's model, have modeled the CO_2 emissions reductions in New England resulting from the injection of 9.45 TWhs of clean hydroelectric energy into ISO-NE and have found that the NECEC will drive significant carbon emissions reductions in Maine, Massachusetts and the entire New England region.

Specifically, Daymark concluded that adding the NECEC-delivered hydropower to the supply mix in New England will induce annual CO_2 emission reductions of approximately 3.1 million metric tons across New England and the net emissions from the portion of regional generation serving Maine load will be reduced by approximately 264,000 metric tons per year.[301] This is roughly equivalent to taking 56,051 passenger vehicles off the road in Maine each year.[302]

LEI's analysis found even greater emissions reductions from the NECEC-delivered clean energy, stating that the NECEC could reduce CO_2 emissions in New England by approximately 3.6 million metric tons per year.[303] The Energyzt/Calpine modeling likewise found that the NECEC-delivered clean energy will result in an annual reduction of 3 million

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[301] Daymark Rebuttal at 40:18-41:2 (citing Exhibit NECEC-5 (Daymark Report) at 4 of 98).

[302] GHG metric ton reduction equivalencies calculated using the U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator (updated Dec. 2018), *available at* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

[303] LEI Report at 12 of 85.

metric tons of CO_2 emissions in New England.[304] Neither LEI's analysis nor Energyzt's analysis included a specific finding as to the Maine-based GHG reductions, but using Daymark's approach of calculating the Maine GHG reductions based upon a ratio of Maine load to New England load,[305] the NECEC would result in approximately 255,000 metric tons of GHG reductions per year in Maine using the results of Energyzt's analysis and approximately 306,000 metric tons of GHG reductions per year in Maine using the results of LEI's analysis. This is roughly equivalent to taking between 54,140 to 64,968 passenger vehicles off the road in Maine each year.[306]

C. Hydro-Québec has Sufficient Clean Energy Available for Export to Meet its Obligations to New England without Shifting Exports Away from New York or other Regions.

Their findings of NECEC's facilitation of carbon emission reductions in New England aside, the Generator Intervenors argue that the NECEC will result in increased total carbon emissions across the Northeast region, because, they claim, Hydro-Québec will have to divert exports to other energy markets in order to increase exports to New England over the NECEC. As discussed below, the record demonstrates that this claim is unfounded and contradicted by information provided directly by Hydro-Québec.

In his direct testimony, Generator Intervenor witness Mr. Speyer claims that in the 2023 study year, Hydro-Québec would have to reduce exports to other markets in order to supply energy to Massachusetts via the NECEC transmission line. Mr. Speyer asserts that

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[304] Speyer Direct, Exhibit JMS-4, Technical Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts at 3 (Apr. 2018).

[305] Exhibit NECEC-5 (Daymark Report) at 21 of 98.

[306] U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator (updated Dec. 2018), *available at* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

XII. CONCLUSION

For the foregoing reasons, CMP respectfully requests the Commission conclude that a public need exists for the NECEC. The Commission should therefore grant a CPCN for the NECEC, as described in Appendix 1.

Respectfully submitted,

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MAINE PUBLIC UTILITIES COMMISSION
AUGUSTA, MAINE

IN RE:)
) Docket No. 2017-232
CENTRAL MAINE POWER COMPANY) March 7, 2019
)

Request for Approval of CPCN for the New England Clean Energy Connect Construction of 1,200 MW HVDC Transmission Line from Québec-Maine Border to Lewiston (NECEC)

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BOB HAYNES, Old Canada Road Scenic Byway
DOT KELLY

1 in New England, we soften demand for RGGI allowances, the bank
2 goes up, and the number of allowances that get sold in the
3 market are less overall. And that affects how it works over
4 time because of the bank and because the states may adjust the
5 state -- or RGGI may decide to adjust the state budgets. But
6 more importantly, there is a direct correlation between the
7 price of RGGI allowances and the revenue that Maine and,
8 therefore, Efficiency Maine Trust receive. And this can only
9 help suppress prices in the RGGI market. And I think that it's
10 unfortunate that that wasn't considered earlier in the case as
11 I said, and I think it's very unfortunate that that's not
12 considered in the context of the settlement. Thank you.
13 MR. TANNENBAUM: I'd like to follow up on that, John.
14 The issue about the impact on the Efficiency Maine Trust is
15 that a reduction in CO2 emissions will reduce the price of RGGI
16 allowances.
17 MR. FLUMERFELT: That's correct.
18 MR. TANNENBAUM: But would that mean that the NECEC
19 will reduce carbon emissions?
20 MR. FLUMERFELT: NECEC will certainly reduce carbon
21 emissions in New England by displacing existing fossil fuel
22 generation both in Maine and across New England.
23 MR. TANNENBAUM: Okay.
24 MR. FLUMERFELT: There's the broader question about
25 net carbon emissions, but that's not part of the settlement.

STATE OF MAINE PUBLIC UTILITIES COMMISSION

DOCKET NO. 2017-00232

CENTRAL MAINE POWER COMPANY REQUEST FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF THE NEW ENGLAND CLEAN ENERGY CONNECT (NECEC) TRANSMISSION PROJECT

NEW ENGLAND CLEAN ENERGY CONNECT

CENTRAL MAINE POWER

REBUTTAL TESTIMONY OF THORN DICKINSON, ERIC STINNEFORD AND BERNARDO ESCUDERO

On Behalf of Central Maine Power Company

July 13, 2018

incremental hydropower generation in response to any particular solicitation. Thus, for example, it was not possible for Hydro-Québec to build additional new hydropower resources to meet the timeline for the 83D RFP. It is for this reason that Hydro-Québec indicated as part of the NECEC bid that the offered hydropower supply would come from Hydro-Québec's existing facilities. This, however, does not mean that Hydro-Québec's deliveries under the NECEC will not be incremental to its historic exports to New England (and regionally). Hydro-Québec has pursued an incremental and on-going development program to add capacity based on its expectations of increasing demand for clean energy across the northeast U.S. and Canada and in order to permit it to participate in solicitations like the Massachusetts 83D RFP. CMP understands that Hydro-Québec's selection to provide Massachusetts the 9.45 TWh of incremental hydropower under the NECEC PPAs is an important next step for Hydro-Québec as a prominent source of clean energy for the region. It justifies Hydro-Québec's on-going capacity expansion efforts which Hydro-Québec expects to complete in 2025 and provides a basis for Hydro-Québec to begin work on the next round of capacity expansions to meet the northeast region's increasing demand for clean energy.[68]

3. Nearly All Hydro-Québec Deliveries Under The NECEC PPAs Will Be Incremental To Its Historical Energy Exports To Surrounding Regions.

CMP understands, based on publicly available information, that upon the commencement of deliveries under the NECEC PPA Hydro-Québec will be able to increase its total energy exports to ensure that all, or at least the vast majority, of the 9.45 TWh

[68] *See* Hydro-Québec, *Strategic Plan 2016-2020 Stetting new sights with our clean energy* (Hydro-Québec 2016-2020 Strategic Plan), at 7, available at http://www.hydroquebec.com/data/documents-donnees/pdf/strategic-plan.pdf.

delivered to the Massachusetts EDCs will be incremental over Hydro-Québec's recent export levels. To measure the incremental nature of Hydro-Québec's future increased exports it is important to set a baseline based on Hydro-Québec historical exports. Using a historical average over the last five years is appropriate given variances that may occur in any particular year in terms of rainfall, weather, market and other conditions. Hydro-Québec's average annual level of exports over the most recent five year period of 2013-2017 is 30.5 TWh.

Starting with a 30.5 TWh export baseline, CMP has assessed, using publicly available information, whether Hydro-Québec will be able to increase its exports to adjoining control areas, including New England, to 40.5 TWh (including a gross up for line losses) per year starting in 2023. This level will ensure Hydro-Québec maintains historical exports to adjoining control areas while adding the 9.45 TWh of exports to New England called for in NECEC PPAs.

CMP understands that Hydro-Québec plans to achieve this increased export level by using its existing hydropower capacity, including the Romaine 3 unit (395 MW) added in 2017, plus certain capacity additions that are expected by 2025. These capacity additions are made up of new hydropower generation facilities, Romaine 4 unit (245 MW expected in service in 2020), and capacity upgrades at existing hydro facilities (such as the replacement of aging turbines with more efficient, new equipment) (500 MW by 2025).

In addition, to achieve the necessary energy output, CMP believes that Hydro-Québec will use the energy it has stored in its hydropower reservoirs. In recent years,

December 14, 2018

Thorn Dickinson
Vice President, Business Development
Iberdrola USA Management Corporation
52 Farm View Drive
New Gloucester, Maine 04260

Good Afternoon Thorn:

You have requested Hydro-Québec's assistance in responding to certain data requests pertaining to Hydro-Québec operations received in the CPCN proceeding for the New England Clean Energy Connect ("NECEC") project.

Below is information in response to questions 004-001 and 004-002.

004-001

Regarding the existing hydro-electric facilities that will provide electricity for NECEC, have those dams spilled water instead of generating electricity due to a lack of economic transmission in any of the years 2012-2017? If so,

a. Please provide a volume estimate per year of that spillage.

b. Please provide the reason(s) for that spillage.

Answer:

Yes, in 2017 Hydro-Québec spilled water due to a lack of economic transmission.

The quantity of spilled water in 2017 for this reason represents approximately 4.5 TWhs worth of energy. In the normal course of business, Hydro-Québec uses water to generate electricity. Excess water not used to generate electricity is stored in large reservoirs for use in later periods. As the reservoirs become full, and storing water is no longer an option, water is spilled.

In this category to date in 2018, Hydro-Québec has spilled approximately 10.4 TWhs worth of energy. Without additional transmission export capability, the quantity of spilled water in future years is expected to be comparable to the quantity of spilled water in 2018 under comparable market and operational conditions.

For the 2050 horizon, independent meteorological studies indicate that average flows in northern Québec are expected to increase by approximately 12%. This could lead to additional spilling[1].

---

[1] https://www.ouranos.ca/publication-scientifique/Synthesis_Summary.pdf

004-002

Does Hydro-Québec have an estimate of the maximum export capacity that existed at the end of 2017, without the existence of the NECEC line? (If that estimate is not available, but an estimate from a different year is, please provide that).

a. Please provide that estimate in aggregate or to the four export markets of Ontario, ISO New England, Maritimes, and New York ISO.

b. Please provide a discussion of factors that formed the basis of the estimate.

Answer:

Hydro-Québec's maximum export capability during 2017 is estimated at 34.4 TWh. Below is the breakdown of these exports to Hydro-Québec's primary external markets:

- Ontario: 4.6 TWh
- New England: 18.2 TWh
- Maritimes: 2.1 TWh
- New York: 7.9 TWh
- PJM/MISO/Other: 1.6 TWh

Many factors determine the maximum export capability for Hydro-Québec's hydropower system including the following:

- Water levels in individual Hydro-Québec reservoirs
- Specific transmission availability within Québec
- Specific generation availability
- Transmission availability to external markets
- Transmission congestion in external markets
- Wholesale market prices and demand in Hydro-Québec's export markets
- Operational constraints in Hydro-Québec's export markets

Please don't hesitate to contact me if you have any questions about this information.

Sincerely,

Simon Bergevin
Director, Energy Transactions
Hydro-Québec
75 Réne Levesque Blvd
Montreal, QC H2Z 1A4

STATE OF MAINE PUBLIC UTILITIES COMMISSION

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In addition, to achieve the necessary energy output, CMP believes that Hydro-Québec will use the energy it has stored in its hydropower reservoirs. In recent years,

EXHIBIT NO. FBS-1.COR
CORRECTED

Prepared Corrected Supplemental Testimony of
William S. Fowler and Tanya L. Bodell

A: Yes. Both Hydro-Québec's strategic plan and Hydro-Québec Distribution's planning documents indicate that the region is short capacity.

- **Strategic Plan:** Hydro-Québec's Strategic Plan 2016-2020 indicates that Québec is short capacity and will be meeting its capacity requirements through energy efficiency initiatives, issuing tenders for capacity, Romaine-4 coming online in 2020, Hydro-Québec Production's anticipated upgrades of 500 MW in 2025, and potentially other hydroelectric investments.[45]
- **Supply Plan for the Integrated Network:** A detailed supply procurement planning document and a status report issued by Hydro-Québec Distribution projects a capacity shortfall of 1,100 MW by 2022/23 increasing up to 1,900 MW by 2025/26, even accounting for increased capacity commitments that appear to correspond to the Romaine units. Exhibit Nos. FBS-3 and FBS-4 provide a translation of the projections from the 2016 and 2017 plans, respectively, including an excerpt of the discussion that indicates Hydro-Québec Distribution anticipates capacity purchases on a short-term basis to cover its shortfalls. In fact, the company is looking for new interties with the U.S. that would allow for increased *purchases* of capacity *from U.S. markets into Québec*:

> Furthermore, the Distributor is eagerly awaiting the development of interconnection projects between Québec and the United States. However, uncertainties regarding these various projects do not allow the

[45] NECEC – 54: Hydro-Quebec, Strategic Plan 2016-2020, p. 7 and Maine PUC Docket 2017-00232, Hearing (In Camera), October 19, 2018, pp. 129-131.

TECHNICAL REPORT

HYDRO-QUÉBEC EXPORTS

Prepared by: Energyzt Advisors, LLC

April 2018

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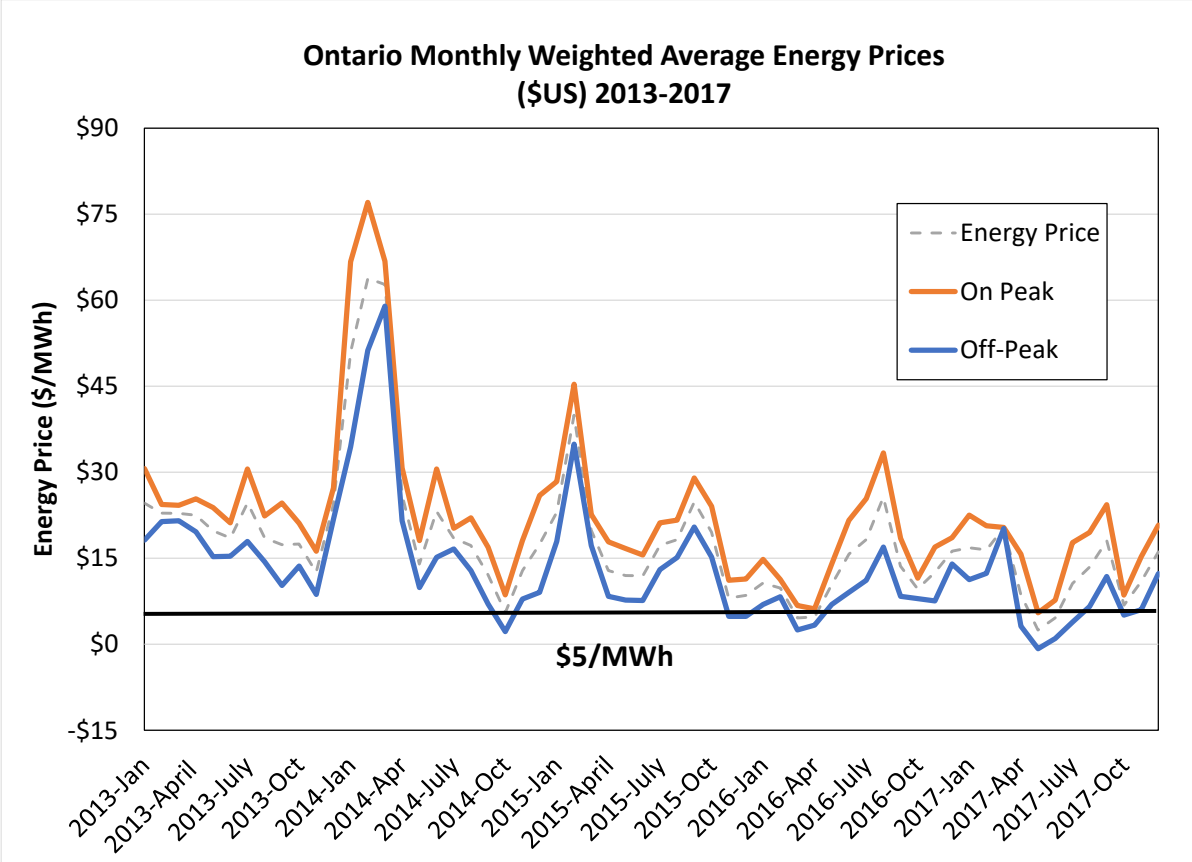
Figure 7: Ontario Wholesale Energy Market Prices



Source: Ontario IESO

3. PROJECTED EXCESS ENERGY IN 2023

Between 2017 and 2023, Hydro-Québec is scheduled to bring a new hydroelectric generation project online: Romaine-4. Romaine-4 would add another 245 MW of capacity and 1.3 TWh of energy. However domestic load also is expected to be higher according to the Hydro-Québec Distribution's long-range plan for 2017 - 2026.[12]

[12] Hydro-Québec Distribution Plan, ÉTAT D'AVANCEMENT 2017 DU PLAN D'APPROVISIONNEMENT 2017-2026, p. 10.

http://www.regie-energie.qc.ca/audiences/Suivis/SuiviR-3986-2016_PlanAppro2017-2026/HQD_SuiviPlanAppro2017-2026_31oct2017.pdf

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Figure 8 provides an estimate of the excess energy that would be available for export in 2023 based on the projected energy (including Romaine-4) less projected domestic load requirements.

Figure 8: Calculation of Québec's Excess Energy in 2023

Excess Energy Available for Export	Net Output (GWh/year)
Total Energy Generated or Purchased in 2016[13]	217,200
Romaine 3 and Romaine 4 Hydroelectric Facilities[14]	1,300
Incremental Long-term Non-Heritage Supply (2017-2026)[15]	3,500
Projected energy in 2023[16]	222,000
Projected domestic requirements in 2023[17]	(188,500)
Excess energy available for export in 2023	33,500

Excess energy of 33.5 TWh would not be constrained by limited tieline capacity of more than 60 TWh.

Therefore, if the New England Clean Energy Connect (NECEC) transmission line were to come online, Québec will supply energy into Maine by simply reducing its exports into other markets.

[13] Hydro-Québec,

www.hydroquebec.com/sustainable-development/energy-environment/power-generation-purchases-exports.html

[14] Hydro-Québec, "A Natural Ally for Massachusetts' Energy Transition," http://news.hydroquebec.com/media/filer_private/2018/01/25/a_natural_ally_for_massachusetts_energy_transition.pdf

[15] Difference between 2026 value of 18.8 TWh and 2017 value of 15.3 TWh.

www.hydroquebec.com/sustainable-development/energy-environment/power-generation-purchases-exports.html

[16] Sum of individual components above the line in the table.

[17] État d'avancement 2017 du Plan d'approvisionnement 2017-2026, 10/31/2017, Table 1, p. 6 and Table 2, p. 8.

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Now let's talk about Hydro-Québec, which has a number of cases.

That's still the case, however. A lot of cases on the sketch board. We have the opportunity, with us today, to ask all the questions because the president, Éric Martel, is here.

- Good morning, Mr. Martel. - Good morning, Mr. Dumont.

Let us start with a very simple issue that has been a major issue in the news.

- The famous overpayments. - Overpayments.

Some people said, "Well, Mr. Legault, he had complained about overpayments. Once elected, Hydro will send us cheques." You have to accept first of all what overpayments are when you talk about them.

You know, every year, we go before the Régie de l'énergie and work with them on a budget, and we say, for example, we will provide you, Quebeckers, with full service, for example, $12 billion.

- At the end of the year... - This determines the price.

It determines the price. That's how we calculate the rate based on it.

It's never a perfect calculation. A budget will happen - We in general, we reach 99.5 on average, over the last 10-15 years, of that budget.

We always do it at a lower cost.

We are providing the same service that we promised Quebeckers.

But it costs a little less than expected, about $50 million.

Because you're budgeting too high. So some would say too cautious.

Exactly. You could say that. But imagine the opposite, that we are over $200 million, and then we turn around and say you owe us $200 million for next year. So there, at that point, it would be - - We would complain. - We'd complain too. Achieving 100% is almost impossible. So we usually arrive, perhaps in a conservative way, but we always get into our budget.

So, over seven - eight years, these sums that you spent a little less than expected each year, it was one and a half million - - One and a half billion. - A billion and a half, I'm sorry, - what we called overpayments. - Exactly.

So it's true that we received that as an extra, but at the same time, it's a service that we have to measure. We provided the service we said we would provide to Quebeckers, but we often made efficiency gains. We did it more efficiently.

And the previous government had said: "We are in a deficit situation.", when they took power, "We're going to keep all these sums." It had been like that for several years.

So they went into the public treasury.

- It went into the public treasury. - Via the Ministry of Finance.

The good news is that it does not go into the pockets of a wealthy shareholder because Hydro-Québec belongs to us and it is obviously redistributed, the state redistributes it, in health services and elsewhere.

So that money is not in the vaults of the basement - the Hydro-Québec building. - Not at all.

In treasure chests We wrote the cheque, but in Quebec City. So, Quebec City has it.

What is happening now is that there was a change in the law that took shape last year. Now we share them.

Last year, we shared, from memory, about 45 million dollars that we gave back to the people.

Now, we don't write a check to everyone or send you a check for a few dollars. Let's put it back into the new tariff case.

It's like a credit. We start the new year with a credit.

- On the rates. - On the rates.

So, how many more years do we have to have a credit like that - on rates? - Oh, well, the law tells us, - every year - - Every year.

Half of the overpayments we had before, we say, you will give it back to Quebeckers and the rest will keep it for you because, as I tell you, it still remains in the taxpayers' pockets.

Let's move on. Let's talk about rates because people are always complaining about the electricity bill and now it's already getting cold by November 15. It doesn't look good this year.

How do you rate our rates? What do you promise us for the next few years?

The good news is that I made a promise when we started about three and a half years ago together.

We're going to make you rate increases under inflation.

- So we're happy to say - - Is that what it's been like so far?

This is the fourth year that we have just filed our rate case.

This year we are at 0.3, next year we asked for 0.8.

So, we're at the bottom of inflation four years ago.

- You're below 1%. - Yes, we're below 1%.

So, we're very happy about that. We delivered our promise on that and at the same time, the company is doing well because we have succeeded...

You may have seen our financial results last week, we are 18% more profitable than last year. So, it's going well.

We have to say to ourselves, at Hydro-Québec, we have good financial results and we have succeeded in lowering rates. Our rates are still today and even widening the gap, the lowest rates in North America.

Even when compared to the European Union, we have the lowest rates.

So, we can say that, we can be happy about that, and these rates, what is interesting to say is that when we look at... When I took office, we were about 13% better than the second ones and now we're 17, 18% better. So we're digging that gap.

It is a competitive advantage for Quebec as well.

First, we know that we heat with electricity, but it also allows us to attract companies, and that is our mission to keep them down.

Well, I'm going to go through the news. There are so many subjects.

The famous Apuiat project. Wind power project in collaboration with the Innu of the North Shore. The government did not want to, but what is happening now, what people were told at home, that it was Martel who did not want to, is the president of Hydro-Québec who started putting in Legault's head that this is a bad project. True or false?

Listen, I, what I did, as the person responsible for managing Hydro-Québec with my team, we had to make sure, with the former government, that we put the facts on the table and say, "Look, we are in a surplus situation." - So we don't need it. - We don't need it.

That's clear and I'm not coming back for that and I'm not hiding.

We don't need it this year, Mr. Dumont, we spilled 10 terawatt hours of electricity.

That means we didn't turbinate water, we let it pass by the dams because we had too much.

How much could it cost if we could sell this?

If we sell it on the American market right now, maybe $500 million in additional revenue.

- That we let it flow there. - Hence the importance of having additional transmission lines because we have energy.

It's here... We have to sell it to the Americans.

And I will come back to our export projects later.

But to repeat your question on the Apuiat project, we don't need it.

We have a surplus for a long time to come.

There was a letter that went out in the media under your name, I don't know if you're going to tell me it's real or not.

- It was the real letter. - Was that the real letter?

That was about the loss over the term of the contract, - a billion and a half, two billion. - To the government, the message is exactly that, Mr. Dumont, it was: "We don't need it." But the government owns Hydro-Québec.

In the end, I have to respect that, but I have to put the facts on the table.

They were informed, at that time, that they would say: "Look, if we ever move forward, it will cost Hydro-Québec between $1.5 billion and $2 billion in net income.

- Those were real numbers. - They were real numbers.

In fact, our own number was 1,667,000, but here, - there are more optimistic scenarios - - I understand, I understand.

It's between 1.5 and 2 and that's what I had to say.

So we said it. Unfortunately, the letter leaked and there was an outcry.

We were in the middle of an election campaign. You know, when you're in charge of Hydro-Québec or the caisse, we always try not to interfere in the election campaign.

We knew we had a long list of topics. This one, unfortunately, has become a campaign issue. - It still brought up the idea that there was between you and the new Prime Minister, Mr. Legault, an accomplice, a lot of chemistry.

Did you have any privileged or unique meetings with him before the election campaign?

I haven't had any meetings with Mr. Legault.

I know there were rumours going around that we were seen at the restaurant, maybe I have a

look-alike, but it didn't happen.

- That is not true. - That is not true.

That is completely false. Mr. Legault and I, like all party leaders, and I made that clear when I arrived at the head Hydro-Québec, I meet everyone. I met Mr. Legault in Hydro-Québec's offices, but it was a year or so - before the campaign. - Not a secret restaurant.

- No, no, no, no. - At the office.

And the government knew about it. I met Mr. Péladeau at the time, I met Mr. Lisée too.

I took my precautions, I run Hydro-Québec, I'm not politicized, and I made sure to keep everyone informed about our cases and what we were doing and to listen to them too, to hear them.

Since we are talking about the new government, I will take you to these projects.

A willingness to export, to sell to Americans, Ontarians, potentially even to develop new dams, something that had not been discussed much in recent years.

Does that make sense, does it fit into your business plan?

It's absolutely in our plan. The plan we tabled three years ago in the National Assembly, which was approved, is that we said, "Look, priority number one, we are in surplus.

It takes us lines to export that." I don't want to throw ten terawatt-hours of water away every year and not monetize it.

It's really our inability to transport it.

- Absolutely. - It's the lack of lines.

Quebec is saturated. Obviously, we have growth in Quebec.

We work hard to bring in data centres, people who consume a lot, and that has had some success.

In the last quarter, we had about 4-5% of our growth coming from the efforts we made, but exports, we need lines to go down more.

That's why we're happy at the beginning of the year, we won our biggest lifetime contract with Massachusetts.

- We signed - - We still have a problem, no one wants to have the line on their property.

But that's part of it, you see, it's long term projects with Maine. We're getting there, getting

permits - - We're going around New Hamsphire. - We'll find somewhere else.

And we have yet another solution, a plan C, if necessary.

You're not worried that we're going to do this line.

We're going to make it, they want it. We were still in Massachusetts last week, you know the Prime Minister was there.

So what the Prime Minister is saying is that we have to export and we are completely in this.

Our strategic plan, which is also a three-year plan, will have to be looked at over the next five years, Hydro-Québec, to see on which river we could go on another major project. I've always said - But now we're already in surplus. If we do another big project, it must be sold in advance.

It has to be sold, and it has to be profitable.

And at the same time, it takes 15 to 18 years to build a new project.

I can easily see that in 21, 22 we will have to make a decision to perhaps build something that would be ready in 38, 39, 40,

but don't forget that there are major milestones coming in 2040.

What is happening with aluminum smelters? There are several contracts that are ending. What's going on with Churchill Falls post 41. So there are some big questions that are open to us to answer and we are preparing for that. We will be ready in 2021-22, Hydro-Québec, we say if we have to build for the future, here is the project we recommend.

Let's talk about internal management: do you pay irregular bonuses that are not recorded in your executives' official remuneration books?

So, look, it's been positioned a little like a secret, etc.

It's no secret at all. We did a mea culpa last week.

We did... This is a mistake. We have a compensation policy in place since 1997. In 2008, new rules were introduced in a decree that affected part of our policy.

- It was from the government. - It came from the government on the variable pay policy.

We had an interpretation. Our compensation people, our experts at the time, looked at it and said: "There are things we can do, there are things we can no longer do." But there have been interpretations of data on so-called retention bonuses. And now I'm correcting right now, it's not just on executives.. We have a duty...

Of the 75 people affected by this case, we have about 13 who are executives; the others are

employees.

- Employees who - - What's so special about them?

That's it, that's it. They are employees who arrive with specific skills.

Manage a pension plan. Manage, for example, all the exports we make. You know we have a group of about 40 people on the phone.

It is a transitional floor where we sell imported energy. It's people - a rare pearl species that's hard to replace.

Absolutely. So we are willing to pay them more because we keep the retention and we want to have the best too, because I don't want to come back in a year and say, "Look, we mismanaged our pension plan or our exports.

It cost us two, three hundred million dollars." It wouldn't be good for anyone.

Because we didn't have the right employee, we put an incompetent one in.

Exactly. It's better to have competent employees.

It costs us about $1.9 million a year.

Why is that in the news? Now you're explaining it to me, - That's a good question. - like a hidden thing.

Our auditor, it's his job to do that.

He checks all our processes to ensure that...

You know, at Hydro-Québec, we have to be whiter than white and he discovered that. He asked himself questions and his questions were true, were fair.

When we looked at this, the compensation people said it was okay. We double-checked that and said that maybe we stretched the elastic, and maybe we couldn't do it.

Corrective measures are being taken to ensure that this is done in the right way. We must ensure that we do not lose these employees who make a significant contribution to Hydro-Québec.

So, we're in this right now, but there was nothing secret, no bad faith and no bad intention to hide it.

When we saw it, we said to ourselves that there was a problem, that we had just realized it, that we were simply going to manage it.

Éric Martel, thank you very much for being with us today.

- Thank you, Mr. Dumont. - Goodbye.

Goodbye.

Observed Trends in Canada's Climate and Influence of Low-Frequency Variability Modes

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ABSTRACT

Trends in Canada's climate are analyzed using recently updated data to provide a comprehensive view of climate variability and long-term changes over the period of instrumental record. Trends in surface air temperature, precipitation, snow cover, and streamflow indices are examined along with the potential impact of low-frequency variability related to large-scale atmospheric and oceanic oscillations on these trends. The results show that temperature has increased significantly in most regions of Canada over the period 1948–2012, with the largest warming occurring in winter and spring. Precipitation has also increased, especially in the north. Changes in other climate and hydroclimatic variables, including a decrease in the amount of precipitation falling as snow in the south, fewer days with snow cover, an earlier start of the spring high-flow season, and an increase in April streamflow, are consistent with the observed warming and precipitation trends. For the period 1900–2012, there are sufficient temperature and precipitation data for trend analysis for southern Canada (south of 60°N) only. During this period, temperature has increased significantly across the region, precipitation has increased, and the amount of precipitation falling as snow has decreased in many areas south of 55°N. The results also show that modes of low-frequency variability modulate the spatial distribution and strength of the trends; however, they alone cannot explain the observed long-term trends in these climate variables.

1. Introduction

Over the past several decades, the northern regions have experienced some of the most rapid warming on Earth (Alexander et al. 2013; Houghton et al. 2001). The annual mean temperature over the high-latitude land area has increased by almost twice the rate of the global average (AMAP-SWIPA 2011; Anisimov et al. 2007; ACIA 2005). The cause of the warming amplification in the northern regions has been attributed primarily to temperature and albedo feedbacks because of complex interactions between land surface temperature, snow cover or sea ice extent, and the atmosphere (Pithan and Mauritsen 2014; Serreze and Barry 2011). Canada, with a large northern landmass, is also experiencing rapid warming with nationwide annual mean surface air temperature increasing by 1.5°C over the period 1950–2010 (Vincent et al. 2012). This warming has been accompanied by significant changes in many other climate elements, in different parts of the country, including increases in precipitation (Mekis and Vincent 2011), decreases in the duration of snow cover (Brown and Braaten 1998), and decreases in streamflow (Zhang et al. 2001). These changes in Canada's climate have widespread impacts on the environment, economic activities, and human health, especially in the north, where warming is proceeding more rapidly and where ecosystems and traditional lifestyles are particularly sensitive to warming (Warren and Lemmen 2014; Allard and Lemay 2012).

Recent changes in Canada's climate have been attributed, at least in part, to the increase in the concentration of atmospheric greenhouse gases associated with anthropogenic activities. Evidence of an anthropogenic influence was found on temperature in the southern regions of Canada (Zhang et al. 2006), in the Arctic (Najafi et al. 2015; Gillett et al. 2008), on Arctic sea ice and precipitation (Min et al. 2008a,b), and to a lesser extent on heavy precipitation events over a large part of the Northern Hemisphere land areas (Min et al. 2011).

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Barnett et al. (2008) attributed much of the observed changes during the second half of the twentieth century seen in winter surface air temperature, river flow, and snowpack in the western United States to anthropogenic forcing.

Previous studies have documented significant links between low-frequency modes of atmospheric–oceanic variability and Canadian climate. For example, positive phases of the Pacific decadal oscillation (PDO) and El Niño–Southern Oscillation (ENSO) have been associated with warm winter temperatures in western and central Canada (Shabbar and Yu 2012; Bonsal et al. 2001; Shabbar and Khandekar 1996) and a reduction of snow cover in western Canada (Brown 1998). An abrupt transition to lower snow depths in the mid-1970s was related to a shift in the Pacific–North America (PNA) index (Brown and Braaten 1998). Interannual variations in Canadian Prairies precipitation have been associated with ENSO variations (Bonsal and Lawford 1999; Shabbar et al. 1997). Positive phases of the PNA pattern and PDO corresponded to shorter durations of ice cover on lakes and rivers (Bonsal et al. 2006), increasing streamflow regime in spring (Brabets and Walvoord 2009), and earlier high-flow season (Stewart et al. 2005). Trends toward positive modes of the North Atlantic Oscillation (NAO) were associated with cold and dry winters in northeastern Canada (Bonsal et al. 2001). Brown (2010) documented evidence of an abrupt decrease in snow depth in southern Quebec around 1980 linked to a reduction in the number of winter storms over the region (Wang et al. 2006) coinciding with a transition to more positive values of the NAO.

It is important to improve our understanding of the various mechanisms responsible for changes in regional surface climate. Large-scale oscillations have a significant influence on climate trends: at times, they can mask or enhance the trends depending on the phase of the oscillation and the time period selected for trend analysis. Canada's climate shows multidecadal-scale variability over the past century associated with oceanic and atmospheric modes: the relationships are however regionally based and are more evident during the boreal winter. Canada's climate has also been influenced by anthropogenic warming in recent decades. It is therefore a complex task to estimate the magnitude of climate trends and their potential causes.

The first objective of this study is to provide a comprehensive analysis of the climate trends in Canada, including those for temperature, precipitation, snowcover, and streamflow indices using recently updated data, and to highlight the consistency among the trends in related climate variables over similar periods of time. The second objective is to evaluate the climate trends after removing the potential effects of low-frequency variability modes in order to determine if the trends remain significant and if they become more consistent across the country. To this end, climate trends are reassessed when indices of large-scale oscillations are used as explanatory variables in the trend estimation. Section 2 describes the datasets and section 3 presents the methodology. The trends in Canada's climate are described in section 4. The climate trends after removing the influence of low-frequency variability modes are provided in section 5. A summary and discussion follow in section 6.

2. Data

A number of data-related issues arise when attempting to analyze climate trends in Canada. There have been changes in instrumentation, observing practices, and relocation of observing sites that have introduced nonclimatic variations in climate datasets (also called "inhomogeneities"), which can interfere with the proper assessment of any climate trends. In addition, the climate observing surface network in Canada has changed considerably in the past, especially since the 1990s, because of the downsizing of the traditional observing network and the increased use of automated systems (Milewska and Hogg 2002). Extensive research has been carried out over the past 15 yr to develop adjusted and homogenized surface air temperature, precipitation, wind speed, and pressure data for Canada to address many of the above concerns (Vincent et al. 2012; Mekis and Vincent 2011; Wan et al. 2010, 2007). However, more work is still needed, especially to address the issues related to the introduction of automated systems for precipitation.

a. *Surface air temperature*

Homogenized daily maximum and minimum temperatures for 338 locations across the country were retrieved from the second generation of homogenized temperature dataset (Vincent et al. 2012). Observations at collocated sites were sometimes joined in order to create longer time series for use in trend analysis. Daily temperatures from automatic systems were included at some stations. Two types of adjustments were performed to produce homogenized datasets. Daily minimum temperature recorded at 120 synoptic stations (mainly airports) was first adjusted to account for the bias due to the change in observing time in July 1961 (Vincent et al. 2009). A second adjustment based on the quantile-matching algorithm, as applied in Wang et al. (2014), was performed as part of the homogeneity assessment carried out by Vincent et al. (2012) to address shifts due to site relocation and changes in observing practices. The daily mean temperature is derived from

the daily maximum and minimum. Monthly mean temperature is computed as the average of the daily means and is set to missing if more than five random or three consecutive daily values are missing. Seasonal and annual means are obtained if all corresponding monthly values are nonmissing. The seasons are defined as winter (December–February), spring (March–May), summer (June–August), and autumn (September–November).

b. Precipitation

Adjusted daily rainfall and snowfall amounts at 464 locations were taken from the second generation adjusted precipitation dataset (Mekis and Vincent 2011). The data were adjusted to account for known measurements issues such as wind undercatch, evaporation and wetting losses for each type of rain gauge (Devine and Mekis 2008), conversion to snow water equivalent from snow ruler measurements (Mekis and Brown 2010), trace observations, and accumulated amounts from several days. As for temperature, observations from nearby collocated stations were sometimes merged to produce longer time series (Vincent and Mekis 2009). Measurements from automatic systems were not included. The adjusted daily total precipitation is the sum of the adjusted rainfall and adjusted snow water equivalent. The monthly total precipitation is the sum of the adjusted daily total precipitation amounts following the previously defined rule for missing daily temperature. Seasonal and annual totals are obtained if all corresponding monthly values are nonmissing. Trends in the ratio of snowfall to total precipitation (hereinafter ''snowfall ratio'') are also examined since they provide information regarding changes in solid precipitation, which is a very important climate characteristic in Canada. The snowfall ratio is defined as the total snowfall water equivalent divided by the total precipitation obtained for each season and annually and is expressed as a percentage.

c. Gridding temperature and precipitation data

Since stations recording temperature and precipitation observations are irregularly distributed across the country with more stations in the south than in the north, temperature and precipitation data were interpolated to evenly spaced point locations for a better spatial representation of the climate variations over the country. Seasonal and annual temperature anomalies from the 1961–90 reference period were first obtained at individual stations. They were interpolated to 50-km spaced grid points (E. Milewska and R. D. Whitewood 2011, unpublished manuscript) using the method of Gandin's optimal interpolation (Gandin 1965; Bretherton et al. 1976; Alaka and Elvander 1972). Normalized seasonal and annual precipitation anomalies (normalized by dividing the anomalies by the 1961–90 averages) and snowfall ratio were gridded using the same method. Seasonal and annual grid point values were averaged together in order to produce seasonal and annual time series representing the whole country. The spatial representativeness of the climate network in Canada and the uncertainty associated to the interpolation were assessed in previous studies (Milewska and Hogg 2001; Zhang et al. 2000).

d. Snow cover

Snow cover data were derived from daily snow depth observations made at climate and synoptic stations since the beginning of the 1950s. Most of the observations were made at open sites or near populated regions and may not be representative of the surrounding area, particularly in regions with higher terrain and forest cover. Nonetheless, these observations still represent a consistent measure of temporal and spatial variations in snow cover in Canada. The data were taken from an update of the Canadian snow cover data (Meteorological Service of Canada 2000), which includes data rescue of previously undigitized Canadian snow depth data and the reconstruction of missing values as outlined in Brown and Braaten (1998). These data were supplemented with daily snow depth observations from the Digital Climate Archive of Environment Canada to the end of the 2012/13 snow season. A homogeneity assessment of the observations was carried out by Brown and Braaten (1998) with little evidence of detectable inhomogeneities due to station relocations.

The snow cover variables selected for this analysis are the annual maximum snow depth; date of the annual maximum snow depth; and snow-cover duration (SCD), which is defined as the number of days with at least 2 cm of snow on the ground during the snow year (August–July). The SCD is also computed over the first (August–January) and second (February–July) halves of the snow year providing a more objective way to monitor snow-cover onset and disappearance than the beginning and ending dates of continuous snow cover (which are sensitive to the definition of ''continuous'' snow cover). The number of stations recording snow depth has seriously decreased since the mid-1990s. There are only 104 stations with sufficient data for trend analysis for 1950–2012 (allowing for 10 missing years). Snow cover data were not gridded since there are too few stations to adequately represent spatial variations over the entire country.

e. Streamflow

Streamflow data were retrieved from the Reference Hydrometric Basin Network of Environment Canada

(Zhang et al. 2001; Scott et al. 1999), which has been updated to 2012 and contains daily mean streamflow observations at 226 basins, mainly located in the south, with at least 20 yr of data. The streamflow variables selected for this analysis are annual maximum and minimum daily mean streamflow (annual highest and lowest daily mean river discharge; expressed in $m^3 s^{-1}$); annual, April, and September mean streamflow; starting date of spring freshet; and river ice freezeup and breakup dates. The starting date of the spring freshet (also called high-flow season) is the date when the cumulative sum of the difference between the daily mean streamflow and its climatology reaches a minimum during the hydrological year, from October to September (Liebmann et al. 2007). In this study, there are only 53 sites with streamflow data and 20 sites with river ice breakup and freezeup dates with sufficient data for trend analysis over 1950–2012. Because of the limited number of sites with river ice data in the past 53 yr, the trends in streamflow indices are also examined over the shorter 1967–2012 period at 57 sites.

f. Large-scale atmospheric and oceanic oscillation indices

Low-frequency modes of climate variability linked to the Pacific and Atlantic Oceans are investigated to assess their influence on long-term climate variations in Canada. Four main modes of variability are assessed: the North Pacific index (NPI), Pacific decadal oscillation, North Atlantic Oscillation, the Atlantic multidecadal oscillation (AMO). NPI represents Pacific Ocean–related atmospheric oscillations and is defined as the area-weighted sea level pressure over the region 30°–65°N and 160°E–140°W (Trenberth and Hurrell 1994); this index was further normalized for this study. PDO represents Pacific Ocean oscillations and is defined as standardized values of the leading principal component of the monthly sea surface temperature anomalies north of 20°N (Zhang et al. 1997; Mantua et al. 1997). In the Atlantic, atmospheric oscillations are provided by NAO that are based on the difference in normalized sea level pressure between the Azores and Iceland (Osborn 2011; Jones et al. 1997; Hurrell 1995). Atlantic oceanic oscillations are represented by AMO defined by the normalized and detrended Kaplan sea surface temperature in the North Atlantic Ocean over 0°–70°N (Enfield et al. 2001). Monthly data for atmospheric and ocean oscillations were extracted from various publically available sources. ENSO is not used in this study since its high-frequency oscillations are not helpful for explaining long-term trends. Seasonal means of the oscillations' indices were computed following the season's definition used for temperature and precipitation (winter average indices for NPI, NAO, PDO, and AMO are presented in Fig. 1).

3. Methodology

Since the climate observing network in the northern regions was established during the late 1940s, there are very few locations in the north with observations prior to 1948. For this reason, temperature and precipitation trends are examined for two periods: 1948–2012 for Canada (the entire country) and 1900–2012 for southern Canada (south of 60°N). The trends for snow-cover and streamflow indices were analyzed for 1950–2012. The trend calculation methodology follows Zhang et al. (2000) with slope estimation from Sen (1968) and statistical significance based on the nonparametric Kendall's test (Kendall 1955). This test is less sensitive to the nonnormality of the data distribution and less affected by extreme values and outliers as compared to the commonly used least squares method. Since serial correlation is often present in climatological time series, the method involves an iterative procedure that takes into account the lag-1 autocorrelation of the time series (Zhang et al. 2000). The temperature and precipitation trends are computed at each grid point and for the time series averaged over Canada and southern Canada. The trends for the snow-cover and streamflow indices are obtained at individual stations. The statistical significance of the trends is assessed at the 5% level (statistically significant trends are reported as significant trends in the text). The uncertainty related to the linear trend is quantified using the 95% confidence interval (reported in square brackets in the text).

A multivariate regression modeling approach was used to evaluate the degree to which low-frequency variability modes (represented by the large-scale oscillations) were able to explain annual and seasonal variations over the short and long periods of time. A regression model was first fitted to the data at each grid point (for temperature and precipitation) or each station (for snow-cover and streamflow indices). Two explanatory variables were used to represent the Pacific and Atlantic influence (e.g., the indices for PDO and NAO) and the dependent variable was the climate element (temperature, precipitation, snow-cover, or streamflow indices). Then the method based on the Kendall test (described above) was applied directly on the residuals at each grid point (or station) in order to estimate the trends after removing the effects of the low-frequency variability modes. Annual and seasonal grid point (or station) residuals were averaged together in order to produce a single time series of residuals representing the entire country (or southern Canada).

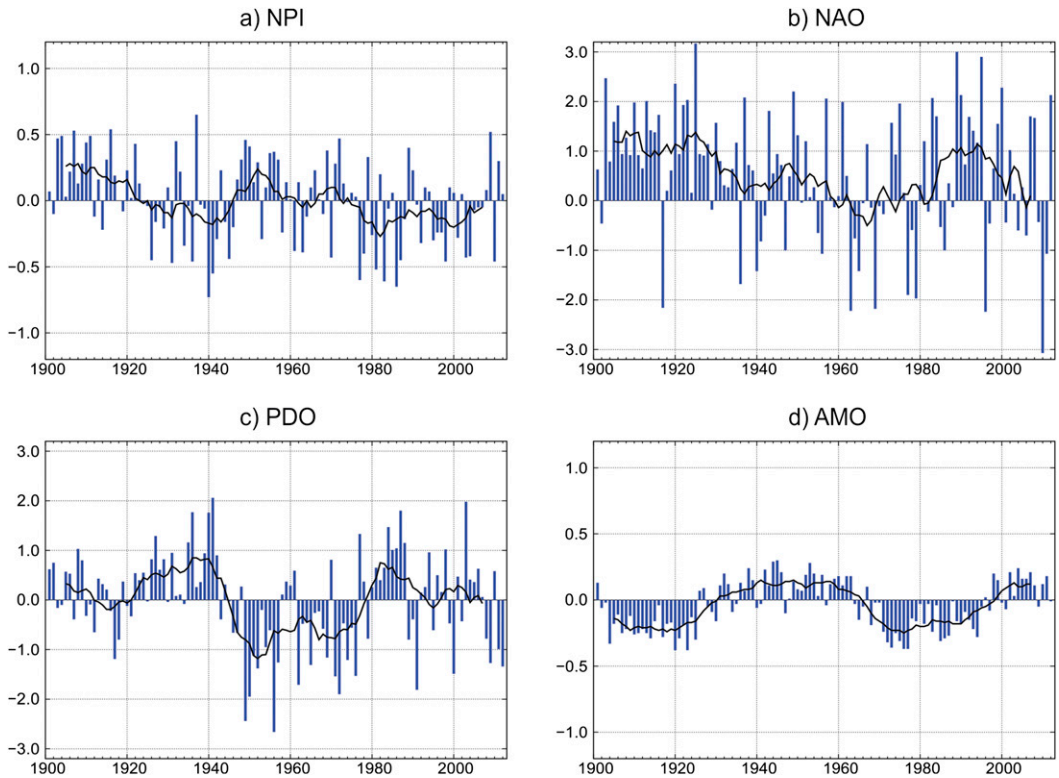

FIG. 1. Winter standardized anomalies of the (a) NPI, (b) NAO, (c) PDO, and (d) AMO indices for 1900–2012. The black line is an 11-yr running mean.

The NAO and PDO indices were first introduced in the regression model since their influence on the Canada's climate is well documented. The annual and seasonal time series of these two indices are not correlated in time and only exhibit a significant positive trend in winter PDO for 1948–2012 and a significant negative trend in winter NAO for 1900–2012. The same procedure is repeated when the NPI and NAO indices (representing atmospheric oscillations in the North Pacific and North Atlantic) and PDO and AMO indices (representing the Pacific and Atlantic oceanic oscillations) are introduced in the regression model in order to determine if the results are similar. It is important to note that the annual and seasonal time series of the PDO and NPI, or AMO and NAO, are significantly correlated in time but inversely and cannot be used in the same regression model. There was no evidence of significant trends in annual or seasonal time series of NPI and AMO over the 1948–2012 and 1900–2012 periods.

4. Observed climate trends in Canada

a. Trends in surface air temperature

Significant trends in annual mean temperature ranging from 1° to 3°C are found almost everywhere across the nation for 1948–2012 (Fig. 2a). The anomalies averaged over the country indicate a significant increase of 1.7°C [1.1°–2.3°C] over the past 65 yr (Fig. 2b). The national time series exhibits considerable variability, although a steady increase is observed from the beginning of the 1970s to 2012. Seasonally, the greatest warming is found during winter (Fig. 3a). The winter trends are predominant in the western regions (northern British Columbia and Alberta, Yukon, Northwest Territories, and western Nunavut), ranging from 4° to 6°C over the past 65 yr. In spring, the warming is less pronounced, but significant warming trends are also dominant over the western regions (Fig. 3b). Summer mean temperature has increased much less than the winter and spring mean temperatures, but the magnitude of the warming is generally more consistent across the country (Fig. 3c). During autumn (Fig. 3d), most of the warming is observed in the Arctic and northern Quebec. Seasonal mean temperature anomalies averaged over Canada indicate significant increases of 3.3° [1.8°–4.8°C], 1.8° [0.7°–3.0°C], 1.4° [0.8°–1.8°C], and 1.5°C [0.5°–2.6°C] over 1948–2012 for winter, spring, summer, and autumn, respectively.

The results for southern Canada (Fig. 2c) show significant warming across the entire region averaging

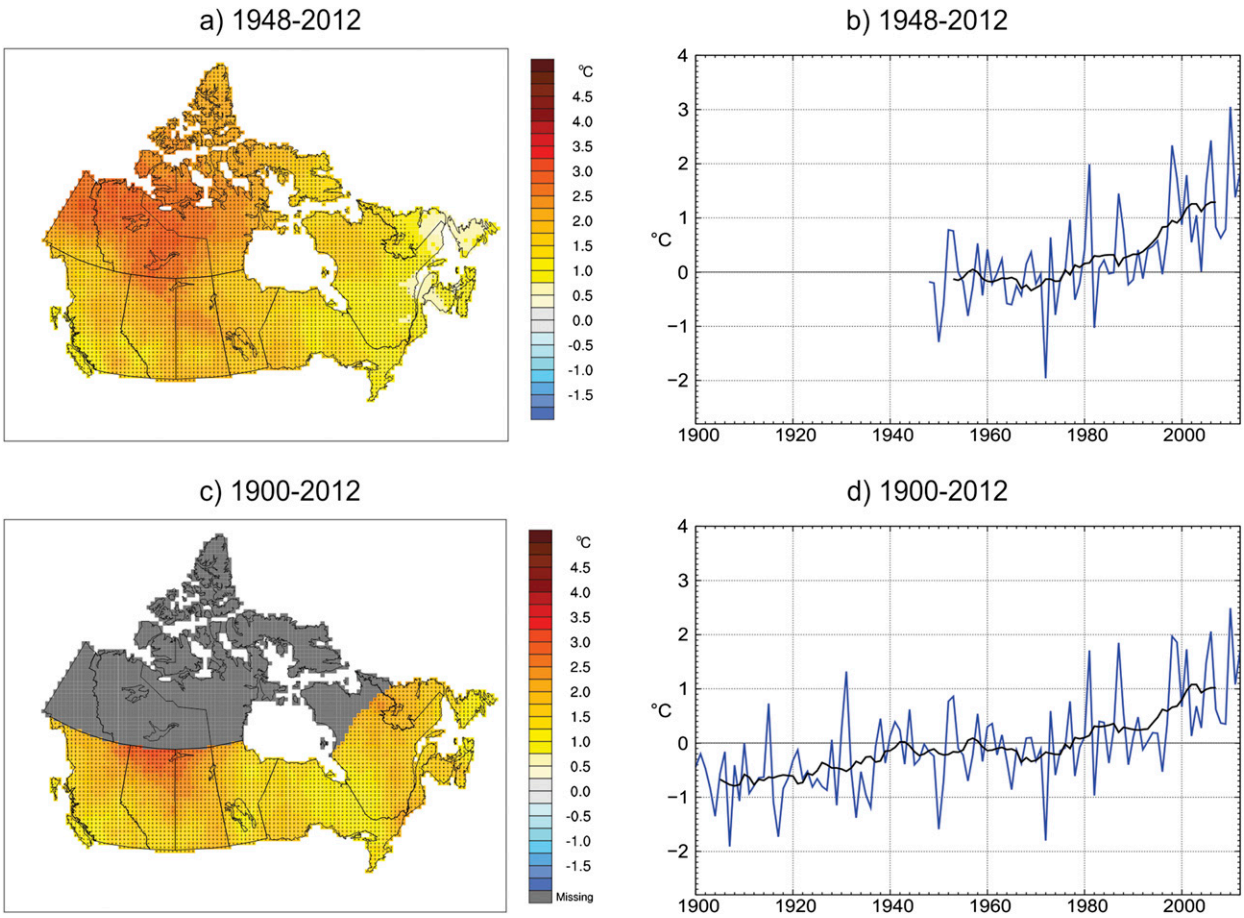

FIG. 2. Trends in annual mean temperature for (a) 1948–2012 [°C (65 yr)$^{-1}$] and (c) 1900–2012 [°C (113 yr)$^{-1}$]. Grid squares with trends statistically significant at the 5% level are marked with a dot. Annual mean temperature anomalies for (b) Canada (1948–2012) and (d) southern Canada (1900–2012). The black line is an 11-yr running mean.

1.6°C [1.2°–2.0°C] over the 1900–2012 period (Fig. 2d). The warming is not monotonic, with periods of more rapid increase evident prior to the 1940s and after the 1970s and with a modest cooling observed over 1940–70. The seasonal trend results (not shown) indicate significant warming in all seasons over southern Canada, averaging 2.6° [1.4°–3.8°C], 1.9° [1.1°–2.7°C], 1.4° [1.1°–1.8°C], and 1.0°C [0.3°–1.8°C] for winter, spring, summer, and autumn, respectively. The winter warming is more pronounced in the western regions (eastern British Columbia, Alberta, Saskatchewan, and western Manitoba), with trends of 2°–4°C over the 113-yr period. These trends are consistent with previous results (Vincent et al. 2012, 2007; Zhang et al. 2000) obtained over shorter periods of time. A reconstruction of global surface air temperature over 1901–2012 suggests that the greatest warming has occurred over northwestern North America and central Eurasia (Vose et al. 2012).

b. *Trends in precipitation*

Annual total precipitation has increased mainly in the northern regions during 1948–2012 (Yukon, Northwest Territories, Nunavut, and northern Quebec), although some areas in the south (eastern Manitoba, western and southern Ontario, and Atlantic Canada) have also experienced significant increasing trends (Fig. 4a). There is more spatial variability in precipitation trends than in temperature trends. The anomalies averaged over the country indicate a significant increase of 19% [15%–22%] during the past 65 yr (Fig. 4b). It is important to note that the percentage anomalies in the north represent much less precipitation amounts than the same percentage in the south. In all seasons, total precipitation has increased mainly in the north (Fig. 5). In winter, decreasing trends are dominant in the southwest (British Columbia, Alberta, and Saskatchewan). There is less evidence of significant changes in the south during spring, summer, and autumn.

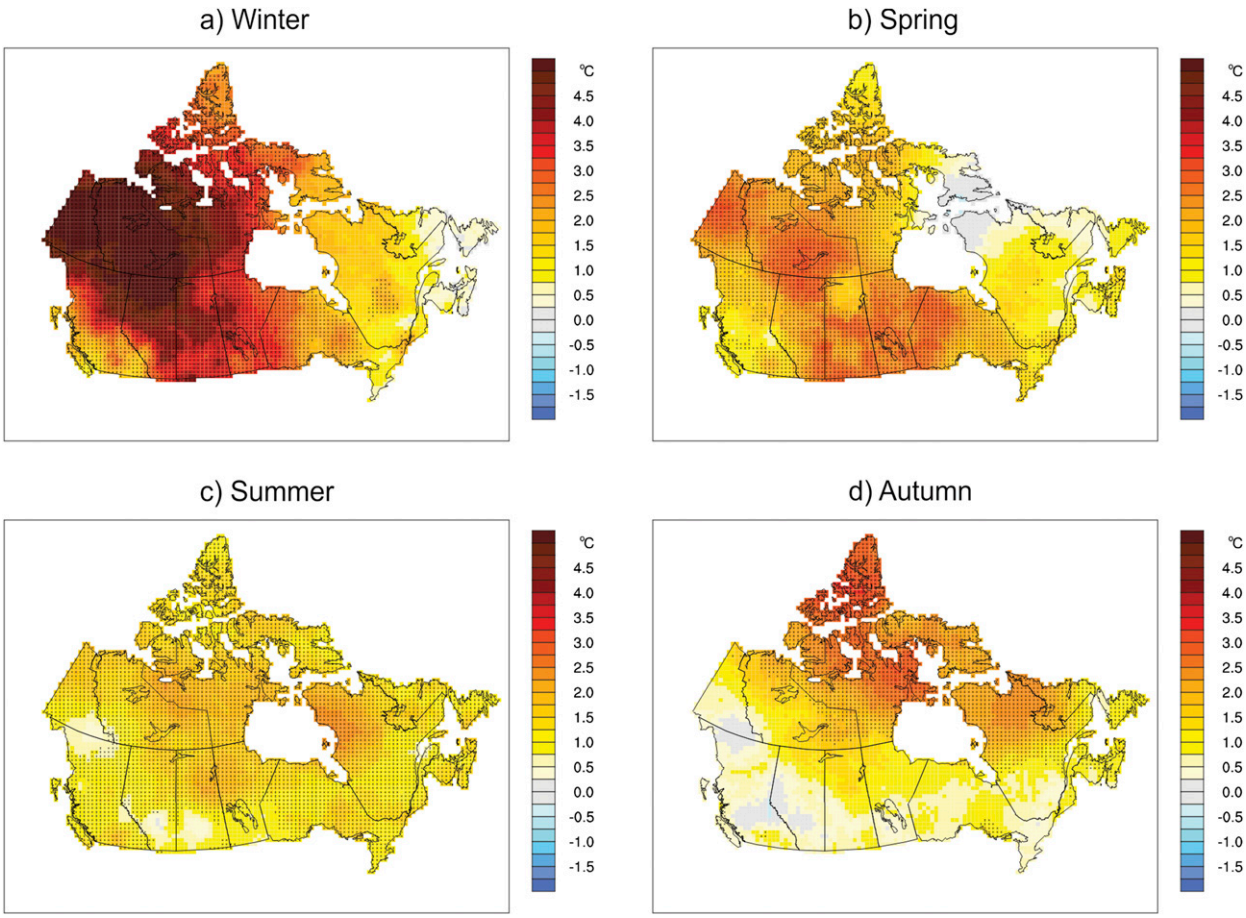

FIG. 3. Trends in mean temperature for 1948–2012 for (a) winter, (b) spring, (c) summer, and (d) autumn. Grid squares with trends statistically significant at the 5% level are marked with a dot. The units are degrees Celsius per 65 yr.

For 1900–2012, annual total precipitation has generally increased across southern Canada (Fig. 4c). The anomalies averaged over the region show a significant increase of 18% [14%–21%] during the 113-yr period (Fig. 4d). The rise in total precipitation results from a steady increase from the 1920s to the 1970s and a modest increase from the 1970s. The pattern of increasing trends is similar in all seasons (figures not presented). Seasonal positive trends are generally significant from coast to coast, with the exception of some areas in the central western (Alberta and Saskatchewan) and central eastern (eastern Ontario and southern Quebec) regions.

Trends in snowfall ratio reflect the combined effect of both precipitation and temperature. The annual trends are generally decreasing over 1948–2012 in many areas south of 65°N while they are increasing in the north (Fig. 6a). The snowfall ratio averaged over the country shows an increase from the beginning of the record to the 1970s, followed by a decrease to 2012 (Fig. 6b). The peak snowfall ratio in the 1970s is consistent with North American winter snow cover extent, which reached twentieth-century maximum values around this time (Brown 2000). In winter, there is less evidence of change although significant decreasing trends are observed in the west (British Columbia) and east (southeastern Quebec) over the past 65 yr (figure not presented). The changes are more pronounced in spring and autumn. In spring, significant decreasing trends are found across western and central Canada (Fig. 7a). Since spring precipitation has not essentially changed in the past 65 yr over this area (Fig. 5b), the decreasing trends in snowfall ratio during spring is mainly due to the spring warming (Fig. 3b), which effectively decreased the proportion of snow. A similar connection is seen in autumn, where significant decreasing trends in northern Quebec (Fig. 7b) correspond to the autumn warming over the past 65 yr (Fig. 3d).

For 1900–2012, the annual snowfall ratio has generally increased in the northern part of southern Canada

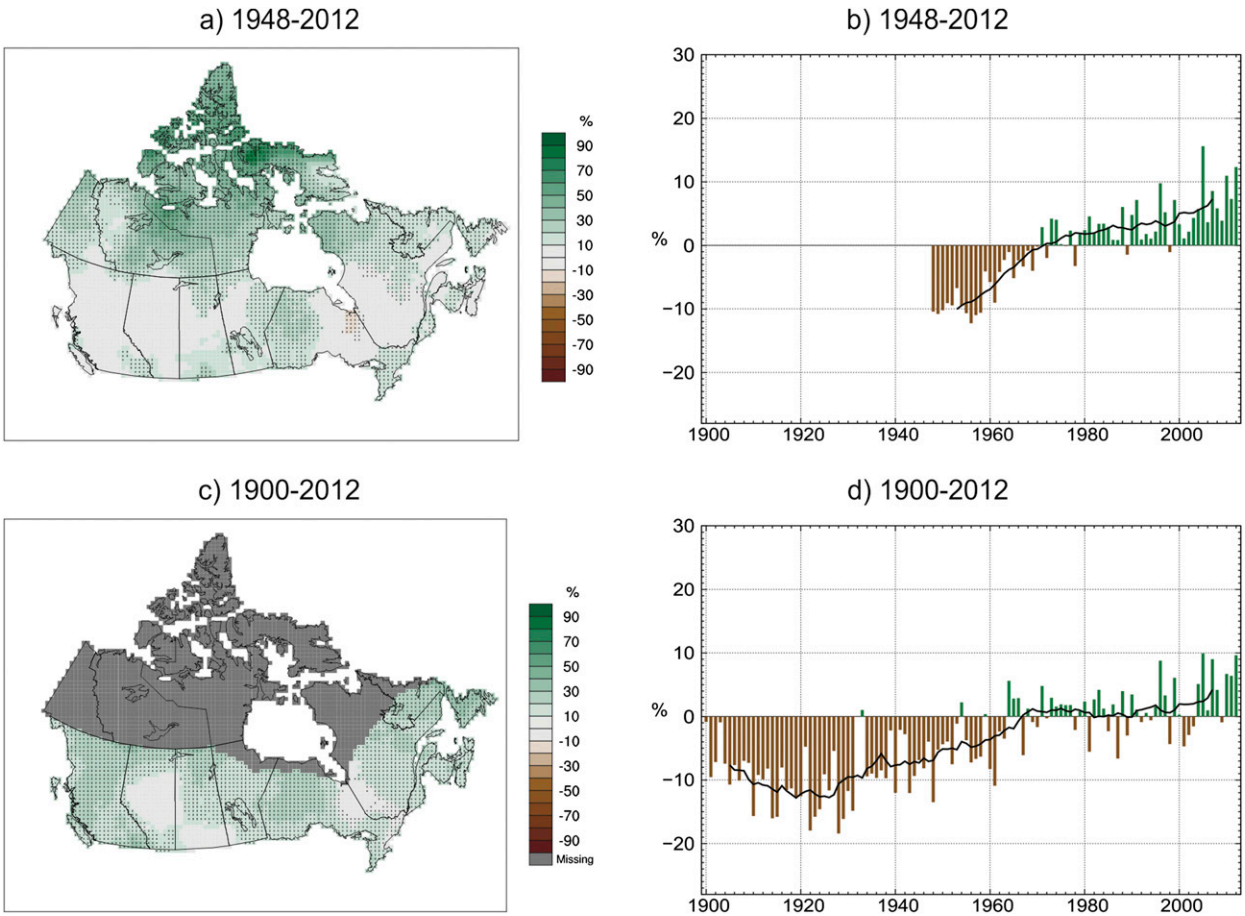

FIG. 4. Trends in annual total precipitation for (a) 1948–2012 [% $(65\,\mathrm{yr})^{-1}$] and (c) 1900–2012 [% $(113\,\mathrm{yr})^{-1}$]. Grid squares with trends statistically significant at the 5% level are marked with a dot. Annual total precipitation anomalies for (b) Canada (1948–2012) and (d) southern Canada (1900–2012). The black line is an 11-yr running mean.

(north of 55°N) and decreased in several regions in the south (Fig. 6c). The snowfall ratio averaged over the region shows a steady increase from the 1920s to the 1970s, followed by a decrease to 2012 (Fig. 6d). Similar to the shorter period, there is less evidence of change in the winter snowfall ratio (not shown), except for some small areas of decreasing trends in the west (southern British Columbia) and east (southern Quebec). The changes in snowfall ratio during 1900–2012 are more pronounced in spring and autumn when increasing (decreasing) trends are found in the northern (southern) part of southern Canada. The increasing snowfall ratio trends north of 55°N are mainly due to increasing precipitation, whereas the decreasing trends in the south are largely due to the warming trends during the past 113 yr. Precipitation trends for 1948–2012 and 1900–2012 are generally in agreement with previous findings (Mekis and Vincent 2011; Zhang et al. 2000).

c. *Trends in snow cover*

Snow-cover duration has decreased in Canada and most of the decreasing trends are observed in spring. About 22% of the stations have significant decreasing trends in the first half of the snow year (Fig. 8a), whereas 43% of the stations have significant decreasing trends in the second half of the snow year (Fig. 8b). The SCD anomalies from the 1961–90 reference period averaged over the 104 stations show a significant decrease of 8 [3–14 days] and 10 days [5–15 days] during 1950–2012 for the first and second halves of the snow year. The trend toward earlier snow disappearance in the spring was previously documented by Brown and Braaten (1998) and is part of a hemispheric-wide trend of earlier melt of snow and ice (Lemke et al. 2007; Vaughan et al. 2013). Snow cover in North America was characterized by rapid decreases in the 1980s and early 1990s with a significant decreasing trend in April snow water equivalent for 1915–97 (Brown 2000).

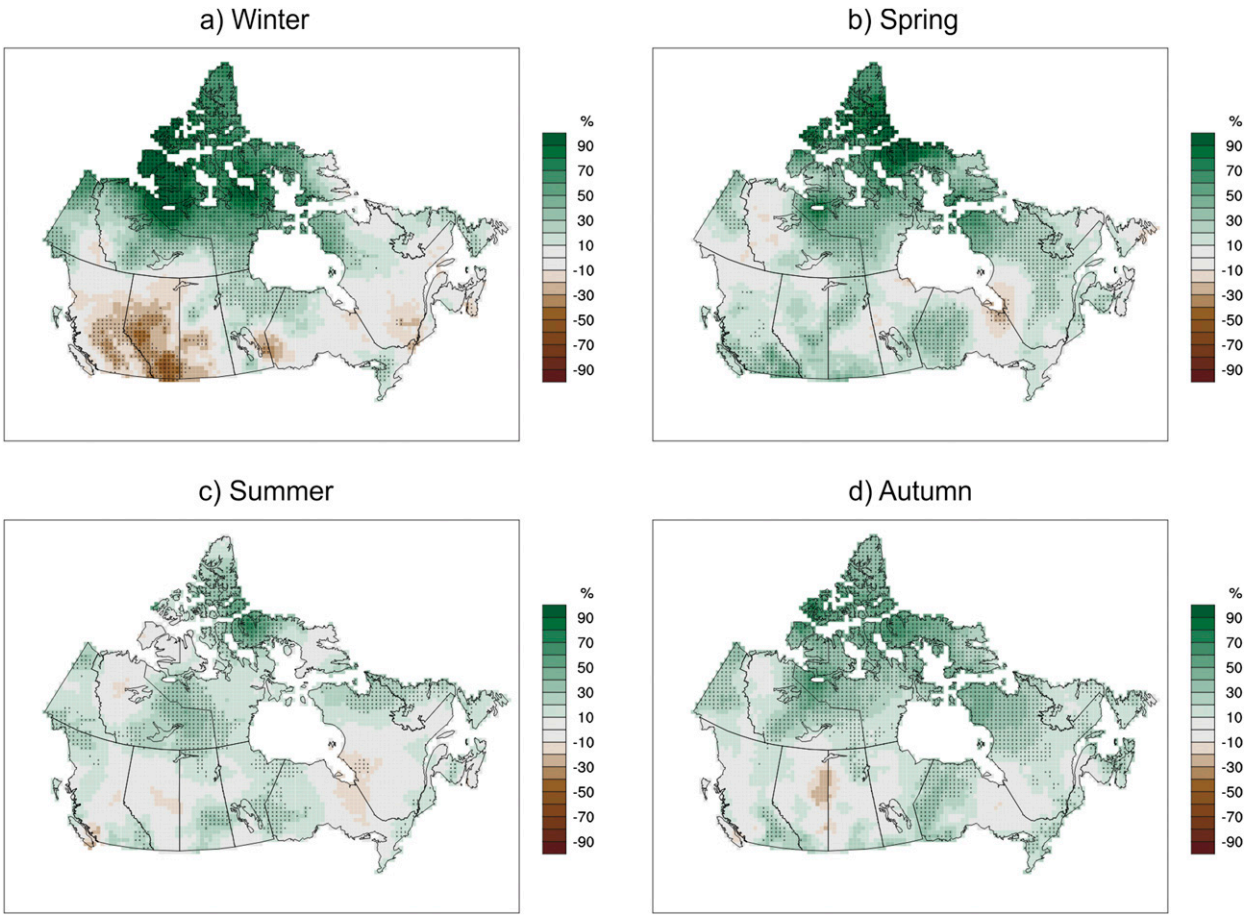

FIG. 5. Trends in total precipitation for 1948–2012 for (a) winter, (b) spring, (c) summer, and (d) autumn. Grid squares with trends statistically significant at the 5% level are marked with a dot. The units are percentage per 65 yr.

The annual maximum snow depth shows a general tendency toward smaller values (Fig. 8c). A decrease of 4 cm [3–11 cm] during 1950–2012 is found when the anomalies are averaged over the 104 stations: of these, 23% exhibit a significant decrease of more than 20 cm. The decrease in the maximum snow depth in the southern regions is being driven by less winter precipitation (Fig. 5a) and a lower fraction of precipitation falling as snow from the winter warming (Fig. 3a). Significant trends toward earlier dates of maximum snow depth are observed at 26% of the stations (Fig. 8d). The data also indicate that, when averaged over the 104 stations, the annual maximum snow depth occurs earlier in the year by about 13 days [6–21 days]. These results are consistent with winter warming. They are also in agreement with broad-scale trends toward declining spring snowpack and earlier runoff over the northwestern United States (Mote 2006; Barnett et al. 2008).

d. *Trends in streamflow*

Evidence of significant change is mainly found in April mean streamflow and in the starting date of high-flow season over 1950–2012. The results show significant increasing trends in April mean streamflow at 25% of the sites (Fig. 9a) and significant decreasing trends in the starting date of the high-flow season at 21% of the sites (Fig. 9b), mostly located in the western and eastern parts of the country. The trends toward earlier high-flow season and increase in April mean streamflow were previously documented in Zhang et al. (2001) and are consistent with the trends found across western North America (Stewart et al. 2005; Brabets and Walvoord 2009). The earlier start of spring freshet and increasing streamflow in April may be attributed to a combination of several factors, including earlier spring snowmelt and an increased proportion of liquid precipitation, depending on location. However, they are also dependent

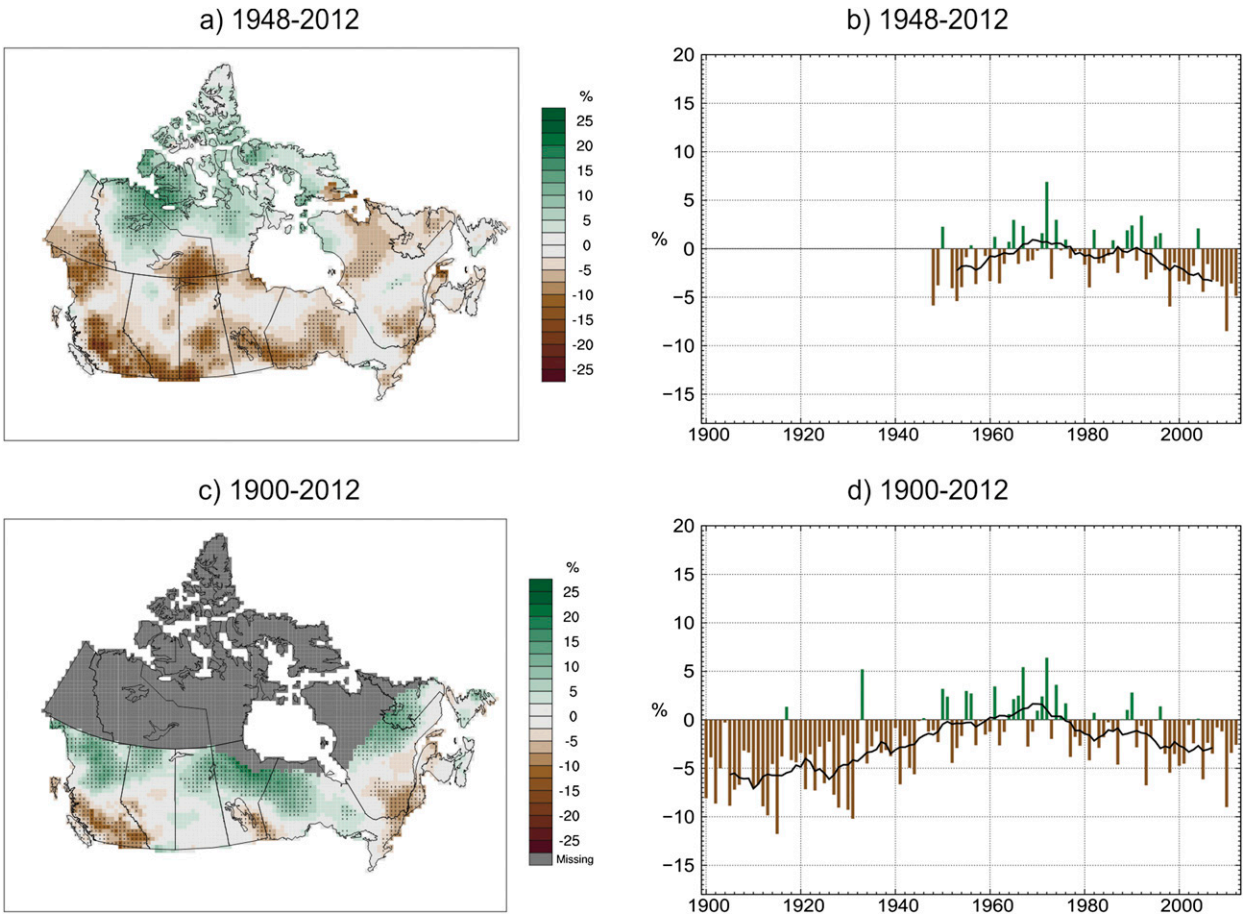

FIG. 6. Trends in annual snowfall ratio for (a) 1948–2012 [% $(65\,\mathrm{yr})^{-1}$] and (c) 1900–2012 [% $(113\,\mathrm{yr})^{-1}$]. Grid squares with trends statistically significant at the 5% level are marked with a dot. Annual snowfall ratio for (b) Canada (1948–2012) and (d) southern Canada (1900–2012). The black line is an 11-yr running mean.

on the maximum water storage of the snowpack and any changes in the distribution of the runoff. A recent study suggests that a shift in precipitation from snow toward rain does not necessary lead to increasing streamflow overall (Berghuijs et al. 2014).

Analysis of the date of river ice breakup and freezeup indicate some evidence of trends toward earlier river ice breakup at most locations for 1950–2012 (Fig. 9c) and 1967–2012. There is less evidence of changes in the date of river ice freezeup (not shown). These results are consistent with previously published studies (Duguay et al. 2006; Latifovic and Pouliot 2007) that report widespread trends to earlier spring breakup with strong regional variability in freezeup dates. These trends are consistent with warmer spring temperature and earlier start of the spring freshet. They are also in agreement with the trends observed over shorter periods of time (Zhang et al. 2001; Bonsal et al. 2006).

5. Influence of large-scale oscillation indices on observed trends

a. *Influence of the PDO and NAO indices on temperature trends*

The regression coefficients associated with the PDO and NAO are first examined when the model is fitted for 1948–2012. The coefficients are significant for a higher number of grid points in winter and spring than in summer and autumn. Significant positive coefficients for PDO are found in the west (Figs. 10a,d), while significant negative coefficients for NAO are observed in the northeast (Figs. 10b,e). These results are consistent with those presented in previous studies (Liu et al. 2007; Wang et al. 2005; Bonsal et al. 2001), which showed positive correlation between surface air temperature and PDO in the west and negative correlation between surface air temperature and NAO in the northeast. The

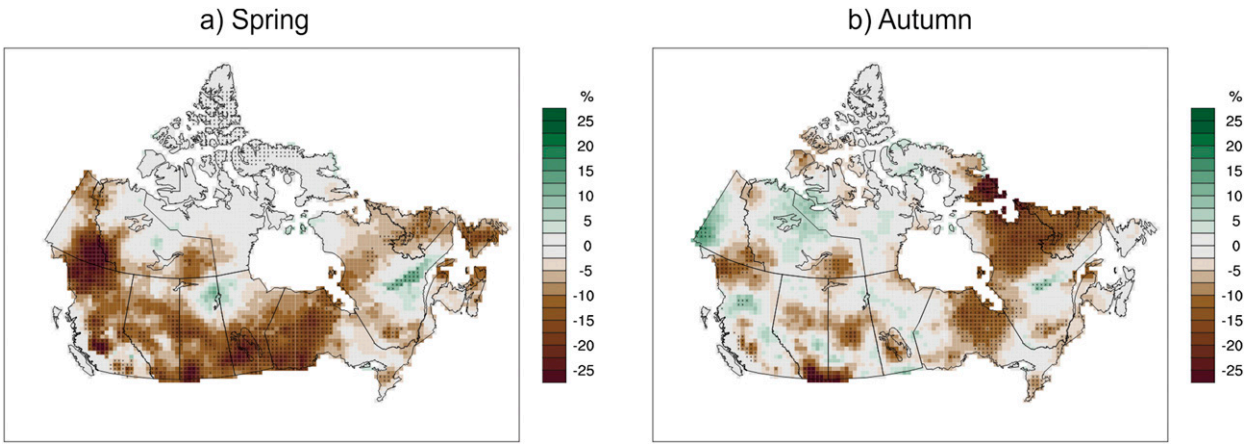

FIG. 7. Trends in snowfall ratio for 1948–2012 for (a) spring and (b) autumn. Grid squares with trends statistically significant at the 5% level are marked with a dot. The units are percentage per 65 yr.

combination of the PDO and NAO indices explain about 21% (13%) of the variation in winter (spring) mean temperature in Canada during 1948–2012 (this percentage is calculated at each grid point and averaged over the nation). This percentage is much smaller for summer and autumn.

When the trends in the residuals are assessed for 1948–2012, the winter and spring warming (Figs. 10c,f) is

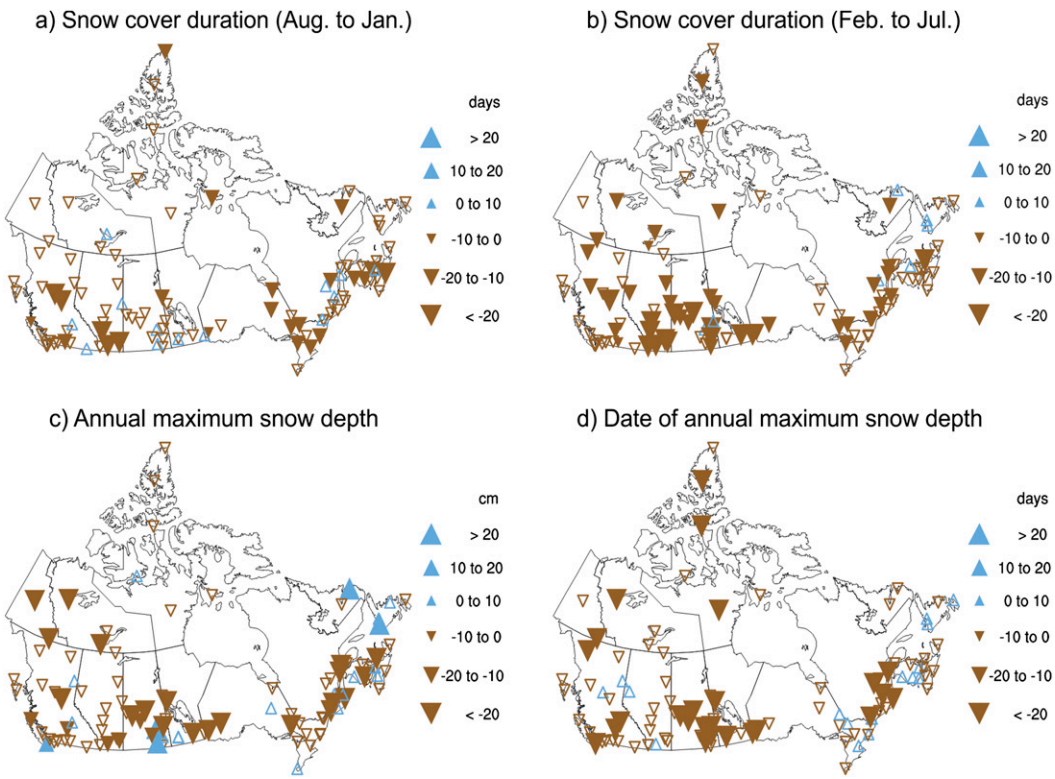

FIG. 8. Trends in snow cover data for 1950–2012: snow-cover duration (number of days with snow on the ground ≥ 2 cm) during (a) the first half of the snow season (August–January) and (b) the second half of the snow season (February–July); (c) annual maximum snow depth; and (d) date of annual maximum snow depth. Upward (downward) pointing triangles indicate positive (negative) trends. Solid triangles correspond to trends significant at the 5% level.

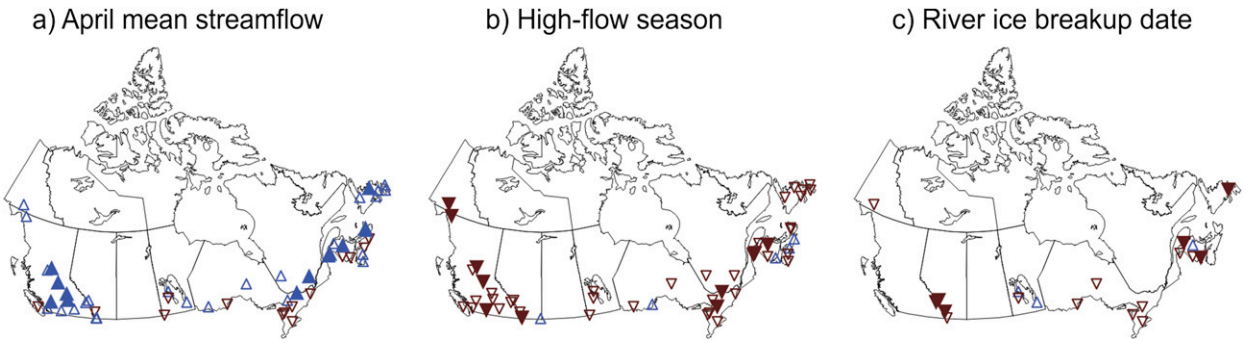

FIG. 9. Trends in (a) April mean streamflow, (b) starting date of high-flow season, and (c) date of river ice breakup for 1950–2012. Upward (downward) pointing triangles indicate positive (negative) trends. Solid triangles correspond to trends significant at the 5% level.

less pronounced than the warming observed in the original data (Figs. 3a,b), mainly in the western and central regions. However, the trends are still significant in many regions and their magnitude is more consistent across the country. The winter (spring) time series of the residuals averaged over the nation indicate a significant warming of 2.1°C (1.0°C) over the past 65 yr while the original winter (spring) data show a significant increase of 3.3°C (1.8°C). These results demonstrate that, while the oscillations explain some of the temperature variations over 1948–2012, the observed trends cannot be explained by low-frequency variability modes alone since there is still significant warming after removing the effects of the PDO and NAO indices. The summer and autumn trends are basically the same before and after removing the influence of the oscillations.

For 1900–2012, significant positive coefficients for PDO are found in the southwest, whereas significant negative coefficients for NAO are observed over a small area in the southeast, during winter and spring (figures not presented). The PDO and NAO indices explain only 16% (10%) of the variation in winter (spring) mean

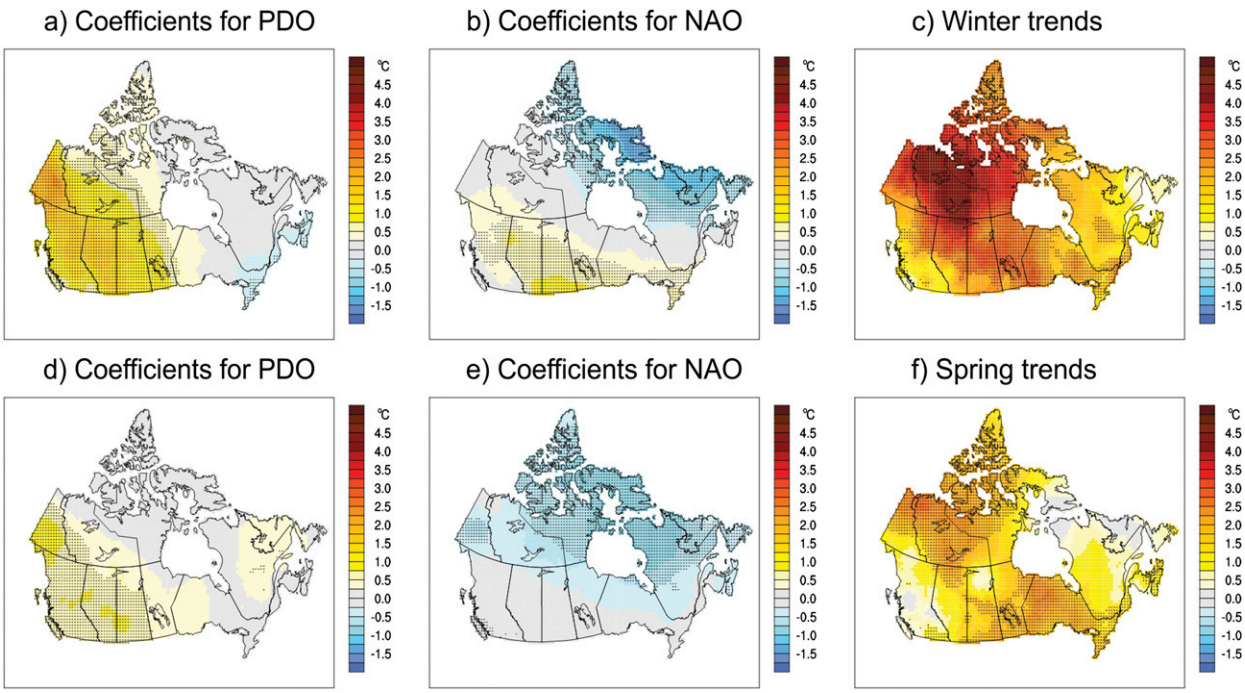

FIG. 10. Regression coefficients for (a) PDO and (b) NAO when the model is fitted to winter mean temperature. (c) Trends in winter mean temperature for 1948–2012 after removing the influence of PDO and NAO. Regression coefficients for (d) PDO and (e) NAO when the model is fitted to spring mean temperature. (f) Trends in spring mean temperature for 1948–2012 after removing the influence of PDO and NAO. Grid squares with trends (or coefficients) statistically significant at the 5% level are marked with a dot. The units are degrees Celsius per 65 yr.

temperature in southern Canada during 1900–2012. The temperature trends after removing the influence of the PDO and NAO indices are almost identical to those observed in the original data (Fig. 2c). The winter (spring) time series of the residuals averaged over the southern Canada indicate a significant warming of 2.5°C (1.8°C) over the past 113 yr, while the original winter (spring) data show a significant increase of 2.6°C (1.9°C). The results indicate that the influence of the PDO and NAO oscillations on the observed temperature trends is very small in southern Canada over the past 113 yr. They also suggest that the magnitude of the trends is more similar over both periods of time after removing the influence of the oscillations. In particular, the winter mean temperature has increased by 2.1°C in Canada for 1948–2012 while it has increased by 2.5°C in southern Canada for 1900–2012 after removing the effects of the oscillations (although the area covered is different).

b. *Influence of NPI and NAO (or PDO and AMO) on temperature trends*

Annual and seasonal mean temperature trends are also examined after removing the influence of the atmospheric (NPI and NAO) and oceanic (PDO and AMO) oscillations separately. The resulting trends for 1948–2012 and 1900–2012 are similar to those obtained when the effects of the PDO and NAO are taken into account. In winter and spring, significant negative coefficients for NPI are mainly found in the western and central regions and significant negative coefficients for NAO prevail in the northeast (figures not presented). For the same seasons, significant positive coefficients for AMO are found in the central and eastern regions whereas significant positive coefficients for PDO prevail in the west. The 1948–2012 trends in winter and spring mean temperatures after removing the effects of NPI and NAO (PDO and AMO) are very similar to those presented in Figs. 10c,f. Overall, these results indicate that the warming is still significant and more consistent across the country after removing the influence of the large-scale oscillations. They also suggest that the observed temperature trends cannot be explained by low-frequency variability modes alone.

c. *Influence of PDO and NAO on the trends in other climate elements*

Annual and seasonal total precipitation and snowfall ratio trends are assessed after removing the influence of the PDO and NAO indices. The combination of the PDO and NAO explain less than 10% of the variation in these two elements for 1948–2012 and 1900–2012. The regression coefficients are significant for a greater number of grid points for winter precipitation and spring snowfall ratio during 1948–2012. For winter precipitation, significant negative coefficients for PDO are found in the south (Fig. 11a) and significant negative coefficients for NAO are found in the northeast (Fig. 11b). The trends in winter precipitation for 1948–2012 after removing the effect of the oscillations (Fig. 11c) are similar to those obtained from the original data (Fig. 5a) with the exception of weaker decreasing trends in the southwest. For spring snowfall ratio, significant negative coefficients for PDO prevail in the west (Fig. 11d), whereas coefficients for NAO are generally near zero (Fig. 11e). The trends in spring snowfall ratio for 1948–2012 after removing the influence of PDO and NAO (Fig. 11f) are similar to those obtained from the original data (Fig. 7a), with the exception of less extensive decreasing trends in the west. The results indicate that, while the PDO index explains some of the variations in winter precipitation and spring precipitation falling as snow during 1948–2012, the magnitude and significance of the trends do not change very much after removing the influence of the PDO and NAO for 1948–2012. There is no evidence of the PDO and NAO impact on the precipitation and snowfall ratio trends during 1900–2012.

When the trends are assessed for various snow-cover and streamflow indices, the regression coefficients associated with the PDO and NAO are significant at a few stations only. The trends after removing the effects of PDO and NAO are almost identical to those obtained from the original values (Figs. 8 and 9). There is no evidence that the PDO and NAO are affecting the trends in the snow-cover and streamflow indices by very much during 1950–2012 (although the number of stations used in this study is limited).

6. Summary and discussion

The trend results reported in this study present a picture of a changing climate in Canada which is consistent across multiple climate elements. Over the past six decades, surface air temperature has increased in Canada, with the largest warming occurring in winter and spring. Precipitation totals have increased principally in the north in all seasons. Winter precipitation has decreased in the southwest and there have been widespread decreases in the amount of precipitation falling as snow in the south. These changes in temperature and precipitation have led to a shorter snow-cover season, mainly in response to earlier snowmelt (in all regions) and lower snowfall amounts (in southern regions). A shorter snow accumulation period and reduced snowfall amounts has resulted in a decrease in annual maximum snow accumulations and earlier dates of maximum snow

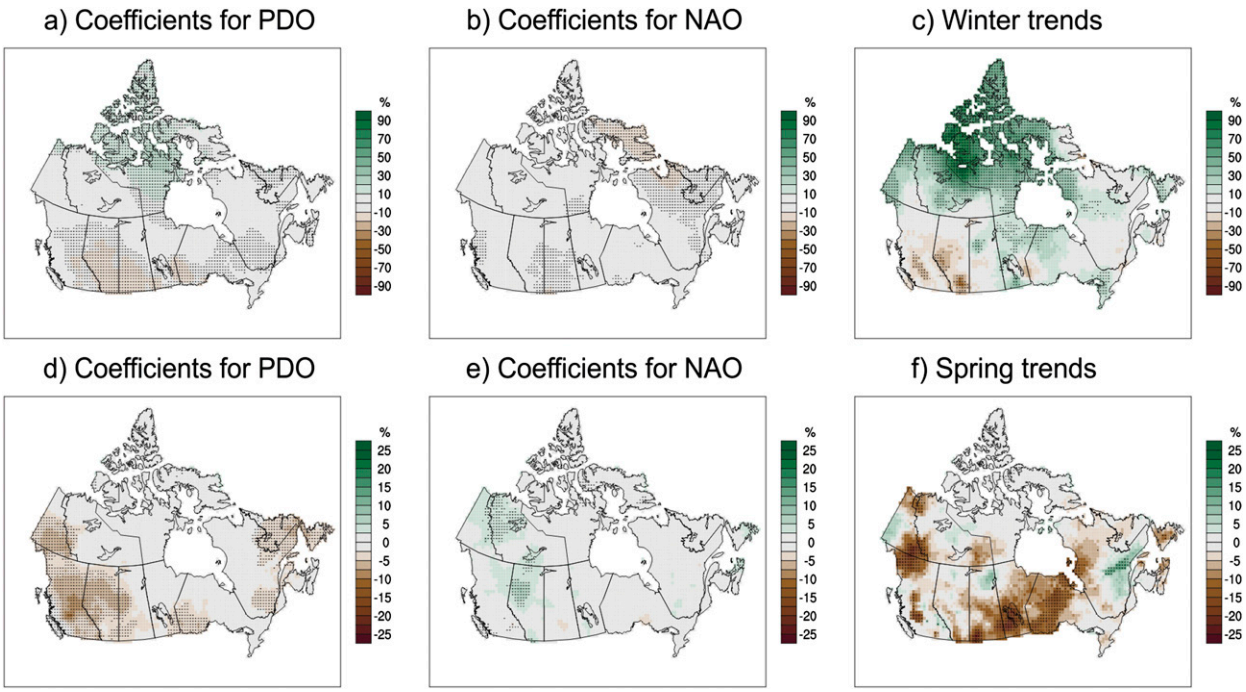

FIG. 11. Regression coefficients for (a) PDO and (b) NAO when the model is fitted to winter precipitation. (c) Trends in winter precipitation for 1948–2012 after removing the influence of PDO and NAO. Regression coefficients for (d) PDO and (e) NAO when the model is fitted to spring snowfall ratio. (f) Trends in spring snowfall ratio for 1948–2012 after removing the influence of PDO and NAO. Grid squares with trends (or coefficients) statistically significant at the 5% level are marked with a dot. The units are percentage per 65 yr.

depth at many stations. An observed earlier start of spring freshet and increasing streamflow in April are consistent with earlier spring snowmelt because of winter and spring warming. Over the past century, temperature has increased in southern Canada, but the rate of increase was not consistent and included a modest cooling during 1940–70. During the same period, the precipitation has increased almost everywhere across the region and the amount of precipitation falling as snow has increased north of 55°N and decreased in the south.

When the influence of large-scale oscillations is taken into account, the warming observed in Canada during 1948–2012 is slightly reduced in the western regions, especially during winter and spring, but the temperature trends are still significant and the warming is more consistent across the country. There are less decreasing trends in winter precipitation totals and spring precipitation falling as snow during 1948–2012 in the southwest after removing the effects of the oscillations, but the overall pattern of increasing winter precipitation trends in the north and decreasing spring snowfall ratio trends in the south remains the same. There is no evidence that the large-scale oscillations have influenced the temperature and precipitation trends over 1900–2012 and the snow-cover and streamflow indices trends over 1950–2012. These results clearly demonstrate that, while the oscillations explain some of the climate variations during 1948–2012, the observed temperature and precipitation trends cannot be explained by low-frequency variability modes alone. Other factors, external to the climate system, such as increase in greenhouse gases and aerosols in the atmosphere may have played a significant role in the observed changes in climate (Wan et al. 2015; Gillett et al. 2008; Min et al. 2008a; Zhang et al. 2006). Ongoing work involves the comparison of the changes observed in historical data with those simulated by climate models under various external forcing and the results will be reported in a different study.

This study presents an analysis of trends in several climate elements using the best updated data available over similar periods of time in order to highlight the consistencies among the trends in related climate variables. It is important to closely monitor climate change in order to improve our understanding regarding the various mechanisms responsible for climate variations. Canada's climate shows multidecadal-scale variability over the past century associated with low-frequency atmospheric and oceanic oscillations. This study reports, for the first time, climate trends in Canada after removing potential mechanisms representing low-frequency

variations. The results show that large-scale atmospheric and oceanic oscillations have influenced regional climate trends to some extent. However, it also reveals that these indices alone do not explain long-term changes observed in various climate elements in Canada.

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Climate Risks & Adaptation Practices

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Canada

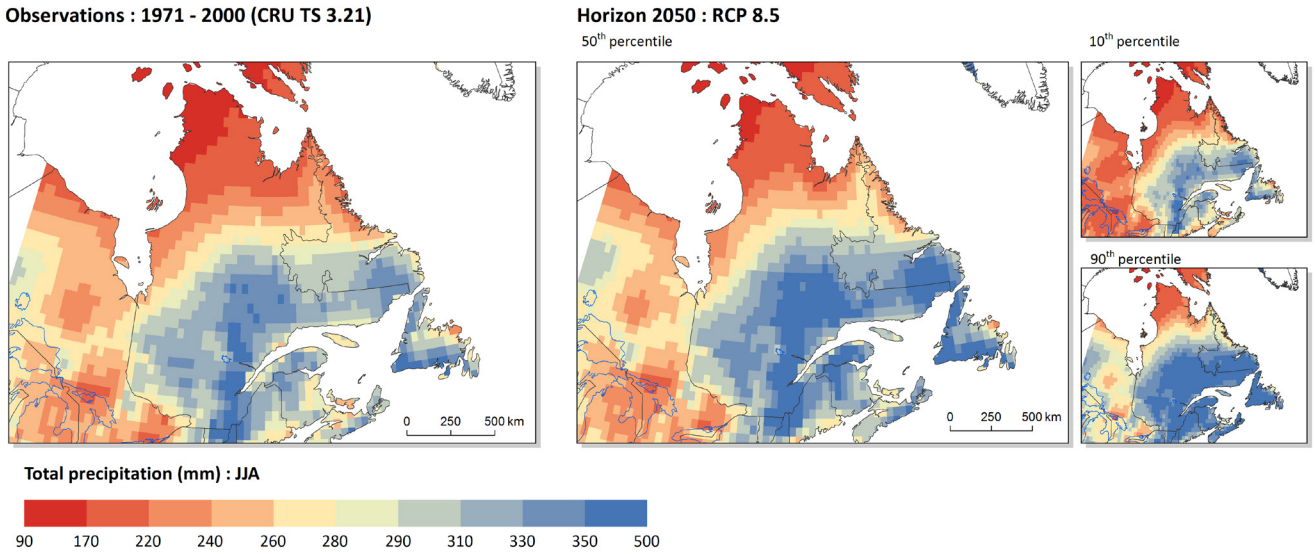
3.2 MORE INTENSE PRECIPITATION EVENTS

Total annual precipitation from observed data shows significant upward trends for many of the weather stations located in the south of the province. For some of these stations, the trends are associated with increases in spring and fall precipitation.

Increases in precipitation are expected in winter and spring throughout Québec. In the northern and more central regions, this would also be the case in the summer and fall seasons. As in the case of temperatures, these increases will be more significant for extreme precipitation events than for averages. In fact, all climate models agree on future upward trends for extreme precipitation events, everywhere in Québec, although these changes are more substantial moving northward. This applies for maximum annual amounts in addition to all durations and frequencies. For example, a maximum annual rainfall event with a 20-year return period over the 1986-2005 timeframe could occur more frequently by 2046-2065 with a return period of around 7 to 10 years. Preliminary studies suggest that future climate conditions could be more conducive to thunderstorms, which are usually accompanied by larger quantities of precipitation, although the robustness of these projections is uncertain.
For winter precipitation, the proportion of snow and rainfall relative to total accumulation depends on temperature. Given that the climate has been warming in the recent past, downward snow precipitation trends are already being observed in the south of Québec. An analysis of several different data sources reveals that snow cover duration has decreased by approximately 2 days per decade in the south of Québec between 1948 and 2005.

Even if snowfall events decrease due to a shorter cold season, rainfall events during this season should increase with warming temperatures in winter (see Figure 6). Changes in snow cover with respect to these trends will vary according to the region, altitude, climatic regime, type of surface and vegetation. Compared to the 1970-1999 average, snow cover duration by 2041-2070 could decrease by up to 25 days in the North of Québec, from 25 to 45 days in the central region, from 45 to 75 days for the Gulf of the St. Lawrence and between 45 and 65 days for the south of Québec.

Figure 6: Observed total summer (JJA: June, July and August) and winter (DJF: December, January and February) precipitation for the period 1971-2000 (left panel) and projected (right panels) for the 2050 horizon (2041-2070). The observed average is calculated using the CRU TS 3.21 dataset (CRU TS = Climatic Research Unit Timeseries, 3.21 dataset is the name of the release). Future maps present the ensemble median (i.e. the median of all available projections) as well as the 10th and 90th percentiles (i.e., lower and higher bounds) of 19 future climate scenarios. Future climate scenarios were produced using the "delta" method calculated from the using CMIP5 (Coupled Model Intercomparison Project Phase 5) simulations (RCP 8.5) applied to the observed data (see Charron, 2014). (Source: Ouranos)



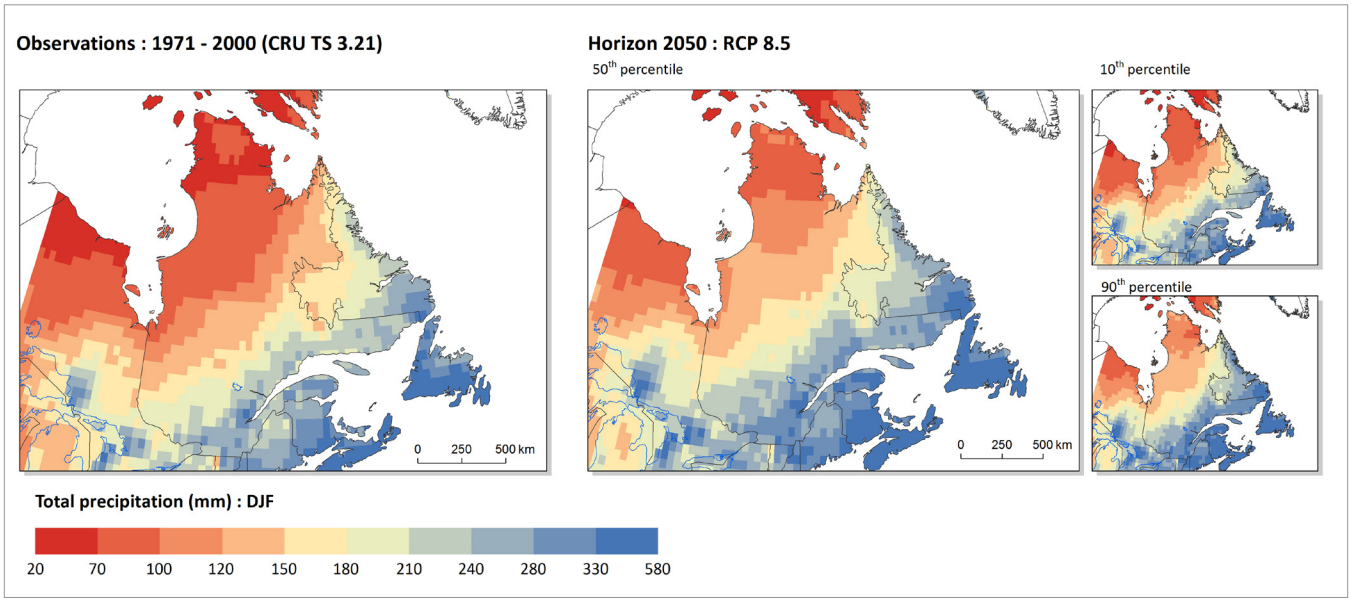
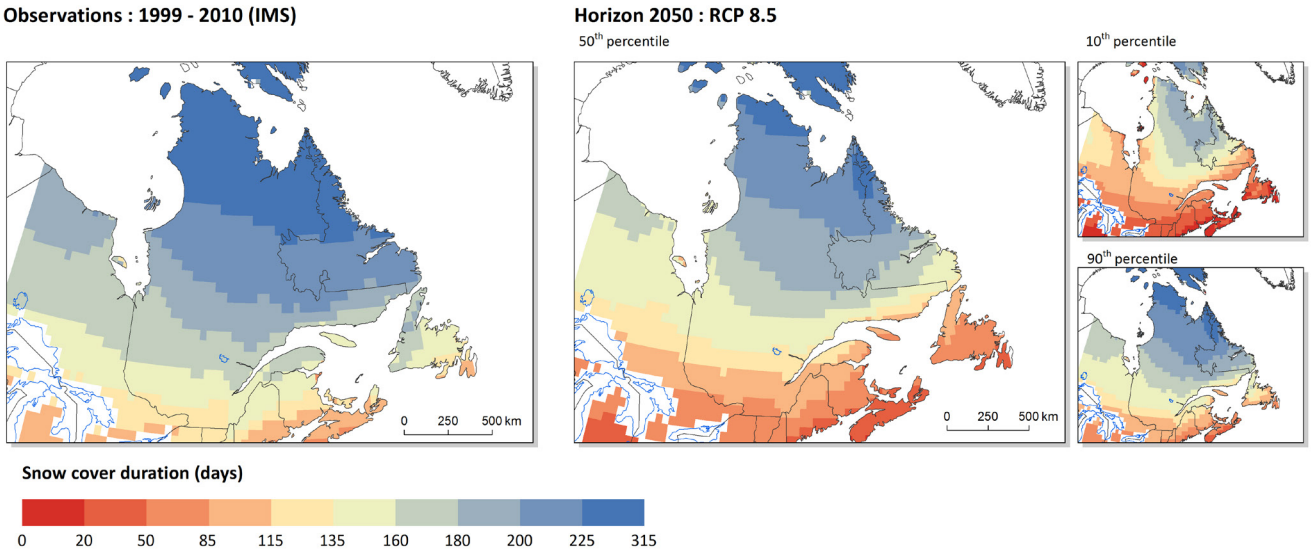


Figure 7: Observed snow cover duration for the period 1999-2010 (left panel) and projected (right panels) for horizon 2050 (2041-2070). The observed average is calculated using the IMS 24 dataset (IMS Ice mapping System 24 km resolution) (National Ice Center, 2008). Future maps present the ensemble median (i.e., the median of all available projections) as well as the 10th and 90th percentiles (i.e., lower and higher bounds) of 19 future climate scenarios. Future climate scenarios were produced using the "delta" method calculated from the CMIP5 (Coupled Model Intercomparison Project Phase) (RCP 8.5) and applied to the observed data (see Charron, 2014). (Source: Ouranos)



With respect to freezing rain, this is a phenomenon that predominantly affects the Saint-Lawrence valley due to its morphology and position (Ressler et al., 2012). While great progress has been made to improve knowledge in terms of the conditions likely to generate this type of event, it remains uncertain whether the number, duration and intensity of these events will change in Québec over the coming decades.

QUÉBEC IN ACTION GREENER BY 2020

2013-2020 Government Strategy for Climate Change Adaptation

A collective effort to strengthen the resilience of Québec society
June 2012

A PLAN FOR QUÉBEC

Québec

1 PRESENT AND PROJECTED CLIMATE

In the last few decades, Québec's climate has changed significantly. Daily mean temperatures in southern Québec have risen by 0.2°C to 0.4°C per decade, with minimum temperatures rising more than maximums, and greater change inland than in maritime regions.

Generally, the climate will grow warmer over the entire territory of Québec, more dramatically in winter than in summer, and more in the North than the South. In winter, by 2050, temperatures are expected to be 2.5°C to 3.8°C higher in southern Québec, and 4.5°C to 6.5°C higher in the North. Summer temperatures are expected to rise by 1.9°C to 3.0°C in the South and by 1.6°C to 2.8°C in the North.

More abundant precipitation is expected in winter and in Nord-du-Québec. Increases in winter precipitation of 8.6% to 18.1% in the South, and 16.8% to 29.4% in North, are expected by 2050. The rise in winter precipitation will lead to deeper accumulations of snow in the North. In southern Québec the opposite is expected: less snow accumulating through the winter due to higher temperatures and a shorter cold season. Summer precipitation is expected to rise by 3.0% to 12.1% in the North, with no significant change expected in the South.

Climate change will result in extreme weather events (winter storms, violent winds, torrential rains, etc.) becoming more frequent and more intense. In turn, such events will sometimes lead to flooding, erosion, landslides and so on.

Changes in temperature and precipitation will also affect many other climate-related phenomena; some of them are well understood, and their changes can be predicted with a high degree of certainty. Thus, it is highly probable that coming decades will see the following:

- A shrinking of the ice cover, with winter ice forming later and melting earlier;
- Winters becoming shorter;
- Less intense and less frequent cold waves;
- Permafrost melting at an increasing rate;
- Hotter and more frequent heat waves;
- Extreme storm surges in coastal areas.

There is also reason to believe that the following will occur as well[1]:

- More frequent winter warm spells;
- More extreme fluctuations in water levels (higher flood levels and lower low-water levels), with increased erosion of shorelines;
- A northward shift of storm trajectories;
- Greater numbers of tropical storms and more intense hurricanes;
- Longer summer droughts.

1 Based on historical trends and less certain scientific understanding.

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May 9, 2019

James R. Beyer
Maine Dept. of Environmental Protection
106 Hogan Road, Suite 6
Bangor, ME 04401

Bill Hinkel
Land Use Planning Commission
22 State House Station
Augusta, ME 04333-0022

RE: Group 4 Comments on NECEC

Dear Mr. Beyer and Mr. Hinkel,

Group 4 respectfully submits the following comments in opposition to the proposed NECEC Project.

- Comment on Project's failure to reduce greenhouse gas emissions
- Comment on Right, Title, and Interest
- Comment from Dr. Calhoun on Vernal Pools
- Comment from Dr. Publicover on Fragmentation
- Petition opposing Project
- Documentation of towns opposing and rescinding support from NECEC

Due to the large size of the combined comments, we are providing a link for download. Please click on the following link to download your file:
https://www.nrcm.org/wp-content/uploads/2019/05/Group4DEPcommentsNECEC05-09-2019.pdf

Respectfully,

Intervenor Group 4

By their attorney/Spokesperson,

Susan Ely
Natural Resources Council of Maine
3 Wade Street
August, ME 04330
207-430-0175
sely@nrcm.org

Comments on the lack of carbon benefits from the New England Clean Energy Connect

The Natural Resources Council of Maine (NRCM) is submitting these comments on the lack of carbon benefits from the New England Clean Energy Connect (NECEC), instead of as sworn testimony, because the Department of Environmental Protection (Department) denied our request to submit expert testimony and provide a witness on greenhouse gas emissions as part of the hearing process. We believe that the Department must include greenhouse gas emissions as part of its permitting decision because the Site Law requires that this project have no unreasonable impact on climate and because Central Maine Power (CMP) has claimed carbon emissions reductions for the project in both its Site Law and Natural Resources Protection Act (NRPA) applications without providing proof that the reductions are real.

Chapter 375, Section 2(B) of the Department's rules states: "In determining whether the proposed development will cause an unreasonable alteration of climate, the Department shall consider all relevant evidence to that effect."

In Section 1.4 of its Site Law application CMP stated:

> The use of the NECEC for delivery of up to 8,500,000 MWh of Clean Energy Generation will provide many significant benefits to Maine and all of New England. In particular, the delivery of Quebec-sourced Clean Energy Generation is expected to reduce greenhouse gas emissions from fossil-fuel fired thermal generation in New England, enhance electric reliability (particularly during winter months when natural gas supply constraints have occurred in recent years), and reduce the wholesale cost of electricity for the benefit of retail customers across the region.

In Section 2-2 of its NRPA application, which incorporates the Site Law application by reference (*see* Section1.0), CMP states:

> The NECEC project is expected to reduce regional CO2 (greenhouse gas) emissions by over one million metric tons per year in Massachusetts, which is a direct benefit to neighboring states, including Maine. This amount would help achieve the stated goals of the Regional Greenhouse Gas Initiative (RGGI) by reducing the total amount of CO2 emissions from the power sector of the six New

> England states, and Delaware, Maryland, and New York. The NECEC's ability to deliver reliable, renewably-generated electricity from Québec will help alleviate the need to build new non-renewable generation plants, and may allow retirement of older, less efficient fossil fueled power plants.

CMP's claims of greenhouse gas reductions and concurrent benefits are unsubstantiated, misleading, or false. If the Department receives an application for a project based on unsubstantiated, misleading or false information, it must deny the application. There is ample evidence from numerous proceedings countering CMP's claims of greenhouse gas benefits associated with NECEC. Section 2(B) of Chapter 375 gives the Department broad authority to consider all relevant evidence regarding climate for a Site Law permit. NRCM asks that the Department consider the following evidence refuting CMP's claims of greenhouse gas benefits.

I. The New Hampshire Site Evaluation Committee (SEC) found no evidence of greenhouse gas benefits from Northern Pass in the absence of new generating facilities. NECEC will result in no new generating facilities.

The SEC faced this same question of whether an HVDC transmission line bringing a similar amount of hydropower from Hydro-Quebec in Canada through New Hampshire to Massachusetts (called "Northern Pass") would reduce greenhouse gas emissions. After years of study and modeling to look at greenhouse gas impacts, the SEC concluded that there was no evidence that Northern Pass would have any greenhouse gas benefits. Specifically, it stated:

> As to the savings associated with a decrease in carbon emissions, we agree with Counsel for the Public that no actual greenhouse gas emission reductions would be realized if no new source of hydropower is introduced and the power delivered by the Project to New England is simply diverted from Ontario or New York. The record is unclear as to whether the hydropower is new or will be diverted from another region.[1]

In the case of NECEC, the record is clear that Hydro-Quebec will build no new hydropower facilities for generating electricity to send to Massachusetts. Hydro-Quebec stated

[1] New Hampshire Site Evaluation Committee. 2018. Decision and Order Denying Application for Certificate of Site and Facility. March 30. P. 161. Accessed at https://www.nhsec.nh.gov/projects/2015-06/orders-notices/2015-06_2018-03-30_order_deny_app_cert_site_facility.pdf.

the following in its application for a contract with the Massachusetts Department of Public Utilities:

> This Proposal offers a viable, low cost Clean Energy Generation delivery project with limited risk, because (i) there is no construction risk related to the generation resources which are already in service… ***Because no new hydroelectric generation projects will be required, there will be no incremental environmental impacts from hydroelectric generation as a result of this Proposal.***[2]

Because Hydro-Quebec has stated that it will build no new generation specifically for NECEC, Hydro-Quebec will have to shift sales of energy to Massachusetts from other customers. Massachusetts ratepayers and Maine's North Woods would pay the price for this electricity shell game.

II. Testimony and briefs from the Massachusetts Office of the Attorney General (AGO) and other intervenors in Massachusetts rebut the claims of greenhouse gas benefits from NECEC.

The Massachusetts Department of Public Utilities (DPU) has held hearings on the contracts between Hydro-Quebec and the Electric Distribution Companies (EDC)[3] that would implement NECEC. A witness for the AGO, Dean M. Murphy of the Brattle Group, submitted testimony that Hydro-Quebec could, under the terms on the proposed contracts, meet its contractual obligations to NECEC by simply shifting electricity away from existing customers, such as New York and New Brunswick. Because Massachusetts would pay more for Hydro-Quebec's electricity under the proposed contracts for CMP's corridor, Hydro-Quebec has a substantial incentive to do this. Mr. Murphy stated that Hydro-Quebec and CMP could meet the requirements of these contracts:

> through resource shuffling—reassignment of a fixed amount of clean energy so as to increase the clean energy delivered to a particular destination without

[2] HRE Section 83D Request for Proposal Application Form. Pp. 4, 56 (emphasis added). Accessed at https://www.nrcm.org/wp-content/uploads/2019/01/HRERequestforProposal.pdf.

[3] Electricity Delivery Company or EDC refers jointly to the three utilities (Eversouce, National Grid, and Until) that would contract with Hydro-Quebec and CMP if NECEC is approved.

> increasing the total amount of clean energy overall. For instance, with the new NECEC transmission link, if HQ [Hydro-Quebec] increased deliveries into New England by the contracts' 9.55 TWh relative to historical New England deliveries, this would achieve full incrementality as defined in the RFP. ***But if HQ accomplished this by reducing its exports to other neighboring regions rather than by increasing clean energy generation overall, then global GHG emissions would not necessarily be reduced. Diverting clean energy from other regions to New England would enable a reduction in fossil generation and emissions within New England, but the reduced deliveries to other regions may need to be replaced by additional fossil generation in those regions. This would effectively substitute fossil generation in other regions for fossil generation in New England, shifting emissions from one region to another, without causing a material decrease.***[4]

The AGO's witness also stated that the process that awarded contracts to CMP and Hydro-Quebec may have been unfair and undermined projects that actually would have meaningfully reduced greenhouse gas emissions. He testified that he was "concerned about the inclusion of bidders' affiliates in the Evaluation Team," stating that "[t]his is generally considered inappropriate because it can bias the evaluation and selection process. Such concerns arose in multiple instances in the 83D[5] evaluation process and were noted by the Independent Evaluator."[6]

RENEW Northeast Inc. (RENEW)[7], echoed Witness Murphy's concerns about the unfair bidding process in its brief:

> RENEW Northeast, Inc. ("RENEW") submits this Initial Brief to request that the contracts as presented to the Department be rejected because of the severely flawed process of selecting and negotiating them, which resulted in contracts that favored the HQUS [Hydro-Quebec's U.S. affiliate] bids in a manner that is contrary to Section 83D's requirements that the solicitation be conducted in a fair

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[4] Direct Testimony of Dean W. Murphy (Brattle Group), Witness for the Massachusetts Attorney General. DPU 18-64 18-65 18-66, p. 15 of 27 (Dec. 21, 2018) (emphasis added). Direct and Rebuttal Testimony attached as Attachment A.

[5] 83D is the section of law that requires Massachusetts to solicit bids for clean energy contracts.

[6] *Ibid*., p. 4 of 27.

[7] According to its website, RENEW "is a non-profit association uniting the renewable energy industry and environmental advocates whose mission involves coordinating the ideas and resources of its members with the goal of increasing environmentally sustainable energy generation in the Northeast from the region's abundant, indigenous renewable resource." Accessed at http://renew-ne.org/.

> and nondiscriminatory manner and in the public interest. RENEW also recommends the Department order the Distribution Utilities to reissue the RFP to comply with Section 83D's objective to secure clean energy generation for the Commonwealth. Given that Section 83D requires procurements be completed by December 31, 2022, ample time exists to conduct one or more additional solicitations.[8]

Other intervenors in the DPU 83(D) contract proceedings have echoed AGO Witness Murphy's concerns about NECEC's failure to provide greenhouse gas benefits. In its surrebuttal testimony to the DPU, Next Era stated:

> The EDCs' Joint Testimony…narrowly interprets the 83 D legislation's goals as only pertaining to the Commonwealth, which does not square with the reality of the impact of CO2 regionally and globally. Thus, the EDCs' narrow reading ignores basic scientific facts about carbon and interregional effects and the clear intent of the legislation, which is to use the purchasing power of the Commonwealth's utilities to be a leader in solving global warming—which requires lowering global emissions of CO2. Spending billions of ratepayers' dollars to merely relabel existing power flows as somehow incremental because it is, in part, new to New England does not further the Commonwealth's CO2 reduction goals.
> . . .
> Given the structure of the 83 D legislation and how relabeling of existing resources could qualify, under the EDCs' reasoning, overall carbon emissions could change not one bit, and the letter of the law still be satisfied. Extending the EDCs' reasoning even further, ratepayers could incur a large cost for zero benefit, and the goals of the procurement would be satisfied. This is particularly concerning, given that there were many clean energy projects that were passed over in favor of NECEC that would clearly been new and incremental, thus directly contributing to CO2 emissions reductions.[9]

In its initial brief in the Massachusetts DUP proceeding, Sierra Club warned that "Hydro-Québec could continue to deliver amounts of hydroelectric power into New England similar to historic averages without incurring any penalties" and that "because the contracts fail to ensure that the underlying generation is incremental to what Hydro-

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[8] Initial Brief of Renew Northeast, Inc. DPU 18-64 18-65 18-66, p. 1 (Mar. 22, 2019). Accessed at: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/10505819.

[9] Surrebuttal Testimony of Christopher Russo, Robert Stoddard, and Stephen Whitley. Witnesses for NextEra. DPU 18-64 18-65 18-66, p, 3 of 31 (Feb 15, 2019). Surrebuttal Testimony attached as Attachment B.

Québec's dams are already producing, the contracts fail to guarantee any real world greenhouse gas emissions benefit.[10]

III. CMP has provided no credible evidence in Maine proceedings that NECEC will provide additional renewable energy and will not be an energy shell game and has continued to make misleading claims.

CMP has provided no credible evidence in Maine proceedings that NECEC will provide additional renewable energy and will not be an energy shell game. Instead they have made the following false or misleading claims, including in comments they submitted to DEP in these proceedings:

1. CMP repeats a misleading claim in its initial comment filing on greenhouse gas reductions that three studies in the PUC show that NECEC would reduce greenhouse gas emissions in New England by 3.0 million to 3.6 million tons annually.
2. CMP repeats unsupported claims by Hydro-Quebec that the corporation is spilling water due to lack of transmission capacity and that NECEC would improve this situation but has provided no evidence to support this claim.
3. CMP has falsely asserted that power from Hydro-Quebec's 250 MW Romaine 4 Project, which is due to come on line in the near future, along with some possible proposed upgrades, will supply power for NECEC.
4. Contrary to CMP's assertions, the Northbridge Associates paper, "Fully Decarbonizing the New England Electric System: Implications for New Reservoir Hydro," is not relevant to NECEC's greenhouse gas impacts.

We address each of these claims in greater detail below.

[10] Initial brief from Sierra Club, DPU 18-64 18-65 18-66, p, 2 (Mar. 22, 2019). Accessed at: https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/10503018.

1. **CMP repeats a misleading claim in its initial comment filing on greenhouse gas reductions that three studies in the PUC show that NECEC would reduce greenhouse gas emissions in New England by 3.0 million to 3.6 million tons annually.**

This may be narrowly true, but it is also irrelevant when considering whether NECEC would provide greenhouse gas reductions that help fight climate change. ***Reducing greenhouse gas emissions in New England does nothing if they increase by a corresponding amount in other jurisdictions. Greenhouse gases are a global pollutant, and we must reduce them globally to have an impact on climate change.*** CMP cites the London Economics International Report (LEI) as evidence of greenhouse gas reductions, but LEI admits on page 12 of its report to the PUC that it did not look at the impacts of NECEC on jurisdictions on other than New England: "For this analysis, LEI did not monetize the social benefits of the CO2 emissions reduction, ***nor did it analyze the emissions changes in other jurisdictions as a result of NECEC***."[11] Similarly, the Daymark Report, which CMP has cited, only looked at New England and assumed that all Hydro-Quebec's Hydro-power would be new and carbon free.[12] Neither of these assumptions is valid. Hydro-Quebec has stated in the DPU[13] and PUC[14] records that it will

[11] London Economics International. 2018. Independent Analysis of Electricity Market and Macroeconomic Benefits of the New England Clean Energy Connect Project. P. 12. May 21, 2018 (emphasis added). Accessed at: https://mpuc-cms.maine.gov/CQM.Public.WebUI/MatterManagement/MatterFilingItem.aspx?FilingSeq=97967&CaseNumber=2017-00232.

[12] Daymark Energy Advisors, NECEC TRANSMISSION PROJECT: BENEFITS TO MAINE RATEPAYERS, Exhibit NECEC-5, MPUC Docket No. 2017-000232, p. 21 of 98 (Sept. 27, 2017).

[13] Again, Hydro-Quebec stated in its response to the Massachusetts 83(d) RFP that: This Proposal offers a viable, low cost Clean Energy Generation delivery project with limited risk, because (i) there is no construction risk related to the generation resources which are already in service… ***Because no new hydroelectric generation projects will be required, there will be no incremental environmental impacts from hydroelectric generation as a result of this Proposal.*** HRE Section 83D Request for Proposal Application Form. Pp. 4, 56 (emphasis added). Accessed at https://www.nrcm.org/wp-content/uploads/2019/01/HREREquestforProposal.pdf.

[14] In a response to a data request from NRCM during the PUC hearing process, CMP Witness Thorn Dickenson stated: "Hydro-Quebec committed in its NECEC 100% Hydro bid that all deliveries under the NECEC PPAs would come from existing Hydro-Quebec hydropower resource." MPUC Docket No. 2017-00232, Data Request 002-006 (Jul. 27, 2019). Attachment C.

use only existing resources to supply power for NECEC. Hydro-Quebec's impoundments also emit a great deal of carbon dioxide, comparable to that of a coal plant[15] in early years after development and roughly half of a natural gas plant over the course of 100 years.

CMP also cites testimony of James Speyer of Energyst to the PUC as backing its claims of New England greenhouse gas reductions. CMP appears to deliberately this testimony out of context. In fact, Mr. Speyer's testimony states that "[a]lthough there may be a reduction of carbon emissions in Maine and New England, this reduction may come at the expense of increased carbon emissions in other regions. On a net basis, therefore, *total carbon emissions reductions in New England could be offset by increased carbon emissions in other markets*."[16] Without knowing whether existing Hydro-Quebec customers will need to increase their use of fossil fuels to make up for the lost power NECEC will divert to Massachusetts, there is no way to conclude that NECEC will result in any greenhouse gas emissions at all. In fact, if New Brunswick increases its use of coal to make up for lost Hydro-Quebec electricity, NECEC would likely increase overall greenhouse gas emissions.[17] This is because NECEC would displace natural gas use in Massachusetts, and natural gas has a lower emissions profile than coal.

Therefore, CMP's claims of greenhouse gas emissions from New England are meaningless without precice information on emissions from Hydro-Quebec's other markets that occur as a result of NECEC.

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[15] Bradford M. Hager. 2019. Commentary: Hydro-Quebec offers misleading claims about power's climate impact. Portland Press Herald. January 5. Accessed at: https://www.pressherald.com/2019/01/05/commentary-hydro-quebec-offers-misleading-claims-about-their-powers-climate-impact/.

[16] Direct Testimony of James M. Speyer, MPUC Docket 2017-00232, p. 14 (Apr. 30, 2018). Accessed at: https://mpuc-cms.maine.gov/CQM.Public.WebUI/MatterManagement/MatterFilingItem.aspx?FilingSeq=97734&CaseNumber=2017-00232.

[17] According to Canada's National Energy Board, New Brunswick generated 36% of its electricity from coal in 2017. Accessed at: https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nb-eng.html.

2. CMP repeats unsupported claims by Hydro-Quebec that the corporation is spilling water due to lack of transmission capacity and that NECEC would improve this situation but has provided no evidence to support this claim.

There is substantial evidence against this claim. For example, in an op-ed to the *Portland Press Herald*, Massachusetts Institute of Technology professor Bradford Hager stated:

> Hydro-Quebec's assertion that it has "wasted" enough water to provide 10 terawatt hours of electricity because it lacks transmission capacity is not backed by documentation. In contrast, a 2017 study of Hydro-Quebec's export capacity found that the limiting factor for total energy output is generation, not transmission capacity. [18] This makes sense – why would Hydro-Quebec pay the high cost of building dams and installing generators and not also provide adequate transmission capability?
>
> Like any hydropower operation, Hydro-Quebec must deal with large variations in rainfall. It is expensive to build enough generation to handle peak flows, and then let the generators stand idle during years that are either dry or have normal rainfall. During unusually wet times, the water is "wasted" because it is more economical to spill water occasionally than to waste generation capacity most of the time. While it may be true that enough water to generate 10 terawatt hours of electricity has been spilled during times of unusually high water, that in no way shows that the rate and timing of this spillage could have been used to fulfill a contract for a more steady supply of power.[19]

Testimony from a former Hydro-Quebec employee, Mr. Gabriel Roumy, in the Maine PUC process also contradicts CMP's assertions about spillage.[20] Gabriel Roumy, appearing on behalf of LEI in the PUC technical conference on December 19, 2018 stated:

> And of course, there's no way, considering the future hydrological conditions in Quebec, to predict how much water would be spilled each and every year, which is why I think at this point we're still comfortable with our assumptions that, you know, energy would generally be redirected from other markets to NECEC if it were built.[21]

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[18] ESAI. 2017. Analysis of Greenhouse Gas Emissions Impacts: New Class I Resources vs. Existing Large Hydro. P.1. September. Accessed at https://granitestatepowerlink.com/wp-content/uploads/2017/10/ESAI-GSPL-CO2-Analysis-9-13-17-FINAL.pdf.

[19] Bradford M. Hager. 2019. *Op cit*.

[20] Mr. Roumy worked for Hydro-Quebec for approximately 10 years. *See*, https://www.linkedin.com/in/jean-gabriel-roumy-164732a8.

[21] Transcript. PUC Technical Conference on December 19, 2018. Pp. 72-73. Accessed at https://mpuc-

CMP and Hydro-Quebec have provided no evidence that links Hydro-Quebec's spillage to a lack of transmission capacity. Nor have they provided evidence on when spillage occurs and whether or not there would be demand for electricity at that time. Spillage is typically high when spring rains combine with snow melt. This is also a time when electricity demand is low. All dams spill at times when there is too much water to use or store. A simple trip to a dam in Maine right now proves this fact.

3. CMP has falsely asserted that power from Hydro-Quebec's 250 MW Romaine 4 Project, which is due to come on line in the near future, along with some possible proposed upgrades, will supply power for NECEC.

These claims fundamentality violate the critical renewable energy concept of "additionality". In testimony to the DPU docket for NECEC, the Massachusetts AGO's witness, Dean Murphy, stated that for any project to reduce greenhouse gas emissions it must be "additional," meaning that it provides greenhouse gas emissions reductions that ***would not occur*** without the project in question. It is critical that a renewable energy project provide energy that is additional both to ensure greenhouse gas reductions and because ratepayers should not pay to subsidize a project that is going to happen anyway under business as usual scenarios. Specifically, the AG's witness stated:

> For the 83D contracts, or any project, to reliably reduce GHG emissions, they would need to provide clean energy that is "additional." Additionality is a commonly-used concept in the climate change discussions; it refers to emissions reductions that occur because of a proposed action, reductions that would not have occurred otherwise under "business as usual". Importantly, it must involve overall global emissions reductions, not reductions in one region or sector that might be offset by a corresponding increase that is triggered elsewhere, or reductions that would have occurred regardless of the proposed action. For example, a PPA [power purchase agreement] that supports the development of a

cms.maine.gov/CQM.Public.WebUI/MatterManagement/MatterFilingItem.aspx?FilingSeq=100615&CaseNumber=2017-00232.

> new wind farm will generally be additional. The new wind farm produces clean energy that would not otherwise be produced, displacing fossil energy and reducing emissions, so the clean energy and the emissions reductions are additional to what would have occurred without the PPA. Clean energy, however, is not always additional in this sense. If an existing wind farm with an expiring PPA signed a renewed PPA with a different buyer, the renewed PPA does not result in additional clean energy. The existing wind farm would have continued to produce clean energy even without the renewed PPA; the output may have been sold to a different buyer or in the spot market. The renewed PPA does not increase the total clean energy produced and consumed or reduce emissions; it just reallocates clean energy that would be produced in any case. It can sometimes be challenging to define and determine additionality in practice, primarily because doing so can require a very precise specification of the alternative "business as usual" circumstance—*i.e.*, additional to what? But for the purposes of the 83D procurement, the important point is that a global perspective is necessary. The RFP requirement that the contract energy be incremental to New England (even if the proposed contracts required full incrementality) does not ensure that it would be additional or necessarily result in corresponding GHG reductions.[22]

Construction of the four-dam Romaine complex, which CMP and Hydro-Quebec have said will provide "new" power for NECEC, began in 2009.[23] The Massachusetts law under which CMP and Hydro-Quebec are pursuing a contract, passed in 2016. In no way is the construction of the Romaine dams connected to NECEC. Hydro-Quebec has existing markets for all of the energy the Romaine complex produces and will sell it regardless of the construction of NECEC. NECEC would just allow Hydro-Quebec to make more money because Massachusetts would pay long-term contract rates and Hydro-Quebec would otherwise sell its electricity on the spot market, which is worth less.

In a report commissioned by the Maine Renewable Energy Association, the Natural Resources Council of Maine, and the Sierra Club, Enrgyst Advisors, an energy consulting firm, concluded that "[A] new intertie merely allows Hydro-Québec to access a higher-priced, long-term contract with Massachusetts instead of selling into competitive spot markets at lower, more

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22 Dean M. Murphy, *Op. Cit.*, p. 15 of 27.

23 Hydro-Quebec web page at https://www.hydroquebec.com/projects/romaine.html.

uncertain prices. The NECEC transmission line is not necessary to export additional clean energy from Québec into external markets."[24]

The only evidence of possible future upgrades of existing Hydro-Quebec dams appears in a single table in the PUC record.[25] This table is 18 pages of various energy projects that Hydro-Quebec has proposed over the past two decades. Simple examination of the table reveals that Hydro-Quebec has withdrawn many of the projects listed in this document. There is no guarantee that it will carry out the upgrades listed in the bottom half of the last page, which CMP claims would provide "new" generation, nor is there any requirement in the Massachusetts draft contracts for NECEC for Hydro-Quebec to do any upgrades at all. There is no evidence to support whether these upgrades would occur as a result of NECEC or even if they would occur at all. They are completely unrelated to NECEC and therefore cannot be considered new or additional energy. The claims about the Romaine dams and future possible upgrades also conflict with the commitment Hydro-Quebec made in its response to the Massachusetts 83(D) RFP that it would use only existing facilities to supply power to NECEC.

4) Contrary to CMP's assertions, the Northbridge Associates paper, "Fully Decarbonizing the New England Electric System: Implications for New Reservoir Hydro," is not relevant to NECEC's greenhouse gas impacts.

Simply put, this paper is nothing more than misleading generalizations, starting with the title. NECEC does not involve any new reservoir hydro-power in New England or in Quebec. Moreover, the New England hydro-power system is old and well-established. All of the good

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[24] Energyzt Advisors, LLC. 2018. GREENWASHING AND CARBON EMISSIONS: UNDERSTANDING THE TRUE IMPACTS OF NEW ENGLAND CLEAN ENERGY CONNECT. p. ES-2. Attachment D. Accessed at https://www.nrcm.org/wp-content/uploads/2018/10/ENERGYZTreportNECECImpacts.pdf.

[25] Accessed at https://mpuc-cms.maine.gov/CQM.Public.WebUI/MatterManagement/MatterFilingItem.aspx?FilingSeq=100724&CaseNumber=2017-00232.

sites for large hydro-power facilities have been dammed already and are producing electricity for the grid. Large-scale new hydro-power is not cost competitive with wind and solar, and no company is proposing any large, new facilities in New England or in Quebec. This paper mentions neither Hydro-Quebec nor NECEC even once and contains no specific information relevant to CMP's transmission corridor. DEP should ignore it.

IV. Conclusion

In closing, CMP has provided no evidence that NECEC will be anything other than an energy shell game allowing Hydro-Quebec to shift sales from spot markets to a more lucrative long-term contract with Massachusetts. CMP has provided no evidence that using existing hydro-power resources in Canada that already have markets for their electricity will lower overall greenhouse gas emissions. The studies they cite did not even examine the impacts of Hydro-Quebec shifting electricity sales from existing customers to Massachusetts. In contrast, there is a great deal of credible evidence in the records of the various proceedings concerning NECEC that it will provide no greenhouse gas benefits, and we have discussed some of this evidence in these comments. It also defies common senses that a project can reduce greenhouse gas emissions without either: 1) decreasing the use of fossil fuels through energy efficiency; or 2) displacing fossil fuel use through the creation of new, renewable generation. NECEC would do neither. Maine's North woods should not suffer large-scale destruction to facilitate Hydro-Quebec's and CMP's energy shell game.

REDACTED

D.P.U. 18-64/18-65/18-66
Exh. AG-DM
December 21, 2018
Hearing Officer: Alan Topalian

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company d/b/a Eversource Energy for approval by the Department of Public Utilities of a long-term contract for procurement of Clean Energy Generation, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12	)	**D.P.U. 18-64**
Petition of Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid for approval by the Department of Public Utilities of a long-term contract for procurement of Clean Energy Generation, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12	)	**D.P.U. 18-65**
Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil for approval by the Department of Public Utilities of a long-term contract for the procurement of Clean Energy Generation, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12	)	**D.P.U. 18-66**

TESTIMONY

OF

DEAN M. MURPHY

Dated: December 21, 2018

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I. STATEMENT OF QUALIFICATIONS

Q. Please state your name, position, and business address.

A. My name is Dean M. Murphy. I am a Principal with The Brattle Group in the Boston office, located at One Beacon Street, Boston, Massachusetts 02108.

Q. Please describe your professional experience and educational background.

A. I have over twenty-five years of experience in economic consulting, with the majority of my work focusing on the electricity sector. My work has encompassed topics such as resource and investment planning (including power and fuel price forecasting), valuation for contract disputes and asset transactions, climate change policy and analysis, competitive industry structure and market behavior, and market rules and mechanics. I have experience examining these and other electric-sector matters from the perspectives of investor-owned and public electric utilities, independent producers and investors, industry groups, consumers, regulators, and system operators. I hold a Ph.D. in Industrial Engineering and Engineering Management and an M.S. in Engineering-Economic Systems, both from Stanford University, and a B.E.S. in Materials Science and Engineering from the Johns Hopkins University.

Q. Have you previously testified before any regulatory body?

A. Yes. I have testified before the New Hampshire Public Utilities Commissions, the Connecticut Department of Public Utility Control, the New Jersey Department of Public Utilities, and the Public Utilities Board of Manitoba, and have presented to advisory committees to the Pennsylvania Department of Environmental Protection. I have testified before committees of the state legislatures in New Jersey, New York, and Pennsylvania. I have also testified before the United States Court of Federal Claims, the U.S. Bankruptcy Court (both New Jersey and Southern District of New York), and the United States District Court (Vermont). I have submitted written testimony on behalf of

the Massachusetts Attorney General's Office addressing the procurement of offshore wind in the Section 83C proceedings. My CV is attached as Attachment 1.

II. PURPOSE OF TESTIMONY

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Massachusetts Attorney General's Office.

Q. What is the purpose of your testimony?

A. Pursuant to Section 83D of the Green Communities Act, ("Act," or "Section 83D"), Eversource, National Grid, and Unitil (collectively, the "Distribution Companies" or "EDCs") jointly sponsored a competitive solicitation for Clean Energy Generation for an annual amount of electricity equal to approximately 9,450,000 MWh (9.45 TWh), to be procured by the Distribution Companies entering into cost-effective long-term contracts by 2022.[1] In accordance with Section 83D, the Distribution Companies issued a Request for Proposals ("RFP") for Long-Term Contracts for Clean Energy Projects. Thereafter, the Evaluation Team received and evaluated the proposals.[2]

The New England Clean Energy Connect Hydro bid ("NECEC Hydro") was ultimately selected for contract negotiations, following the siting denial of the Northern Pass Transmission Hydro bid ("NPT Hydro"), which had initially been selected. The NECEC Hydro bid consists of energy supplied by Hydro Renewable Energy, Inc. ("HRE") and a new HVDC transmission line constructed by Central Maine Power ("CMP") that interconnects Québec with the New England power grid in Maine.[3] The contract

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[1] Section 83D of Chapter 169 of the Acts of 2008 (the "Green Communities Act"), as amended by chapter 188 of the Acts of 2016, *An Act to Promote Energy Diversity* (the "Energy Diversity Act").

[2] The Evaluation Team was comprised of the Distribution Companies and the Department of Energy Resources ("DOER").

[3] HRE is a wholly-owned indirect unit of Hydro-Québec.

Continued on next page

negotiations resulted in power purchase agreements ("PPAs") for energy and Environmental Attributes ("EAs") between the EDCs and H.Q. Energy Services (U.S.) Inc. ("HQ"), and Transmission Service Agreements ("TSAs") between the EDCs and CMP. The PPAs specify the obligation of HQ to supply Qualified Clean Energy and Environmental Attributes from Hydro-Québec Power Resources ("HQPR").[4]

The purpose of my testimony is to discuss the reasonableness of the Section 83D solicitation process and the resulting PPAs and TSAs.

Q. What are the major findings from your analyses?

A. The proposed contracts, as written, do not ensure that the Qualified Clean Energy acquired via the contracts will comprise fully incremental energy deliveries into New England, as the RFP specified. The RFP required that the Qualified Clean Energy under the contract should be incremental to (*i.e.*, in addition to) the hydroelectric energy that HQ has delivered to New England historically, or that would otherwise be expected to be delivered. The proposed contracts implement much weaker requirements for incrementality and would allow most (and potentially all) of the contract energy delivered to substitute for historical deliveries. This aspect of the contracts must be corrected in order to conform with the RFP requirements, and the overall purpose of the Act. This could be done by modifying the requirements of the proposed contracts, assuming HQ is able and willing to provide fully incremental Qualified Clean Energy into New England. If HQ is unable or unwilling to provide fully incremental Qualified Clean Energy, other sources of clean energy could supplement or substitute to satisfy this requirement. For example, the HQ deliveries of hydroelectric energy could be supplemented with some renewable energy that does meet the RFP's incrementality

[4] The PPAs define HQPR as "those existing hydroelectric generating stations, located in the Province of Québec and owned and operated as a system by Hydro-Québec or its subsidiaries from time to time, that produce electric energy, which consists predominantly of low-carbon and renewable hydro-electric energy services during the Services Term." Exh. JU-3-B, at 14.

requirement, or the HQ energy could be replaced in its entirety with energy from other renewable bids (which might have different transmission requirements). There were several alternative bids comprised of new renewable generation (and transmission) that would provide fully incremental clean energy, and some of these alternative bids scored well in the evaluation.

In addition, I have concerns about the selection process. Neither of the two top-scoring bids, [redacted], nor a potential portfolio comprised of just those two bids, were carried forward from the second stage of the evaluation into the third and final stage.[5] These alternatives that were dropped from consideration may have performed better than the NECEC Hydro project that was selected. This selection issue may be related to the previous question of whether the proposed contracts provide fully incremental clean energy, because the [redacted] projects would have fully satisfied the incrementality requirements of the RFP.

I am also concerned about the inclusion of bidders' affiliates in the Evaluation Team. This is generally considered inappropriate because it can bias the evaluation and selection process. Such concerns arose in multiple instances in the 83D evaluation process and were noted by the Independent Evaluator.[6]

My final concerns regard the potential for the scaling approach used in bid scoring to inadvertently and improperly affect the bid scores and ranking, and the metric used to calculate the Global Warming Solutions Act ("GWSA") benefits. Although these appear to be less important issues in this solicitation than the concerns noted above, they should be addressed in any future solicitations.

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[5] Revised Independent Evaluator Final 83D Report Confidential, at 68, 70 (August 7, 2018). These two high-scoring bids were included as components of portfolios that scored relatively poorly in the evaluation; the lower scores for these portfolios may have been due to the inclusion of still other, lower-scoring bids in those portfolios.

[6] *See, e.g., id.*, at 27-28, 32, 36, 48-49.

III. REVIEW OF KEY DOCUMENTS IN THE PROCEEDING

Q. What documents have you reviewed in this proceeding?

A. I have reviewed the RFP, the Independent Evaluator's report submitted by Peregrine Energy Group, responses to Information Requests, and the direct Joint Testimony and accompanying exhibits submitted by the Distribution Companies, including the Tabors Caramanis Rudkevich ("TCR") evaluation report, the bid selection letters, the scoring protocols, the qualitative scoring, portions of the bids, and the proposed contracts.

IV. THE PROPOSED CONTRACTS DO NOT PROVIDE INCREMENTAL HYDROELECTRIC GENERATION AS CONTEMPLATED BY THE RFP

Q. What is your concern regarding whether these proposed contracts will provide incremental hydroelectric generation?

A. The proposed contracts do not require that HQ provide incremental hydroelectric generation as specified in the RFP. The stated goal of the Act is to "facilitate the financing of clean energy generation resources."[7] That is, the legislature intended to bring additional clean energy into the Commonwealth. This goal is reflected in the RFP, the stated intent of which, in the context of a hydroelectric bid, was to acquire "Incremental Hydroelectric Generation"[8] that would be incremental to historical hydroelectric energy deliveries into New England.[9] My understanding of the purpose of this RFP requirement is to ensure that the hydroelectric or renewable energy resources procured under the long-term contracts would not substitute for historical clean energy deliveries, but rather would provide a long-term net increase in the amount of clean energy delivered into New England. As written, the proposed contracts include much

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[7] Section 83D(a).

[8] Exh. JU-2, at 18.

[9] Bids for renewable resources were required to be provided from new generation, which would necessarily be incremental to historical energy. Hydro suppliers were permitted to offer "Incremental Hydroelectric Generation" from existing resources but were required to show that the generation would be incremental.

weaker requirements. Although each EDC's contract has its own incrementality provisions, even the most stringent contract requires that less than half of the newly contracted clean energy provided be incremental to historical average generation.

Q. What did the RFP require in terms of incrementality?

A. The RFP defines incremental hydroelectric generation:

> "Incremental Hydroelectric Generation" means Firm Service Hydroelectric Generation that represents a net increase in MWh per year of hydroelectric generation from the bidder and/or affiliate as compared to the 3 year historical average and/or otherwise expected delivery of hydroelectric generation from the bidder and/or affiliate within or into the New England Control Area.[10]

That is, to be considered "incremental," the RFP requires the bidder to provide energy in addition to the bidder's 3-year historical average of deliveries into New England (or more than the bidder would have otherwise delivered). The 2014-2016, 3-year imports from HQ into New England is 14.8 TWh.[11] Thus, for the 9.55 TWh of Qualified Clean Energy from the contracts to be fully incremental energy delivery, total deliveries would need to be 24.35 TWh annually.

Q. Do the proposed contracts adopt the RFP definition of incrementality?

A. Although the preamble that appears in each of the proposed contracts asserts "WHEREAS, the output of the Hydro-Québec Power Resources, delivered through the New Transmission Facilities (as defined herein), shall constitute incremental hydroelectric generation during the Services Term,"[12] the contracts themselves do not define the term "incremental hydroelectric generation." Rather than repeating or referring to the definition in the RFP, or implementing equivalent requirements, each of the proposed contracts establishes considerably less stringent requirements.

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[10] Exh. JU-2, at 5.

[11] Exh. NEER-1-8.

[12] *See, e.g.*, Exh. JU-3-A, at 7.

Continued on next page

The contracts require two types of energy to be delivered: 1) "Guaranteed Qualified Clean Energy," which is the contracted total of 9.55 TWh across the three contracts, to be delivered through the NECEC,[13] and 2) "Baseline Hydroelectric Generation Imports" ("Baseline Hydro"), which consists of all other power deliveries from Hydro-Québec to New England.[14] Exhibit H to the proposed contracts establishes Minimum Required Baseline Hydroelectric Generation Imports ("Minimum Baseline") quantities.[15] Conceptually, to provide incremental generation, the Minimum Baseline should equal historical energy deliveries. But the values established for the Minimum Baseline quantities are substantially below the historical average, and so the contracts do not actually require the clean energy deliveries to be incremental.

The three EDCs' proposed contracts establish different requirements for the Minimum Baseline quantity. The National Grid contract establishes a Minimum Baseline of 9.45 TWh, which is substantially below the 14.8 TWh of historical deliveries.[16] This implies that HQ must deliver a total of 19.0 TWh annually to New England (9.45 TWh of Minimum Baseline plus 9.55 TWh from the contract). Even though the contracts

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[13] Exhibit B to the proposed contracts provides the Schedule of Guaranteed Qualified Clean Energy for each hour. For Eversource, this number is 579.335 MWh/hour (Exh. JU-3-A, at 72); for National Grid it is 498.348 MWh/hour (Exh. JU-3-B, at 80); and for Unitil it is 12.317 MWh/hour (Exh. JU-3-C, at 72). Summing across EDCs and multiplying by 8,760 hours/year yields total Guaranteed Qualified Clean Energy of 9.548 TWh/year.

[14] See, *e.g.*, Exh. JU-3-A, at 86. The Baseline Hydro amount refers to all other deliveries to New England, not the amounts that are specific to each EDC or their contracts.

[15] Exh. JU-3-B, at 92. While the Eversource and Unitil contracts do not use the phrase "Minimum Required Baseline Hydroelectric Generation Imports," the contracts do require a minimum level of "Baseline Hydroelectric Generation," against which damages are measured. Exh. JU-3-A, at 86.

[16] According to National Grid's response to Exhibit NEER-1-8, due to "the difficulties of predicting what differences from HQ's 3-year historical average annual delivery of approximately 14.8 TWh from HQ to New England from 2014-2016 could reasonably be expected over the twenty years following the targeted commercial operation date for this project, it is reasonable and acceptable to move forward with the contract based on HQ's agreement to the 9.45 TWh Minimum Required Baseline Hydroelectric Generation Imports."

Continued on next page

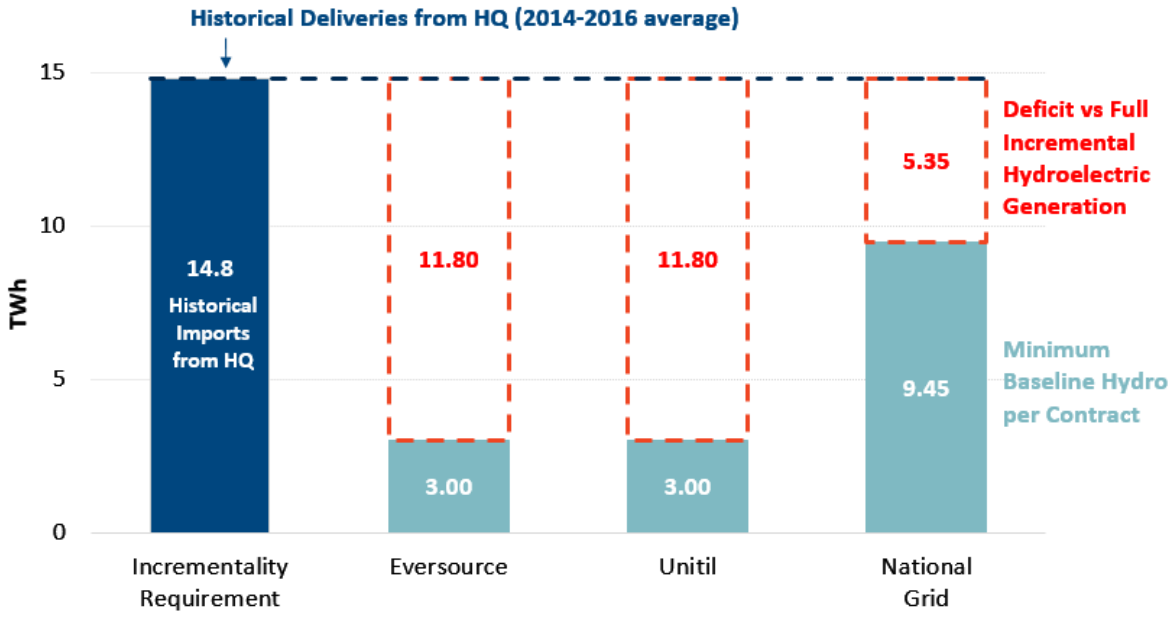
nominally represent incremental hydro of 9.55 TWh annually, HQ will be required to deliver to New England only 4.2 TWh more than it has delivered historically. In other words, less than half the contract energy is required to be incremental; for the remainder, HQ can simply substitute contract energy at the contract price for energy that it has historically sold into New England. In fact, the Minimum Baseline for National Grid may be reduced further (though not increased) by several potential adjustments.

The incrementality requirements of the Eversource and Unitil contracts are even less stringent They are based on a Minimum Baseline quantity of 3.0 TWh,[17] so that the total clean energy deliveries into New England, including deliveries under the new contract, can be below historical average deliveries. Thus, HQ could satisfy its long-term contract obligations by delivering only 12.55 TWh annually (9.55 contract + 3.0 Baseline), which would be 15% <u>less</u> clean energy than it has delivered historically. The difference could then, for example, be sold into the market to another buyer offering a higher price, which might include a premium for the fact that the hydro energy is clean.

Figure 1 below illustrates the contract quantity requirements, contrasting what would be required for full incrementality as described in the RFP, shown by the first column, with what is required by each of the proposed contracts. The figure shows that the Eversource and Unitil contracts require HQ to deliver just 3.0 TWh of Baseline Hydro to New England, 80% (11.80 TWh) below the historical average. The National Grid contract requires somewhat greater Baseline deliveries of 9.45 TWh, but still 36% (5.35 TWh) below the historical average. The Deficit indicated relative to each contract is the amount by which total hydro deliveries to New England (Qualified Clean Energy plus Baseline Hydro) can fall short of full incrementality without penalty.

[17] According to Exhibit NEER-1-9, Eversource and Unitil found that the requirement to deliver incremental generation was met in the bid response, and the 3 TWh Minimum Baseline that was negotiated would not make "the administration of such a provision problematic."

Figure 1: Baseline Hydro Deliveries into New England Required by Proposed Contracts



Sources and Notes: Minimum Baseline Hydro per Contract is from contracts (Exhs. JU-3-A, JU-3-B, JU-3-C).

Q. Do the Minimum Baseline hydro generation levels established in the proposed contracts provide a reasonable assurance to Massachusetts ratepayers that the total clean energy delivered to the Commonwealth will increase if the proposed contracts are enacted?

A. No. As discussed above, the contract provisions do not ensure that energy deliveries under the contracts will be fully incremental relative to historical imports from HQ. In the case of Eversource and Unitil, total clean energy deliveries could fall below historical levels without penalty. Furthermore, the stated goal of the Act is to "facilitate the financing of clean energy generation" through "cost-effective long-term contracts."[18] If the proposed long-term contracts allow HQ to provide less clean energy to New England than it has historically, then it is not apparent that the contracts would be financing clean energy generation. It is also not clear that the contracts would be cost-effective, as ratepayers could be paying for energy and EAs as if they would be incremental to

[18] Section 83D(a).

historical deliveries, but the deliveries would not necessarily be fully incremental because the contracts do not require it.

Q. How do the contracts enforce the Minimum Baseline requirements that they do include?

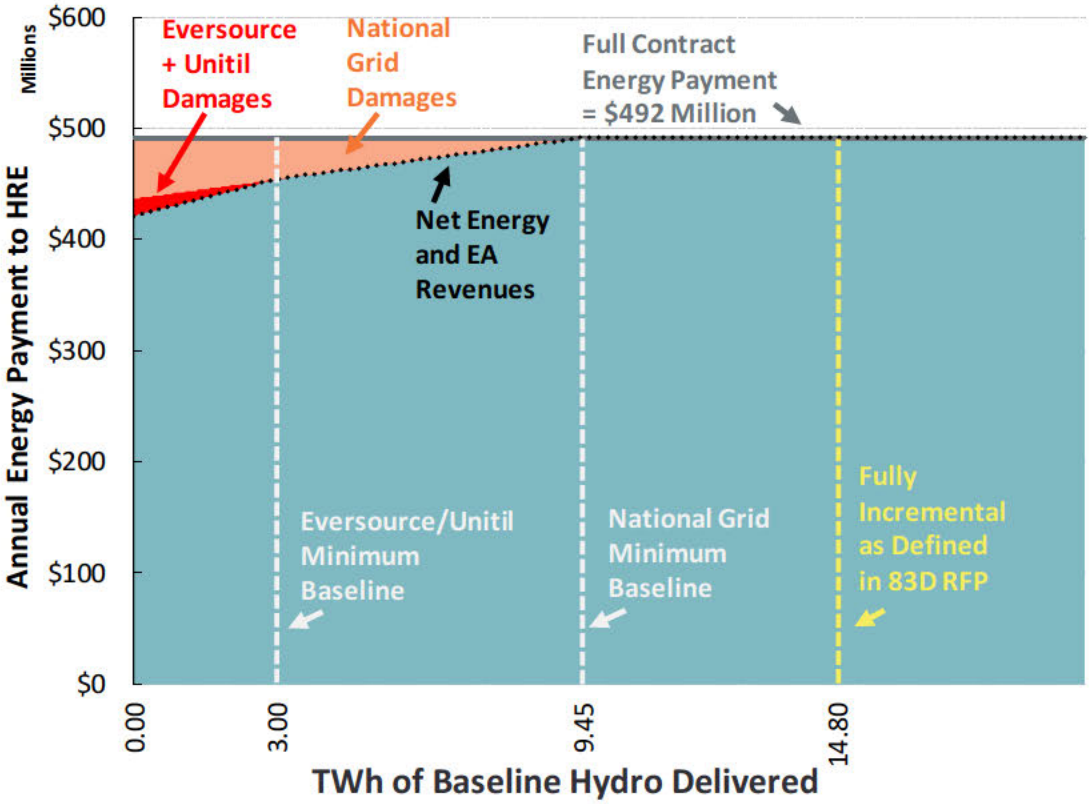
A. The Minimum Baseline requirements are enforced by a damages calculation that penalizes any Shortfall, the amount by which Baseline Hydro is below the Minimum Baseline. The damages, which would be applied to the energy payment to HQ, are calculated as a share of the TSA payments proportional to the Shortfall. For National Grid, the damages share is the Shortfall divided by the Minimum Baseline (9.45 TWh); whereas for Eversource and Unitil, the damages share is the Shortfall divided by the Minimum Baseline (3.0 TWh) plus the contract energy, totaling 12.55 TWh. In both cases, the damage amount is the relevant share multiplied by the annual TSA payments, with some time averaging and rolling average adjustments. Several factors may reduce the damages amount and/or reduce the Minimum Baseline deliveries that are required to avoid damages.[19]

Figure 2 below illustrates the contract incentives facing HQ to provide incremental energy, showing how the aggregate contract payments for energy and EAs change as the level of Baseline Hydro delivered changes. If HQ delivers fully incremental Baseline Hydro (equal to the historical average of 14.8 TWh), there are no damages and no

[19] Damages are only calculated if the Shortfall is positive (*i.e.*, HQPR delivers less than the Minimum Baseline). The Eversource and Unitil contracts provide a reduction in the Minimum Baseline subject to a *Force Majeure* provision, and a provision related to negative pricing in New England. Exhs. JU-3-A, at 86-87; JU-3-C, at 84-85. The National Grid contract provides for several factors that can reduce (but not increase) the Minimum Baseline, including on-peak prices relative to a floor, total transfer capabilities for deliveries into New England, total net electricity exports from Hydro-Québec, and changes in Hydro-Québec's firm transmission rights. The National Grid damages for Shortfall are also scaled down by 20% after each five years of the contract, starting at 100% of the Shortfall share times the TSA payment in the first 5 years, and falling to 40% in the last 5 years. Exh. JU-3-B, at 94.

reduction to the net revenues earned under any of the EDCs' contracts. Damages are incurred when Baseline Hydro deliveries drop below the Minimum Baseline of the National Grid contract, 36% below the level that would be fully incremental. As Baseline Hydro falls below this level, net energy and EA revenues from National Grid are reduced according to the Shortfall relative to the National Grid Minimum Baseline, at a rate of $5.80/MWh of Shortfall. Below the 3.0 TWh Minimum Baseline of the Eversource and Unitil contracts, which is 80% below full incrementality, Eversource and Unitil damages begin to be incurred as well; total damages across all three contracts in this range are $10.98/MWh of Shortfall. Even at zero Baseline Hydro, total energy and EA payments across the three contracts are reduced by only 14.3%. These measures do not account for any of the other adjustments noted above, which could reduce (but not increase) the damage amounts.

Figure 2: EDC Energy Payment vs. Baseline Hydro Generation



Source and Notes: Contracted energy prices, contracted clean energy delivery, and contract details in relation to Baseline Hydro are from Exhibits JU-3-A, JU-3-B, JU-3-C. Transmission unit price and contract capacity are from Exhibits JU-

4-A, JU-4-B, JU-5-C. For the purposes of this chart, it is assumed that all contracted clean energy (Guaranteed Qualified Clean Energy) is delivered. The chart reflects prices from contract year 1 (Nominal 2017 $).

Q. Do the damage mechanisms in the contracts give HQ sufficient incentive to provide fully incremental hydro deliveries?

A. No, the damage mechanisms do not give HQ the proper incentives to provide fully incremental deliveries of clean energy. There is no disincentive for HQ to under-provide Baseline Hydro until it falls well below the historical average, and even then, the disincentives for further Shortfall are modest.

Q. Has this potential for Massachusetts ratepayers to receive the same total clean energy generation but pay for it at an above market rate been raised previously?

A. Yes. The Department of Public Utilities ("Department") explicitly acknowledged this risk in response to HQ's comments,[20] in which HQ proposed amending the incrementality requirements in the RFP by changing the definition of incremental hydro generation to require only the capability to deliver incremental power, rather than the actual delivery of incremental power:

> The Department agrees that there would be a risk to ratepayers if an electric distribution company entered into a contract with a bidder based on the

[20] HQ proposed that Incremental Hydroelectric Generation be defined as: "Firm Service Hydroelectric Generation that is capable of providing a net increase in MWh per year of hydroelectric generation from the bidder and/or affiliate as compared to the 3 year historical average delivery of hydroelectric generation from the bidder and/or affiliate within or into the New England Control Area." *Fitchburg Gas and Electric Light Company d/b/a Unitil, Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid, and NSTAR Electric Company and Western Massachusetts Electric Company, each d/b/a Eversource Energy*, D.P.U. 17-32, Comments of H.Q. Energy Services (U.S.) Inc., at 8 (February 21, 2017). This proposed definition is aligned with HRE's response to how it provides incrementality in its bid for this solicitation: "[redacted]." *Section 83D Request for Proposal Application Form,* NECEC RFP Response (HRE) Confidential, Section 4.2, at 20 (emphasis added).

Continued on next page

> bidder's capability to provide a net increase in MWh/year of hydroelectric generation. If the bidder subsequently failed to provide a net increase in generation, ratepayers would have paid for a service (*i.e.*, Incremental Hydroelectric Generation) that the bidder did not deliver.[21]

In its 2016 background document on regulations to limit greenhouse gases ("GHG"), including the Clean Energy Standard ("CES"), the Massachusetts Department of Environmental Protection ("DEP") explicitly expressed a concern that "resource shuffling" of Canadian hydro (*i.e.*, the contractual or transactional reassignment of clean energy without increasing the total amount of clean energy overall) could result in the CES delivering no additional clean energy to the Commonwealth:

> Excluding existing resources from the CES would not be sufficient to prevent resource shuffling with respect to transmission of electricity from Canada. Currently, electricity imported from Canada is an important source of clean electricity for Massachusetts, but the ability to import additional electricity from Canada is limited by the amount of transmission capacity. Resource shuffling could occur if new hydroelectric generation resources were to displace existing hydroelectric resources as the source of the electricity traveling through existing transmission lines. In this case, CES compliance could occur without any change in the amount of clean energy available for use in Massachusetts. [22]

Although the DEP's comments were focused on the role of transmission, the issue of incrementality is not limited to transmission. Adding new transmission without requiring that deliveries be incremental would fail to address the issue, as illustrated in this proceeding and the development of the RFP.

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[21] D.P.U. 17-32, at 33 (2017).

[22] Massachusetts Department of Environmental Protection, *Background Document on Proposed New and Amended Regulations*, at 30 (December 16, 2016).

Continued on next page

Q. Does the fact that the contracts add significant transmission capacity to enable greater deliveries to New England alleviate the concern about whether the contract energy would be incremental?

A. Energy deliveries from Québec are often constrained by the limits of the transmission interface between Québec and New England.[23] Thus transmission must be expanded to enable the delivery of incremental clean energy into New England. However, merely adding transmission does not ensure that clean energy deliveries will be incremental relative to historical deliveries, unless the contracts explicitly require this. As the proposed contracts are written, that will not necessarily be the case; clean energy deliveries could be far less than fully incremental and still satisfy the requirements of the proposed contracts.

V. ADDITIONALITY AND OFFSETTING GREENHOUSE GAS EMISSIONS

Q. Must the contracts require full incrementality for the 83D clean energy to create the desired offset to greenhouse gas emissions?

A. Even if the proposed contracts required energy deliveries to be fully incremental, this would not necessarily guarantee that GHG emissions would decrease by an amount corresponding to the Qualified Clean Energy of the contract. Incrementality is defined in the RFP only with respect to deliveries <u>into New England</u>, while GHG emissions must be measured at a <u>global</u> level.[24] It would be possible, at least in principle, to satisfy the requirements of full incrementality (*i.e.*, the Qualified Clean Energy is incremental to the full historical average deliveries into New England), and still not offset a corresponding amount of global GHG emissions. This could happen through resource shuffling—reassignment of a fixed amount of clean energy so as to increase the clean energy

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[23] *Section 83D Request for Proposal Application Form*, NECEC RFP Response (HRE) Confidential, Section 4.2, at 20.

[24] Exh. JU-2, at 5-6.

delivered to a particular destination without increasing the total amount of clean energy overall.

For instance, with the new NECEC transmission link, if HQ increased deliveries into New England by the contracts' 9.55 TWh relative to historical New England deliveries, this would achieve full incrementality as defined in the RFP. But if HQ accomplished this by reducing its exports to other neighboring regions rather than by increasing clean energy generation overall, then global GHG emissions would not necessarily be reduced. Diverting clean energy from other regions to New England would enable a reduction in fossil generation and emissions within New England, but the reduced deliveries to other regions may need to be replaced by additional fossil generation in those regions. This would effectively substitute fossil generation in other regions for fossil generation in New England, shifting emissions from one region to another, without causing a material decrease (the actual impact would depend on the relative emissions intensities of each region).[25]

Q. What would be required to ensure a reduction in GHG emissions?

A. For the 83D contracts, or any project, to reliably reduce GHG emissions, they would need to provide clean energy that is "additional." Additionality is a commonly-used concept in the climate change discussions; it refers to emissions reductions that occur <u>because of</u> a proposed action, reductions that would not have occurred otherwise under "business as usual." Importantly, it must involve overall global emissions reductions, not reductions in one region or sector that might be offset by a corresponding increase that is triggered elsewhere, or reductions that would have occurred regardless of the proposed action. For example, a PPA that supports the development of a new wind farm will generally be additional. The new wind farm produces clean energy that would not otherwise be

[25] This shifting of emissions from one region to another through resource shuffling is analogous to "leakage," defined as "the offset of a reduction in emissions of greenhouse gases within the commonwealth by an increase in emissions of greenhouse gases outside of the commonwealth." G.L. c. 21N, § 1.

produced, displacing fossil energy and reducing emissions, so the clean energy and the emissions reductions are additional to what would have occurred without the PPA. Clean energy, however, is not always additional in this sense. If an existing wind farm with an expiring PPA signed a renewed PPA with a different buyer, the renewed PPA does not result in additional clean energy. The existing wind farm would have continued to produce clean energy even without the renewed PPA; the output may have been sold to a different buyer or in the spot market. The renewed PPA does not increase the total clean energy produced and consumed or reduce emissions; it just reallocates clean energy that would be produced in any case. It can sometimes be challenging to define and determine additionality in practice, primarily because doing so can require a very precise specification of the alternative "business as usual" circumstance—*i.e.*, additional to what? But for the purposes of the 83D procurement, the important point is that a global perspective is necessary. The RFP requirement that the contract energy be incremental <u>to New England</u> (even if the proposed contracts required full incrementality) does not ensure that it would be additional or necessarily result in corresponding GHG reductions.

Q. Do the proposed contracts require the energy to be additional in this sense of offsetting GHGs globally?

A. No, not necessarily. HQ has committed to using <u>existing</u> HQPR facilities to supply the contracted energy.[26] If these facilities were spilling significant amounts of water due to transmission constraints that would be relieved by the NECEC transmission, or if Hydro-Québec undertook investments to expand its system—to increase output from existing facilities or add new generation or storage capability—then a portion of the generation may be considered additional. But the contracts do not require this, nor has HQ indicated that it is the case.

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[26] *See, e.g.*, Exhibit JU-3-A, at 70-71 for a list of existing facilities that will be used to provide the contracted energy.

VI. POTENTIAL CHANGES TO THE PROPOSED CONTRACTS TO ENSURE INCREMENTALITY

Q. How could the proposed contracts be modified to ensure the energy provided is fully incremental relative to historical deliveries?

A. Increasing the Minimum Required Baseline Hydroelectric Generation Imports quantity in Exhibit H to the proposed contracts will increase the amount of energy that is required to be incremental. Unfortunately, it may not be as simple as increasing this value to equal the 14.8 TWh historical average of deliveries into New England (and removing the provisions that can reduce the Minimum Baseline). This simplistic approach could create difficulties because the amount of hydroelectric energy that HQPR is able to produce can vary from year to year based largely on hydrologic conditions. Dry years will have less total energy available, and it may not be possible to export the historical average amount; similarly, the appropriate Baseline Hydro amount could exceed the historical average in years with above-average energy. Some further adjustment mechanisms may be necessary; these might include indexing the Minimum Baseline to water conditions or to total exports from Hydro-Québec, and/or making the Minimum Baseline a multi-year or rolling requirement (the National Grid contract contains some such adjustments). A desirable principle for defining the Baseline Hydro energy (as well as the 83D contract energy) is that it should take priority over HQ exports to other regions to ensure that the contract energy is incremental to what would have been delivered to New England absent the contracts. But the existing low minimum thresholds for Baseline Hydro delivery in the proposed contracts, and the modest incentives to meet even those minimum thresholds, are insufficient to ensure that Massachusetts ratepayers will receive the fully incremental clean energy that was solicited in the RFP.

Q. Would HQ be able to provide fully incremental energy to meet such a contract requirement with its existing system?

A. In Section 4.2 of its bid materials, HRE [redacted]

[redacted]

Q. If HQ is unable or unwilling to provide hydro production that is fully incremental, are there other options that could improve the performance of the contracts on this dimension?

A. If HQ is unable or unwilling to provide fully incremental hydro, as that might be reasonably defined, then another option could be to include other energy sources that can provide incremental energy. For example, if some new renewable energy was used to supplement the HQ hydro supply, the demands on HQPR's existing hydro system could be reduced while maintaining the total amount of incremental energy provided to New England under the contract. An alternative bid included both wind and hydro generation with the NECEC transmission, the "NECEC Wind/Hydro" bid [redacted]. In this bid, SBx (a joint venture of Gaz Metro and Boralex) would develop the wind generation as a complement to the existing hydro power. [redacted]

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27 *Section 83D Request for Proposal Application Form,* NECEC RFP Response (HRE) Confidential, Section 4.2, at 20.

28 [redacted].

29 [redacted] he difference between [redacted] and the [redacted] provided in the wind portion of the bid, leaves [redacted] TWh of the contract to be fulfilled by hydro generation.

Continued on next page

Q. Would this amount of supplemental wind energy enable HQPR's existing hydro system to provide the balance of the energy requirements for fully incremental energy?

A. It may, though it is possible that even with the [redacted], HQ might not be able or willing to provide the lower [redacted] of hydro required for incremental generation. In that case, it may be necessary to turn to other suppliers for the required amount of incremental energy. [redacted].[30] If the NECEC Hydro bid cannot provide fully incremental energy, these other bids would be unable to do so. Fortunately, there were other bids that could supply the desired fully incremental clean energy requirements. In fact, because many of these other bids were based on new renewable generation, they would be additional, and thus would ensure that the clean energy delivered to New England would offset GHG emissions, which even fully incremental energy from existing hydro resources might not necessarily do, as discussed above. The Evaluation Team created and evaluated several portfolios of renewable energy projects in Stage 3 that could be candidates if the NECEC Hydro bid [redacted] could not provide incremental clean energy. In addition, the two highest-scoring bids in the Stage 2 evaluation were [redacted] bids; although they were not evaluated on a standalone basis in Stage 3, they could be potential candidates.

VII. PROJECT SELECTION

Q. What is your concern regarding project selection?

A. There appear to be some issues regarding which projects and portfolios were selected to carry forward into Stage 3 of the evaluation. Specifically, the two highest-scoring projects in Stage 2, [redacted], were not carried forward into the

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30 [redacted]

Stage 3 evaluation individually. This may have been because each bid offers less clean energy than the 9.45 TWh desired in the solicitation, though that would not necessarily disqualify these projects as standalone bids, since there was no requirement that the full amount be acquired in a single solicitation, and multiple solicitations were contemplated. Further, a portfolio consisting of just these two projects would have provided about [redacted] of the energy targeted by the procurement and may have performed very well. These two projects were included as components in several larger portfolios, though these larger portfolios included other, lower-scoring bids that may have diluted their value.

Q. Do your concerns regarding project selection relate to the question of whether the NECEC Hydro bid offers fully incremental clean energy?

A. Yes. The [redacted] bids both [redacted], and so there is no concern about whether they would offer incremental energy to New England. In fact, they would be additional as well, in the sense discussed above, and are not subject to concerns over resource shuffling, so they would offer confidence regarding global GHG reductions.

Q. Please briefly describe the evaluation of bids and bid selection process.

A. The bids were evaluated in three stages, which was followed by bid selection. In Stage 1, bids were evaluated against the RFP threshold requirements. Bids that met the threshold requirements were carried to Stage 2, where they were evaluated on both quantitative and qualitative dimensions. The Evaluation Team then selected several large proposals from Stage 2, plus several portfolios made up of multiple projects, for further evaluation in Stage 3, and ultimately project selection.

Q. Were all the bids that were evaluated in Stage 2 also evaluated in Stage 3?

A. No. As stated in the RFP, it was not expected that all bids from Stage 2 would be evaluated in Stage 3. The RFP provides three metrics for including bids in Stage 3: 1) the rank order of the proposals at the end of the Stage 2 evaluation; 2) the cost

effectiveness of the proposals based on the Stage 2 quantitative evaluation; and 3) the total annual generation of the proposals relative to the procurement target.[31]

Q. Were the proposals with the highest rank order and highest cost-effectiveness from Stage 2 brought forward into Stage 3?

A. As standalone projects, no. [redacted] were the two most highly ranked large proposals in Stage 2. They received the highest Net Total Benefit scores and highest Net Direct Benefits scores.[32] Both the [redacted], and thus would provide energy to New England that would be both incremental to New England and additional globally. [redacted] was the top ranked bid in Stage 2, receiving a total score of 85.94; [redacted] was the second highest ranked bid in Stage 2, with a total score of 80.24. The NECEC Hydro bid was ranked third with a score of 79.95, more than 5 points below the top-ranked [redacted]

[redacted] Each of these portfolios included between [redacted] other smaller projects that had lower net direct benefits and higher costs,[33] which may have depressed the portfolio scores. The Evaluation Team did not evaluate [redacted] bids individually or in a portfolio composed solely of these two projects.

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[31] Exh. JU-2, at 41.

[32] [redacted]

[33] As previously discussed, the [redacted] is an exception. *See supra* note 32.

Continued on next page

Q. Is it likely that the [redacted] bids would have scored well in Stage 3, either individually or combined in a portfolio consisting of just these two bids?

A. Yes. [redacted] bids were ranked first and second in the Stage 2 evaluation. The Stage 3 scoring used the same quantitative and qualitative evaluation approaches as Stage 2, so these bids would have ranked first and second in Stage 3 as well, above the NECEC Hydro bid.[34] I believe that these two bids should have been considered on a standalone basis, so that an explicit tradeoff could be made [redacted] and their better performance.

Further, a portfolio consisting of just these two bids would likely have scored quite well, and would have provided most of the energy targeted in the procurement. The Stage 3 portfolios that included [redacted] along with other projects likely scored lower due to the inclusion of these other lower-scoring projects, and so do not offer good guidance regarding the value of a portfolio consisting solely of these two bids. To calculate the total benefits of this new portfolio would require a full evaluation, including a new simulation with TCR's Enelytix model, as requested in Information Request AG 3-2.[35] I believe that a portfolio consisting of just the [redacted] projects would have been attractive and might have been preferred to the NECEC Hydro bid, and thus should have been evaluated. Further, these bids, either individually or in a portfolio, would provide greater confidence regarding the delivery of fully incremental clean energy to New England, and GHG emissions offsets.

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[34] The scaling of quantitative scores was performed independently in Stage 3, so the scoring would differ slightly from the Stage 2 scoring (*see* Section IX on the impact of scaling). The Stage 3 scaling slightly increases the advantage of the [redacted] bids over the NECEC Hydro bid.

[35] While the direct benefit portion of the total quantitative benefits should be additive and thus not require another simulation, and the qualitative benefits are not affected by inclusion in a portfolio, the indirect benefits may not be additive and would require a separate simulation to evaluate.

Continued on next page

Q. In combination, would the [redacted] bids satisfy the full clean energy procurement requirement under section 83D?

A. [redacted] the Act allows the EDCs to carry out multiple procurements to acquire the full 9.45 TWh of desired clean energy.[36] Had the EDCs selected a bid or a portfolio that did not satisfy the full 9.45 TWh goal, a second procurement could have been held to acquire the remaining clean energy. In fact, several other portfolios evaluated in Stage 3 offered less than the 9.45 TWh desired, though none fell short by as much as [redacted]

VIII. EVALUATION TEAM COMPOSITION

Q. In your opinion, is it appropriate that the utilities participated in bid evaluation, given that their affiliates had submitted bids in this solicitation?

A. In general, I do not find it appropriate that the Evaluation Team included the utilities whose affiliates had submitted bids. This apparent conflict of interest raises serious concerns, for several reasons.

Q. Is this just a perceived conflict of interest, or are there reasons that this could influence the outcome of the procurement process?

A. The perception of a possible conflict of interest is rooted in real reasons for concern. One concern is the possibility of information sharing that could offer the affiliate a bidding advantage. This is particularly relevant in this procurement, where bidders were not generally aware of the precise scoring mechanism that would be used to evaluate bids. The risk that bid evaluators might share information with some bidders and not others is increased if members of the bid Evaluation Team are affiliated with some bidders.

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[36] Section 83D(b).

Q. Does walling off the Evaluation Team from direct or indirect communications with the bidding team alleviate the concerns regarding bidder affiliates on the Evaluation Team?

A. An ethical wall can be established between members of the Evaluation Team and the bidding teams, with the intent of minimizing the possibility of inappropriate information sharing. I understand that Standards of Conduct were established to create such ethical walls in this instance, though I cannot attest to their efficacy.

But in addition to concerns about inappropriate information sharing, incentive problems can arise. If the EDC stands to benefit if its affiliate prevails in the procurement process, then the EDC members on the Evaluation Team may—consciously or subconsciously—be influenced by those incentives, and favor bids from the affiliate. An apparent bias in evaluation toward an EDC affiliate's bid, either intentional or unintentional, occurred at several points in this 83D solicitation, and was explicitly identified and documented by the Independent Evaluator:

> Based on our observations, Eversource favored, or had the appearance of favoring, NPT in various stages of the evaluation and selection process, especially toward the end. This included the deliberations with respect to the interest rate assumption in the quantitative evaluation and the qualitative evaluation with respect to several criteria, [redacted]. This was also the case with respect to the Stage 3 and bid selection process, where Eversource focused on aspects of the evaluation, evaluation metrics and assumptions that supported selection of Northern Pass. It was perhaps even more apparent when Eversource sought to keep NPT in play for contract negotiations even after the required New Hampshire siting approval was denied, with a remote possibility for a prompt reversal in order for Northern Pass to be able to build the project anywhere near the timeframe proposed.[37]

The issue of favoritism toward an affiliate's bid is clearly problematic both in theory, and in practice in this solicitation. Here, if it had not been for the removal of the NPT Hydro bid from consideration due to the siting denial, there might have been good reason to contest the final winner on these grounds.

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[37] Revised Independent Evaluator Final 83D Report Confidential, at 48–49 (August 7, 2018).

Q. Did having affiliates on the Evaluation Team cause a problematic outcome?

A. The possibility that affiliate favoritism may have influenced the evaluation and selection process in some subtle way cannot be ruled out, even after NPT Hydro was removed from consideration. Project selection was ultimately made by the DOER, as the EDCs did not agree on the selection. Eversource and Unitil favored NPT Hydro, a bid affiliated with Eversource. National Grid favored NECEC Hydro. After the DOER selected NPT Hydro, this bid was removed from consideration and the non-affiliated NECEC Hydro bid was selected. But this does not eliminate all concern, because the DOER only discussed the NPT Hydro and NECEC Hydro bids in its selection letter.[38] It did not, for example, consider the high-scoring [redacted] discussed above for potential final selection. In the end, I do not have enough evidence to either exclude the possibility that affiliate favoritism may have affected bid scoring or selection, nor to conclude that the outcome was tainted by having affiliates on the Evaluation Team. Nonetheless, I would not recommend this for any future solicitations.

IX. SCALING OF QUANTITATIVE NET BENEFIT

Q. Please summarize your analysis and findings regarding the scaling of quantitative net benefit in Stage 2 and Stage 3.

A. The quantitative net benefit calculated for the proposals in the evaluation process is scaled onto a 75 point scale, with qualitative scoring accounting for up to another 25 points.[39] The scaling approach implies that the dollar value of each point depends on the particular values of the Net Total Benefit of the proposals, and the dollar value of a point affects the relative importance of quantitative vs. qualitative dimensions. The value of Net Total Benefit depends in turn on other analytic assumptions used in the evaluation. Thus using this scaling approach means that the choice of analytic assumptions could alter the relative importance of the qualitative vs. quantitative dimensions in the

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[38] Exh. JU-10, at 1.

[39] Revised Independent Evaluator Final 83D Report, at 11 (August 7, 2018).

evaluation, potentially influencing the ranking of proposals in ways the Evaluation Team may not intend or even understand.

In this solicitation, quantitative and qualitative scores are negatively related among several of the higher-scoring proposals, with bids that scored high on quantitative measures scoring low qualitatively, and vice versa. For example, [redacted] had a Stage 3 quantitative score of 65.69 and a qualitative score of 19.13. Conversely, the NECEC Hydro bid had a higher Stage 3 quantitative score of 75, and a lower qualitative score of 15.63.[40] These are conditions under which the scaling approach, with its potential to influence the relative weighting of quantitative and qualitative factors, could influence the ranking of portfolios, and potentially the outcome of the solicitation. While the weighting would have had to change significantly in this case to influence the ranking of these two bids, this potential impact illustrates why this scaling approach should be reconsidered for future energy solicitations.

X. EVALUATION OF GWSA BENEFITS

Q. Please describe the metric used to evaluate the GWSA impact of the proposals.

A. The GWSA metric is designed to measure "the value of the Proposal's contribution toward meeting the Global Warming Solutions Act (GWSA) over and above compliance with the RPS and CES."[41] It was calculated in the 83D bid evaluations as the dollar value of the difference between the emissions decrease (relative to the Base Case) and the amount of RECs or CECs created by the project and used for compliance with the RPS or CES. According to the Evaluation Team (excluding National Grid), the RECs and CECs are subtracted off in an attempt to avoid double-counting the REC and CEC value of the projects.[42]

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[40] Exh. JU-6, at 25.

[41] *Id.*, at 31.

[42] Revised Independent Evaluator Final 83D Report Confidential, at 17–18 (August 7, 2018).

Q. Does the GWSA metric accurately reflect a proposal's contribution toward meeting GWSA requirements?

No. The GWSA requires an economy-wide reduction in GHG emissions. The appropriate metric regarding GWSA benefits involves the GHG reduction attributable to the project relative to the Base Case, without deducting the REC/CEC quantity.[43] This is the same position that National Grid has expressed.[44] Ultimately, the GWSA calculation error did not impact the ranking of NECEC Hydro as the highest ranked bid.[45]

Q. Does this conclude your current testimony?

A. Yes.

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[43] D.P.U. 18-76/18-76/18-78, Exh. AG-DM-1, at 17 (November 5, 2018).

[44] Revised Independent Evaluator Final 83D Report Confidential, at 18; D.P.U. 18-77, Exh. NG-TJB-1, at 6 (November 30, 2018).

[45] Exh. AG-2-2-C, Attachment.

DEAN M. MURPHY
Principal

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Dr. Dean Murphy is an economist with a background in engineering. He has expertise in energy economics, competitive and regulatory economics and finance, as well as quantitative modeling and risk analysis. His work centers on the electric industry, encompassing issues such as resource and investment planning (including power and fuel price forecasting), valuation for contract disputes and asset transactions, climate change policy and analysis, competitive industry structure and market behavior, and market rules and mechanics. He has addressed these issues in the context of business planning and strategy, regulatory hearings and compliance filings, litigation and arbitration. Dr. Murphy has examined these matters from the perspectives of investor-owned and public electric utilities, independent producers and investors, industry groups, regulators, system operators, and consumers.

Dr. Murphy holds a Ph.D. in Industrial Engineering and Engineering Management and an M.S. in Engineering-Economic Systems, both from Stanford University, and a B.E.S. in Materials Science and Engineering from the Johns Hopkins University. Prior to joining The Brattle Group in 1995, Dr. Murphy worked as an associate with Applied Decision Analysis, Inc.

AREAS OF EXPERTISE

- Resource Planning, Investment, and Forecasting
- Valuation for Energy Contract Disputes and Energy Asset Transactions
- Climate Policy Analysis
- Market Structure and Competitiveness
- Electricity Markets: Energy, Capacity, and Ancillary Services
- Procurement and Restructuring

EXPERIENCE

Resource Planning, Investment, and Forecasting

- For Manitoba Hydro, which is evaluating large investments in hydroelectric capacity and transmission expansion that would facilitate significant off-system sales, Dr. Murphy testified in a public hearing regarding the potential evolution of long-term power prices in the export market. He also developed a set of future scenarios based on the possible future evolution of several key market drivers, and forecast long-term market prices of power for each scenario. The scenario drivers included fuel prices, climate policy, coal plant retirements, renewable energy portfolio standards, and load levels, which are affected by price feedback and active demand management programs. This assignment has been repeated in subsequent years to

understand how changing market drivers have influenced the potential range future of power prices.

- Dr. Murphy assisted the investor-owned utilities and regulators in Connecticut in complying with a legislative mandate to develop annual resource and procurement plans for the state, over several annual cycles. He focused particularly on the development of a set of scenarios against which alternative resource plans were evaluated, in order to illuminate the risks that might be associated with such plans. Key issues were potential federal climate legislation, natural gas prices, electricity demand, and demand side management strategies, and the complex interplay between these factors. He also evaluated energy security issues, including interactions between natural gas availability and electric reliability, as well as the potential role of nuclear power and emerging technologies, and their impacts on energy security.
- For a consortium in the initial stages of developing a major long-distance offshore DC transmission link designed to integrate multiple thousands of megawatts of new wind generation into several electric markets, Dr. Murphy performed a preliminary evaluation of the potential energy and capacity value of the project, and the approximate customer cost impact. These analyses were designed to assist in securing FERC approval for incentive rate treatment and abandoned cost recovery.
- For a merchant electric generator contemplating renewing or replacing an expiring output contract for a gas-fired generator, Dr. Murphy used a power market simulation model to forecast potential long-term power price trends under several scenarios involving fuel costs, generator retirements and renewable additions. Using the forecasts of potential long-term trends, he simulated the plant's short-term operations and its resulting financial performance. A key factor that had a significant effect on the plant's value in this analysis was characterizing the short-term volatility of power prices and the plant's ability to respond to capture short periods of attractive prices.
- Dr. Murphy developed a long-term forecast of Renewable Energy Credit (REC) prices across multiple states and interconnected electricity markets for a renewable generation developer. He considered state-level Renewable Portfolio Standard (RPS) requirements over time, as well as potential federal renewable requirements, looking at the cost and geographic availability of several potential renewable resource types and incorporating the effect of in-state requirements and alternative compliance payments.
- Dr. Murphy worked with a manufacturer of an energy storage technology to estimate its value on several dimensions across a range of potential applications. He used simulated charge-discharge cycles with historical prices in several markets to demonstrate not only the technology's energy and capacity value, but also its potential ancillary service and reliability benefits.
- For the Tennessee Valley Authority (TVA), Dr. Murphy assisted in the development of TVA's long-range Strategic Plan to deal with the development of competitive markets and a changing regulatory environment. He organized and performed numerous operational and financial analyses to understand TVA's performance under a wide variety of scenarios, and

integrated the results into a strategic framework, considering numerous potential outside influences (e.g., fuel price scenarios) and TVA responses (e.g., product unbundling or changes to TVA's pricing structure).

- For a utility client interested in building a merchant transmission line, Dr. Murphy evaluated the benefits of the line, designed and implemented an auction for the rights to use the line once constructed, and evaluated the bids received in the auction.
- For an entrepreneurial client investigating the opportunities for an electric storage technology in the deregulated electric market, Dr. Murphy developed a model that optimizes facility operations with respect to a set of forecasted electric commodity price profiles. The model was used to evaluate the technology's potential profitability on several different electricity systems. Commodity price profiles for each system were projected by integrating historical real-time system marginal cost data with the projected cost of additional capacity.

Valuation for Energy Contract Disputes and Energy Asset Transactions

- In a bankruptcy hearing, Dr. Murphy testified regarding the fair market value of the post-petition energy services (electricity, chilled and hot water) provided under contract by a creditor, in order to determine the debtor's responsibility for these costs.
- Dr. Murphy assisted the Staff of the New Hampshire Public Utility Commission in understanding the customer cost savings associated with a proposed utility divestiture of generating assets, as assessed by the utility. Key issues were whether the utility's analysis had correctly represented the operational benefits of the assets to customers in reducing their energy costs, and whether the capacity value of the assets had been accurately captured.
- Dr. Murphy assisted an Asian energy company in deepening their understanding of U.S. electricity and natural gas markets, as part of their plan to acquire assets in the region. Brattle helped to characterize market rules, including recent and proposed changes, in several regional ISOs, and how these rules may affect the financial opportunities of generators located in these ISOs.
- In a major arbitration dispute, Dr. Murphy assisted a merchant generating company in determining the value lost when the government agency with whom it had contracted to develop a gas-fired power plant decided to terminate the contract before the plant was completed. A key contributor to the value lost was the potential riskiness of the contract revenues. The contract's unusual structure insulated the merchant generating company from many of the risks normally associated with electricity markets, transferring these risks to the government agency over the contract's twenty-year term. This transfer of risk had a major effect on the value of the contract and thus on the magnitude of the arbitration claim.
- Dr. Murphy calculated the damages that resulted from several partial derates of a nuclear plant. The plant's owner had a unit-contingent output contract with a regional utility, and during the derate events, the plant delivered less power than it would have if it had operated normally. The utility had to replace the missing power (or equivalently, in some hours lost

the opportunity to resell the power) at higher market prices, and also lost some of the capacity value of the plant in the regional capacity market.

- For an investor exploring the acquisition of several gas-fired generators in markets without retail deregulation, Dr. Murphy helped to analyze the potential profitability of the assets under a range of assumptions about future natural gas and CO_2 allowance prices. Building on simulation results developed by another consultant, Dr. Murphy and the Brattle team were able to investigate several factors specific to the individual assets in question but not captured by a broad market simulation model.
- Dr. Murphy advised a committee of bondholders of a foreign subsidiary of a U.S. merchant power company that was undergoing restructuring. He advised regarding the value of several power contracts and assets in which the subsidiary had an interest, including a potential damage claim for a terminated long-term contract.
- In a dispute related to a terminated long-term power contract for an electric generating facility, the original contract contained clauses that may be triggered in the event of a default, based on the value of available replacement opportunities. For a group of bondholders of the facility, Dr. Murphy prepared an affidavit regarding the market value of the available replacement opportunities, and how they related to the facility's debt and operating costs.
- For an independent power producer, Dr. Murphy supported expert testimony to value damages due to termination of a long-term electric generator tolling contract, requiring power market forecasting and finance valuation techniques. Key to this case was the increase in risk caused by the loss of the contract, in an environment (following the collapse of the power sector in 2001) in which it was not possible to obtain a long-term replacement contract.
- For a bondholder of a power marketing company, Dr. Murphy evaluated the likely outcome of an arbitration hearing regarding damages due as a result of the termination of a long-term generation contract.
- For an independent power producer forced into bankruptcy by the rejection of a long-term power contract by its counterparty, Dr. Murphy assessed the economic damages due to the loss of the contract.
- In the context of a dispute over damages in a terminated gas supply contract, Dr. Murphy analyzed and provided written testimony regarding the potential to resell contracted natural gas that could not be utilized by the purchaser.
- For a utility client attempting to acquire a partially completed generating station to be held as a utility affiliate, Dr. Murphy analyzed the acquisition and affiliate transaction to determine whether there would be any violation of market power regulations.

Climate Policy Analysis

- With a Brattle co-author, Dr. Murphy evaluated the contributions of nuclear plants to the U.S. economy, as well as their environmental effects in reducing carbon and other emissions. This study used a power sector simulation model in combination with a dynamic input-output model of the U.S. economy, and found that the primary economic effect was that nuclear plants hold down power prices, reducing what all consumers pay for electricity. This savings, because it is significant and widespread, gives a substantial boost to the economy overall.
- Similar to the study described above, Dr. Murphy and his co-author have performed more detailed evaluations at the level of several individual states where nuclear is an important generation source. They have examined specific nuclear plants that are facing financial challenges to determine how these plants affect electricity prices, economic activity, and emissions of CO_2 and other pollutants within their state.
- Dr. Murphy helped the senior executives of a major coal producer to assess the long-term implications of U.S. climate policy on the electricity generating infrastructure. He characterized the effects of different potential policy structures and stringency on CO_2 prices, the economics of existing and future electric generating technologies, and likely generation expansion and retirement decisions over several decades, in order to forecast power sector costs and CO_2 emissions under these policy approaches. The project also involved estimating the long-term effects on CO_2 emissions in the transportation and other sectors.
- In seeking regulatory approval for a generation expansion plan, an investor-owned utility engaged Dr. Murphy to help understand the interrelationship between potential climate policy, the cost of natural gas, and the cost of generation technologies. He helped the client to incorporate these interacting factors into the client's existing planning models.
- Dr. Murphy assisted the executives of a major U.S. electric company in developing a proposed policy structure to mitigate greenhouse gas emissions (carbon dioxide) that would be economically efficient, effective, and manageable for industries and the economy. The research evaluated the impact on the electric industry, addressing overall, regional, and company-level effects of alternative policies and stringency of legislation. It also addressed the effects on consumers and other industries.

Market Structure and Competitiveness

- Dr. Murphy leads the Brattle team as the Independent Auction Monitor for the Southern Companies' Energy Auction, which has been in operation since April 2009. The auction is governed by FERC tariff, which is designed to mitigate potential market power. The tariff requires Southern to administer auctions for standard day-ahead and hour-ahead energy products for delivery "Into SoCo," and to offer its available capacity at a cost-based rate into these auctions. The Brattle team has developed data structures, monitoring protocols and automated tools to track Southern Companies' load forecasting, purchases and sales, outage declarations, and unit capabilities and costs. On this basis, Brattle monitors Southern's offers

into each auction to ensure in compliance with the FERC cost-based tariff. Brattle also ensures that the auction functions and clears properly, and monitors the behavior of third party participants in the Auction. Monitoring is done on a daily basis, with reports annually on auction performance and tariff compliance to the FERC.

- Dr. Murphy participated in a market power analysis in the context of a major electric utility merger, focusing on the analysis of how transmission availability and constraints affect the potential for the exercise of market power. He coordinated the collection and interpretation of transmission data from numerous utilities. To correct for the inherent data weaknesses, he designed and oversaw a separate, integrated transmission modeling effort to determine the ability of the grid to support short-term power transactions.
- Dr. Murphy evaluated the potential anti-competitive effects of a merger between a major regional natural gas company and an electric utility in a region where electric generation is highly dependent on natural gas as a fuel. He examined the potential for the merged company to exercise vertical market power by manipulating the price of natural gas to influence the competitive price of electricity, and what effect that would have on the competitiveness of the electric market.
- In several other cases, Dr. Murphy analyzed whether proposed energy company mergers or acquisitions would create the potential for the exercise of horizontal and/or vertical market power, developing mitigation strategies where appropriate.
- In a proposed merger involving an East Coast electric utility, Dr. Murphy assisted senior management in evaluating the effects of retail access on the financial health of both the client company and the potential merger partner, taking into account projected operating costs, the timing of open access, market prices for power, customer loss, and stranded cost recovery.

Electricity Markets: Energy, Capacity, and Ancillary Services

- For a competitive energy supplier and generation owner, Dr. Murphy analyzed the role of demand-side resources, such as interruptible load, in an ISO-sponsored capacity market. He examined the extent to which demand-side resources could supply capacity needs, and the risk that frequent utilization of such resources might dissuade their participation in the market.
- Dr. Murphy assisted a U.S. electric ISO with understanding the implications of expanding ISO membership on the ancillary service requirements of both existing and proposed new ISO members.
- For a major hydroelectric generator, Dr. Murphy assessed the planning and decision system used to determine when and how to allocate energy (e.g., in spot or forward markets). Both value and risk implications are important, and both are affected by large uncertainties and correlations in forward and spot prices, weather, energy (water) availability, and non-electric restrictions, among other factors. Dr. Murphy developed a number of recommendations for improving the accuracy of the utility's forecasts and models, thus improving the decisions based on them.

- Dr. Murphy assisted a major Northwest hydroelectric generator in understanding the role of electric ancillary services, including voltage control and reserve generating capacity, in a restructured electric market. Issues included the interaction between the energy market and the ancillary services market, and the implications of embedded cost pricing as compared to competitive market-based pricing of ancillary services. This engagement involved coordinating work across the generation and transmission groups within the client organization to determine appropriate tariff rates for these ancillary services.
- In a series of projects for the Electric Power Research Institute (EPRI), Dr. Murphy examined the potential for hydroelectric generators to provide reserve generating capacity in a restructured electricity market. Dr. Murphy developed an economic framework for understanding how the markets for electric energy and reserve capacity interact, and whether hydro's technical advantages in providing reserve capacity are likely to make reserves a natural niche market for hydro. Dr. Murphy also evaluated the probable effect of industry restructuring on the value of hydroelectric power assets, taking account of their technical capabilities to store and release energy according to market conditions, and provide ancillary services.
- For a utility client, Dr. Murphy evaluated the effects of pricing structure on demand for electricity, load shape, and revenues. Changes in pricing structure can stimulate electric demand, increasing revenue without increasing the per unit electricity price. This may be a useful mechanism for mitigating a utility's stranded costs as the industry is restructured.

Procurement and Restructuring

- Dr. Murphy assisted the Staff of the New Hampshire Public Utility Commission in an analysis of customer savings that would result from the divestiture of a New Hampshire utility's remaining generation assets. Concerns and disagreements about an earlier analysis had led to disputes over whether to move ahead with the divestiture, including a split within the PUC Staff. Dr. Murphy's analysis and his testimony before the NHPUC helped to unite the parties in support of moving ahead with the divestiture.
- Dr. Murphy assisted an electric utility client with regulatory strategy regarding a state proposal to allow utilities to earn a "premium" on long-term power purchases, in order to account for the risks involved in committing to purchased power contracts.
- Dr. Murphy assisted a California utility in hearings before the California Public Utilities Commission regarding the establishment of a process for the California utilities to resume power procurement in the wake of the western power crisis of 2000-2001.
- In several engagements, Dr. Murphy assisted utility clients facing potential customer loss through municipalization. As part of these analyses, he determined the stranded costs (unrecovered investment) that municipalization would involve.
- Dr. Murphy assisted an electric utility client in planning for industry restructuring by characterizing alternative paths that restructuring could take, and developing potential strategies that respond to a competitive market and regulatory changes. He developed a

detailed spreadsheet-based system and financial model to evaluate the effects of various strategies and scenarios on the magnitude of stranded costs and the client's financial performance. This modeling effort required analysis and forecasting of the changes in the structure of the market for electricity, as well as probable regulatory changes and their implications. The model served as the basis for several follow-up studies addressing more specific decisions and issues, performed by the client and by The Brattle Group.

Other Engagements

- In eight different litigation cases involving 14 nuclear reactors at 11 plants, Dr. Murphy has evaluated the Department of Energy's (DOE) failure to honor its commitment to remove spent nuclear fuel from U.S. nuclear plants. He led the analytical effort in all of these cases, and provided expert witness testimony in one of them, to characterize how the government should and would have carried out its contractual obligation. Dr. Murphy simulated a nationwide market for the exchange of spent fuel removal rights, as was enabled by the contract, which made it possible to determine the timing of spent fuel removal from each individual plant in the non-breach world. The results of these analyses were used to support the damage claims of the client nuclear owners for ongoing spent fuel storage costs that would have been unnecessary if the DOE had performed its contract obligations.
- Dr. Murphy assisted in a review of the auction of an ownership share in a nuclear generating plant, in order to determine whether the sale was performed using commercially reasonable means to ensure mitigation of the regulated seller's stranded costs.

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COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company d/b/a Eversource Energy for approval by the Department of Public Utilities of a long-term contract for procurement of Clean Energy Generation, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12	)	**D.P.U. 18-64**
Petition of Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid for approval by the Department of Public Utilities of a long-term contract for procurement of Clean Energy Generation, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12	)	**D.P.U. 18-65**
Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil for approval by the Department of Public Utilities of a long-term contract for the procurement of Clean Energy Generation, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12	)	**D.P.U. 18-66**

REBUTTAL TESTIMONY
OF
DEAN M. MURPHY

Dated: **February 15, 2019**

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I. STATEMENT OF QUALIFICATIONS

Q. Please state your name, position, and business address.

A. My name is Dean M. Murphy. I am a Principal with The Brattle Group in the Boston office, located at One Beacon Street, Boston, Massachusetts 02108.

Q. Have you previously submitted direct testimony in this proceeding?

A. Yes. I submitted direct testimony in this proceeding on December 21, 2018, on behalf of the Massachusetts Attorney General's Office. In that testimony, I addressed (a) that the proposed Power Purchase Agreements ("PPAs") with H.Q. Energy Services (U.S.) Inc. ("HQ") do not provide incremental hydroelectric generation as defined in the RFP and (b) the concepts of additionality and offsetting greenhouse gas emissions. I provided recommendations on (c) potential changes to the proposed PPAs to ensure incrementality, (d) project selection, (e) evaluation team composition, (f) scaling of the quantitative net benefit and (g) the evaluation of the GWSA benefits.

Q. Please clarify how you will be referring to the various parties throughout your testimony.

A. The Massachusetts utilities, Eversource, Unitil, and National Grid, are counterparties to proposed PPAs with HQ, and proposed Transmission Service Agreements ("TSAs") with Central Maine Power Company ("CMP"). I collectively refer to the PPAs and the TSAs as "the Contracts."

Due to the number of organizations involved in this proceeding, I will use the following taxonomy with regard to Hydro-Québec. For all matters directly related to the bid, I will refer to Hydro Renewable Energy ("HRE"), a wholly owned subsidiary of Hydro-Québec which was the bidding party. For matters directly related to the PPAs, I will refer to H.Q. Energy Services (U.S.) Inc. ("HQ"), which is the Hydro-Québec counterparty to those

PPAs. When referring to documentation from Hydro-Québec and not from its subsidiaries (*e.g.*, HRE or HQ), I will refer to it directly as Hydro-Québec.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your rebuttal testimony?

A. My rebuttal testimony responds to several issues raised in the rebuttal testimony offered by Jeffery S. Waltman (Eversource), Nicolas H. Baldenko (Eversource), Timothy Brennan (National Grid), and Robert S. Furino (Unitil), collectively the "EDCs." I specifically respond to the their points on 1) the requirements of the proposed PPAs to provide hydro generation that is incremental, 2) the evaluation of MCPC 3 and GSPL II in Stage 3, and 3) the potential for future high value clean energy projects in future solicitations.

III. THE PPAS DO NOT ENSURE INCREMENTAL HYDRO GENERATION AS REQUESTED IN THE RFP AND OFFERED IN THE NECEC HYDRO BID

Q. Please summarize your response to the EDCs' rebuttal testimony regarding the PPAs' requirements for Incremental Hydroelectric Generation.

A. In my direct testimony, I showed that the proposed PPAs with HQ do not require the power delivered under the PPAs to be fully incremental to historical energy deliveries, as requested in the RFP.[1] The New England Clean Energy Connect ("NECEC") Hydro bid offered to provide 9.55 TWh of energy ("Contract Energy") that is incremental to historical deliveries, and the bid was evaluated and ultimately selected on this basis. The PPAs operationalize this incrementality requirement in Exhibit H first by defining "Baseline Hydroelectric Generation Imports," deliveries from HQ to New England that are outside the 83D PPA ("Baseline Hydro"). Exhibit H then establishes the "Minimum

[1] Exh. AG-DM, at 5-14.

Required Baseline Hydroelectric Generation Imports," ("Minimum Baseline") the required level of Baseline Hydro below which contract payments are penalized for under-delivery, to ensure that the Contract Energy will actually be incremental.[2] However, the Minimum Baseline values specified in Exhibit H to the PPAs fall far short of the historical average deliveries solicited in the RFP. In their rebuttal testimony, the EDCs have improperly re-interpreted the incrementality solicited the RFP, claiming that a very large share of historical imports are not appropriate for inclusion as Baseline Hydro. In effect, they imply that the appropriate Minimum Baseline might be near zero, pointing out that the PPAs offer stronger protections than this. The PPAs, particularly this Minimum Baseline requirement, should be amended to reflect historical average deliveries as solicited in the RFP, offered in the bid, and evaluated and selected.

Q. How does the RFP define Incremental Hydroelectric Generation?

A. The RFP states:

> "Incremental Hydroelectric Generation" means Firm Service Hydroelectric Generation that represents a net increase in MWh per year of hydroelectric generation from the bidder and/or affiliate as compared to the 3 year historical average and/or otherwise expected delivery of hydroelectric generation from the bidder and/or affiliate within or into the New England Control Area.[3]

The form PPA that accompanied the RFP adds specificity, identifying 2014-2016 as the 3 year historical period for the average.[4] Incremental Hydroelectric Generation or "Incremental Hydro" is apparently defined in this way to use historical average hydro deliveries as a proxy for what future energy deliveries from HQ would be in the absence of these PPAs. Thus, the incrementality requirement ensures that the Contract Energy

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[2] The three PPAs use slightly different terms to refer to this Baseline concept, and they set the Minimum Baseline energy at different levels, as discussed below. Eversource and Unitil PPAs do not use the term "Minimum Required Baseline Hydroelectric Generation Imports." Instead the PPAs require a minimum level of "Baseline Hydroelectric Generation," against which damages are measured. *See, e.g.*, Exh. JU-3-A, at 86.

[3] Exh. JU-2, at 5.

[4] Draft Power Purchase Agreement, at 7 (May 12, 2017).

will be additional hydro energy, relative to HQ deliveries to New England without the Contracts.

Q. What is the Minimum Baseline requirement in the proposed PPAs, and how does this relate to historical deliveries?

A. As I outlined in my direct testimony, Exhibit H of each of the PPAs establishes an annual Minimum Baseline that must be delivered to New England in addition to the Contract Energy. The Minimum Baseline quantity differs across the PPAs. The National Grid PPA sets it at 9.45 TWh, allowing several adjustments that can reduce (but not increase) this amount.[5] The Eversource and Unitil PPAs set the Minimum Baseline at 3.0 TWh, with adjustments only for Force Majeure events.[6] Both of these Minimum Baseline requirements are far below the level of historical deliveries into New England, which averaged 14.8 TWh in 2014 through 2016.[7]

Q. Do the EDCs acknowledge that the Appendix H requirements of the PPAs are less stringent than the definition of Incremental Hydroelectric Generation in the RFP?

A. No. The EDCs claim that the PPAs contain "an appropriate threshold for the delivery of additional quantities of hydroelectric power"[8] despite the obvious discrepancy between the 14.8 TWh historical average and the much lower Minimum Baseline values of the PPAs, either 3.0 or 9.45 TWh. In fact, the EDCs claim that the incrementality requirements of the proposed PPAs are actually <u>stronger</u> than those of the RFP:

> "In fact, the Baseline Hydroelectric Generation provisions in Exhibit H negotiated by each Distribution Company provide greater protections than the

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5 Exh. JU-3-B, at 92-95.

6 Exhs. JU-3-A, at 86-87; JU-3-C, at 84-86.

7 Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE), Appendix B to the RFP (Confidential), Section 4.2, at 19; Exh. NEER-1-8.

8 Exh. EDC-RB-1, at 21.

> terms included in the form PPA for firm hydroelectric power, which was issued as part of the RFP."[9]

Q. How do the EDCs explain the gap between the PPA requirements for Minimum Baseline and the 14.8 TWh of historical average generation?

A. The EDCs begin by identifying the difficulty with establishing the differences attributable to "otherwise expected delivery." In this context, to reconcile the Exhibit H requirements of the proposed PPAs with the language of the RFP and bid, the EDCs appear to put great weight on the "and/or otherwise expected" qualifying phrase in the definition of Incremental Hydroelectric Generation ("as compared to the 3 year historical average and/or otherwise expected delivery of hydroelectric generation" [emphasis added]).[10] They give this qualifier more weight than the primary descriptor, the "3 year historical average." In doing this, they redefine the concept of incrementality, by explicitly excluding most of the historical energy deliveries from HQ into New England:

> …current deliveries may be non-firm and result from spot market trading decisions or may be under existing contracts that may not be renewed or extended. Thus, there are current deliveries that may not be appropriate for inclusion in the 'baseline' to which future deliveries are compared.[11]

[redacted] By redefining the Minimum Baseline requirement to exclude non-firm historical deliveries, the EDCs effectively claim that the clean energy deliveries under the PPA should be allowed to substitute for [redacted] historical deliveries, rather than being incremental to total historical deliveries. This appears to explain how the EDCs arrived at the low Minimum Baseline requirements in the PPAs, and their claim that these requirements are more stringent than the RFP. But the definition of Incremental Hydroelectric Generation established in the

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9 Exh. EDC-RB-1, at 21.

10 Exh. JU-2, at 5.

11 Exh. EDC-RB-1, at 17.

12 Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE), Appendix B to the RFP (Confidential), Section 4.2, at 19.

RFP made no mention of excluding non-firm, spot, or any other types of transactions when determining the historical average deliveries that would set the baseline. [redacted].[13] The EDCs' revised interpretation of Incremental Hydro effectively says that the Contract Energy must be incremental to historical deliveries, though ignoring the vast majority of historical deliveries. This interpretation holds HQ to nothing beyond its existing contractual obligations to other parties, and makes the concept of Incremental Hydro essentially meaningless.

Q. If the EDCs' interpretation of the "and/or otherwise expected" phrase in the RFP language is not correct, how should it be interpreted?

A. The RFP does not specify how this phrase should be interpreted, but the plain language suggests that this 3-year historical average is at least a good starting point for what would be reasonably expected to occur absent the Contracts. Including the "and/or otherwise expected" phrase acknowledges that in at least some circumstances, the 3-year average might <u>not</u> be the expected amount. This can be understood as allowing for the fact that HQ may not be able to achieve that historical average in each and every year, due primarily to normal variability in hydrologic conditions. In a dry year where Hydro-Québec is unable to generate as much hydroelectric power, the reasonable expectation for HQ's deliveries into New England, absent the Contracts, might be less than 14.8 TWh. A high-water year might lead to a higher expectation. Over the three historical years used in the average, 2014-2016, HQ's deliveries to New England ranged from [redacted]

[13] [redacted]

[redacted];[14] they were 17.9 TWh in 2017.[15] But on average over time, HQ should be able to match the 14.8 TWh historical deliveries. The addition of the NECEC transmission project will facilitate an increase in the amount of power that can be delivered to New England, enabling 9.55 TWh of Contract Energy in addition to the (average) 14.8 TWh of Baseline Hydro. There would have been no point in the RFP specifying the use of historical average deliveries in defining Incremental Hydro, particularly specifying which 3 years to use for the average, if this amount was not intended to guide expectations. The EDCs' interpretation that the vast majority of historical deliveries should be excluded from the Minimum Baseline, strips all meaning from the requirement that existing hydro bids should provide incremental deliveries.

Q. Have the EDCs provided any evidence that future deliveries of electricity from HQ to New England, absent the Contracts, would be expected to be lower than the three-year historical average?

A. To my knowledge, the EDCs have not expressed any particular view of how the "otherwise expected" deliveries might differ from the historical average. Their rebuttal testimony, in describing the rationale for the 9.45 TWh Minimum Baseline value used in the National Grid PPA, did claim that it would be difficult to determine the "otherwise expected" deliveries, and named some factors that might affect future deliveries, including the addition of offshore wind in Massachusetts (which might reduce demand for non-firm and short-term HQ resources), or significant changes in market conditions and/or energy policies in HQ's neighboring control areas (which could work in either direction).[16] Ultimately, "National Grid determined that it was reasonable to move forward

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14 [redacted]

15 Hydro-Québec's 2017 annual report states that exports to New England were 52% of the 34.4 TWh of exports. Hydro-Québec Annual Report 2017, at 11.

16 Exh. EDC-RB-1, at 23-25.

based on HQUS's agreement to the 9.45 TWh Minimum Required Baseline Hydroelectric Generation Imports."[17] It is not surprising that HQ would agree to this value, of course, and even less surprising that it would agree to the 3.0 TWh Eversource and Unitil value. However, from the perspective of Massachusetts ratepayers, HQ's willingness to agree to these values would not seem to be a good justification for dramatically relaxing, and potentially eliminating, the requirement that contract deliveries be incremental to historical deliveries.

Q. What explanation did the EDCs provide for the Eversource and Unitil Minimum Baseline values being lower than National Grid's?

A. The EDCs appear to provide multiple interpretations. According to the IE's report, National Grid was interested in negotiating a minimum baseline clause while neither Unitil nor Eversource thought it was necessary.[18] The IE also indicated that the Unitil and Eversource provisions were negotiated to be [redacted][19] Eversource and Unitil state that the cover damages were priorities over other issues, including incrementality.[20] Later, they asserted that the addition of Appendix H and the requirement for a baseline of 3.0 TWh was negotiated as a further requirement for delivery without making the administration of such a provision "problematic".[21]

Q. In the quantitative evaluation of the NECEC Hydro project, did the Evaluation Team model imports from Québec at the Minimum Baseline levels specified in the proposed PPAs?

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17 Exh. EDC-RB-1, at 25.

18 Independent Evaluator Final 83D Report Redacted, at 51 (July 24, 2018).

19 [redacted] Revised Independent Evaluator Final 83D Report Confidential, at 53 (August 7, 2018).

20 Exh. DPU 1-23.

21 Exh. NEER-1-9, at 1.

A. No. The quantitative evaluation of the NECEC Hydro project is consistent with fully Incremental Hydro. In its modeling, TCR assumed that the interchanges with Québec would reflect 2012 levels, noting that 2012 was reflective of 2014-2016, the years specified in the form PPA for incrementality.[22] There are two other paths through which Hydro-Québec can deliver electricity into the New England ISO – through New Brunswick and through New York. TCR modeled import levels from New Brunswick to New England at 2016 levels and deliveries from New York to Massachusetts were dispatched on an hourly economic basis in the analysis.[23]

Q. Would the benefits attributable to the NECEC Hydro project in the evaluation be affected if the project had been evaluated using the Minimum Baseline deliveries reflected in the PPAs, rather than assuming it would be fully incremental as it was actually evaluated?

A. No, almost certainly not. The quantitative indirect benefits associated with GHG abatement were assessed by comparing a model run including the NECEC Hydro project with a "Base Case" run without the NECEC Hydro project.[24] If the power flows from Québec into New England were reduced in the analysis to mirror the Minimum Baseline requirements of the proposed PPAs, alternative generation would be needed to serve Massachusetts, altering the project's GHG effects and the impact on the Massachusetts GHG inventory. The extent of the changes would depend on the resource mix that replaced the reduction in HQ deliveries. Accurately quantifying the impact to the benefits would require a new Enelytix run performed by TCR; to my knowledge, such a sensitivity case has not been analyzed.

Q. Can you estimate the potential GHG impact of lower deliveries from HQ?

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22 Exh. JU-6, at 142.

23 *Id*.

24 The base case was common across all projects evaluated.

A. I can at least establish some reference points for the potential GHG impact. The Global Warming Solutions Act ("GWSA") compliance benefits reflect the GHG reductions attributable to the project, and are likely to decrease with lower overall deliveries from Québec.[25] The low Minimum Baseline values in the PPAs reflect considerably less clean energy from HQ than the fully incremental deliveries evaluated; 11.8 TWh less with the Eversource and Unitil Minimum Baseline, or 5.35 TWh less with the National Grid value.[26] Lower deliveries would need to be made up with alternative generation, at least some of which would almost certainly be fossil, leading to greater overall Massachusetts GHG emissions.

In Figure 1, I provide an indicative estimate of the impact using three alternative assumptions about the generation that might replace the historical HQ generation not required by the proposed PPAs. I consider replacements consisting of zero-emission energy, energy equivalent to average Massachusetts imports, or a natural gas combined cycle unit. I estimate the amount of energy replaced at the National Grid Minimum Baseline (rows [2] – [4]), and again at the Eversource/Unitil Minimum Baseline (rows [5] – [7]). Of course, rows [2] and [5] show that replacement by zero-emissions generation substitutes one clean energy source for another, with no emissions impact.[27] If the lower HQ deliveries are replaced by increasing imports to Massachusetts from regions other than Québec, the replacement generation would have relatively low emissions reflecting the generation sources in those regions. At the higher National Grid

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[25] The GWSA metric as employed in this solicitation also includes a component related to the number of RECs or CECs used for CES compliance, and I do not agree that this component should be included in the GWSA metric, as discussed in my direct testimony. Exh. AG-DM, at 27. For the purposes of this discussion, I have assumed that there is no adjustment to the number of CECs provided by the NECEC Hydro project for CES compliance.

[26] As discussed previously, this 5.35 TWh is lower bound on the decrease in clean energy deliveries that would be assured. National Grid's 9.45 TWh Minimum Baseline may be further reduced by several factors.

[27] The emissions factor used for Québec in the inventory model used by TCR is approximately [redacted] MMT CO_2e/MWh. For the purposes of illustration, I have assumed that a hypothetical Zero-Emitting generator would have this same *de minimis* emissions rate.

Minimum Baseline, the 2 million tons per year CO_2e abatement of a fully incremental NECEC Hydro project would drop to 0.8 million tons per year, just 41% of its former value. The Eversource/Unitil Minimum Baseline is so low that it would allow HQ to actually decrease clean energy deliveries relative to the historical average, wiping out the project's GHG offsets entirely.

Figure 1: Indicative Changes in GHGs Attributable to Massachusetts

[redacted]

Sources and Notes: Baseline Hydro imports into New England from Exhs. JU-3-A through C. Massachusetts average imports emissions rate is calculated as the weighted average emission rate for modeled imports excluding those from Québec (based on Att. B2 - NECEC Hydro Stage 3.xlsx, HSCI). Average emissions rate for a gas combined cycle is taken from *Environment Baseline, Volume 1: Greenhouse Gas Emissions from the U.S. Power Sector* (US Department of Energy, June 2016). Reductions in flows are assumed to occur on the direct interfaces between Hydro-Québec and New England, with flows through other regions being unaffected.

If instead of relatively low-emitting imports, the lower HQ deliveries were replaced by an efficient natural gas combined cycle plant (probably a better estimate of the actual marginal replacement in the region), all of the GHG emissions reductions of a fully incremental project could be cancelled out under either the National Grid or the Eversource/Unitil Minimum Baseline values. This is not to say that the project would necessarily cause an increase in emissions, since deliveries from HQ are unlikely to actually be <u>lower</u> with the NECEC Hydro project than without (though replacement with all gas could cause emissions to rise even if HQ deliveries increase overall. But this does illustrate the fact that if the PPA Minimum Baseline values do not <u>require</u> HQ's contract deliveries to be fully incremental, the GHG benefit attributed to the project and anticipated by ratepayers can be put in serious jeopardy.

Q. At what point during the solicitation process did the discrepancy arise between the RFP's definition of Incremental Hydroelectric Generation and the proposed PPAs?

A. It apparently arose at the last stage of the process, in the drafting of the PPAs. The definition of Incremental Hydroelectric Generation was stated in the body of the RFP, and again in the form PPA issued with the RFP, where it was given greater specificity by identifying 2014 to 2016 as the specific historical years to be used.[28] In its bid, HRE proposed to meet this definition, reflected particularly in the fact that [redacted].[29] The Evaluation Team evaluated the proposal assuming that the energy provided would be fully incremental; they ultimately selected the NECEC Hydro project as the winning bid on this basis. Up through this point, there was no apparent dispute or question about what the RFP had requested or what the NECEC Hydro bid had offered, and thus full incrementality with respect to historical generation was an integral component of the bid, similar to the bid price. In fact, if the bid had proposed to provide only the weaker version of incrementality now reflected in the proposed PPAs, the Evaluation Team should have considered disqualifying it altogether for failing to offer Incremental Hydro.

It was only in the final stage of the process, in drafting the PPAs, that the Incremental requirement was loosened. This late change, after bid selection, to lower the Minimum Baseline requirement fundamentally alters the terms of the agreement in a way that unfairly disadvantages the EDCs and their customers, who would pay for the fully incremental deliveries solicited but might receive substantially less. It might also be unfair to competing bidders, who structured their bids on the reasonable presumption that any competing hydro bids would be required to provide fully incremental generation.

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[28] Exh. JU-2, at 5; Draft Power Purchase Agreement at 7 (May 12, 2017).

[29] [redacted]

Q. Is HQ able to provide energy that is fully incremental with respect to historical average deliveries?

A. The EDCs, in their rebuttal testimony, go to some length to argue that HQ is able to provide incremental generation to New England, and that the Contracts will provide it.[30] They refer to several statements in the HRE's bid that indicate that power flows from HQ into New England are currently limited by the transfer capability of the direct interties between the control areas.[31] By relieving this limitation, the new NECEC transmission link will enable the delivery of "a vast amount of clean energy generation capacity" into New England as Incremental Hydroelectric Generation.[32] The EDCs also cite a brief two-page letter from Hydro-Québec that was supplied in the Maine Public Utility Commission ("MPUC") Docket No. 2017-00232.[33] This letter claims that existing transmission limitations caused Hydro-Québec to spill water equivalent to 4.5 TWh in 2017, and 10.4 TWh in 2018 (through December 14), implying that the 2018 level of spillage could persist in the future. The letter also cites an independent meteorological study that indicates that in the 2050 horizon, average water flows in northern Québec are expected to increase on the order of 12%, which could lead to additional spilling (though 2050 is outside the PPA term).[34] The implication is that if additional transmission capability was available, this spilled water could instead be used to generate and export power to New England. The EDCs also note that Hydro-Québec recently added a new generation project in 2017 and will add another in 2020,[35] further increasing the amount of energy that can be generated, if there is the transmission capability to export it.

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30 EDC-RB-1, at 15-16, 18-20.

31 EDC-RB-1, at 18-20 and Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE) Confidential, at 3, 19-20.

32 EDC-RB-1, at 18-19, referring to HRE bid excerpts, Exhs. EDC-RB-3 and EDC-RB-4.

33 EDC-RB-5.

34 EDC-RB-5.

35 EDC-RB-1, at 20.

Q. Does this mean that HQ would be able to provide fully Incremental Hydro as solicited by the RFP?

A. The statements by HQ and the EDCs do not make this entirely clear. Both the EDCs and the bidders have been vague, failing to offer clarity about what level of incremental hydro they are referring to, or what actual amounts of energy could be produced and delivered. They offer apparent reassurance that HQ would be able to provide sufficient generation to New England, without being specific about what that means. While stating that added transmission capability will increase the amount of power that is deliverable to New England, they offer no analysis or even an unambiguous statement regarding whether the total amount of energy delivered would or could equal the full 9.55 TWh of the Contract Energy, in addition to the 14.8 TWh of the relevant historical average. So ultimately, it is not entirely clear whether the EDCs and/or the bidders are claiming that HQ will be able to deliver fully incremental hydro, as solicited and as offered. In this respect, it would be helpful if HQ would make a clear statement about how much energy it can provide. Clearly, though, the proposed PPAs do not <u>require</u> HQ to deliver fully Incremental Hydro, with respect to historical average deliveries.

Q. Do HQ's actual historical exports to New England offer any insight?

A. HRE disclosed in its bid its historical deliveries to New England for years 2014-2016, averaging 14.8 TWh per year;[36] and the Hydro-Québec 2017 Annual Report cites 17.9 TWh of deliveries into New England in that year.[37] I do not have the details of Hydro-Québec's calculations, but the New England ISO publishes information on historical

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[36] Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE) Confidential, Section 4.2, at 19; Exh. NEER-1-8. HRE reported its total deliveries from Québec to New England through the Phase II, Highgate and Derby interties or by wheeling through the New Brunswick and NYISO control areas in 2014, 2015, and 2016.

[37] Hydro-Québec 2017 Annual Report, at 11 (calculated as New England's 52% share of 34.4 TWh total sales outside Québec). The EDCs stated in rebuttal testimony that 2017 deliveries were 18.2 TWh, though the exhibit they cite references Hydro-Québec's export <u>capabilities</u>, not actual exports. Exh. EDC-RB-1, at 20, *citing* Exh. EDC-RB-5.

flows across the direct interface between Hydro-Québec and New England (the Phase II and Highgate interties), which provides additional perspective. Figure 2 below shows the ISO-NE data on flows on the direct interface (blue line) for the past 10 years, and overlays the available information from Hydro-Québec (bars). Comparing these data sources for the 4 years where they overlap, the average annual flow across the direct interface (ISO-NE data) in these years was about 13.26 TWh, which is about 2.29 TWh below the average 15.55 TWh of reported sales into New England. This difference is not surprising; HRE notes that Hydro-Québec sales into New England include power flows [redacted].[38]

Figure 2: Historical Deliveries from Québec into New England

[redacted]

Sources and Notes: Imports shown in the blue line are the sum of imports over the Highgate and Phase II interties, as reported by ISO-NE in Net Energy and Peak Load datasets. Derby intertie is not included in imports reported by ISO-NE.

The red horizontal line represents the three year average imports for 2014-2016 as reported by HRE in Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE) Confidential, Section 4.2, at 19; and Exh. NEER-1-8. The light blue bars represent HQ delivery of energy into New England as reported by HRE in their bid and in rebuttal testimony (Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE) Confidential,

[38] Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE) Confidential, Section 4.2, at 19.

Section 4.2, at 19 and Exh. EDC-RB-1, at 20) for 2014-2016. The 2017 deliveries are reported in Hydro Québec's 2017 Annual Report. The gray dashed lines are the Minimum Baseline values from the proposed PPAs.

Q. Is there other information that is relevant to the question of whether HQ would be able to provide fully incremental generation?

A. Yes. Hydro-Québec has been adding significant amounts of generation during this timeframe. After the 2014-2016 historical period that should determine the Minimum Baseline, and before the anticipated 2023 start of delivery on the PPA, HQ is adding two more generating stations as part of its Romaine complex. The 395 MW Romaine 3 station came online in 2017, and the 245 MW Romaine 4 station is anticipated in 2021.[39] These two units account for 41% of total Romaine capacity; if they provide a similar share of its 8 TWh energy, it will give HQ an additional 3.3 TWh of annual energy, on top of what it has been spilling, with which to provide Contract Energy that is fully incremental to the historical deliveries of 2014-2016.

Q. What do you conclude about whether HQ would be able to provide fully incremental generation, defined by the historical average?

A. This information on what HQ has been able to generate and deliver to New England in the past, and the increases in generating capacity it will have going forward, taken together with its reassuring (if imprecise) statements about its ability to deliver incremental power to New England if transmission capability is added, suggest that it should be able to achieve a Minimum Baseline requirement of 14.8 TWh. (Though time averaging or some other mechanism would likely be advisable to accommodate variable hydrologic conditions.) HQ's deliveries to New England have been at or above 14.8 TWh for the last several years, it has been spilling water, and the Romaine 3 and 4 additions will increase its capabilities further, so recent years are likely a better reflection of future capabilities. Hydro-Québec has implied, at least, that it can provide incremental

[39] *See* https://www.hydroquebec.com/projects/romaine.html.

hydro to New England. So there is no evidence to suggest that HQ would be unable to provide fully Incremental Hydro.

Q. If HQ were to confirm unambiguously that it will be able to provide fully incremental hydro as solicited by the RFP, would that resolve your concerns in this regard?

A. No, not by itself. Whether HQ is able to deliver incremental energy is important, of course, but is not the only relevant question. Equally important is whether the proposed PPAs require HQ to deliver fully incremental energy. Although the EDCs claim that HQ has made a commitment to deliver incremental energy,[40] the proposed PPAs as currently written do not require incrementality.

Q. What would be the impact if the PPAs do not require HQ to deliver the full historical average energy as Baseline Hydro?

A. If the PPAs do not require HQ to deliver the full historical average as Baseline Hydro, then it becomes HQ's option whether to provide the product that was solicited in the RFP and offered in the bid. HQ could, at its discretion, substitute Contract Energy for historical energy deliveries to New England, rather than providing Contract Energy that is incremental on top of the historical average. That is, it could shuffle existing resources from historical Baseline Hydro deliveries to the new contract sales into New England. Because it would not be required to sell the full historical average generation into New England as Baseline Hydro, it would then be able to sell a portion of this energy into other markets, perhaps earning a clean-energy premium on that alternative sale. Under the current PPAs, HQ would nonetheless be paid the full PPA price on the entire 9.55 TWh of Contract Energy.

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[40] *See, e.g.*, Exh. EDC-RB-1, at 25-26 describing HQ's "commitments under Section 4.2 of its bid to deliver incremental hydroelectric generation." Section 4.2 states that HRE could provide incremental energy.

Q. Would the need for the NECEC transmission project be affected if HQ does not provide fully incremental energy?

A. The NECEC transmission link might not be necessary to deliver the amount of power required by the PPAs, since they do not require fully incremental hydro deliveries. The Eversource and Unitil PPAs require total deliveries to New England of only 12.55 TWh (9.55 TWh of Contract Energy, plus 3.0 TWh Minimum Baseline). The National Grid PPA requires total deliveries of 19.0 TWh (9.55 plus 9.45). Even the higher 19.0 TWh requirement of the National Grid PPA could be delivered by the existing transmission system with little or no expansion. Hydro-Québec has stated that its 2017 export capability to New England was 18.2 TWh,[41] and it actually delivered 17.9 TWh in 2017.[42]

This calls into question why Massachusetts customers should pay for the NECEC transmission project if it is not actually needed for the deliveries that are required under the proposed PPAs. This conundrum cannot be what was intended by the RFP, or by HRE in its bid. Further, Section 83D specifically states that its goal is to facilitate the financing of clean energy generation resources.[43] The bid itself and bidder statements since make clear the need for additional transmission, which would need to be financed (HRE confirmed that financing is necessary only for the transmission component of the bid), to deliver the Contract Energy.[44] But if the NECEC transmission is in fact not necessary because of the PPAs' weak requirements, there might be nothing to finance, undermining the 83D goal. The only logical interpretation is that the Contract Energy

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41 Exh. EDC-RB-5.

42 Hydro-Québec's 2017 annual report states that exports to New England were 52% of the 34.4 TWh of exports in 2017. Hydro-Québec Annual Report 2017, at 11.

43 Section 83D(a) states that, "In order to facilitate the financing of clean energy generation resources…every distribution company shall jointly and competitively solicit proposals for clean energy generation and, provided that reasonable proposals have been received, shall enter into cost-effective long-term contracts for clean energy generation…"

44 Section 83D Request for Proposal Application Form, NECEC RFP Response (HRE), Appendix B to the RFP (Confidential), Section 1, at 2-3, Section 4.2, at 19-20 and Section 5.1.1, at 26; Exh. EDC-RB-5.

should be incremental to full historical deliveries, and the PPAs should require 14.8 TWh of Baseline Hydro.

Q. Under the proposed PPAs, would Massachusetts ratepayers pay for the NECEC transmission line if the energy delivered is not incremental?

A. The Minimum Baseline damages calculation of the proposed PPAs would impose no penalty until HQ's Baseline Hydro deliveries fall below 9.45 TWh, which is 5.35 TWh below the 14.8 TWh 2014-2016 historical average deliveries. That is, ratepayers would pay for the full NECEC transmission project, even if only 44% of the Contract Energy is incremental hydro.[45] Below 9.45 TWh, damages are paid on the National Grid PPA; Eversource/Unitil damages are not incurred until Baseline Hydro falls below 3.0 TWh. In fact, if HQ provided zero Baseline Hydro, delivering far less total energy than the historical average (even including the Contract Energy), Massachusetts ratepayers would still pay 41% of the total TSA payments.[46]

Q. How would you remedy this flaw in the PPAs?

A. In principle, this is relatively straightforward, as I outlined in my direct testimony.[47] For a hydro bid, maintaining Baseline Hydro deliveries at the level of historical imports, as a proxy for imports that would have occurred absent the PPA, is a key component of this procurement. The terms of the PPAs should be adjusted to provide what the RFP solicited, what the NECEC Hydro bid offered, and the way the bid was evaluated and selected. They should require the delivery of fully incremental clean hydro generation

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[45] At the National Grid Minimum Baseline of 9.45 TWh, total deliveries are 19.0 TWh, only 4.2 TWh above the historical average. This is 44% of the 9.55 TWh Contract Energy.

[46] Ratepayers would actually continue to pay for the NECEC via full TSA payments regardless of the Baseline Hydro delivered. Damage payments in the context of Exhibit H Minimum Baseline shortfalls reduce the payments to HQ under the PPA, even though they are expressed as a share of the TSA payment; I refer to them here in the same way.

[47] Exh. AG-DM, at 17-19.

— *i.e.*, require 9.55 TWh of Contract Energy, in addition to 14.8 TWh of Minimum Baseline Hydroelectric Generation.

As I had noted in my direct testimony, it may be necessary to allow some adjustments to the Minimum Baseline calculation, for instance to allow for year-to-year variability in hydro conditions.[48] It might be possible to index to hydrologic conditions or total exports from Hydro-Québec, or use multi-year or rolling average requirements to smooth year-to-year variations in available energy. Five-year averaging for the Minimum Baseline requirement is already a component of the proposed National Grid PPA,[49] and time-averaging is commonly used to accommodate performance variability in PPAs, so this should not present a significant challenge.

Q. How could the proposed PPAs be modified to avoid the situation wherein ratepayers pay for unnecessary transmission capacity?

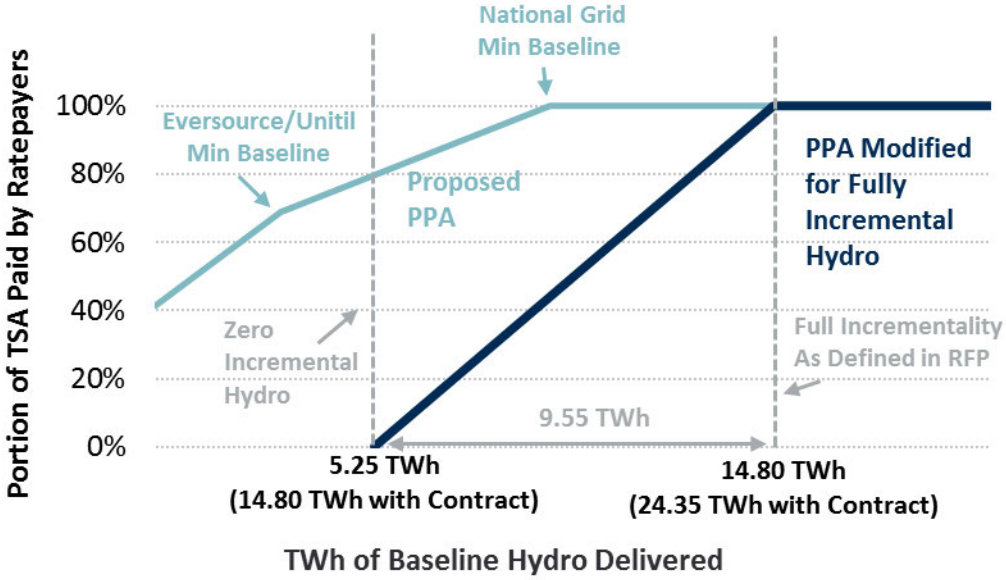
A. One reasonable approach would be to calibrate the damages calculations in Exhibit H to reflect the amount of transmission needed to deliver Incremental Hydro, as illustrated in Figure 3. Under this construct, the Minimum Baseline would be set to full incrementality, 14.8 TWh per year. Damages would be zero if HQ delivered fully Incremental Hydro — 14.8 TWh of Baseline Hydro in addition to 9.55 TWh of Contract Energy, totaling 24.35 TWh. At 5.25 TWh of Baseline Hydro, total energy delivered (including Contract Energy) would be 14.8 TWh, meaning that contract energy would just be substituting for historical average energy, and none of the energy delivered would be incremental. This 14.8 TWh could easily be accommodated with existing transmission facilities; this much and more has been delivered in recent years. Thus damages would equal 100% of the TSA payment, and ratepayers would not be required to pay for the unused NECEC transmission capacity. In essence, damages would reflect

[48] Exh. AG-DM, at 17.

[49] Exh. JU-3-B, at 92-95.

the cost of transmission capacity constructed but not needed, due to a shortfall below the Minimum Baseline.

Figure 3: Exhibit H Damages Calculation
Proposed PPAs vs PPAs Modified for Fully Incremental Hydro



Sources and Notes: Minimum Baseline values and Proposed PPA damages from Exhibits JU-3-A through C, Exhibit H. PPA Damages with Fully Incremental Hydro is equal to the TSA payment multiplied by the shortfall in Baseline Hydro, divided by the Contract Energy amount, where the shortfall in Baseline Hydro is 14.8 TWh minus Baseline Hydro delivered, and Contract Energy is 9.55 TWh.

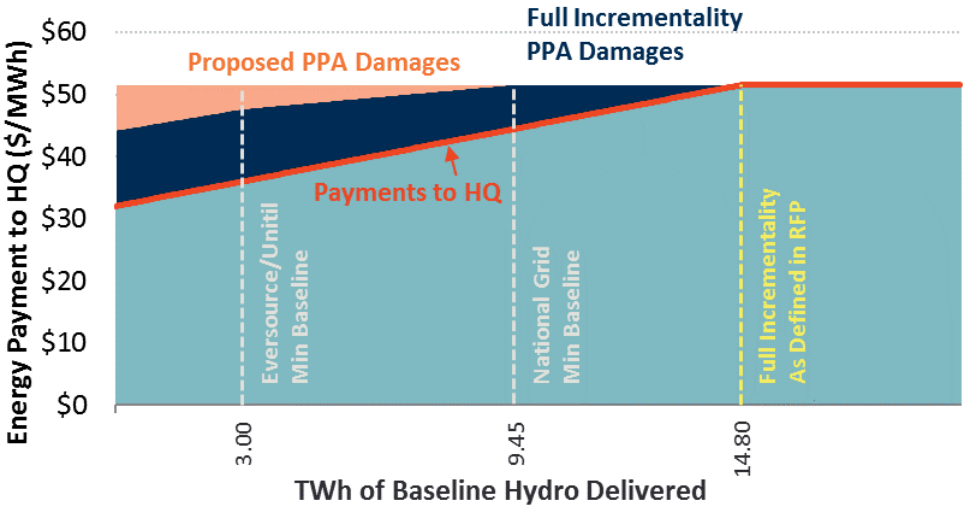
Q. Under the approach discussed above, should additional damages be assessed beyond the full TSA amount if HQ Baseline Hydro deliveries fall below 5.25 TWh?

A. Most likely, yes. The damages calculation should incentivize HQ to provide more Baseline Hydro at every level up to full incrementality of 14.8 TWh. Whether the damages function should continue at the same rate below 5.25 TWh of Baseline Hydro, or at a different rate, may warrant further consideration.

Q. If the Minimum Baseline amount was increased to 14.8 TWh, and if adjustments to that were limited, would this threaten financial harm to HQ?

A. Of course, relaxing the requirements of any contract can make it more lucrative, as the low Minimum Baseline values in the proposed PPAs are likely to do. So, relative to the current proposed PPAs, establishing the Minimum Baseline at 14.8 TWh might make the PPAs somewhat less lucrative for HQ. This could occur to the extent the lax incrementality requirements give HQ opportunities to redirect energy from New England to other markets if it is more profitable to do so. But the contract payments are intended to compensate the Seller for not just the Contract Energy, but also for the fact that this energy is incremental to the full historical Baseline Hydro. This was clear in the RFP and in HRE's bid. The contract revenue will help to offset the financial impact on HQ, if any, of strengthening incrementality requirements to reflect historical average deliveries. Figure 4 below shows how the suggested Exhibit H adjustments above would affect HQ's overall PPA revenues, as a function of its Baseline Hydro deliveries (assuming full delivery of Contract Energy). The orange area at the top left represents the damages for under-delivery of Baseline Hydro as the PPAs are currently drafted. The dark blue area represents the damages for under-delivery if the PPA was revised to require full incrementality, calibrating the amount of damages to the share of the NECEC transmission capability needed to deliver the Baseline Hydro. That is, with 14.8 TWh of Baseline Hydro, which is fully incremental, there is no penalty. At 5.25 TWh, total deliveries including Contract Energy would equal historical deliveries; Contract Energy is just substituting for historical deliveries. Since all the energy could be delivered over the existing transmission system, the penalty would be equivalent to the entire TSA payment.

Figure 4: Impact of Baseline Hydro Shortfall on PPA Payments to HQ
Proposed PPAs vs PPAs Modified for Fully Incremental Hydro



Sources and Notes: Minimum Baseline numbers and Proposed PPA damages from Exhibits JU-3-A through C, Exhibit H. The full energy price for HQ is the year one PPA price from Exhibits JU-3-A through C, Exhibit D. PPA Damages with Fully Incremental Hydro are equal to the TSA payment multiplied by a shortfall in Baseline Hydro divided by the Contract Energy amount, where this shortfall is 14.8 TWh minus Baseline Hydro delivered, and the Contract Energy is 9.55 TWh. Figure assumes penalty continues at the same rate below 5.25 TWh of Baseline Hydro.

Q. Did the Independent Evaluator ("IE") raise questions of fairness with regard to requiring full incrementality?

A. Yes. The IE stated the opinion that "The form PPA did not contain any specific provision requiring…any amount of energy other than that being committed to under the proposed contract."[50] This could be argued, given that the form PPA explicitly defined Incremental Hydro as the 2014-2016 average deliveries, though it did also qualify this with "and/or otherwise expected deliveries."[51] The IE appears to be taking the same position as the EDCs in their rebuttal testimony, relying more on the qualifying "otherwise expected" phrase than the primary description of how Incremental Hydro should be interpreted. But

[50] Independent Evaluator Final 83D Report Redacted, at 51 (July 24, 2018).

[51] Draft Power Purchase Agreement, at 7 (May 12, 2017).

in any case, the IE claimed that requiring fully incremental Baseline Hydro would have been a major liability and "raised a fairness question."[52] This fairness question is different from the one I pose above; it focuses on fairness to HQ rather than on fairness to the ratepayers ultimately responsible for the cost of the Contracts, and perhaps to other bidders. The IE did, however, recognize that the issue of providing full incrementality had been raised previously, and concluded that it would be "acceptable" to negotiate a contractual commitment for incrementality.[53]

Q. Would other potential adjustments be necessary to the Minimum Baseline value, for instance like those included in the proposed National Grid PPA?

A. Some adjustments would be warranted, particularly time averaging like the mechanism already included in the National Grid PPA, or some alternate mechanism to accommodate variability in hydrologic conditions. Some further adjustment may be necessary for longer-term shortfall in total exports, as is also included in the current National Grid PPA. On the other hand, a downward adjustment of the Minimum Baseline for low power prices, which is also currently included in the National Grid PPA, may not be necessary, since the Baseline was determined under a range of conditions that also included low prices.

Importantly, potential adjustments to the Minimum Baseline requirement should be bi-directional, to accommodate adjustments that may make the appropriate Minimum Baseline either higher or lower than the historical average, as conditions warrant. For instance, for wet years that have above average total Hydro-Québec generation (or periods of consecutive wet years, if averaging across time), the Minimum Baseline should likely be set above the historical average. Adjustments to the Minimum Baseline should protect the EDCs and their customers as well as HQ.

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52 Independent Evaluator Final 83D Report Redacted, at 51 (July 24, 2018).

53 *Id.*, at 52.

IV. HIGHEST SCORING STAGE 2 BIDS SHOULD HAVE BEEN EVALUATED AS STANDALONE PORTFOLIO

Q. Please summarize your response to the EDCs' rebuttal testimony regarding the evaluation of the [redacted] and [redacted] bids.

A. In my direct testimony, I observed that the two highest scoring "large" projects from Stage 2 were not carried into Stage 3 as a standalone portfolio (*i.e.*, without other projects) and that such a standalone portfolio would satisfy about [redacted] of the energy targeted by the procurement.[54] In their rebuttal testimony, the EDCs asserted that a standalone portfolio of the two top bids would not fulfill the energy target for the procurement as required by the Stage 3 Evaluation Protocol, and that a future solicitation would be unlikely to procure a high-value project to fill the difference between such a portfolio and the procurement target.[55]

Q. Does the Stage 3 Protocol include a threshold requirement for the size of portfolios?

A. No. While the protocol describes the "overall goal" of the solicitation to contract for 9.45 TWh of energy, there is no stated threshold for portfolio size, and there is no requirement that all of the Contract Energy under 83D must be procured in this solicitation (as opposed to subsequent 83D solicitations). With respect to portfolio composition, the protocol states:

> The Evaluation Team will develop various combinations of top-ranked project proposals for evaluation as portfolios to determine their portfolio effect with respect to:
>
> a) The overall impact of various portfolios of proposals on the Commonwealth's policy goals, including GWSA goals as directed by DOER
>
> b) The overall cost effectiveness of various portfolios of proposals, including those portfolios that the Evaluation Consultant identifies as optimized in the Evaluation model

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54 Exh. AG-DM, at 19-20.

55 Exh. EDC-RB-1, at 68-69.

Nowhere in this statement does the protocol provide a minimum portfolio size for evaluation in Stage 3. Furthermore, in the section of the protocol that outlines the selection process, the Evaluation Team outlines six factors for consideration. None of these factors explicitly includes a minimum annual generation quantity.

Q. Did the Evaluation Team analyze any portfolios in Stage 3 that had annual generation of less than 9.45 TWh?

A. Yes. Of the 12 portfolios that the Evaluation Team selected for analysis in Stage 3, [redacted] would have supplied less than the 9.45 TWh target.[56] The smallest Stage 3 portfolio evaluated would have supplied [redacted] target. By comparison, a portfolio consisting solely of [redacted] and [redacted] would have supplied [redacted] of this target. The EDCs now appear to imply that there is a size threshold somewhere between [redacted] and [redacted], though the Stage 3 Protocol contains no such strict threshold. In any case, a strict size threshold is not necessary if it is possible to acquire additional generation in a subsequent solicitation as is the case here. Particularly since these two bids scored so well individually, and together would have satisfied [redacted] of the overall targeted energy, a portfolio consisting of just these two should have been considered and evaluated. The results of that evaluation could have informed the tradeoff between the better performance of this portfolio versus its somewhat smaller size and the potential need for a subsequent solicitation.

Q. Do you agree with the EDCs' assertion that future procurements are unlikely to produce high scoring proposals that could "fill-in" the difference between the 9.45 TWh 83D goal and the energy supplied by the [redacted] and [redacted] bids?

A. No. In attempting to dismiss the possibility that a future procurement might produce additional attractive projects, the EDCs state that "There is no evidence to suggest that

[56] Revised Independent Evaluator Final 83D Report Confidential, at 70 (August 7, 2018).

an additional solicitation for the remaining 1.95 TWh would result in materially different result."[57] First, the absence of evidence is not evidence of absence. More importantly, it is unlikely that the potential renewable resources in and around New England have been exhausted by the proposals offered into this 83D solicitation. It is certainly possible, and perhaps likely, that future solicitations would attract additional high quality proposals. For example, the most recent 83C solicitation produced a winning bid whose direct price was within $6/MWh of the NECEC Hydro bid, and was below all but [redacted] of the "small" 83D proposals.[58] In addition, there were also 16 projects disqualified in this solicitation for not meeting interconnection/delivery or site eligibility requirements; several of these would have produced more than [redacted] GWh/year. These might continue development and meet requirements for a future solicitation.[59] There may also be additional potential projects that did not bid into this solicitation for any number of reasons. Indeed, TCR estimated that an additional [redacted] of renewable energy per year will need to be acquired between 2019 and 2040 to meet the existing Renewable Portfolio Standard ("RPS") targets of the New England states,[60] and this will increase further with the recent increase in the Massachusetts RPS requirement.[61] So it is unlikely that this one solicitation has revealed all of the attractive bids that might potentially be available in the region.

Q. Does this conclude your testimony?

A. Yes.

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57 Exh. EDC-RB-1 at 69.

58 The Vineyard Wind 800 MW GLL bid offered a direct price of $64.97/MWh while the NECEC Hydro Bid offered a direct price of $59.05/MWh. Independent Evaluator Final 83C Report Redacted, at 56 (August 3, 2018), Independent Evaluator Final 83D Report Redacted, at 70 (July 24, 2018).

59 Revised Independent Evaluator Final 83D Report Confidential, at 67 (August 7, 2018). One additional project was disqualified due to being an existing facility.

60 [redacted] TWh refers to the RPS increase between the 2019 RPS requirement ([redacted] TWh) and the 2040 RPS requirement ([redacted] TWh).

61 *An Act to Advance Clean Energy*, Bill H.4857 Section 12 at lines 59-63. (July 30, 2018).

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company and Western Massachusetts Electric Company, each d/b/a Eversource Energy, for approval of long-term contracts for renewable energy, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.	)	D.P.U. 18-64
Petition of Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid for approval of long-term contracts for renewable energy, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.	)	D.P.U. 18-65
Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil, Massachusetts Electric Company for approval of long-term contracts for renewable energy, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.	)	D.P.U. 18-66

JOINT SURREBUTTAL TESTIMONY OF
CHRISTOPHER RUSSO,
ROBERT STODDARD
AND
STEPHEN WHITLEY

EXHIBIT NEER-RSW-S-1

February 15, 2019

JOINT SURREBUTTAL TESTIMONY OF CHRISTOPHER RUSSO, ROBERT STODDARD AND STEPHEN WHITLEY

Q. Are you the same Christopher Russo, Robert Stoddard, and Stephen Whitley who submitted Direct Testimony in this proceeding?

A. Yes, we provided Direct Testimony in this docket on December 21, 2018.

Q. On whose behalf are you testifying in this case?

A. This testimony is offered on the behalf of NextEra Energy Resources, LLC ("NextEra" or "NEER").

Q. What is the purpose of your Surrebuttal Testimony?

A. The purpose of our joint Surrebuttal Testimony is to address the February 1, 2019 Rebuttal Testimony submitted by Mssrs. Waltman, Baldenko, Brennan, and Furino related to the New England Clean Energy Connect ("NECEC") project and its satisfaction of the Section 83 D eligibility and Massachusetts Global Warming Solutions Act ("GWSA").

Q. Please summarize your joint Surrebuttal Testimony.

A. This surrebuttal testimony is organized into the following sections:

1. The NECEC as it relates to the GWSA and greenhouse gas emissions ("GHG");
2. Incremental Hydro definitions per the Power Purchase Agreements ("PPAs") and H.Q. Energy Services (U.S.) Inc.'s ("HQUS") ability to deliver incremental energy;
3. Massachusetts Department of Environmental Protection ("MADEP") review and the PPA as they relate to the goals of 83D and the GWSA;

4. The PPA as a put option/winter price spikes;
5. The inability of NECEC to contribute to the reliability of the Commonwealth; and
6. The 83 D selection process.

Q. What exhibits are you sponsoring?

A. We are offering:

RSW-S-1: Décision, Régie de l'Énergie de Québec, D-2018-084 R-4045-2018 (13 July 2018) with English translation.

1. GWSA AND GHG IMPACTS

Q. The Joint Rebuttal Testimony of Waltman et. al. at 8, lines 19-20 describes your testimony as resting upon a "general assertion that carbon is a global pollutant and that GHG emissions must be measured at a global level." Do you agree with this characterization of your testimony?

A. No. The scientific evidence is clear that (a) carbon emissions into the atmosphere is the chief source of global warming and (b) the impact of such emissions is on global-level climatic systems.[1] In this regard, CO_2 is far different than, say, NO_x, SO_2 or particulate matter emitted by generators, where the effect is principally localized. Consequently, the Electric Distribution Companies' ("EDCs") selection of NECEC is not reducing the Commonwealth's contribution to adverse climate effects, as NECEC involves merely

[1] See, e.g. Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report* available at https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

"tagging" existing and ongoing zero-emission power generation, and not the contracting for new and incremental clean energy.

Q. Does the 83 D legislation recognize this aspect of carbon emissions?

A. Yes, but only indirectly. The EDCs' Joint Testimony at 8:19-9:12 narrowly interprets the 83 D legislation's goals as only pertaining to the Commonwealth, which does not square with the reality of the impact of CO_2 regionally and globally. Thus, the EDCs' narrow reading ignores basic scientific facts about carbon and interregional effects and the clear intent of the legislation, which is to use the purchasing power of the Commonwealth's utilities to be a leader in *solving* global warming—which requires lowering global emissions of CO_2. Spending billions of ratepayers' dollars to merely relabel existing power flows as somehow incremental because it is, in part, new to New England does not further the Commonwealth's CO_2 reduction goals.

Q. Under the EDCs' logic, could regional or global CO_2 emissions increase and the EDCs' meet the requirements of the GWSA?

A. Yes. Given the structure of the 83 D legislation and how relabeling of existing resources could qualify, under the EDCs' reasoning, overall carbon emissions could change not one bit, and the letter of the law still be satisfied. Extending the EDCs' reasoning even further, ratepayers could incur a large cost for zero benefit, and the goals of the procurement would be satisfied. This is particularly concerning, given that there were many clean energy projects that were passed over in favor of NECEC that would clearly been new and incremental, thus directly contributing to CO_2 emissions reductions.

Q. The Joint Rebuttal Testimony of Waltman et. al. at 6:3-5 describes your analysis framework as "self-serving." Do you agree with their characterization?

A. No. Our framework recognizes basic scientific facts and the alternatives available under the 83 D procurement. We do not dispute the validity of the 83 D legislation, but it is our opinion that rather than actually "moving the needle" on global warming solutions, the EDCs' NECEC selection simply reinforces the status quo.

Q. The Rebuttal Testimony of Waltman et. al. at 9:3-6 claims that:

> **The GWSA is a Massachusetts law, not regional and the Distribution Companies, both in evaluating the bids received in response to the RFP and in entering into the PPAs, are bound by the requirements of the GWSA and the Department's regulations regarding the Section 83D solicitation.**

Do you agree with this testimony?

A. While it is true that the EDCs are bound by the laws of the Commonwealth and the regulations of the Department, mere "check the box" compliance with narrow interpretations of Massachusetts laws and regulations does not match the reality of how CO_2 emissions impact Earth does not satisfy the intent of the GWSA. While the GWSA is a Massachusetts law, pertaining to Massachusetts GHG emissions, it is false to claim that the evaluation of the 83 D solicitation was bound by the policy in a way that would consider *only* Massachusetts in the analyses. The idea that the Request for Proposals ("RFP") was so narrowly focused on meeting the criteria of the GWSA, while the extent of global greenhouse emissions impacts were overlooked, seems unreasonable and illogical.

Q. The Joint Rebuttal Testimony of Waltman et al. at 7-8 indicates that the terms of the GWSA were applied, because NECEC did not receive credit for the 2020-specifc GWSA emission goals in the evaluation. Does this adequately relieve the concerns regarding the Project's benefits as evaluated by the EDCs?

A. It does not. The mere fact that the qualitative score for NECEC was reduced to reflect its late in-service date does not fully address the concerns we raised in our rebuttal testimony. In particular, the EDCs have not provided an analysis showing that NECEC will result in the operation of NECEC supporting a reduction of CO_2 emissions in the Commonwealth. We do know, however, that customers are being asked to pay billions of dollars to HQUS and Central Maine Power Company ("CMP") for what appears to be little to no GHG reduction.

Q. How could the Department alleviate this issue?

A. To address the issue of timeliness, the EDCs could have selected projects that are fully permitted and have a credible in-service date in 2020. Also, to address the issue of impact to the Commonwealth, the EDCs could have selected clean energy projects with injection sites in the Commonwealth or project in close proximity to the Commonwealth that were truly incremental.

Q. Would such projects replace or lead to the retirement of existing fossil generators in the Commonwealth?

A. We have not analyzed this specific question, but it seems likely. Renewable generation typically offers into the energy market at price of zero (or lower, reflecting Production Tax Credits). Adding truly incremental, zero-priced generation into the dispatch stack for southern New England would tend to lower energy and capacity prices, thereby reducing the profitability of incumbent generators. Over 2 gigawatts of generation were

submitted as retirement bids into the most recent Forward Capacity Auction[2] Such additional negative price pressure impacting generator revenues could lead to permanent retirement of fossil-fired generation in the region.

Q. Would a direct injection transmission project and/or more local projects provide other benefits to Massachusetts?

A. Yes. Economic and employment benefits would be greater for a transmission line or generation project located in Massachusetts. In-state projects would directly create jobs, both during construction and for maintenance over the lifetime of the projectsThese new jobs would indirectly add other jobs through a multiplier effect. Moreover, in-state projects would enhance property value, which, together with additional jobs, would increase the tax base of the Commonwealth.

Q. Did the EDCs' quantitative evaluation consider these tangible economic benefits?

A. No.

2. INCREMENTAL HYDRO AND DELIVERY

Q. Do the EDCs dispute your assertion that the NECEC project will not result in incremental flows equal to its full capacity?

A. No, our contention that NECEC will not result in 9.55 terawatt-hours ("TWh") of incremental renewable energy to New England is uncontested. In the Joint Rebuttal

[2] ISO New England, "New England's Forward Capacity Auction Closes with Adequate Power System Resources for 2022-2023" press release, issued Feb. 6, 2019. Available at https://www.iso-ne.com/static-assets/documents/2019/02/20190206_pr_fca13_initial_results.pdf

Testimony of Waltman et al. 26–27, the EDCs offer an alternative calculation that indicates NECEC would result in an incremental 5.6 TWh per annum of flow relative to historical deliveries; we estimated that it would be 3.9 TWh per year. Both of these figures are significantly below the contracted 9.55 TWh per year. Thus, the Commonwealth will not receive the full benefit of NECEC's capacity or the energy purchased under the PPAs.

Q. Do you agree with the assertions in the Joint Rebuttal Testimony Waltman et al. at 27 that historical deliveries are not the correct benchmark, but rather HQUS deliveries should be compared to a lower amount that might be "otherwise expected"?

A. No, the PPAs' Exhibit H requirements for "Minimum Required Baseline Hydroelectric Generation Imports" grant HQUS substantial latitude to reduce historical flows, allowing a relabeling of customary sales from HQUS to New England as contract sales. As the Joint Rebuttal Testimony Waltman et. al. state at 27, the 5-year average imports from HQUS to New England are 13.4 TWh. Yet the National Grid PPA *caps* the required baseline at 9.45 TWh, with generous allowances for HQUS to reduce that baseline for many reasons. The Unitil and Eversource Exhibit Hs provide no such allowances, but set the baseline at merely 3 TWh, fully 10.4 TWh lower than historical imports. Thus, these two PPAs would not require *any* additional imports from HQUS to meet the terms of the PPA.

Q. The Joint Rebuttal Testimony Waltman et al. at 27:10-15 notes that the bulk of these historical imports have been "made on a non-firm basis and are dependent on market conditions and transmission service." Is the EDCs' position sufficient rationale to slash the baseline requirement?

A. No. The analysis included in the Joint Rebuttal Testimony of Waltman et al. at 35 claims that the market prices in ISO New England have been the most attractive export market for HQUS in the substantial majority of hours. By the EDCs' logic, HQUS would chooseto continue to sell power into New England going forward, absent a substantial and unforeseen shift in market fundamentals or transmission topology. Considering these factors together, the EDCs have simply conceded to HQUS an unjustified reduction in the required baseline of nearly 4 TWh (for National Grid) or 10 TWh (for Unitil and Eversource).

Q. Do the EDCs make claims regarding NECEC meeting the RFP definition of "Incremental Hydroelectric Generation"?

A. Yes. At Joint Rebuttal Testimony of Waltman et al. at 18, the EDCs claim that the NECEC bid effectively indicated HQUS's ability to deliver Incremental Hydroelectric Generation, noting their "vast amount of existing hydroelectric resources." There is no explanation of how this "vast amount" translates into actual benefits to the Commonwealth, or where the PPAs provide sufficient safeguards. For example, the PPAs do not grant EDCs any audit rights over books and records of HQUS and its affiliates to assure that all deliveries in fact were sourced from hydroelectric facilities.

Q. The Joint Rebuttal Testimony of Waltman et al. at 35-36 asserts that the degree to which HQUS would choose to export, or not, could be judged by the price spread between markets. Do you agree?

A. The EDCs' assertion reflects a fundamental misunderstanding of how HQUS and hydro systems operate. The price spread *between hours* is as important as the price spread *between markets.* Attempting to analyze how HQUS would choose to allocate its power across markets by looking at price spreads in the same hours is an invalid approach. HQUS, like other hydro operators, has the unique ability to store energy. A rational

market operator in HQUS' position would look at not only the price spreads between markets, but also projections of future prices in other markets. In other words, the choice is not simply which market to export to, but also whether to export at all. If the price spread between markets today is small, but a particular market is known to have a high price tomorrow, HQUS may choose to simply reduce or curtail exports today for a more favorable price later.

This distinction is particularly important in understanding the option value to HQUS created by the PPAs. The generally higher prices in New England have provided HQUS the most profitable market *on average* for its sales. But savvy energy traders also take opportunities to shift both the timing and location of sales. The fact that the PPAs include only cover damages remedy when the supposedly firm deliveries are interrupted simply makes the decision of whether to deliver contract power a matter of economics and profit maximization for HQUS, without regard to the reliability or cost to the EDCs.

Q. Does the EDCs' analysis in their rebuttal testimony inform in any way the question of how HQUS would choose to operate?

A. No. The EDCs' analysis specifically looked only at prices *in the same hour*, which, as we described above, is a flawed and inadequate approach.

Q. How would HQUS deliver energy above the PPA flows into New England to take advantage of this time arbitrage?

A. To take advantage of the price arbitrage, HQUS needs two things: a way to store power and a way to transmit and deliver it in higher-priced hours. HQUS' generation affiliate, Hydro Quebec Production, has the ability to store power, given the substantial reservoir capacity on its affiliate's system. Regarding transmission, it might at first appear that HQUS has no options. After all, when prices are higher in Maine than New York,

HQUS will have the economic incentive to flow the entire 1,090 MW on NECEC. Even in these hours, though, HQUS will be able to sell additional energy into New England both on historical transmission routes (Highgate, Phase II and wheeling through New Brunswick and New York) as well as the incremental 110 MW of NECEC that HQUS will control on a merchant basis. These additional transmission pathways allow the arbitrage across time that we discussed above. Therefore, the EDCs' selection of NECEC and agreement to delivery flexibility in the PPAs willenable HQUS to increase its opportunities to arbitrage.

Q. Joint Rebuttal Testimony of Waltman et al. notes at 34 that diverting more than 20% of firm deliveries could trigger a breach of contract. Does this fact change your conclusion about the optionality inherent in the contract?

A. No, not materially. The greatest value of arbitrage opportunities are when prices are high and volatile. In the northeastern markets, such opportunities are clustered during extreme weather events, typically mid-winter and high summer. Just having the flexibility to short deliveries by 1.9 TWh annually, as the PPAs do, provides HQUS a substantial opportunity to profit from these limited arbitrage windows.

Q. The Joint Rebuttal Testimony of Waltman et al. at 20 contends that because HQUS has spilled water equivalent to 4.5 TWh in 2017 and 10.4 TWh in 2018, there is evidence that HQUS will deliver incremental hydroelectric generation. Does this spillage provide assurance that HQUS will in fact deliver incremental hydroelectric generation?

A. It does not. As we describe below, there have been incidents during the past several weeks when HQUS reduced its flows to New England, which is inconsistent with the claims of excess "spillage." As we explained in our direct testimony at 19, lines 16-21, "hydroelectric generators spill, or bypass, dams for many reasons, which may result

from flood control, environmental concerns, seasonal effects or internal transmission constraints. Even if it is true that Hydro Quebec spills water from time to time, it is not necessarily evidence that there is incremental capacity to generate power on its system, nor that this incremental capacity is sufficient to deliver an incremental 9.55 TWh/year on NECEC."

Q. Do the energy regulators of Hydro Quebec view its spillage capacity in the same way as set forth by the EDCs?

A. No. In June of 2018, Hydro Quebec applied for a fixed price and service conditions in for cryptographic usage, resulting in approximately 2.2 TWh increase in load. In response, the Régie de l'énergie (Quebec energy regulator) recognized that Hydro Quebec had insufficient generation resources to accommodate this demand. Régie de l'énergie also found that the 10.4 TWh of excesses estimated in 2020 by Hydro Quebec are expected to decline gradually, and warned that the proposed cryptocurrency usage could tip the excess energy balance of 2020 into a deficit. (See Exhibit RSW-S-1).

Q. Do you agree with the energy regulator?

A. Yes. We concur that spillage is not a necessary measure of excess capacity, especially given time-of-year. For example, spillage in the spring or particularly wet months does not result in available excess capacity in the winter to be sold to Massachusetts via NECEC – or cryptographic usage, for that matter.

Q. Should the EDCs' speculation about HQUS' future behavior be the basis for assumptions about the effectiveness of this contract?

A. Good question. In fact, Joint Rebuttal Testimony of Waltman et al. at 9:13-10:1 attempts to address this question, but they fail to recognize the implications of their own conclusions:

> …it would be inappropriate for the [EDCs] to have attempted to account for future potential actions by HQUS in these, or any other, states. Any such attempt would have been rife with so many assumptions and caveats regarding the actions of not only HQUS, but also the actions and/or reactions of other generators, traders, policymakers, control areas operators and their stakeholders, so as to render the end result essentially meaningless.

The fact that the EDCs are referring to other markets undercuts their own argument even further. In asserting that HQUS would always choose to export to New England, they are specifically analyzing exports to New York to justify their conclusions about New England exports. Even though the EDCs acknowledge that they cannot predict the behavior of HQUS, they base their belief that HQUS will continue to deliver power over NECEC on predictions of how HQUS, generators, and other traders will distribute their exports to different markets.

Q. Is there evidence in the EDCs' testimony of this fundamental inconsistency of what future deliveries from HQUS would be, absent these PPAs?

A. Yes. The Joint Rebuttal Testimony of Waltman et al. at 27 speculates that it would be "in HQUS's best interest to maintain the level of imports", and further speculates about HQUS' "ability to earn a rate of return."

Q. The Joint Rebuttal Testimony of Waltman et al. at 29:12 claims the PPAs are delivering "firm" power. Do you agree?

A. No. Simply labeling something "firm" doesn't make it so. The PPA is not consistent with commonly accepted definitions of firm power. The simple fact is that the PPAs do not *require* HQUS to deliver power in all hours, but the EDCs *believe* that it will because of economic incentives created by modest costs of Cover Damages. Predicating multi-decade PPAs on the EDCs' speculation about HQUS' internal business decisions is unduly risky.

Q. How should the PPAs have strengthened the provisions for firm power to assure delivery?

A. There are several ways that the PPAs could have been structured to provide greater assurance of firm delivery. Consistent with ISO New England's standards for capacity imports, the PPAs could have required curtailment priority *pro rata* with native load in Québec.[3] The PPAs could also have required HQUS to make all reasonable efforts to schedule firm deliveries through ISO New England (without exception for low generation at the HQ Power Resources) and provided an actual penalty with some "teeth" in the Cover Damages, rather than merely making HQUS pay limited, enumerated costs of the EDCs created by delivery shortfalls. The PPA also could have ensured that the actual delivery of power to New England was truly incremental (rather than creating an implausibly low baseline as we discussed above), so that Commonwealth ratepayers realize the full benefits of the project by ensuring that a full 9.55 TWh is delivered to New England.

3. MADEP AND PPA REVIEW OF SYSTEM SALES

Q. Did the EDCs address your prior concerns that the electricity coming from HQUS isnot guaranteed to be 100% hydro-generated electricity?

A. They did in part. The Joint Rebuttal Testimony of Waltman et al., at 12, lines 20-21, states "the PPAs contain strict provisions requiring satisfaction of unit-specific accounting of Environmental Attributes."

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[3] The Hydro Quebec Transmission Service Agreement nominally provides such parity but also has loopholes that allow for curtailing exports before native load.

Q. Do you believe that these provisions adequately ensure that the sales over NECEC will be 100% hydroelectricity, as opposed to a system sale?

A. They do not. When the MADEP materials and the NEPOOL GIS are considered, it is clear that the EDCs have not sufficiently proven that all electricity sold over the Project will be generated with the HQUS hydroelectric dams, as intended in the original proposal. The MADEP "requirements to provide . . . unit-specific accounting of Environmental Attributes" for MADEP's accounting purposes do not necessitate that this will be purely hydroelectricity coming over NECEC.

Q. Do the PPAs explicitly acknowledge that not all of the energy will come from zero-emission resources?

A. Yes. The defined term "Hydro-Québec Power Resources" means "those existing hydroelectric generating stations … that produce electric energy, which consists *predominantly of low-carbon* and renewable hydro-electric energy…."[4] According to Hydro Quebec's own documents, they generated 305 GWh from thermal power stations in 2017.[5] Consequently the "system sales" approach in the PPAs are insufficient to assure delivery of Clean Energy Standard-compliant energy.

Q. The EDCs discuss how the PPAs will be consistent with the "inventory methodology used by the Massachusetts Department of Environmental Protection". (Joint Rebuttal Testimony at Waltman et al. at 6). Accepting for the

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[4] Exhibit JU-3-B, emphasis added.
[5] Hydro Québec, "Power generation, purchases and exports" filed as Attachment EDC-NEER 1-2-1.2

sake of argument that this is the appropriate standard, how would you measure "incremental hydroelectric generation" under this methodology?

A. The MADEP's inventory methodology counts compliance in two stages. First, it counts contracted resources. Second, it assigns to each EDC a pro rata value of uncontracted resources in the pool. For example, MADEP counts output from the Seabrook generating facility as contributing to compliance even though there is no contract between Seabrook and any Massachusetts EDC for its output. In the same way, spot sales by HQUS into New England are already treated in the inventory as contributing towards environmental compliance, pro rata to Massachusetts' load-ratio share. Thus, the historical imports of power from HQUS are already being counted towards GWSA compliance. The likely reduction in these imports, as we discuss below, and the consequent reduction in the MADEP inventory should be taken into account when calculating the incremental clean energy procured under these PPAs.

Q. Accepting hypothetically the EDCs' own calculations that these PPAs only require 5.6 TWh of incremental deliveries (Joint Rebuttal Testimony of Waltman et. al at 27:5), please explain how much additional clean energy would be counted towards Massachusetts' compliance with the GWSA under this MADEP inventory approach.

A. The historical average deliveries of 13.4 TWh are non-firm, aside from 225 MW of long-term sales to Vermont utilities, which would account for about 1.9 TWh. The remaining 11.5 TWh of non-firm sales are counted by MADEP as uncontracted, system power. Therefore, Massachusetts' load-share ratio, about 5.7 TWh, is already counted as meeting the GWSA goals.

Under the proposed PPAs, all 9.55 TWh of contract power would be counted towards GWSA compliance. But using the EDCs' own math, 4 TWh or more of this power is not

incremental and will result in reduced baseline imports. Thus the MADEP inventory of compliant energy would be reduced by about 2 TWh. Therefore, the net addition of clean energy from these PPAs is about 7.5 TWh, not the 9.55 TWh claimed – even accepting that 100% of HQUS's deliveries are in fact from clean sources.

4. PPA AS A PUT OPTION AND WINTER DELIVERY

Q. The Joint Rebuttal Testimony of Waltman et al. at 30-31 contends that the PPAs are not a put option for HQUS. Do you agree?

A. No. A put option is a contract that gives the buyer the right to sell shares of an underlying security at a predetermined price for a preset time period. The seller is obligated to buy the underlying security if the buyer exercises the option to sell on or before the option expiration.[6] A common contractual structure in energy markets is a "take or pay" contract; this agreement is the inverse, in that it is a "sell or pay" contract.

Q. And are the EDCs' PPAs examples of put options?

A. Yes, they are. The unequivocal and undisputed fact is that the PPAs allow, and, in fact, specifically contemplate that HQUS may choose to not deliver to New England for up to several months out of the year and instead cover its position financially.

Q. How so?

A. HQUS can choose to deliver power, or pay the cover damages, which is the power price in New England plus the transmission service charges and the cost of environmental

[6] https://www.nasdaq.com/investing/options-guide/option-types-puts-calls.aspx

attributes. This fact is undisputed and is specifically contemplated in the PPAs. It is thus hard to understand how a common-sense interpretation of the contract would define this as a breach or default. The contract specifically defines failure to deliver in up to 20% of hours of the year as a default, but does not similarly classify HQUS' choice to cover its position through cover damages as a default.

Q. The Joint Rebuttal Testimony of Waltman et. al. at 28:11-12 contends that the PPAs "contribute to reducing winter price spikes." Do you agree?

A. No. The PPAs offered by HQUS and the EDCs do not guarantee that NECEC will contribute to reducing winter price spikes.

Q. Is there any evidence to support your assertion that HQUS might choose to forgo delivery under certain conditions, and, thus not contribute to reducing winter price spikes?

A. Yes. As we will demonstrate, during recent scarcity and "polar vortex" conditions, HQUS appears to have curtailed its exports to New England, just at the point that New England needs the energy to reduce winter price spikes.

Q. Has HQUS reliably provided ISO-NE with energy during winter peaks in the past?

A. No. In the figures below, one can see direct correlations between the price spikes at the ISO-NE Internal Hub and HQUS's exports over the existing Phase II and Highgate interties during the winter months. During these winter price spikes, HQUS often reduced its exports over the Phase II. Furthermore, in some cases HQUS even reduced its exports over Highgate, a line with what we understand to be a firm contract. Like Highgate, NECEC is also a "firm" contract.

Q. The Joint Rebuttal Testimony of Waltman et al. 34:16-23, states:

> **Per the terms of the PPAs, in the event of a Curable Delivery Shortfall, the Shortfall Cure Amount of Qualified Shortfall Energy may only be delivered during the corresponding period of the Shortfall Cure Period during the off peak/on peak, i.e., if the shortfall occurs in the Winter Period as defined in the PPAs, then the delivery of the shortfall cure energy must take place in the corresponding Winter Period of the Shortfall Cure Period (Exhs. JU-3-A; JU-3-B and JU-3-C, § 4.3(c)(vi)). Section 4.3(c) allows for HQUS to cure shortfalls with physical energy flows instead of paying a penalty under the PPAs. Massachusetts customers benefit from these additional measures designed to support the PPAs' firm delivery attributes."**

Do you believe these terms ensure winter delivery?

A. No. For example, HQUS could choose to cure its shortfall on an unseasonably warm 60 degree day instead of a 5 degree day within the same week and satisfy the contract, without actually ever helping with winter price spikes.

Q. Are there instances in which HQ significantly reduced exports to ISO-NE, when NE needed it most?

A. Yes. During the polar vortex of January 2014, HQUS reduced exports over both Phase II and Highgate. Described by ISO-NE as a cold snap from December 31, 2013 through January 8, 2014,[7] the polar vortex brought forced outages, fuel supply issues, and generation shortfalls. During this time, Hydro Quebec dramatically reduced its exports

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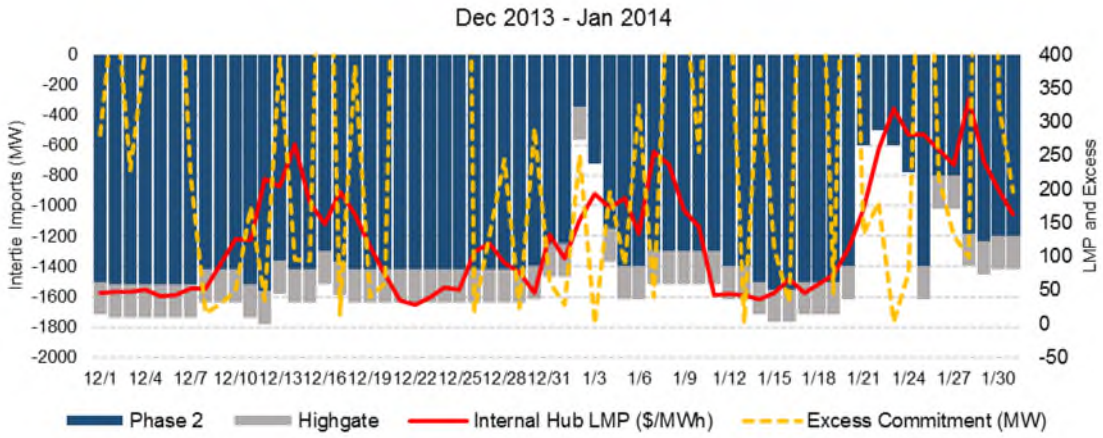
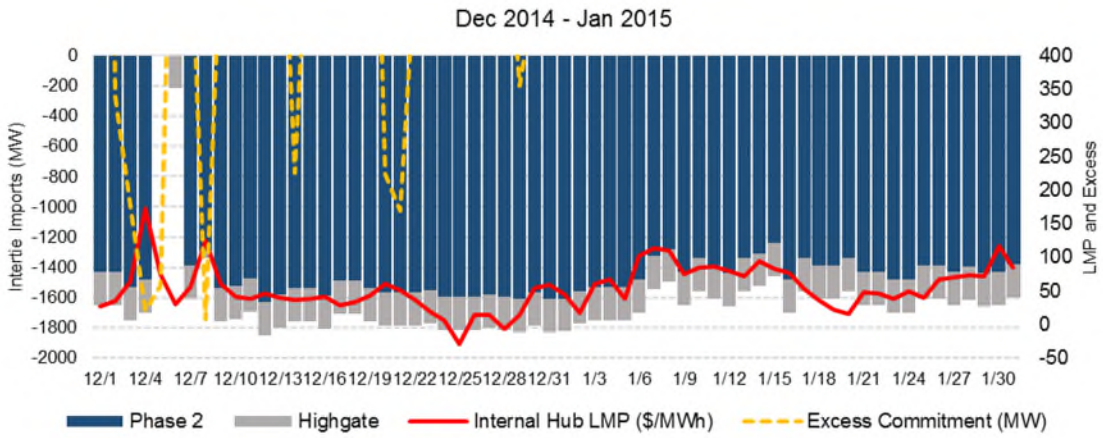
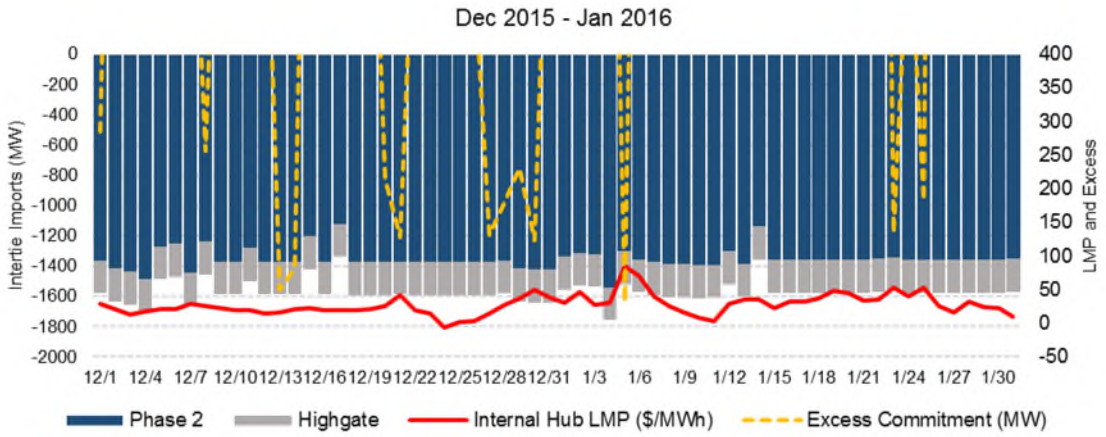
[7] https://www.iso-ne.com/static-assets/documents/pubs/spcl_rpts/2014/iso_ne_response_ferc_data_request_january_2014.pdf; p16

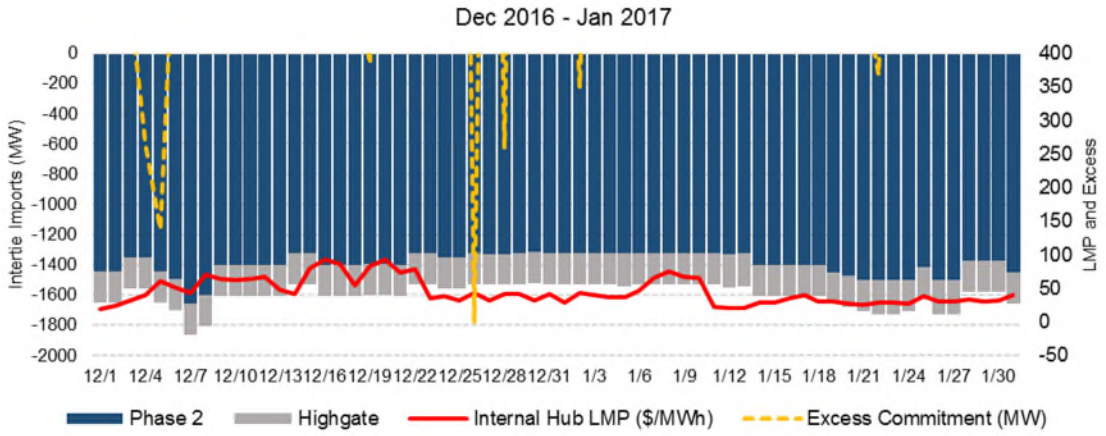
over Phase II, and did so again later in January. This is seen in Figure RSW-1, which depicts the ISO-NE from Hydro Quebec over Phase II and Highgate for the months of December and January of the five years, as well as the ISO Internal Hub LMP. They also reduced their flows over Highgate during these periods. Both flows are closely correlated with the ISO-NE LMP.

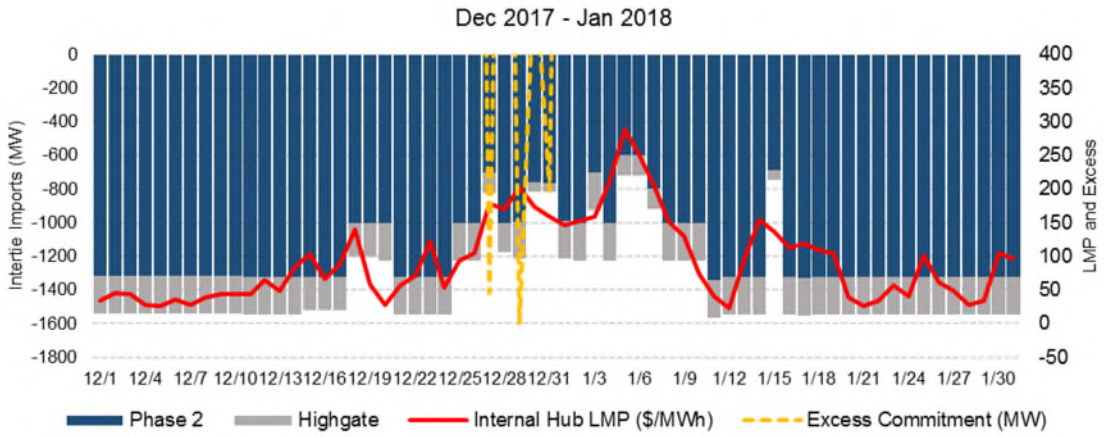
Figure RSW -1: HQ Exports to ISO-NE






Dec 2015 - Jan 2016
Intertie Imports (MW)
LMP and Excess
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
400
350
300
250
200
150
100
50
0
-50
12/1 12/4 12/7 12/10 12/13 12/16 12/19 12/22 12/25 12/28 12/31 1/3 1/6 1/9 1/12 1/15 1/18 1/21 1/24 1/27 1/30
Phase 2
Highgate
Internal Hub LMP ($/MWh)
Excess Commitment (MW)

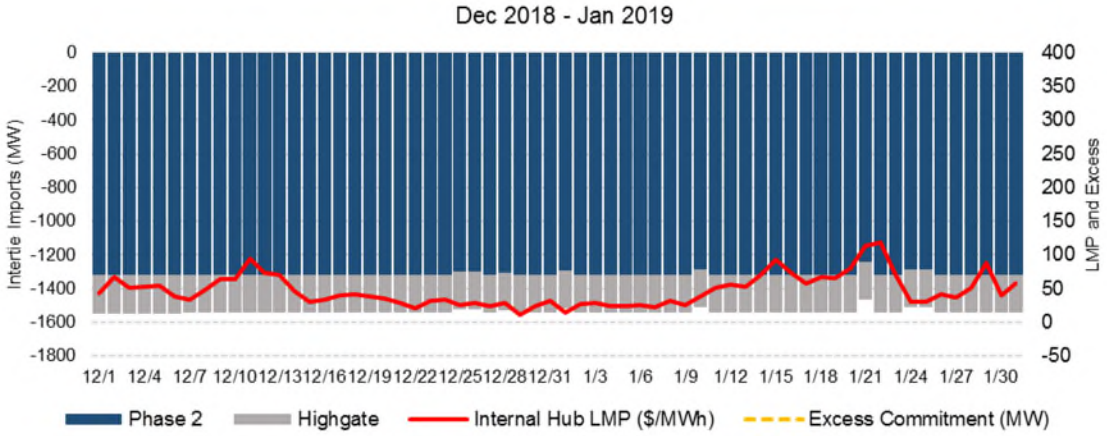

Dec 2016 - Jan 2017
Intertie Imports (MW)
LMP and Excess
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
400
350
300
250
200
150
100
50
0
-50
12/1 12/4 12/7 12/10 12/13 12/16 12/19 12/22 12/25 12/28 12/31 1/3 1/6 1/9 1/12 1/15 1/18 1/21 1/24 1/27 1/30
Phase 2
Highgate
Internal Hub LMP ($/MWh)
Excess Commitment (MW)



Q. Has HQUS backed off deliveries into New England recently?

A. Yes. In the cold snap in January 2019, HQUS again reduced its flows over Phase II when prices spiked in New England, as seen in Figure RSW-2. This is inconsistent with HQUS' assertions in the media that because of spillage there is ample excess power to export to New England.

Figure RSW -2: HQ Exports to ISO-NE (Jan. 2018)



The data shown in Figures RSW -1, -2 provide evidence that HQUS does not export to New England during those times in which it could have contributed to reducing winter price spikes in the Commonwealth. Instead requiring firm deliveries in the winter during all hours and all days to ensure a contribution to winter price spikes, the PPAs do the opposite –Section 4.3, provides the flexibility for HQUS not to deliver and make up those deliveries at some other time, as well as not deliver and pay cover damages. Therefore, at best, there is only speculation as to whether NECEC will contribute to reducing winter price spikes, and more likely than not the evidence shows that HQUS will not deliver when New England needs the energy in very cold winter days. This is particularly true given that while electrical demand peaks in ISO-NE in the summer and in Quebec in the winter, gas demand, and, therefore, electricity prices, peak in ISO-NE in the winter; accordingly, the winter is the period of the year when non gas-fired generation is most valuable. This is precisely the period of the year where HQUS imports have a history of being unreliable.

6. RELIABILITY

Q. Did TCR quantify a NECEC reliability benefit for Massachusetts customers as claimed by the Joint Rebuttal Testimony of Waltman et. al. at 37:15-19 and 41:9-12?

A. No. The Joint Rebuttal Testimony made an incorrect conclusion due to an incorrect reading or understanding of the TCR study. Their statement claims that "One of TCR's tasks was to quantify that [reliability] benefits flowed to Massachusetts customers. This work was done using a production-cost dispatch model that respected a significant set of known transmission constraints. NECEC showed benefits to the Commonwealth in this model that respects electric system constraints, thereby proving that NECEC enhances electric reliability in the Commonwealth." They are wrong in two aspects:

1. The dispatch model used in the TCR study is not a reliability analysis model used for a resource adequacy assessment. As stated in the TCR study report (Exhibit JU-6 at 6), "TCR used the ENELYTIX computer simulation software tool to simulate the operation of the New England wholesale markets for energy and ancillary services, forward capacity and RECs under the 83D Base Case and for each Proposal / Portfolio Case." Had TCR used the same model that ISO-NE, North American Electric Reliability Corporation ("NERC"), Northeast Power Coordinating Council ("NPCC")[8] for resource adequacy assessment, TCR would have come to the same conclusion that the resources in exported constrained Maine and/or Northern Northeast zones cannot materially contribute to the reliability of the ISO-NE region.

2. The TCR study did not show that the installed capacity requirements for Massachusetts will be reduced due to the addition of the NECEC. On page 9 of Exhibit JU-6, when using the ENELYTIX, TCR specified the resource adequacy constraints "in terms of installed capacity requirements ("ICR") for the ISO-NE system as whole and for reliability zones within ISO-NE". And, on page 87, "Using statistical data for past resource adequacy analyses performed by ISO-NE, forward projections of electricity demand and future limits on transmission interfaces defining reliability zones, TCR develops forward looking estimates of

[8] NERC, NPCC, and ISO-NE use GE-MARS, a reliability assessment tool for ensuring system resource adequacy to satisfy customer load demand. The power industry has been using this tool to determine whether future resource mixes will comply with the resource adequacy criterion.https://www.geenergyconsulting.com/sites/gecs/files/downloads/GE%20MARS%20Reliability%20Modeling%20Software.pdf

installed capacity requirements for all zones." That shows that the ICR forecasts were used as inputs to ENELYTIX model, not an output. In addition, the TCR study maintained the transmission capacity constant after 2019 without any additional transmission additions, other than those specific to the proposed project(s) in response to the 83 D. Therefore, such projected zonal installed capacity requirements will not materially change from what they are today in 2019, particularly for the import constrained zones such as NEMA/Boston, West and Central Massachusetts, etc. Indeed, Tables 9 and 10 at 103-104 of the TCR study have shown that the TCR Projections for these zones as well as for the ISO-NE as whole are flat with small increases over the years from 2022 through 2025; and much higher from 2029 through 2040. Theoretically, when an efficient investment in reliability is made, the installed capacity requirement, and, hence, the cost to meet the resource adequacy reliability standard should be reduced accordingly to return some benefit to the consumers. Otherwise, the reliability investment would be unjust and unreasonable.

Q. The Joint Rebuttal Testimony of Waltman et. al. at footnote 24 claims that "To date, NextEra has not identified any flaws in TCR's analyses of transmission constraints." Are there flaws?

A. Yes. As we discussed above, the TCR study did not correctly assess system reliability, and, particularly, resource adequacy, in a realistic way. For example, the TCR study met the resource adequacy criterion by assigning new resources in each load zone per today's local ICRs. It assigned new generation into the NEMA/Boston zone and elsewhere in southern New England. Therefore, it did not objectively assess any reliability benefits that NECEC could provide. To properly assess the reliability benefits of the NECEC, there should not have been additional resources assigned to NEMA/Boston or any other locations south of the remaining two binding interfaces. A

second run could have been made to evaluate the benefits of NECEC after transmission upgrades are made to eliminate the two constraining interfaces. This would have shown there are no benefits to Massachusetts consumers with the NECEC injection into Maine without completing the upgrades required to eliminate the Maine-New Hampshire and the North-South bottlenecks.

Q. Will NECEC's upgrades to the existing transmission system in Maine benefit Massachusetts customers, as claimed by the Joint Rebuttal Testimony of Waltman et. al. at 37:17-20.

A. No. The system upgrades required to interconnect NECEC inside of Maine do not add reliability benefits to the balance of the region. The generation resources in Maine have been providing reliability benefit to the entire ISO-NE region up to the level limited by either of the three transmission interfaces: the Surowiec-South, the Maine-New Hampshire, and the North-South. Even after the Surowiec-South interface inside Maine is upgraded, the next two interfaces outside of Maine -- the Maine-New Hampshire and the North-South (Refer to Figure B, Joint Direct Testimony of Russo, Stoddard, and Whitley), still effectively constrain the capacity from Maine to Northern New England (e.g., New Hampshire, Vermont) and from Northern New England to the "Rest of Pool" and the Commonwealth, respectively.

Q. Can NECEC deliver capacity to benefit Massachusetts and the ISO-NE region, as claimed by Joint Rebuttal Testimony of Waltman et. al. at 40:14-17; 42:16-19 and 47:5-7.

A. Currently, no. As shown in Figure B of Joint Direct Testimony of Russo, Stoddard, and Whitley, the NECEC is located on the very edge of the ISO-NE system. In order to realize the reliability benefit of the NECEC project to the Commonwealth, the two transmission interfaces between Maine and New Hampshire and between Northern New

England and Western and Central Massachusetts, respectively must be upgraded to open up the constrained capacity resources in Maine and in the Northern New England zones.

If the NECEC project is approved as proposed, the inefficient use of the bottled capacity resources in Maine and Northern New England will lead ISO-NE to require the construction of significant transmission upgrades to ensure the capacity and energy delivered in a remote part of the ISO-NE grid is helping ISO-NE to meet its reliability criteria by actually delivering the NECEC benefit to the entire region.

If NECEC is built as proposed, it is likely that ISO-NE may seek transmission upgrades to eliminate these bottlenecks from a regional transmission planning perspective. Such was the case when ISO-NE implemented transmission upgrades designed to unbottle the generation capacity in SEMA/Rhode Island in the early and mid-2000s. For example, two new 345 kV cables were built into downtown Boston. In addition, a major expansion was made to move power from eastern Massachusetts to Central and Western Massachusetts with the New England east to west projects. There were also two new 345kV lines built into southwest Connecticut. All of these projects were required due to reliability needs in order to unbottle generation and move the generation to the load centers while meeting NERC and NPCC reliability standards. This is the same type and magnitude of transmission upgrades that would be required to unbottle the surplus resources in the Maine and Northern New England, if the NECEC is built as proposed.

Alternatively, there would be a reliability benefit to the Commonwealth if the NECEC line were terminated in a more robust Electric High Voltage network within NEMA/Boston. Instead, the NECEC is proposed to inject 1,090 MW north of the two constrained interfaces, the Maine-New Hampshire and the North-South interfaces. By definition, this results in little/no reliability benefits to the Commonwealth's consumers. Logically, the overall long-term cost of this project could be minimized if the NECEC

were terminated within the NEMA/Boston zone, avoiding the cost of transmission upgrades to open up the two constrained transmission interfaces mentioned above.

Q. The Joint Rebuttal Testimony of Waltman et, al. at 47:16-17 states that "There is no basis to single out one transmission [the NECEC] project to be assigned the cost of this process." Do you have an opinion on this statement?

A. We do not disagree with the statement. The point we are making here is that when NECEC is built, jamming 1,090 MW of capacity behind the transmission interfaces, it is logical for the ISO-NE planning process to conclude that it will fix the transmission system by way of costly system upgrades to address the congestion on the interfaces. The cost allocated to the Massachusetts consumers will be a significant additional cost to what they have to pay for the NECEC as proposed today.

Q. Do you agree with the Joint Rebuttal Testimony of Waltman et. al. at 44-47 that the NECEC upgrades address transmission issues beyond the Maine zone?

A. No. ISO-NE PP-10, cited by the EDC witnesses, states that "The study resource will be responsible for recorded overloads that meet any of the above-listed thresholds where, in relation to the Load Zone to which it is interconnecting"; and "The study resource will not be responsible for increasing the transfer capabilities of interfaces that form the boundaries between existing Load Zones" – which here is the Maine zone. Further, it states "NECEC will be deliverable to the ISO-NE PTF [New England pool transmission facility] when it is built, under the strict [Capacity Capability Interconnect Standards] CCIS interconnection standard" which is not equivalent to delivering the NECEC capacity to Massachusetts to help it in meeting the resource adequacy criterion.

Q. The Joint Rebuttal Testimony of Waltman et. al. at 46 disagrees with NextEra's position that Maine is export constraint. Do you have a response?

A. Yes. NextEra has consistently questioned whether adding capacity to the export constrained zone will materially bring reliability benefits to Massachusetts. The Joint Rebuttal Testimony confuses the two distinctive concepts: capacity for reliability and energy for economic benefits. For example, on page 37, it states that "This [TCR] work was done using a [energy] dispatch model that respected a significant set of known transmission constraints. NECEC showed benefits to the Commonwealth in this model that respects electric system constraints, thereby proving that NECEC enhances electric reliability in the Commonwealth." At the same time, the Joint Rebuttal Testimony of Waltman et. al. reached numerous incorrect conclusions because they rely on TCR's analysis that there is no congestion over the Maine-New Hampshire interface and the North-South interface from TCR energy dispatch studies, and, therefore, there are no capacity export constraints by the same two interfaces in the capacity resource adequacy assessment. This analogy is inaccurate. It is true that the NECEC energy can flow across these interfaces during many of the non-peak hours of the year by backing down other generation in Maine and remaining below these interface limits. However, when winter and summer peak conditions occur, and all of the Maine generation is needed for reliability in New England, these interfaces are binding and additional generation will not flow to Massachusetts. For the winter peak of 2018 (per the ISO-NE CELT report)[9], the peak demand in Maine was just under 2,000 MW. The total available Maine generation from existing resources was over 3,700 MW and a New Brunswick import of

[9] https://www.iso-ne.com/system-planning/system-plans-studies/celt/

208 MW which totals to 3,908 MW. This represents a surplus of 1,908 MW that could be transmitted to southern New England if no other bottlenecks existed. However, the Maine-New Hampshire interface is limited to 1900 MW. If 1090 MW is added into Maine from NECEC, there is no headroom to move this additional capacity south. The North-South interface limits also have the same bottleneck effects on limitations to Northern New England capacity.

Q. Do you agree that with the Joint Rebuttal Testimony of Waltman at 48:4-7 and 49:7-9 that EDCs have effectively analyzed the future upgrades resulting from NECEC?

A. No, they have not. As discussed above, the transmission upgrades by NECEC according to the ISO-NE interconnection process, including the CCIS upgrades, only provide the minimum reliability interconnection standard for the NECEC to be able to reliably interconnect and deliver its capacity and energy to the capacity/load Maine zone. The transmission upgrades were not intended to address the export constraining issues for the Maine-New Hampshire interface and the North-South interface.

We agree that ISO-NE has a robust planning and interconnection processes, which will make the NECEC project able to interconnect into Maine without negatively impacting system reliability. Once the required the system upgrades are implemented according to the CCIS standard, the NECEC capacity can technically be delivered to the Maine Zone. However, the CCIS standard is not the same as a system reliability study being performed to assess if the capacity into the export constrained zones can assist a resource shortage situation in NEMA/Boston, for example. To truly realize the reliability and economic benefit of the existing and the future NECEC capacity in Maine and in Northern New England, the analysis should include the costs of the more likely

than not fact that the ISO-NE planning process will identify major transmission expansion needs.

6. THE SELECTION PROCESS

Q. The Joint Rebuttal Testimony of Waltman et al. at 59:16-18, claims that "CMP's knowledge of the selection of TCR as the Evaluation Team Consultant, the selection of the DOER's consultant or the Evaluation Team's consultant, TCR, was not confidential." Does this alleviate your previous concerns regarding the fairness of the selection process?

A. It does not. The EDCs assert that this knowledge *could* have been public and that the EDCs *would* have released information, but only CMP *actually* had it. This does not seem to constitute an equal playing field, given clear discrepancies in knowledge.

Q. When bidders hold asymmetric information, how does this affect the competitiveness of the process?

A. A core premise of competitive bidding situations is that all bidders are similarly situated and have symmetric knowledge. Each bidder will, of course, have private knowledge about its own project, but in a properly constructed competitive auction, all bidders will have the same information about matters that affect them all equally. In this process, however, CMP had knowledge regarding the selection process that other submissions did not. Regardless of whether this information was subject to disclosure to a public records request, such request was not made, and therefore the other companies submitting proposals did not have the same knowledge that CMP did.

Q. Do you believe CMP had an advantage due to it having information that was not publicly known?

A. Yes, it likely did. It is clear from CMP's email (Exhibit RSW-10) that the author thought the information was valuable and that the information gained indicated that the evaluation process would be similar to that used in the Tri-State solicitation. There is little question that the author was passing on this information so that CMP could refine its bid.

Q. Is it accurate, as the Joint Rebuttal Testimony of Waltman et al. at 60:13-61:7 claims, that the transmission information in Exhibit RSW-11 would have been available to all proposals and their sponsors?

A. No, it is not. The CEII information regarding the evaluation team was only available to those with PAC/RC CEII access. Also, there was no showing by the EDCs that all bidders have this access nor that they knew this information would be valuable for their bids.

Q. The Joint Rebuttal of Waltman et al. at 72 asserts that the EDCs selection process was consistent with the statutory requirement that "[e]very distribution company shall jointly and competitively solicit proposals for clean energy generation…" In your opinion, was this process competitive?

A. No. Although the EDCs received a reasonable number of bid packages, each and every portfolio given full and final consideration had at its core the same energy source: HQUS. When there is only one seller, a solicitation cannot be considered competitive.

Q. Does this conclude your Surrebuttal Testimony?

A. Yes, it does.

REQUEST FOR APPROVAL OF CPCN FOR THE NEW ENGLAND CLEAN ENERGY CONNECT CONSTRUCTION OF A 1,200 MW HVDC TRANSMISSION LINE FROM QUEBEC-MAINE BORDER TO LEWISTON (NECEC) PERTAINING TO CENTRAL MAINE POWER COMPANY.
2017-00232
RESPONSE TO NRCM-002
BY CENTRAL MAINE POWER COMPANY

27-JUL-18

NRCM-002-006

Q. 6. Refer to CMP Rebuttal Testimony, p. 24, lines 18 - 20. Please provide all material, documents, analyses, and communications, including notes and summaries of oral discussions with Hydro-Quebec, plus any projections created by Hydro-Quebec within the past five years, whether or not reviewed by CMP, regarding the source of Hydro-Quebec's energy to be sold into NECEC "as that system is expanded over time." For any communications, please provide the date, speaker, his/her position at Hydro-Quebec, and the CMP/Avangrid employee who heard the communication.

A. Hydro-Quebec committed in its NECEC 100% Hydro bid that all deliveries under the NECEC PPAs would come from existing Hydro-Quebec hydropower resources. That bid is available at https://macleanenergy.com/83d/83d-bids/, under the heading "NECEC Hydro". This commitment is then confirmed in the PPAs between H.Q. Energy Services (U.S.) Inc. (HQUS) and the Massachusetts EDCs, with the specific hydropower resources that may be used as the source for deliveries under the PPAs identified in Exhibit A to the PPAs. During the term of the PPAs this will be further confirmed by GIS reporting. Please also see CMP's response to NRCM-002-021.

Author of Response:
Thorn Dickinson Vice President Business Development

Witness Responsible For Response:
Thorn Dickinson Vice President Business Development

List of Attachments

GREENWASHING AND CARBON EMISSIONS: UNDERSTANDING THE TRUE IMPACTS OF NEW ENGLAND CLEAN ENERGY CONNECT

Prepared by: Energyzt Advisors, LLC

Prepared for: Maine Renewable Energy Association
Natural Resources Council of Maine
Sierra Club

October 2018

ENERGYZT

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EXECUTIVE SUMMARY

GREENWASHING AND CARBON EMISSIONS: UNDERSTANDING THE TRUE IMPACTS OF NECEC

This report was commissioned by the Maine Renewable Energy Association, Natural Resources Council of Maine, and Sierra Club to understand the potential impacts of the New England Clean Energy Connect ("NECEC") on carbon emissions.

NECEC is a proposed transmission line with a capacity of 1,200 MW that would import around 9.5 TWh of energy from Québec into New England for purchase by Massachusetts utilities under Section 83D of the *Climate Protection and Green Economy Act*.[1] Although Central Maine Power ("CMP") and Hydro-Québec[2] claim that the electrical energy delivered via NECEC would be "clean energy" from Québec's existing hydroelectric system, there are a number of reasons why the energy flowing through NECEC may not be "clean," may not be hydroelectricity, and may not even be sourced from Québec. Furthermore, the NECEC project – a high voltage direct current ("HVDC") transmission line crossing 145 miles in Maine, including 53.5 miles of pristine areas -- also could hinder Maine's efforts to develop its own renewable energy resources which otherwise could reduce carbon emissions and create local jobs and economic opportunities. This report examines the impacts of NECEC on carbon emissions and concludes that NECEC will not result in a significant reduction in greenhouse gas emissions, and may even increase them.

Hydro-Québec has a financial incentive to sell as much excess energy that it can, subject to water and generation constraints, and divert exports from other markets into NECEC to achieve a higher price. Given its system characteristics and profit goals, Hydro-Québec could even purchase energy from other markets during low-priced hours in order to retain energy in the form of water waiting in its reservoirs for subsequent sale at higher prices to New England through NECEC. Furthermore, the significant inflow via a 1,200 MW transmission line into Maine could adversely affect the economic prospects for Maine renewables, which are likely to be deferred or delayed as a result of the project's impacts

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[1] Mass. Gen. Laws Ch. 21N, Section 3 (a – d).

[2] Hydro-Québec refers to the parent company of Hydro Renewable Energy, Inc. ("HRE") which submitted a bid in response to the Massachusetts Section 83D request for proposal and Hydro-Québec US, the entity that is the counterparty to the Massachusetts contracts. Hydro-Québec is a provincially-owned company that manages the Québec power system via Hydro-Québec Power (generation), Hydro-Québec TransEnergíe (Transmission) and Hydro-Québec Distribution (distribution system delivery and retail services).

on the local transmission network. The net result would be a minimal impact on efforts to reduce total carbon emissions.

NECEC could divert energy sales from another market into New England; shifting flows between markets may not reduce total greenhouse gas emissions and could even increase total carbon injections into the atmosphere.

It is important to note that intertie capacity from Québec into other markets is not a constraining factor for Hydro-Québec exports. Even during 2017 when Hydro-Québec exports reached a record high, there was a significant amount of unused transmission capacity throughout the year, indicating that the constraint on increasing exports from Québec into other markets is due to limited availability of water to produce energy or other production constraints, not the amount of transmission capacity. Therefore, a new intertie merely allows Hydro-Québec to access a higher-priced, long-term contract with Massachusetts instead of selling into competitive spot markets at lower, more uncertain prices. The NECEC transmission line is not necessary to export additional clean energy from Québec into external markets.

Hydro-Québec's proposal in response to the Massachusetts Clean Energy RFP explicitly states that it would supply energy to NECEC from existing generation resources, and not from new sources of renewable energy developed to serve the line. Given that Hydro-Québec would maximize its exports without NECEC and sell whatever excess energy that it had into external markets,[3] Hydro-Québec would supply NECEC by simply shifting those exports into New England via NECEC at a higher contracted price. This shift in energy flows could create an offsetting impact in the other markets which would have to produce replacement energy, potentially resulting in offsetting carbon emissions. While Maine power plants would be forced to shut-down to accommodate energy flowing into NECEC, fossil fuel plants in other markets (including oil, natural gas and coal units), would fire-up in response to Hydro-Québec's shifting its energy sales, negating any potential climate benefits.[4]

Hydro-Quebec can and does buy energy from low-priced markets and then sells its "clean energy" at a higher price into other markets, potentially creating a similar impact

[3] External markets into which Hydro-Québec sells energy includes Ontario, New Brunswick, New York, Mid-Continent ISO, PJM, and New England.

[4] The relative carbon emissions impact of displacing New England generation with new generation in other markets depends on the carbon intensity of power plants on the margin in each market.

on carbon emissions in the atmosphere as if Hydro-Québec were generating power from fossil fuels directly.

As a result of its reservoir storage capability, Hydro-Québec can buy lower cost energy from markets where fossil fuel generators are operating, retain water in its reservoirs and then sell that water as hydropower at higher priced periods back into the same or other markets. This strategy was described publicly by the government of Québec back in 2004:

> . . . Hydro-Québec is able to purchase electrical energy from neighbouring markets at lower prices during certain periods, and then resell it later to neighbouring networks at higher prices.[5]

Hydro-Québec continues to declare its ability to engage in the buy-low/sell-high arbitrage opportunities in its Annual Reports.[6] At the Maine Public Utilities Commission (Maine PUC), CMP admitted on the record that the proposed power purchase agreements for energy via NECEC allow Hydro-Québec to use its existing resources and import/export interties to optimize profits.[7] In this way, Hydro-Quebec can claim that the electricity it sells is "clean" hydropower even if it is buying fossil fuel electricity to enable those energy sales. There is no way for anyone in New England to know when this happens, even though Hydro-Quebec has publicly acknowledged that this is their business model. So long as NECEC can assign energy from its dams to New England, the Massachusetts contracts ignore how Hydro-Québec is managing its system to meet its energy sales obligations.

NECEC would suppress the development of new renewable energy generation in Maine which, in contrast to Hydro-Québec's market-switching strategy, actually could lower greenhouse gas emissions and provide more local jobs and economic benefits than NECEC.

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[5] Minestere des Ressource natuelles, dela Faune et des parcs, Gouvernement du Quebec. 2004. "The Energy Sector in Québec, Context, Issues and Questions," p. 41.

[6] Hydro-Québec Annual Report 2017, p. 48, "Hydro-Québec supplies the Québec market with electricity and also sells power on wholesale markets in Canada and the United States. In addition, it is active in arbitrage transactions."

[7] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Technical Conference Transcript (Aug. 1, 2018), pp. 21-25.

The proposed transmission project is a direct line from Québec into New England via Maine that does not allow other renewables in Western Maine to interconnect. NECEC is anticipated to consume the existing transmission availability and could make the cost of interconnection by in-state renewable resources to the ISO-NE system at a different point in Maine more expensive. This means that new renewable energy projects, such as solar arrays and wind projects, would not be able connect to the grid as easily and could be unable to compete with renewables in other states. In contrast to Hydro-Québec's energy flows through NECEC, potential Maine-based renewable energy projects would result in greenhouse gas reductions, would employ people in Maine and New England, and provide greater environmental benefit.

The Massachusetts contracts pay a higher price for energy than Hydro-Québec otherwise would earn by selling into other markets under current conditions. Although there are certain penalties if threshold levels of hydroelectric energy are not delivered, the contracts do not require the energy to be incremental to historical levels or to what Hydro-Québec currently can produce. Hydro-Québec is allowed to replace its "clean energy" with substitutes, even if it results in higher emissions.

Adjusting CMP's model to reflect lower runoff conditions while maintaining Hydro-Québec's exports at historical levels illustrates how and why Hydro-Québec would have to resort to diverting exports and greenwashing.

CMP's model assumes that heavy water conditions would continue throughout the term of the contract. Changing one simple assumption in CMP's model of Hydro-Québec's system while maintaining exports at levels experienced during the past five years indicates that energy supplied via NECEC could be required to divert exports into other markets and even engage in greenwashing to meet its obligations.

The reality, however, is that Hydro-Québec is not confined to a single strategy or objective over the course of the contract. Hydro-Québec will manage its system, sales, exports and opportunities according to water conditions, market prices and production constraints. Such optimization will include diverting sales into other markets and greenwashing, as required to optimize profits.

The Massachusetts contracts do not preclude Hydro-Québec from engaging in purchasing energy from other markets to supply NECEC. The net result could be higher emissions.

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GREENWASHING AND CARBON EMISSIONS: UNDERSTANDING THE TRUE IMPACT OF NECEC

This report examines the environmental impact of the proposed New England Clean Energy Connect ("NECEC") project on carbon emissions.[1]

NECEC is a 1,200 MW high voltage direct current ("HVDC") transmission line that would cross 145 miles of Maine natural resources from Bettie Township on the Québec border to Lewiston, Maine – of which 53.5 miles in Somerset Country would require construction of a new clearing along a previously undeveloped right of way. While this transmission project would have significant impacts on Maine's natural resources and ecosystems, the focus of this report is on whether the project would have a net impact on carbon emissions globally.

Greenwashing

The term greenwashing was created in 1986 in response to an increase in marketing and advertising that created the perception that a company's products, aims or policies were sustainable, clean and/or green, regardless of reality. The term greenwashing subsequently was applied to the electricity sector with respect to concerns that renewable energy claims did not reflect the true nature of the underlying energy source.

Hydro-Québec claims that NECEC will deliver 100% clean energy 100% of the time via NECEC.[2] This claim, however, is unsupported by the terms of the contracts with the Massachusetts utilities. Given Québec's interconnections with other markets, NECEC effectively allows Hydro-Québec to divert its energy sales from other markets into New England for a higher contractual price. In addition, under the terms of the contracts with

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[1] This report was commissioned by the Maine Renewable Energy Association ("MREA"), Natural Resources Council of Maine ("NRCM"), and Sierra Club.

- MREA: According to its website, "MREA leads the local and statewide policy debate on renewable energy generation in Maine, and works to ensure its efforts are united with those of its member companies." https://www.renewablemaine.org/
- NRCM: NRCM is a "nonprofit membership organization protecting, restoring, and conserving Maine's environment," https://www.nrcm.org/
- Sierra Club: With over 3.5 million members and supporters focused on "defending everyone's right to a healthy world," the Sierra Club is "the most enduring and influential grassroots environmental organization in the United States." https://www.sierraclub.org/home

[2] Commonwealth Magazine, John Carroll and Lynn St. Laurent, "Hydro-Quebec, Central Maine Power respond to critics," September 8, 2018,

https://commonwealthmagazine.org/opinion/hydro-quebec-central-maine-power-respond-to-critics/

Massachusetts utilities, Hydro-Québec would not be precluded from purchasing energy from other markets to sell directly into NECEC or for purposes of conserving water in its reservoirs for future supply to NECEC at a later time.

The practice of purchasing energy from one market in order to sell it into another market as hydroelectric energy at a later time can be referred to as "greenwashing." In effect, Hydro-Québec can procure supply from other markets in order to meet its clean energy obligations delivered via NECEC even though the environmental impact in those other markets could be the same as if the energy were supplied directly from fossil fuel generating resources. Massachusetts ratepayers effectively could be paying above-market prices for energy from existing resources outside of Québec that provide no incremental environmental benefit and could even increase carbon emissions.

There are many indicators that this project would not reduce carbon emissions and could even increase them. Hydro-Québec's interconnected system with significant reservoir storage, makes the origin of the energy being sold through NECEC into Massachusetts difficult to confirm, and thus the true impact on carbon dioxide emissions impossible to measure. The following factors make it likely that this proposed transmission line will have adverse environmental consequences despite being marketed as a "clean" energy project:

- **Incentive and Opportunity to Buy Low and Sell High:** Hydro-Québec's highly interconnected system configuration, especially with respect to other markets, creates opportunities for Hydro-Quebec to source the energy sold to Massachusetts via NECEC from other markets, where nuclear energy and fossil fuel generation is operating and effectively would supply Hydro-Québec's purchases.

- **Potential for Increased Carbon Emissions in other markets**: The diversion of existing sales of hydroelectricity from other markets, for example in New York, New Brunswick or Ontario, could increase carbon emissions in those markets, offsetting or even exceeding claimed carbon benefits of NECEC in New England.[3]

[3] The ultimate impact on total carbon emissions will depend on the relative carbon emissions intensity of the last plant required to generate energy or shut-down in response to Hydro-Québec's activities. If the states in the Northeast pursue their stated carbon reduction goals, the relative impact should go to zero as relative carbon emissions across markets converge.

- **Displacement of Existing and New Maine Renewable Resources:** Maine's potential for new renewable resources will be adversely impacted, delayed and deferred as a result of NECEC.

The outcomes described in this report are not theoretical. Under realistic assumptions about water conditions, Hydro-Québec would not be able to maintain exports at 2017 levels with NECEC unless it diverted sales from other markets and engaged in greenwashing during the first half of the contract. Hydro-Québec has engaged in the described behavior in the past and has every incentive to engage in this behavior to optimize its profits going forward.

1. OVERVIEW OF NECEC

Central Maine Power is proposing to build a new transmission line to bring existing Canadian hydroelectric energy into New England via Maine. NECEC was developed in response to the Massachusetts solicitation for clean energy under Section 83D of the *Climate Protection and Green Economy Act*.[4]

Of the forty-six submissions to the Massachusetts Section 83D Request for Proposal ("RFP"), NECEC is one of three projects that proposed to supply existing hydroelectricity from Hydro-Quebec via new transmission lines into New England. Northern Pass Transmission (NPT) was selected initially and offered 1,200 MW; NECEC was the next choice after New Hampshire refused to site Northern Pass, also offering 1,200 MW; and TDI's New England Clean Power Link (NECPL) would have transmitted up to 1,000 MW of energy from Québec's existing hydroelectric power system.[5] Aside from one other transmission project proposed by Emera, the forty-two (42) other projects included wind, solar, hydroelectricity or some combination, and includes renewable energy projects being developed in Maine.[6]

The assertion that NECEC supply would come from existing resources appears multiple times in Hydro-Québec's proposal in response to the Massachusetts clean energy request for proposal, as illustrated by the following excerpt.[7]

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[4] Mass. Gen. Laws Ch. 21N, Section 3(a – d).

[5] See the public versions of the bid submitted for each project located on the Massachusetts Clean Energy website: https://macleanenergy.com/83d/83d-bids/.

[6] Ibid.

[7] See for example, pages 4, 6 and 56.

> All of the hydroelectric generation units that comprise the HQ Hydropower Resources are in operation and, therefore, have already been constructed. Although new hydroelectric generation units may be added to the HQ Hydropower Resources portfolio in the future, **no new facilities or capital investments for hydroelectric generation units are required as part of this Proposal**.[8]

(emphasis added).

The RFP initially required bidders proposing to supply from existing projects to explain how the delivered energy would be incremental to historical levels. The requirement that the delivered energy be incremental also was incorporated into the template for the Power Purchase Agreement which defined "Qualified Clean Energy" to include "Incremental Hydroelectric Generation," defined as:

> "Incremental Hydroelectric Generation" means hydroelectric generation that represents a net increase in MWh per year of hydroelectric generation from the Seller as of the Effective Date as compared to the three-year historical average for the period January 1, 2014 through December 31, 2016 and/or otherwise expected delivery of hydroelectric generation from the Seller within or into the New England Control Area.[9]

Following negotiations between Hydro-Québec and the Massachusetts utilities, however, the signed version of the contract dropped the definition of "Incremental Hydroelectric Generation" and changed the definition of "Qualified Clean Energy" to exclude any reference to incremental hydroelectric generation.[10] Furthermore, there is no requirement that total deliveries into New England versus the historical averages be incremental, only

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[8] HRE Section 83D Application Form, submitted July 27, 2017, p. 63 (emphasis added).

[9] DRAFT* POWER PURCHASE AGREEMENT FOR FIRM QUALIFED CLEAN ENERGY FROM HYDROELECTRIC GENERATION BETWEEN [_____] [Buyer] AND [_____] [Seller] As of [_____], 201_ , p. 7.

[10] See for example, *Central Maine Power Co., Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232,* Exhibit No. NECEC-16, POWER PURCHASE AGREEMENT FOR FIRM QUALIFIED CLEAN ENERGY FROM HYDROELECTRIC GENERATION BETWEEN MASSACHUSETTS ELECTRIC COMPANY AND NANTUCKET ELECTRIC COMPANY d/b/a NATIONAL GRID AND H.Q. ENERGY SERVICES (U.S.) INC., as of June 13, 2018, [REDACTED].

penalties if Hydro-Québec fails to meet the new set of requirements, which is described in Exhibit H to the power purchase agreement. Although Exhibit H is redacted, CMP witnesses testified before the Maine PUC in public session that Hydro-Québec does not have to make incremental delivery of power into New England, but can pay penalties instead.[11]

The Maine PUC Technical expert, London Economics, testified that this ability to trade between markets and obtain a higher price is a "key motivator" for NECEC.[12]

Key Insight

The signed contracts do not require Hydro-Québec to deliver incremental energy from its existing hydroelectric projects. Instead, if it is economic or strategic to do so, Hydro-Québec can choose to not deliver incremental energy and pay penalties instead. The contracts do not monitor or preclude Hydro-Québec from engaging in purchases from other markets for its own domestic use to allow for sales of its hydroelectricity at a premium to Massachusetts utilities under the contracts.

The NECEC project, as submitted to the Section 83D RFP, is a collaboration between CMP and two wholly-owned subsidiaries of Hydro-Québec -- Hydro-Québec TransEnergíe (HQT) and Hydro Renewable Energy (HRE). HRE subsequently was replaced by Hydro-Québec US in the signed power purchase agreements, placing the obligation on a US-based affiliate of Hydro-Québec that has limited assets in the event of default.

Under publicly available contracts and proposals, the NECEC transmission line would have a capacity of 1,200 MW. HQT would build and operate the transmission line on the Québec side and CMP would build and operate the portion of the transmission line located in Maine. Hydro-Québec would make available to Massachusetts a minimum of 8.5 TWh up to 9.5 TWh of electricity per year at the discretion of the Massachusetts distribution utilities engaged in the procurement.[13]

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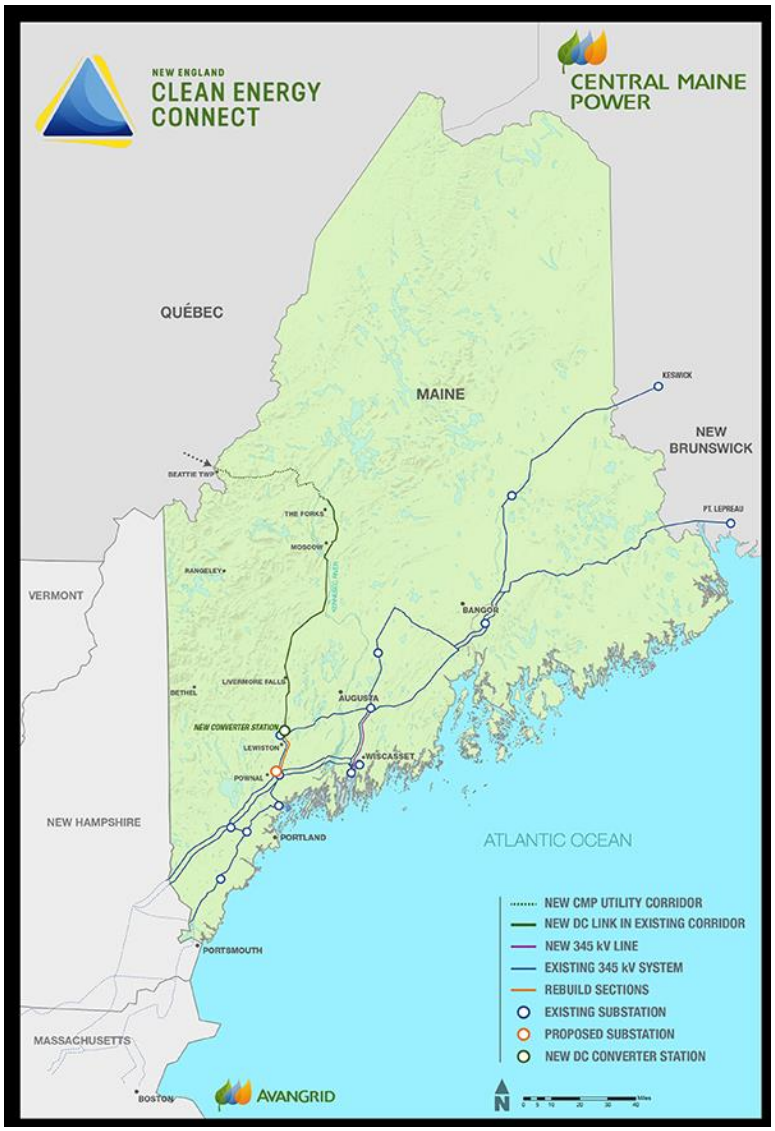
[11] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Technical Conference Transcript (Aug. 1, 2018), pp. 28 – 35.

[12] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Technical Conference Transcript (Sep. 19, 2018), pp. 21-25.

[13] Section 83D, Request for Proposal Application Form, submitted by Hydro Renewable Energy Inc., p. 3, https://macleanenergy.com/83d/83d-bids/

Figure 1 illustrates the proposed path of the NECEC project and interconnection between Québec and Lewiston, Maine.

Figure 1: Proposed NECEC Project[14]



The injection point at Lewiston, Maine, is not ideal. Maine is connected to the ISO-NE system through a long high voltage AC line and energy must pass through at least four interfaces before arriving in Massachusetts. The Maine generation system produced only 11.5 TWh of energy in 2017 compared to 17 TWh in 2010. According to the U.S. EIA,

[14] NECEC, https://www.necleanenergyconnect.org/map

electricity imports from Québec that already have occurred are one of the reasons for the reduction in Maine generation:

> Maine's Renewable Portfolio Standards (RPS) require electricity providers to fuel 30% of their electricity generation with renewable resources. In addition to policy initiatives, electricity imports from Canada—notably from Quebec—have been contributing an increasingly larger share to Maine's total generation, displacing natural gas-fired generation as the primary source. Since 2012, electricity imports from Canada have more than tripled . . . [15]

Imports into Maine from Québec already have displaced a significant portion of Maine's natural gas plants. NECEC would continue the trend of displacement by nearly matching the total amount of energy generated by Maine power plants in 2017. If NECEC were to proceed injection of such a significant amount of energy into Maine, Maine's existing generators, including biomass plants, will be displaced. NECEC also will have an adverse impact on transmission availability, congestion and losses. As a result, new renewable energy generation would find it more costly to connect to the system in Maine for delivery into the rest of New England. These higher interconnection costs would make it more difficult for Maine renewable resources to compete with the rest of New England.

Under the agreement with Hydro-Québec, CMP would build the transmission line on the Maine portion of the line. CMP anticipates the need to invest in a number of transmission upgrades to incorporate NECEC into the system; a critical part of the existing ISO-NE transmission system, Surowiec-South, currently has only 200 MW of availability for incremental energy flows without upgrades.[16] CMP's proposed upgrades, however, would simply move congestion down to the Maine-New Hampshire Interface which has an interface limit of around 1,900 MW and does not have enough capacity to flow NECEC out of Maine in all hours without the additional cost of congestion and incremental line losses.[17]

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[15] EIA Form 923 data, https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2018/09_27/

[16] ISO-NE, Final Maine Resource Integration Study ("MRIS"), March 2018, Available at https://www.iso-ne.com/staticassets/documents/2018/03/final_maine_resource_integration_study_report_non_ceii.pdf

[17] *Central Maine Power Co., Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232,* Exhibit No. TLB-1, "Testimony of Tanya L. Bodell," April 30. 2018.

The total cost for CMP's transmission line build-out and upgrades is estimated to be $950 million. Under the proposed structure, Maine ratepayers would not be responsible for any payments to build the transmission line. However, Maine ratepayers also would not obtain any direct rights to capacity on the transmission line or energy being delivered across NECEC. Therefore, any benefit to Maine that could result from the proposed transmission line would be indirect impacts.

Given the global nature of carbon emissions, the impact on Maine's carbon emissions alone or even New England's carbon emissions across the broader region cannot be examined without consideration of the impact on surrounding areas. In assessing the net impacts of NECEC on carbon dioxide emissions, therefore, it is necessary to consider the total impact of NECEC across multiple markets.

Key Insight

NECEC does not offer any direct benefits to Maine residents. Whereas Massachusetts is estimated to receive hundreds of millions of dollars in direct benefits, Maine would not receive any direct benefits associated with energy deliveries dedicated to Maine ratepayers. Instead, the potential impact of NECEC to Maine includes the net impact of NECEC on global emissions and should be examined across multiple markets.

2. SOURCE OF QUÉBEC HYDROELECTRIC SUPPLY

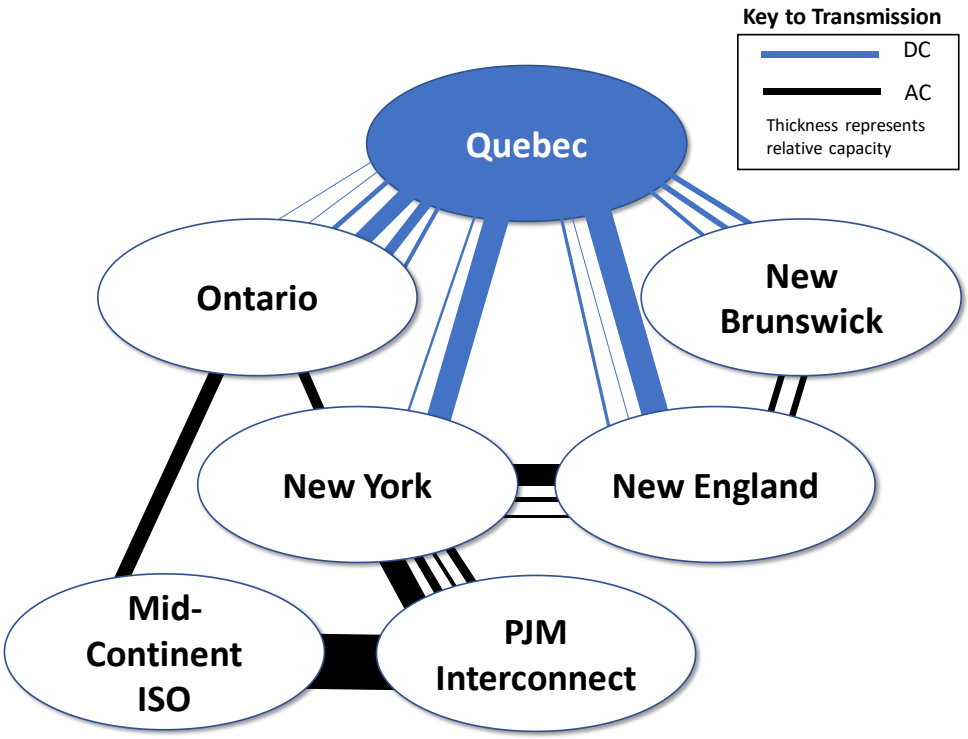
Hydro-Québec owns and operates a large system of hydroelectric generation and other power generating capabilities along with an extensive transmission network. In order to understand how Hydro-Québec is likely to supply energy via NECEC, it is important to understand the current and anticipated state of its system, the amount of excess energy it could produce with or without NECEC and what Hydro-Québec otherwise would do with that energy in the absence of NECEC.

This section provides a high-level summary of the Hydro-Québec system; Appendix B provides a more detailed overview.

2.1 Québec is interconnected with multiple markets

Québec is physically interconnected to four other markets via DC tielines – New England, Ontario, New York and New Brunswick (**Figure 2**).

Figure 2: Interties and transmission lines between Québec and major markets



In addition, by wheeling through other markets, Hydro-Québec can sell into PJM and the Mid-Continent ISO -- two markets that are explicitly listed in Hydro-Québec's application for a blanket export license.[18] Both New York and New Brunswick connect with New England via an AC transmission interconnection, allowing Hydro-Québec to sell energy into New England via New York and New Brunswick. In addition, Hydro-Québec can and does sell into New York via Ontario.[19]

The ability to purchase from other markets and store an equivalent amount of energy by

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[18] National Energy Board, Application by Hydro-Québec, "Application for a Blanket Electricity Export Permit Pursuant to s.119.03 of the National Energy Board Act and s.9 of the National Energy Board Electricity Regulations," Application Submission Date 19/02/2010, p. 4.

"(3) Provide a brief description of the export markets (e.g. geographic area, NERC region, etc.) to be served. Les marchés visés sont les marchés nord-américains desservis par le New York Independent System Operator, Inc., l'ISO New England Inc., le Midwest Independent Transmission System Operator, Inc. et la PJM Interconnection, LLC."

[19] National Energy Board, Analysis of Commodity Tracking System Data,

https://apps.neb-one.gc.ca/CommodityStatistics/Statistics.aspx?language=english

reducing flow through its turbines provides valuable flexibility to Hydro-Québec. This flexibility is particularly profitable during low water conditions when Hydro-Québec would have less energy to sell into external markets or high-priced years when the difference between peak and off-peak energy prices is greater.

The higher-priced, long-term NECEC contract is an example of the way Hydro-Québec can arbitrage between markets – buying low in one market and then reselling that energy at a higher price elsewhere. The above-market price of the contracts with Massachusetts utilities also would allow Hydro-Québec to maximize profits through optimization of its imports and exports while selling under a lucrative long-term contract.

2.2 The National Energy Board issues energy export licenses

In order to sell any energy commodity products into the US, Hydro-Québec must obtain a license from the National Energy Board (NEB). The NEB considers a number of factors before issuing a license, including:

- **Other Provinces:** Whether or not there could be adverse consequences to other provinces in Canada; and

- **Environment:** Impact on the environment.

As explained below, these requirements, combined with the characteristics of Hydro-Québec's system, makes it very clear that Hydro-Québec would have to divert sales from other markets in order to deliver electricity products via NECEC (thereby negating any impact on carbon emissions) and/or purchase electricity products from other markets in order to meet its firm commitments under the Massachusetts contracts (i.e., greenwashing).

2.2.1 Other Provinces

Specific export licenses for Hydro-Québec indicate that the NEB also looks at whether or not there would be an adverse impact on other provinces. The license issued to Hydro-Québec for contractual sales to Vermont specifically notes in the preamble:

> AND WHEREAS the Board is satisfied that the parties interested in buying electricity for consumption in Canada have been given fair market access to any electricity proposed for export under this permit;

> AND WHEREAS the Board is satisfied that the proposed exports will not cause any unacceptable effects on provinces other than those from which exports will occur;[20]

The focus on potential impacts on other Canadian provinces could make it difficult for Hydro-Québec to reduce sales into Ontario or New Brunswick or engage in behaviors that could adversely impact those provinces. Therefore, the bulk of the export reductions could come from New York.

2.2.2 Environment

The NEB also is tasked with considering the environment and would be required to perform a detailed review of potential environmental impacts if the proposed source of energy sales is to come from new generation facilities. In the case of the 10-year blanket export license issued to Hydro-Québec in 2010 for up to 30 TWh of firm and interruptible energy for export, the NEB specifically noted:

> Regarding the impact of the proposed exportation on the environment, the Board is of the view that there is no nexus between the proposed export and new facilities, changes to existing facilities, or modifications to the operation of existing facilities and environmental effects. As a result, the Board is satisfied that further consideration of the environmental effects of the proposed export is not required.
>
> To ensure that a potential nexus would not arise in the future, the Board has incorporated a condition into the permit, which in relation to any single export contract, limits the ability of the Applicant to rely on the permit to a maximum period of five years. The Board is of the view that a sales contract of five years or less is not sufficient to support the construction of new facilities or modifications to existing facilities, to serve the demands of an export contract.[21]

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[20] National Energy Board, Permit EPE-370, IN THE MATTER OF section 119.03 of the National Energy Board Act (the Act) and the regulations made thereunder; and IN THE MATTER OF an application by Hydro-Québec for authorization to export electricity to H.Q. Energy Services (U.S.) Inc. dated 4 March 2010 by Hydro-Québec for authorization to export electricity to H.Q. Energy Services (U.S.) Inc., pursuant to section 119.03 of the National Energy Board Act (the Act), Issued August 18, 2011.

[21] National Energy Board, "Letter accompanying the issuance of a licence in response to Application dated 19 February 2010 for authorization to export electricity pursuant to Section 119.03 of the National Energy Board Act (Act)1 by Hydro-Québec," October 29, 2010, p. 3.

In this context, it is understandable why Hydro-Québec so clearly indicated that it would only supply energy from its existing portfolio of hydroelectric projects that already are built for purposes of the Clean Energy RFP – to say otherwise may run afoul of the NEB licensing requirements. If supply were to be from new construction, the NEB could require an extensive environmental review.

2.3 Québec's energy versus capacity

In order to understand the source of Hydro-Québec's energy into New England via NECEC, an examination of Hydro-Québec's system – both energy and capacity -- is in order. Capacity is provided by existing or planned generating plants that could be available to generate electrical energy when needed. Energy is the electricity that flows when those generating plants are operating. The distinction is important because the contracts with Massachusetts are for energy only – not capacity.[22]

Furthermore, the contracts are for firm energy; firm energy that is not backed by specified resource capacity needs to be firmed with another resource. In this case, Hydro-Québec's system and the ability to optimize energy purchases and sales across its four system interties could provide the firming without the need to dedicate specific hydroelectric units to the contract. This section explains further why the contracts with the Massachusetts utilities are for firm energy only and the implications for greenwashing and carbon emissions.

Québec's system is a winter-peaking system and, as such, Hydro-Québec is required to maintain generation capability above its peak demand in the winter. However, water flow is at its lowest during the winter months, requiring Québec to rely on stored water in its reservoirs to produce energy. Therefore, Hydro-Québec's energy production capacity is limited by its already-built generation capacity and reservoir levels.[23]

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[22] Although the contracts require Hydro-Québec to attempt to qualify to provide capacity into the ISO-NE market, there is no penalty if such capacity is not available or does not clear the market, "For the avoidance of doubt, but without limiting the condition set forth in Section 3.4(b)(ii), **Seller shall have no obligation during the Services Term** to pay for such Network Upgrades or **to complete the Forward Capacity Auction qualification process**" (emphasis added).

[23] As with any large hydroelectric system operator, Hydro-Québec manages its reservoir levels to be able to meet its energy needs over the course of the year and under adverse run-off conditions over multiple years as well as during peak periods.

The North American Electric Reliability Council (NERC) projects that Québec could be short of its required reserve margins by 2024 unless another 1,100 MW of prospective resources are obtained.

> Under the Prospective Scenario, a total of 1,100 MW of expected capacity imports are planned by the Québec area. These purchases have not yet been backed by firm long-term contracts. However, on a yearly basis, the Québec area proceeds with short-term capacity purchases (UCAP) in order to meet its capacity requirements if needed.[24]

In other words, Québec is projected to require nearly the equivalent of NECEC's potential capacity by 2023 according to NERC. If Hydro-Québec must purchase capacity to meet its own provincial needs, it would not be able to sell capacity into another market such as ISO-NE unless it is purchasing sufficient capacity from other markets.[25] In fact, Hydro-Québec already appears to be engaging in capacity arbitrage – purchasing short-term capacity from New York's UCAP market and Ontario (500 MW), and selling 462 MW into the higher-priced ISO-NE Forward Capacity Market ("FCM") for FCA9 (June 2018 –May 2019).[26]

ISO-NE explicitly requires that a resource bidding into the capacity market as a New Import Capacity Resource backed by an external control area such as the Québec system to show that its load and capacity projections for the external Control Area has sufficient excess capacity to back the bid.[27] If Hydro-Québec intends to rely on specific generating

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[24] NERC, 2017 Long-term Reliability Assessment, pp. 55-56, Under the prospective scenario, a total of 1,100 MW of expected capacity imports are planned by the Québec area, although these purchases have not yet been backed by firm long-term contracts. https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_12132017_Final.pdf

[25] Ibid., pp. 53-54. Ontario also will not be in a position to renew the current sale of 500 MW of capacity to Québec.

[26] ISO-NE, "Forward Capacity Auction Capacity Obligations," https://www.iso-ne.com/markets-operations/markets/forward-capacity-market/

[27] See ISO-NE Market Rules (Effective Date, 9/28/2018 - Docket # ER18-2078-000), Market Rule 1, Section 13, paragraph III.13.1.3.5.3:

> III.13.1.3.5.3. Imports Backed by an External Control Area. . .
>
> If the New Import Capacity Resource will be backed by an external Control Area and the capacity will be imported over an Elective Transmission Upgrade and the capacity will be imported over an interface that has not achieved Commercial Operation as defined in

resources to bid power, those resources must be identified and shown to be unencumbered from other capacity supply obligations.[28]

The shortfall in capacity does not correspond to a shortfall in energy because Québec has reservoirs and can store water to generate excess energy across the year whereas capacity requirements are an instantaneous need at the point of peak demand on the system. Given the natural flows of precipitation and snow melt in Québec, the province is flush with water in the late spring and early summer months. That water is used to produce energy as well as to replenish the reservoirs for the winter. Water is converted into energy and sold into other markets in order to maximize profits.

In addition to energy sales, Hydro-Québec also engages in arbitrage opportunities where it purchases from one market at a lower price and either sells directly into another market or stores the purchased energy in the reservoir in order to sell energy at a later time.

Figure 3 illustrates how Hydro-Québec has used purchased energy imported into Québec historically to support its export sales into other markets. For example, in 2010, imports supported nearly half of its exports (10.7 TWh imported versus 23.3 TWh exported). Without those purchases, Hydro-Québec either would have had to reduce exports or fall below minimum reservoir levels.[29]

Schedule 25 of Section II of the Transmission, Markets and Services Tariff, the provisions regarding site control (Section III.13.1.1.2.2.1) and critical path schedule (Section III.13.1.1.2.2.2) shall apply in addition to the requirement that the Project Sponsor **submit system load and capacity projections for the external Control Area showing sufficient excess capacity during the Capacity Commitment Period to back the New Import Capacity Resource for the length of the multi-year contract** (emphasis added).

[28] Ibid, Section III.13.1.3.5.2.

[29] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Response to NRCM-002-021, Attachment 1.

Figure 3: Hydro-Québec total exports and imports[30]

Year	[1] Exports (TWh)	[2] Imports (TWh)	[3] Net Exports (TWh)
2008	21.3	6.1	15.2
2009	23.4	4.9	18.5
2010	23.3	10.7	12.6
2011	26.8	6.0	20.8
2012	31.8	1.7	30.1
2013	32.2	1.4	30.8
2014	26.6	1.2	25.4
2015	29.9	0.6	29.3
2016	32.7	0.1	32.6
2017	34.9	0.5	34.4

NOTES:
[1] See "Hydro-Québec at a Glance, p. 2 across the Annual Reports for a consistent set of data on electricity sales outside of Québec. For 2012 and earlier, there is conflicting information in other areas of the report, which is ignored for purposes of developing this table.
[2] Derived as the difference between reported Exports and Net Exports.
[3] Net Electricity Exports, p. 12 (2016 Annual Report), p. 12 (2014 Annual Report).

As a general proposition, Québec has excess energy over the course of the year that it can sell into other markets at a profit and already is doing so. Revenue from sales to external markets has exceeded $1.5 billion over the past few years.[31] In 2017, Hydro-Québec earned $1.575 billion from electricity exports and issued more than $2 billion back to the Québec government as a dividend for the fifth consecutive year.[32] Selling exports has become a necessity for Hydro-Quebec, as indicated by Hydro-Québec CEO Éric Martel's recent comment, "Without exports, our profits are in trouble."[33]

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[30] Compiled using Hydro-Québec Annual Reports 2012 – 2017.

www.hydroquebec.com/about/financial-results/annual-report.html

[31] Hydro-Québec Annual Reports.

[32] 2017 Hydro-Québec Annual Report, p. 3,

http://www.hydroquebec.com/data/documents-donnees/pdf/annual-report.pdf

[33] Financial Post, "Without exports our profits are in trouble: Hydro-Quebec plugs into U.S. markets for growth," April 20, 2018, https://business.financialpost.com/commodities/energy/without-exports-our-profits-are-in-trouble-hydro-quebec-plugs-into-u-s-markets-for-growth.

The Massachusetts contracts represent a higher value opportunity for Hydro-Québec than their existing exports because it is an above-market, fixed price contract. It is an arbitrage opportunity across markets that Hydro-Québec describes in its Annual Reports as an activity in which it engages. As the Maine PUC Technical Expert noted,

> With a new outlet for its energy, such as NECEC, HQP will have an increased ability to capture higher energy prices in ISO-NE's energy markets, forfeiting sales to other lower-priced markets . . . This arbitrage opportunity is the core of HQP's exporting strategy and the key motivator for HQP in contracting with NECEC.[34]

2.4 Economic Incentives to Buy, Divert or Build

There are multiple ways that Hydro-Québec could meet its firm energy commitment to NECEC:

1) **Buy:** Purchase energy directly from other markets.

2) **Divert:** Reduce energy sales into other markets.[35]

3) **Upgrade:** Invest in existing hydroelectric facilities to obtain higher maximum output levels.

4) **Build:** Invest in new impoundments and associated hydroelectric facilities to increase system output.

Hydro-Québec's response to the RFP indicated that Hydro-Québec would use only existing facilities; there would be no upgrades or new facilities required to meet the requirements in the contracts.[36] A new license with the NEB also would have to use existing facilities or be subject to an extensive environmental impact review. According to

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[34] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Technical Conference Transcript (Sep. 19, 2018), pp. 21-25.

[35] Rob Ferguson, The Star, "Ontario signs deal for electricity from Quebec in bid to defuse anger over hydro bills," October 21, 2016, https://www.thestar.com/news/queenspark/2016/10/21/ontario-signs-deal-for-electricity-from-quebec-in-bid-to-defuse-anger-over-hydro-bills.html.

[36] HRE Section 83D Application Form, submitted July 27, 2017, pp. 4, 6, 56, and 63.

Hydro-Québec's own study, a new facility would cost more than the contract price for at least the first half of the contract, making it an uneconomic solution at least initially (see Appendix B, **Figure B - 10**). Furthermore, a new hydroelectric facility in Québec would take around 10 years to build, well into the NECEC contract period even if it could be economically justified.

Hydro-Québec would not be able to use the upgrades for NECEC. The response to the RFP explicitly noted that no new upgrades would be required.[37] Furthermore, Hydro-Québec's own load projections indicate that it would need around 6.2 TWh of upgrades to meet incremental load by 2023; additional load growth through 2034 would require the entirety of potential upgrades to keep sales into other markets constant during the 20-year NECEC contract period.[38]

CMP has argued that Hydro-Québec has sufficient water in storage to supply NECEC without diverting sales into other markets.[39] This conclusion, however, is based on the assumption that recent high water conditions will continue; under an assumption of lower runoff conditions, Hydro-Québec would need to divert sales to meet its obligations to supply NECEC (see Appendix B, section B.5). Furthermore, there is no reason why Hydro-Québec would not sell any available energy that it had in the absence of NECEC, subject to economic prices and transmission availability, which is plentiful and has not been fully utilized in the past (see Appendix B, section 8.3).

Therefore, in order to supply NECEC, Hydro-Québec would either have to divert sales that otherwise would occur and/or purchase energy from other markets.

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[37] Ibid., p. 63.

[38] Hydro Québec, Deep Decarbonization in the Northeastern United States and Expanded Coordination with Hydro-Québec, April 2018, pp. 27-28 ("Load in Québec was assumed in all scenarios to grow by 0.42% per year for a total increase of 28.7 TWh between 2015 and 2050."). If, as reported in footnote 5, 144 TWh of hydroelectricity is available, there would be only 13 TWh of additional energy available through upgrades. This amount would be consumed by Québec load growth by around 2034 given the 0.42% load growth assumed by the study.

[39] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Rebuttal Report of Dickinson, et. al., July 13, 2018, pp. 30 – 35.

Key Insight

It would be uneconomic for Hydro-Québec to build new hydroelectric facilities to meet the need of NECEC energy supply under current conditions. This buttresses the case that Hydro-Quebec would not provide new renewable energy and therefore NECEC would not lower greenhouse gas emissions.

Under the Massachusetts contracts, Hydro-Québec receives an energy price that starts at $51.50 / MWh in 2023 and rises to around $82.40 / MWh in 2042. The starting price is lower than the cost of building new facilities which Hydro-Québec assumes to be $70/MWh.[40] Instead, Hydro-Québec would simply divert energy from other markets which have been trading at between $20 and $40/MWh, consistent with futures prices for energy to be delivered into New York (see Appendix B, **Figure B - 12** and **Figure B - 13**). Although upgrades could cost less, those reported upgrades already are required to meet Québec's domestic load growth. Therefore, it would be more economic for Hydro-Québec to divert lower-priced energy sales from other markets into NECEC or greenwash low-priced purchases.[41]

Key Insight

Given the stated source of this energy and economic incentives, the natural source of supply would be a diversion of energy away from other markets.

3. GREENWASHING: SOURCING PURCHASES FROM OTHER MARKETS

Hydro-Québec also could purchase energy from markets with low or even negative prices to meet its energy commitments. The ability to purchase imports in order to conserve water in its reservoirs for use during higher-priced periods creates a profit-maximizing opportunity that Hydro-Québec is uniquely positioned to pursue. The impact on the environment could be the same as if Hydro-Quebec were generating energy in those

[40] Energyzt confirmed that all dollar figures in the Deep Decarbonization study are in US dollars via conversation with Evolved Energy Research, one of the authors of the report.

[41] Hydro-Québec notes in its Section 83D application form that it may upgrade or build new facilities in the future, but that these are not required to supply NECEC. Given Hydro-Québec's need for new capacity, if any upgrades or capacity additions could occur regardless of NECEC, then they should be incorporated into the scenarios with and without NECEC when estimating the impact of NECEC on carbon emissions.

markets from fossil fuels directly. This section describes how Hydro-Québec has engaged in greenwashing in the past and is incentivized to continue to do so in the future.

3.1 Hydro-Québec's strategic plays across markets

The ability to buy-low and sell high is an arbitrage opportunity, and is cited in Hydro-Québec's annual reports as an activity that it engages in along with selling energy into other markets.[42] Hydro-Québec has engaged extensively in such arbitrage opportunities in the past, purchasing nearly 50 percent of its exports in 2010 (Appendix B, **Figure B - 6**). Such purchased energy is likely to include carbon-emitting resources.[43]

This strategy has been a long-standing approach for Hydro-Québec, referenced in 2004 by the Government of Québec:

> Hydro-Québec is able to purchase electrical energy from neighbouring markets at lower prices during certain periods, and then resell it later to neighbouring networks at higher prices. If rainfall conditions permit, and once Québec's own energy security has been guaranteed, Hydro-Québec Production's unused supplies can be exported (net export sales) to neighbouring markets.[44]

While this type of arrangement can help Hydro-Quebec to maximize its profits, it also creates a "greenwashing" situation where Hydro-Quebec can create the perception that its energy is clean and renewable when it is not. Specifically, Hydro-Quebec's interconnectedness would allow the NECEC energy to appear to come from Hydro-Québec's hydroelectric plants when, in reality, such excess energy was only enabled through purchases from fossil fuel plants.

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[42] For example, see 2017 Hydro-Québec Annual Report, Notes to Consolidated Statements, p. 50 of 94.

[43] Many of the surrounding markets have stated objectives to decarbonize the grid in order to achieve lower carbon emissions from the power sector. This decarbonization would make the impact of import/export optimization converge over time.

[44] Minestere des Ressource natuelles, dela Faune et des parcs, Gouvernement du Quebec. 2004. The Energy Sector in Québec, Context, Issues and Questions. p. 41.

3.2 Greenwashing is possible under the contracts

The Massachusetts contracts have no way to monitor, prevent, or penalize Hydro-Québec for engaging in purchases from other markets in order to conserve water in its reservoirs for sale though NECEC. Although the Massachusetts contracts do require Hydro-Québec to "tag" its electrons through the ISO-NE Generation Information System (GIS), the tracking system simply tags imports from Hydro-Québec as coming from a specific hydroelectric facility. However, the GIS does not track Hydro-Québec's total system dispatch or decisions.

Under the contracts with Massachusetts utilities, Hydro-Québec is not required and therefore is unlikely to provide the details for its entire system operations, energy imports and energy sales. Without an understanding of Hydro-Quebec's entire system, it will look as if the Massachusetts utilities are purchasing hydroelectricity when, in fact, those purchases may be enabled by purchases from other markets that allowed Hydro-Quebec to conserve the water in its dams for production when NECEC supply was required.

The inability to track energy flows into and out of Hydro-Quebec's system allows Hydro-Québec to effectively "greenwash" any energy it purchases from other markets and convert it into "clean energy" for purposes of its contracts. At best, Hydro-Québec would be receiving the system mix which would include whatever was operating at the time of the purchases. In reality, Hydro-Québec's purchases from other markets could be enabling carbon-emitting resources to operate when they otherwise would be turned off. For example, low cost coal from New Brunswick or natural gas from New York could be the incremental plant's fuel source that effectively allows Hydro-Québec to purchase from another markets in order to conserve water to service NECEC. Under such conditions, NECEC actually would be increasing fossil fuel use in other markets outside of ISO-NE that would not have occurred in the absence of NECEC.

There is no reason to assume that Hydro-Québec would not engage in the same strategy that it described in 2004, and clearly executed upon from 2008 through 2012, referenced in its annual reports as recently as 2017 and could pursue without penalty under the Massachusetts contracts. As a result, Massachusetts ratepayers would be paying multiples on the market price for something that is not truly Québec hydroelectricity. Hydro-Québec effectively would be an expensive broker purchasing energy that Massachusetts ratepayers otherwise could obtain through competitive markets.

Key Insight

The higher price in the NECEC contract and the inability to accurately account for the Hydro-Quebec system creates perverse incentives for Hydro-Québec to engage in arbitrage opportunities by purchasing cheaper and, potentially, higher emitting energy from other markets to meet the NECEC firm energy supply obligations.

3.3 NECEC energy may not come from Québec

The risk of Hydro-Québec engaging in buy-low/sell-high opportunities is not theoretical. Futures prices in New York for peak hours are trading at around $41/MWh for 2023; off-peak prices would be even lower.[45] It therefore would be economic for Hydro-Québec to divert energy away from New York to sell via NECEC.

The estimated energy price discrepancy between market prices and energy prices in the NECEC contract undoubtedly will incentivize Hydro-Québec to ensure that there is enough water in its reservoirs to meet the requirements of the GIS tracking system and contract requirements to be able to claim that its energy supply via NECEC is "clean energy."[46] Although it would appear that the energy was coming from Québec, it actually would have been sourced from another market either via diversion of exports or purchases from lower-priced markets.

Key Insight

Hydro-Québec has every incentive to arbitrage between markets, and already does so. The lucrative arrangements under the NECEC contract create an even greater incentive for Hydro-Québec to greenwash energy by buying from other markets to supply NECEC.

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[45] CME Group, NYISO Zone A Day-Ahead Peak Calendar-Month 5 MW Futures Quotes, October 11, 2018, https://www.cmegroup.com/trading/energy/electricity/nyiso-zone-a-5-mw-peak-calendar-month-day-ahead-lbmp-swap-futures.html.

[46] The actual price for energy under the NECEC contract has been disclosed to the public as part of the filings to the Massachusetts Department of Public Utilities. The energy price starts at around $51 / MWh in 2023, rising to around $82 in 2043. Adding in transmission charges over NECEC, the delivered energy price in Lewiston starts at $66/MWh, rising to around $103/MWh in 2042. In addition, Massachusetts ratepayers would have to pay for the cost of transmission, including congestion and losses, required to bring the energy from Lewiston, Maine into Massachusetts.

3.4 No guarantee that NECEC would be incremental to New England

The Massachusetts contracts do not guarantee that energy flowing through NECEC would be incremental.

The Massachusetts RFP originally required hydroelectric imports to be "incremental to New England" and required a showing of what Québec's imports into New England has been over the prior three years.[47] The template for the contract included as part of the RFP also included a definition for incremental energy to be delivered:

> "Incremental Hydroelectric Generation" means Firm Service Hydroelectric Generation that represents a net increase in MWh per year of hydroelectric generation from the bidder and/or affiliate as compared to the 3-year historical average and/or otherwise expected delivery of hydroelectric generation from the bidder and/or affiliate within or into the New England Control Area.

However, the final contracts excluded the entire definition of "Incremental Hydroelectric Generation." Although the contract does include penalties for Hydro-Québec's failure to deliver adequate amounts of "clean energy" under the Attachment H to the contract, the penalties are limited, allowing Hydro-Québec to make an economic decision as to how to manage its system to optimize profits taking into account the opportunity costs of sales into other markets versus NECEC.

Key Insight

Hydro-Québec's system characteristics plus the AC transmission connections between those interconnected markets and a contract that does not even have a definition for "Incremental Hydroelectric Generation" makes it difficult to track and ascertain the true source of Hydro-Québec's energy that would flow via NECEC. There is no guarantee that the energy would be incremental. There is no guarantee that it would come from Québec. There is no guarantee that it would be "clean" and there is no guarantee that total carbon emissions would be reduced.

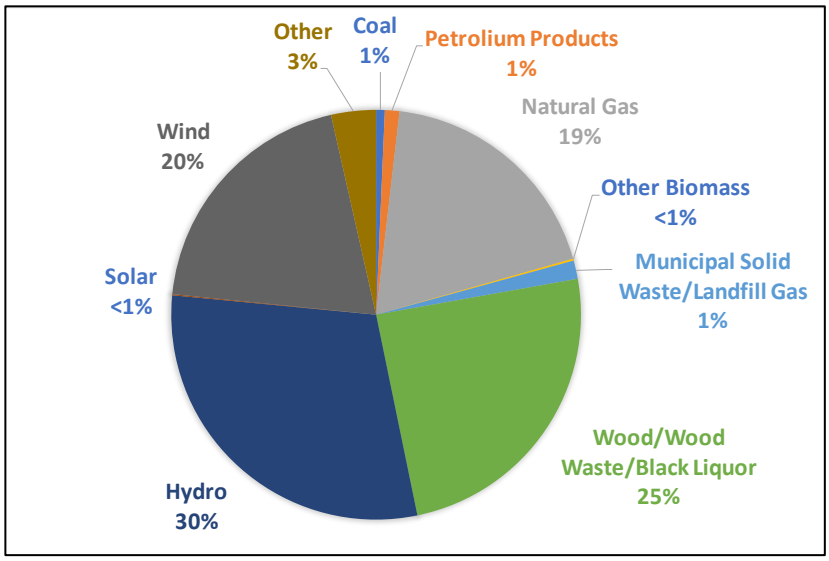
[47] NECEC Section 83D Application Form, p. B (redacted).

4. ADVERSE IMPACT ON MAINE RENEWABLES

Another adverse environmental impact of NECEC relates to its consequences on the development of renewable resources in Maine. According to the U.S. Energy Information Administration, Maine's in-state retail customers consumed around 11.5 TWh of energy in 2016.[48] ISO-NE's load forecasts underlying the 2018 CELT report project that Maine load will total around 13.5 TWh in 2023.[49] Regardless, adding 9.5 TWh to a system with nearly equivalent amount of supply and demand could be extremely disruptive to existing and new resources.

In 2017, approximately 75 percent of the electrical energy produced was from renewable resources (**Figure 4**).[50]

Figure 4: Maine generation mix by fuel type[51]



[48] U.S. EIA, State Profiles, Maine, https://www.eia.gov/electricity/state/maine/

[49] ISO-NE, 2018-2027 Forecast Report of Capacity, Energy, Loads, and Transmission *(CELT)*, http://isonewswire.com/updates/2018/5/8/2018-forecast-of-capacity-energy-loads-and-transmission-is-p.html

[50] U.S. EIA, State Profiles, Maine, https://www.eia.gov/state/?sid=ME

[51] Energyzt analysis of https://www.eia.gov/electricity/data/eia923/ and https://www.eia.gov/state/print.php?sid=ME

Maine frequently exports energy from its diverse system mix to the rest of New England across long transmission lines, especially when natural gas supply is constrained during extreme winter conditions.

According to the US EIA, the amount of Maine-based generation output declined over the past decade partially due to increasing imports from Québec.

> Maine's Renewable Portfolio Standards (RPS) require electricity providers to fuel 30% of their electricity generation with renewable resources. In addition to policy initiatives, electricity imports from Canada—notably from **Quebec—have been contributing an increasingly larger share to Maine's total generation, displacing natural gas-fired generation as the primary source. Since 2012, electricity imports from Canada have more than tripled**, increasing from 0.8 GWh in 2012 to 2.7 GWh in 2017.[52]

(emphasis added).

NECEC would bring even more Québec imports directly into Maine and would have adverse impacts on existing and future renewable developments in Maine. Existing renewable resources – primarily biomass and hydroelectric dams in Maine – could face reductions to energy margins as a result of NECEC. New renewable developments would face higher costs to connect and higher price premiums, making them less competitive than potential similar renewable developments in other New England locations outside of Maine.

4.1 Reduced operating margins

Adding around 9.5 TWh into Maine's system would have adverse consequences for Maine's existing renewable resources, particularly biomass and hydroelectric generators. NECEC would decrease energy prices that those plants receive from ISO-NE for energy they generate and reduce the energy margins required to keep the plants operational.[53]

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[52] US EIA, Natural Gas Weekly Update, "Renewables surpass natural gas as the primary electricity-generating source in Maine," https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2018/09_27/.

[53] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Exhibit No. TLB-1, Prepared Surrebuttal Testimony of Tanya L. Bodell, August 17, 2018, p. 8.

The total impact of potentially lower prices would be less than 0.6 percent of an average Maine residential ratepayer bills.[54] Most of the decrease in energy prices to Maine ratepayers would be due to increased congestion and losses tied to transporting so much more energy out of Maine into the rest of New England.[55] In effect, the majority of any potential energy price reduction resulting from NECEC is due to inefficiencies tied to the higher waste of energy through increased losses.[56]

Key Insight

NECEC would adversely impact existing renewable resources in Maine for very little economic and carbon emissions benefit.

4.2 Higher costs for Maine renewables to connect to ISO-NE

A recent study performed by ISO-NE estimated that there is currently around 200 MW of capacity available for new renewables to connect in Western Maine and an additional 600 MW of estimated transmission capacity that can be accessed with upgrades.[57] NECEC's Section 83D Application Form claims that it can increase the capacity at the Surowiec-South line with upgrades by 1,000 MW. Regardless, the fact that NECEC would use the 200 MW of existing headroom and add only the incremental amount it requires leaves little excess transmission capability for Maine renewables under development.[58]

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[54] This calculation assumes a delivered retail rate of around $130/MWh.

[55] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Exhibit No. TLB-1, Prepared Direct Testimony of Tanya L. Bodell, April 30, 2018, Figure 8, p. 23.

[56] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Technical Conference, September 7, 2018, pp. 37, 50, 53, 68. See also EXM-004-006_Uplan Results.xlsx.

[57] ISO-NE, Maine Renewable Integration Study,

Central Maine Power Co., Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Exhibit No. NECEC-36 originally submitted as Attachment 1 to CMP-014-001.

[58] This argument was posed by Francis Pullaro from RENEW in his submission on April 30, 2018, to the *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232.

Furthermore, congestion would simply shift from the Surowiec-South Interface to the Maine-New Hampshire Interface, where no new upgrades are planned.[59] The Maine-New Hampshire Interface currently allows for up to around 1,900 MW of energy flows at any point in time. The addition of NECEC pushes those flows to the maximum level more often, increasing losses and congestion charges.

In addition, NECEC increases losses that would be incurred by all generators in Maine. Losses represent wasted energy that is lost because of transmission line inefficiencies. As current increases, losses increase by the square of the energy flows. The exponential relationship ensures that losses increase as flows increase. Higher losses mean that more energy has to be produced to deliver the same amount to demand.

In ISO-NE, this translates into a lower price for energy produced at the generator site in Maine. Lower prices are a market signal that discourages new generation plants from being built. Therefore, NECEC's adverse impact on losses and congestion effectively will send the signal to renewable resource developers that they should not build in Maine, all else equal.

Currently, several western Maine renewable developments are in front of NECEC. Some of the renewable resource developments slated for northern Maine already have fallen behind NECEC in the queue as of May 22, 2018. Although the renewable developments in front of NECEC would not face higher upgrade costs, CMP in its Section 83D Application Form noted that it expects to supersede most of the Maine renewable resources in the ISO-NE queue:[60]

> These other generation projects are instead being evaluated as part of the ISO-NE MRIS in a "clustered" basis. As discussed in Section 6.9, CMP believes that these projects will fall below the NECEC Transmission Project in the queue through the cluster study process that ISO-NE is seeking to implement, thereby leaving the NECEC Transmission Project only behind

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[59] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Exhibit No. TLB_1, Testimony of Tanya L. Bodell, April 30, 2018.

[60] Both the northern and western clusters were ahead of NECEC in the queue when it issued its proposal in response to the Massachusetts Clean Energy RFP. Since then, the northern cluster did not fund a cluster study and fell behind NECEC in the queue.

> the three queue projects included in the NECEC system impact study performed by the Avangrid transmission planning group.[61]
>
> . . .
>
> Should each of these projects decline to commit to fund the necessary transmission upgrades in order to participate in the cluster study, they will drop down in the queue (or drop out entirely), thereby significantly reducing the number of projects holding queue positions before the NECEC Transmission Project and expediting the timeline for ISO-NE to complete the required system impact studies for the NECEC Transmission Project.[62]

For those renewable resources that are behind NECEC in the queue, the net impact would be increased costs for Maine renewable resources to upgrade transmission as part of their interconnection requirements if NECEC were to proceed. Such renewable resources would be deferred or delayed – potentially indefinitely – with a lost opportunity to create a net reduction in carbon emissions.

Key Insight

Because of the increased cost of upgrading transmission due to the NECEC, development of renewable resources in Maine could be deferred or indefinitely delayed.

5. IMPLICATIONS FOR CARBON EMISSIONS

Given the interconnectivity of Québec and New England, the analysis of NECEC's impact on carbon dioxide emissions must extend beyond the boundaries of New England to other interrelated markets. Such an analysis requires a detailed production cost model that can run a projection of what the markets would do with and without NECEC and the associated diversion of Québec excess energy exports.

Two studies are in the public domain that apply two different production cost models to analyze the impact of carbon dioxide emissions under the assumption that total excess

[61] NECEC Section 83D Application Form, p. 83, footnote, 21.

[62] Ibid., p. 85.

energy available for export into other markets by Hydro-Québec is held constant:[63]

- **Energyzt Analysis:** Assessment of the impact of NECEC on carbon emissions, presented in the testimony of James M. Speyer before the Maine PUC Docket No. 2017-00232, April 30, 2018; and

- **ESAI Study:** "Analysis of Greenhouse Gas Emissions Impacts: New Class I Resources vs. Existing Large Hydro," Prepared for GridAmerica Holdings, Inc., September 2017, focused on the impact of Northern Pass Transmission.

Even though the ESAI study examines the impact of Northern Pass Transmission, the findings are relevant to NECEC which is a similar type of project that includes a new 1,200 MW transmission line between Québec and New England, as well as around 9.5 TWh of baseload energy flows from Hydro-Québec under contract with the Massachusetts utilities.

These studies make four significant conclusions that are consistent with the discussion above:

1) **Excess energy is the same with or without a new Intertie (e.g., NECEC or Northern Pass):** Hydro-Québec exports into other markets are limited by water availability, not transmission delivery capability. Therefore, the total amount of excess energy that Hydro-Québec has available to sell into external markets will remain the same with or without NECEC.

2) **Hydro-Québec would divert external sales to meet new energy requirements:** In order to meet new firm energy requirements associated with a long-term power purchase agreement to be delivered over a new tieline such as NECEC or Northern Pass, Hydro-Québec would reduce energy sales into other markets.[64]

3) **Higher carbon emissions elsewhere offset the impact in New England:** As a

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[63] Interestingly, both CMP's expert (Daymark) or the Maine PUC Expert (London Economics) calculated the impact on carbon emissions for New England only, and did not present an estimate of how NECEC would impact total carbon emissions across other markets that would be impacted by NECEC.

[64] The Maine PUC Technical Expert, London Economics Incorporated, makes the same assumption for purposes of its analysis of the NECEC Minimum Offer Price Rule. *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Transcript (Sep. 19, 2018).

result of Hydro-Québec's diversion of energy sales from other markets into New England via a new transmission line from Québec, carbon dioxide emissions would be higher in other markets from which energy sales are diverted.

4) **The offset in other markets could result in higher total emissions in some years:** The amount by which carbon emissions would exceed the savings in New England depends on where Québec sources its energy. However, it is NECEC could result in higher total carbon emissions than otherwise would occur if the transmission line were not to proceed.

Each of these points is elaborated upon below with respect to the impact on total carbon dioxide emissions from importing Québec hydroelectricity across a 1,200 MW HVDC transmission line into New England.

5.1 Excess energy is the same with or without a new intertie

Both the Energyzt Analysis and the ESAI Study conclude that Hydro-Québec has a limited pool of excess energy that already is and would continue to be optimized subject to constraints such as water conditions, reservoir management decisions, and firm commitments.

Intertie capacity into other markets is not a constraining factor. Both studies conclude that it is economical for Hydro-Québec to export all of its surplus energy and that Hydro-Quebec has a low marginal cost of production and sufficient transmission capacity into external markets to continue to do so going forward. Therefore, a new intertie merely allows Hydro-Québec to access a higher-priced, long-term contract market in Massachusetts and is not necessary to transport clean energy that otherwise would be wasted.

The total amount of excess energy available to Hydro-Québec to sell into other markets varies between the studies, but would be somewhere between 33 to 38 TWh per year, of which between 20 and 25 TWh would be exported to the United States in the base case.[65] Hydro-Québec's own study assumes that exports to the U.S. would remain constant at

[65] ESAI provides a projection for 2017 to 2026 that ranges from 36.2 to 38.2 (ESAI, p. 5). The Energyzt Analysis projects that there would be 33.5 TWh in 2023 if purchases were reduced to reflect Romaine-3 coming online.

22.4 TWh without a build-out of new hydroelectric facilities.[66]

The Technical Expert of the Maine PUC estimates that the amount of firm energy that would be available to flow into the US would total 21.5 TWh in 2021 based on a supply and demand comparison.[67] Existing transmission lines would allow for the entirety of this amount of excess energy to be sold into US markets. Therefore, there appears to be consensus about the amount of excess energy that Hydro-Québec would have available for sale into the United States. Regardless of the estimate, the NECEC energy supply obligation of up to 9.4 TWh would be a sizable portion of any available excess energy that Hydro-Québec would sell.

Key Insight:

A new transmission line from Québec into New England such as NECEC would not create an incremental increase in total exports of hydroelectric power from Quebec into other markets.

5.2 Hydro-Québec would divert exports to meet new energy requirements

Accepting that Hydro-Québec's excess energy is the same with or without a new intertie, each study applies a different methodology to divert energy from other markets into the new intertie.

The Energyzt Analysis used historical averages for the base case flows from Québec into the U.S.. Assuming that exports to the U.S. would remain the same, the Energyzt analysis then removed the equivalent of the NECEC flows from New York into NECEC, starting with the lowest-priced hours first.

ESAI created a base case that: 1) held contractual flows fixed; and 2) applied the remaining excess energy into the highest priced markets during the highest-priced hours first, followed by the next highest priced hours/markets until the surplus energy was allocated. For the case with a new transmission line and flows from Québec, ESAI then reallocated energy from the base case starting with the lowest-priced hours in the lowest-priced markets first. The result is that energy tends to be diverted predominantly from

[66] Deep Decarbonization Study, p. 30.

[67] See *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, London Economics response to GINT-001-049.

New York and Ontario into Northern Pass.[68]

The models were then rerun with the reallocated energy to calculate total carbon dioxide emissions generated by each power plant in the model.

5.3 Higher carbon emissions incurred elsewhere offset emissions in ISO-NE

In both analyses, higher emissions in other markets resulting from Québec's diversion of exports into those markets offset the impacts from the proposed transmission line and Québec energy supply in New England. A comparison of the results of the two analyses for 2023 under projected low gas price and low carbon price conditions is presented in **Figure 5**.

Figure 5: Impact on carbon emissions in 2023 under low gas and low carbon prices

	Change in Carbon Emissions by Market (Million MT)	
Market	**ESAI Analysis[69]**	**Energyzt Analysis[70]**
New England	(2.4)	(3.3)
NYISO	1.0	2.3
PJM	0.1	0.5
MISO	0.2	0.5
Ontario	1.0	0.1
TOTAL Across Markets	**(0.1)**	**0.1**

[68] ESAI, Table 5, p. 15.

[69] ESAI Study, Table 5, p. 15. For comparative purposes, the signs have been switched. ESAI denotes decreases in carbon emissions as a positive number whereas Energyzt denotes it as a negative value. In addition, the ESAI results were presented in short tons and converted to metric tons for comparison with the Energyzt Analysis results using a conversion rate of 0.9072 metric tons per one short ton.

[70] *Central Maine Power Co., Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232,* Exhibit No. JMS-4.

Key Insight:

Under low natural gas and low carbon price conditions, an increase in carbon emissions from the diversion of Québec exports from other markets into a transmission line into New England offsets the impact from the proposed transmission line and Québec energy supply into New England, resulting in no net impact, and in the case of the Energyzt Analysis, results in an increase in total carbon emissions.

The impact that NECEC has on total carbon emissions will depend on market conditions. The Energyzt analysis also examined an alternative case of high natural gas prices and high carbon prices that were assumed by the NECEC expert in its application to the Maine PUC. Under those conditions, carbon dioxide emissions in New England would be lower than the low natural gas-price case due to the fact that less efficient units would be more expensive and therefore displaced by operating the more efficient units more often. Under this scenario, diverting exports from Québec from New York into Massachusetts tends to have a much greater impact on carbon emissions, resulting in an increase in total carbon emissions of 0.4 million metric tons in 2023 (**Figure 6**).

Figure 6: Carbon emissions impact in 2023 under high gas and high carbon prices

State/Region	Carbon Emissions (Million MT)		Net Carbon Emissions Impact (Million MT)
	No NECEC	With NECEC	
ISO-NE	26.8	23.8	(3.0)
NYISO	25.8	28.1	2.3
PJM	396.8	397.8	1.1
MISO	351.0	350.9	(0.1)
Ontario	3.6	3.7	0.1
Total	**804.0**	**804.4**	**0.4**

As noted in the Energyzt testimony summarizing the results of the analysis, the increase in total emissions is the equivalent of building "a new 250 MW combined cycle gas power plant running at a 40 percent capacity factor or average emissions from around 80,000 automobiles averaging 4.75 metric tons of carbon emissions over the course of a year."[71]

[71] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Exhibit No. JMS-1.

Key Insight:

Under conditions of higher natural gas prices and higher carbon prices, carbon emissions could increase.

In summary, NECEC would have a negligible impact on total carbon emissions and could even increase them when the effect on other markets is considered. Hydro-Québec's diversion of energy exports from other power markets to service NECEC results in incremental carbon emissions as power plants in those markets fire-up generators to make up the missing energy flows. In effect, there is no net impact to carbon emissions, and possible adverse consequences, when Hydro-Québec diverts its surplus energy resources into NECEC.

6. ANALYSIS OF GREENWASHING POTENTIAL USING CMP's MODEL

As part of the Maine PUC hearing, CMP offered a model to assess the ability of Hydro-Québec to meet its NECEC obligations while maintaining exports at historical levels. The model purports to determine whether or not Hydro-Québec's sales via NECEC can be incremental.[72]

The simplistic model suffers from three fundamental flaws (described in more detail in Appendix B):

1) **The CMP Model Answers the Wrong Question:** The real question is whether NECEC reduces global emissions, and the CMP model does not address this question at all. To do so would require an analysis of what carbon emissions would be with and without NECEC, which the model does not do.

2) **CMP Assumes a Sudden Availability of Incremental Exports:** CMP assumes that Hydro-Québec does not sell its excess energy into other markets unless NECEC is built. In fact, there is plenty of excess transmission capacity servicing the interconnected markets that Hydro-Québec could use to sell its excess energy that currently is stored in its reservoirs and the incentive to do so prior to NECEC coming online.

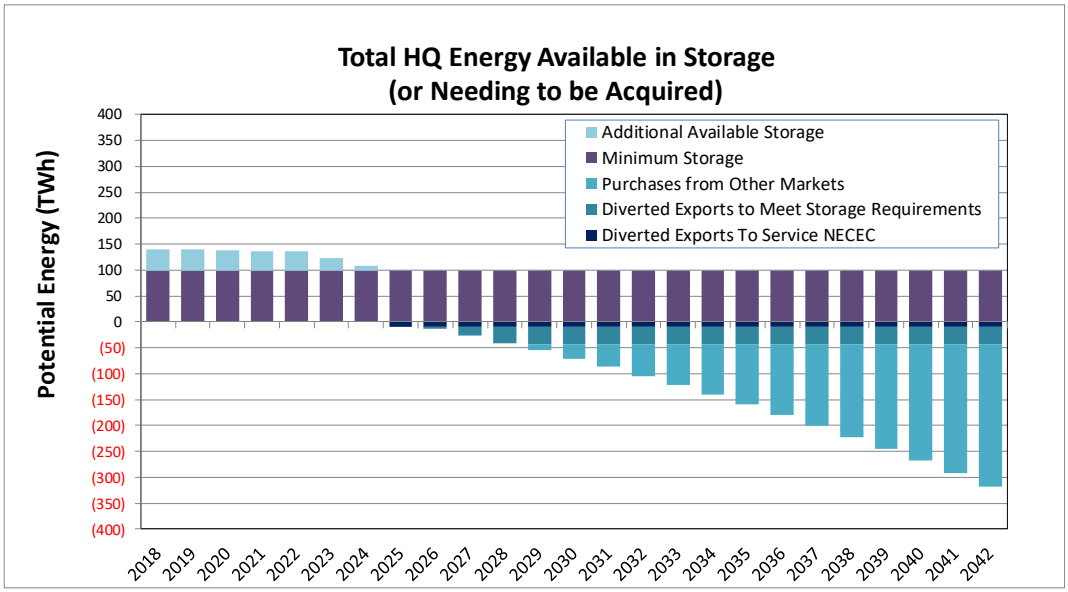
3) **Sensitivity to Key Assumptions:** The model is incredibly sensitive to key

[72] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, CMP Response to NRMC-032-021, Attachment 1.

assumptions, including how much runoff would Hydro-Québec receive. CMP implicitly assumes high water conditions that have been experienced in 2017 and the years before will continue for the entirety of the contract, allowing for high levels of energy availability that allows incremental exports compared to historical levels. Making a small adjustment to this assumption has a significant impact.

Adjusting a single assumption -- the assumed availability of water and potential generation output by only six percent to reflect lower runoff than the high water conditions experienced in 2017, it is clear that Hydro-Québec would not be able to service NECEC without diverting energy from other markets and engaging in greenwashing through purchases from other markets (**Figure 7**).

Figure 7: Hydro-Québec operations per the CMP Model with lower runoff



In reality, Hydro-Québec is not confined to a single strategy over the course of the contract. Hydro-Québec will manage its system, sales, exports and opportunities according to water conditions and market prices. NECEC simply imposes another fixed obligation onto the system against which Hydro-Québec will optimize its operations. Such optimization will include diverting sales into other markets and greenwashing, as required to optimize profits.

This activity is allowed under the "clean energy" contracts with Massachusetts utilities.

7. CONCLUSION

Under the terms of the contracts with Massachusetts utilities, Hydro-Québec would not be precluded from purchasing energy from other markets to sell directly into NECEC or for purposes of conserving water in its reservoirs for future supply to NECEC at a later time. Massachusetts utilities would have no ability to monitor or prevent this possibility from occurring. Massachusetts ratepayers effectively could be paying above-market prices for power from existing resources outside of Québec that provide no incremental environmental benefit and could even increase carbon emissions.

CMP's own model of the Hydro-Québec system does not include realistic assumptions. Adjusting the model to reflect lower runoff conditions and an objective of maintaining exports at historical levels illustrates a realistic scenario under which Hydro-Québec would have to divert energy and engage in greenwashing behavior. Under these conditions, Hydro-Québec would have to do both in order to maintain exports at 2017 levels.

Hydro-Québec's sales via NECEC do not have to be incremental to Québec's historical hydroelectric generation sales into New England. The energy does not have to be incremental to what Hydro-Québec otherwise would sell into other markets. There is no guarantee that Massachusetts ratepayers would receive 100% "clean energy" given the greenwashing game that Hydro-Québec is able to play. There is no guarantee that the environment would receive a net reduction in carbon emissions; total carbon emissions in other markets could increase to a level that any reduction in New England carbon emissions would be negated or even exceeded. If NECEC were allowed to proceed, the only guarantee is that Québec would receive billions of dollars in future dividends and Maine's renewables industry will be adversely impacted.

It is unlikely that NECEC will benefit the climate. At best, the NECEC could have negligible impact on global greenhouse gas emissions. However, there are a number of conditions under which NECEC actually could increase global carbon emissions as Hydro-Québec engages in profit-maximizing behavior around its firm rights to capacity on the NECEC transmission line and contracts with Massachusetts utilities.

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APPENDIX B:
OVERVIEW OF QUEBEC'S ELECTRICITY SYSTEM AND EXPORTS

Hydro-Québec owns and operates a large system of hydroelectric generation and other power generating capabilities along with an extensive transmission network. Hydro-Québec's generating capacity in 2017 was 37,309 MW from 87 generating stations. Additional sources, such as wind, solar and purchases from third parties create total nameplate capacity of 47,857 MW.[1]

In understanding what electricity products are likely to be sold via NECEC, it is important to distinguish between energy and capacity. Capacity is provided by existing or planned generating plants that could be available to generate electrical energy when needed. Energy is the electricity that flows when those generating plants are operating. The distinction is important because the contracts with Massachusetts are for energy – not capacity.[2]

Furthermore, the contracts are for firm energy; firm energy that is not backed by capacity needs to be firmed with another resource – in this case, Hydro-Québec's ability to optimize energy purchases and sales across its four system interties. This section explains further why the contracts with the Massachusetts utilities are for firm energy only and the implications for greenwashing and carbon emissions.

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[1] Hydro-Québec - TransÉnergie, Plan Directeur, 2020, http://www.hydroquebec.com/data/transenergie/pdf/hqt-plan-directeur-2020.pdf

[2] Although the contracts require Hydro-Québec to attempt to qualify to provide capacity into the ISO-NE market, there is no penalty if such capacity is not available or does not clear the market (see NECEC-16, section 7.5., "For the avoidance of doubt, but without limiting the condition set forth in Section 3.4(b)(ii), **Seller shall have no obligation during the Services Term** to pay for such Network Upgrades or **to complete the Forward Capacity Auction qualification process**" (emphasis added).

B.1 QUÉBEC'S CAPACITY

In order to meet reliability standards, each region is required to maintain an amount of generating resources above its maximum demand for power. In Québec, where the system peaks in winter, Hydro-Québec strives to maintain a level of installed and purchased capacity above its winter peaking load. Targeted reserve requirements are 12.9 percent above peak demand.[3] However, waterflow is at its lowest during the winter months, requiring Québec to rely on stored water in its reservoirs to produce energy in addition to its normal flows. Its energy production capacity is limited by its available generation capacity and reservoir levels.

The North American Electric Reliability Council (NERC) projects that Québec will be short of its required reserve margins by 2024 unless another 1,100 MW of prospective resources are obtained.[4] Québec is not in a position to sell 1,200 MW of capacity into New England or any other market during the winter months. If anything, Québec will need to purchase that level of capacity resources from other markets to meet its required reserve margins. Assuming that NECEC will provide 1,090 MW of capacity into New England results in an immediate shortfall for Québec against its targeted reserve margins, as shown in **Figure B-1**.[5]

This is particularly problematic for New England which requires capacity to be sold year-round. In other words, Québec will not be in a position to commit capacity into New England via NECEC– which is why the contracts with Massachusetts are for firm energy only. Therefore, Québec either would have to withdraw its current capacity sales into New England and New York to meet its own reserve requirement

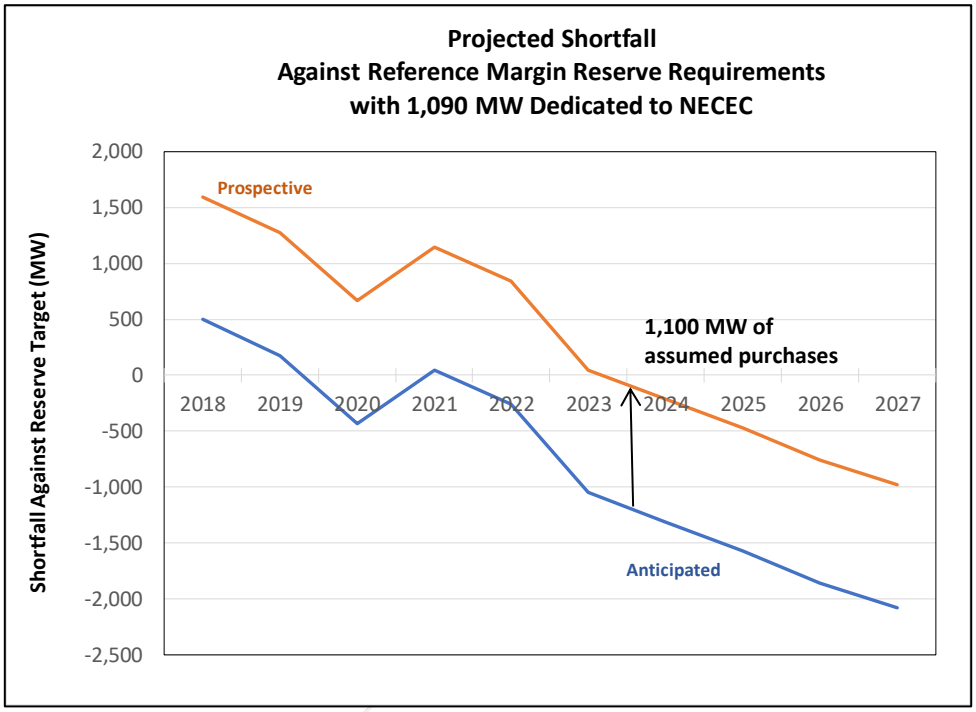
[3] NERC, 2017 Long-term Reliability Assessment, pp. 55.

[4] NERC, 2017 Long-term Reliability Assessment, pp. 55-56, Under the prospective scenario, a total of 1,100 MW of expected capacity imports are planned by the Québec area, although these purchases have not yet been backed by firm long-term contracts. https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_12132017_Final.pdf

[5] NERC, 2017 Long-term Reliability Assessment, pp. 53-54. Ontario will not be in a position to renew the current sale of 500 MW of capacity to Québec. However, the Maritimes, New York and New England are projected to have excess capacity that could be sold to Québec.

levels or optimize its purchases and sales of capacity across the interconnected markets. NECEC could be used to meet Québec's shortfall in capacity, not the other way around.

Figure B - 1: Hydro-Québec shortfall against reserve margins with NECEC[6]



NOTE: Anticipated resources reflect what already exists or is being built; prospective resources include potential purchases that could be used to meet the targeted levels.
Reference Margin Level = Installed Reserve Margin Requirement

Therefore, if Québec is going to build any new upgrades or new impoundment structures, it would be because of its own need for new capacity, not to service other markets. Those additional capacity investments would occur regardless of NECEC.

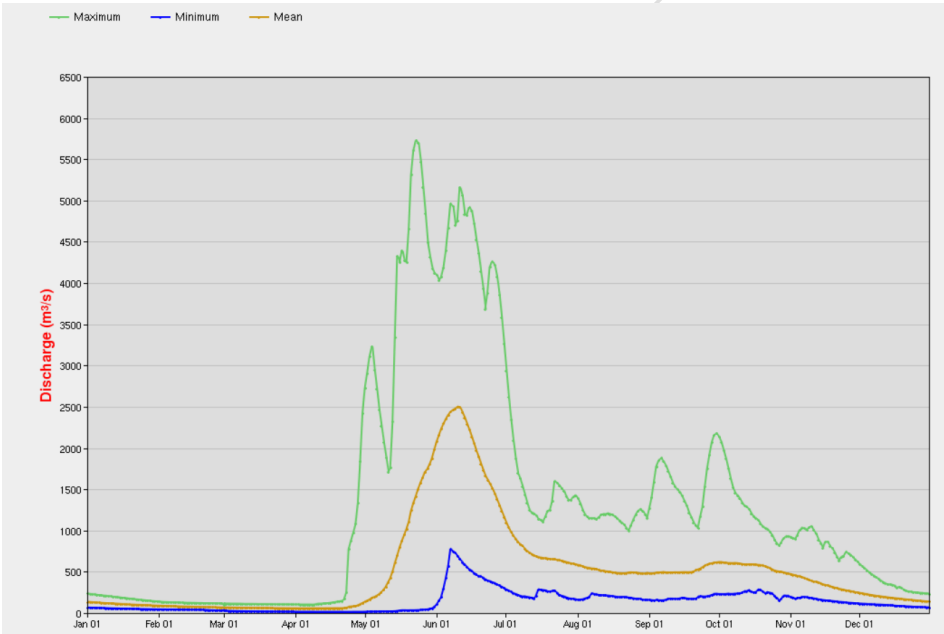
[6] NERC, 2017 Long-Term Reliability Assessment, p. 55 adjusted for 1,090 MW reduction for potential NECEC commitments.

B.2 HYDRO-QUÉBEC'S ENERGY

The shortfall in capacity does not correspond to a shortfall in energy because Québec can store water to generate excess energy across the year whereas capacity requirements are an instantaneous need at the point of peak demand on the system. Québec's generation capacity is dominated by large hydroelectric generation, some renewable resources predominantly purchased from third parties, and small percentage of thermal plants located in remote regions.

Given the natural flows of precipitation and snow melt in Québec, the province is flush with water in the late spring and summer months (**Figure B - 2**). That water is used to produce energy as well as to replenish the reservoirs for the winter.

Figure B - 2: **Daily flow for Baleine River (1956 – 2013)**[7]

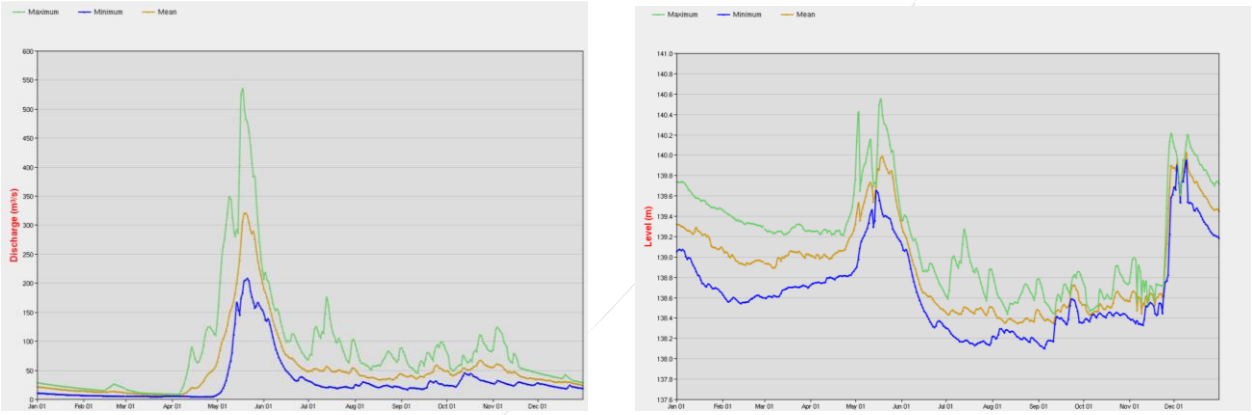


[7] Government of Canada, Hydrometric Flow Data, Daily Discharge Graph for BALEINE (RIVIERE A LA) À 40,2 KM DE L'EMBOUCHURE (03MB002) [QC], https://wateroffice.ec.gc.ca/mainmenu/historical_data_index_e.html

Reservoir management is a critical function of Hydro-Québec, which must meet its firm commitments while balancing between ensuring that reservoir levels do not drop below optimal levels for production in the winter and early spring while ensuring that snow melt does not exceed reservoir capacity and spill in the summer months. **Figure B - 3** illustrates the management of reservoir levels versus average snowmelt for Churchill Falls, the largest single resource that Hydro-Québec Power has access to (5,428 MW under contract). Although waterflows are negligible November through March and peak in May and June, reservoir management allows Hydro-Québec to draw down on its reservoirs during the winter periods and maximize generation during peak periods as require.

Figure B - 3: Daily discharge for Churchill Falls (2009 – 2014)[8]

Water Flows **Water Levels**



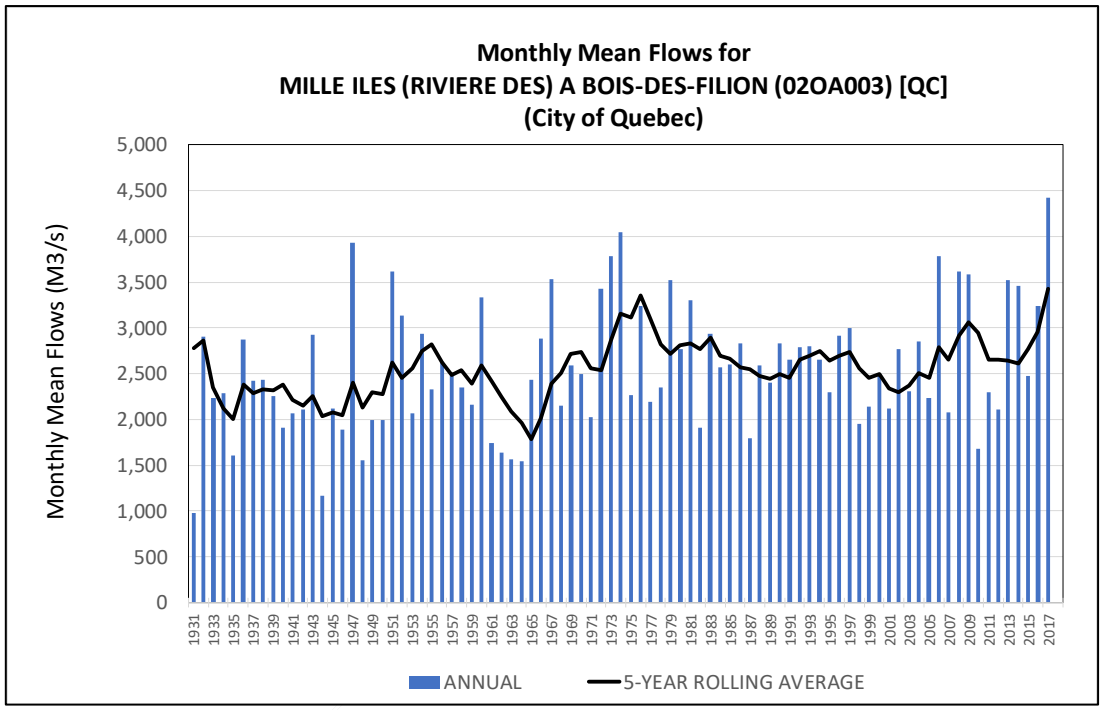
Hydro-Québec also manages its reservoirs to ensure that potential energy is optimized. If reservoirs cannot be too low or the water will fall below the generator intake tunnels, preventing the production of electricity. If too high, water may have to be spilled – released through upstream chutes without producing electricity. Reservoir management allows Hydro-Québec to manage the energy available in its system over multiple years.

The ability to manage across multiple years is important as the average precipitation varies on a year-by-year basis, as illustrated above with the range of water flows at Baleine

[8] Government of Canada, Hydrometric Flow Data, Daily Discharge Graph for CHURCHILL RIVER ABOVE CHURCHILL FALLS TAILRACE (03OD008) [NL], https://wateroffice.ec.gc.ca/mainmenu/historical_data_index_e.html

and Churchill Falls. **Figure B - 4** shows variation in monthly flows at Québec City, the location with the most consistent records of monthly water flows. The bars are annual water flows; the line represents a 5-year rolling average for the past 90 years. As can be seen, 2017 was a record water flow year and the five-year average flows ending 2017 exceed the previous high set in 1976.

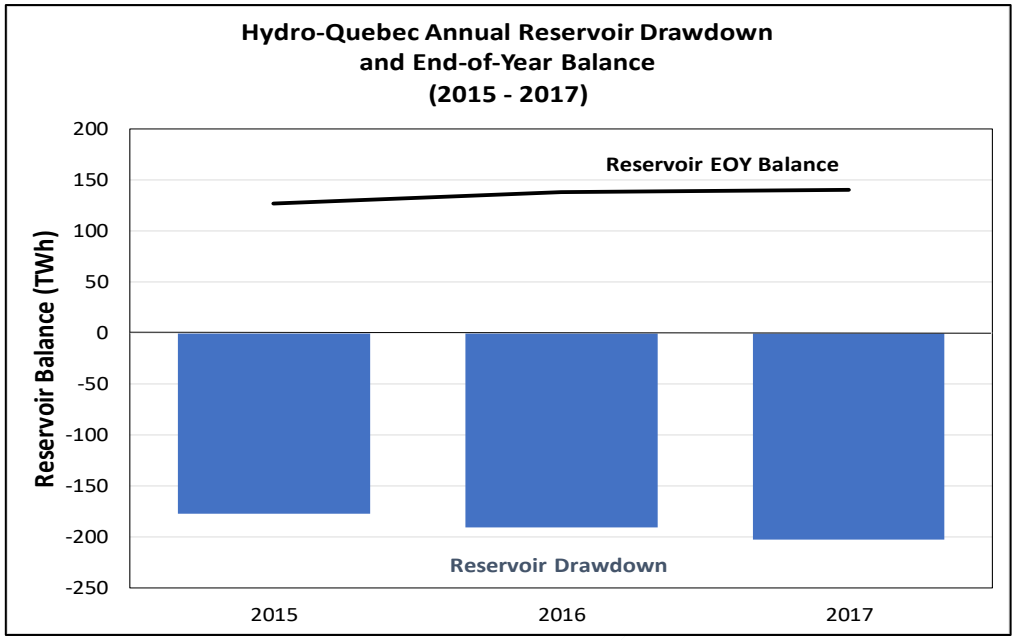
Figure B - 4: Daily flows for Québec City (1931-2017)[9]



The high precipitation and flow levels required significant drawdown on its reservoirs to maintain levels below maximum. Despite the increasing draw-down, year-end levels remained higher in 2017 than at the end of the previous three years (**Figure B - 5**). This is indicative of heavy water conditions through precipitation and snow melt.

[9] Government of Canada, Hydrometric Flow Data, Daily Discharge Graph for Monthly Discharge Statistics Data for MILLE ILES (RIVIERE DES) A BOIS-DES-FILION (02OA003) [QC], https://wateroffice.ec.gc.ca/mainmenu/historical_data_index_e.html

Figure B - 5: Hydro-Québec reservoir draw-down (2015-2017)[10]



Hydro-Québec's annual reports support the fact that 2017 and the prior years experienced high runoff conditions.

<u>Per the 2017 HQ Annual Report:</u>

> In 2017, net electricity exports reached a historic volume of 34.4 TWh and contributed $780 million to net income. As a result of an effective sales strategy, smooth operation of generating and transmission facilities **and <u>high runoff</u>**, net exports increased by 1.8 TWh over the previous record, set in 2016.[11]

(emphasis added).

[10] Calculated based on Hydro-Québec Annual Reports.

[11] Hydro-Québec Annual Report 2017, p. 22.

Per the 2016 HQ Annual Report:

> EXPORTS REACH A HISTORIC HIGH Net electricity exports rose by 3.3 TWh compared to 2015, reaching a historic high of 32.6 TWh and contributing $803 million to net income. This is a 1.8-TWh increase over the previous record, set in 2013, made possible by the smooth operation of generating and transmission facilities, in particular, **as well as high runoff and favorable weather conditions**. These factors, combined with the skillful development and deployment of the sales strategy, enabled the company to take advantage of business opportunities on external markets. The record volume of exports is all the more remarkable given the unavailability of a major power transmission link between Québec and New England in April and May 2016 due to scheduled maintenance. Finally, **because of the high runoff in 2016**, Hydro-Québec ended the year with record reservoir storage of 138.2 TWh.[12]

(emphasis added).

These annual reports also make it clear that variability in runoff is one of the key uncertainties and one which Hydro-Québec manages in various ways:

> **One of the principal uncertainties that Hydro-Québec faces relates to natural water inflows . . . It therefore manages its reservoir storage on a multiyear basis and maintains an adequate margin between its generating capacity and its commitments.** This allows the division to compensate for variations in runoff, replenish its reserves or take advantage of business opportunities.[13]

(emphasis added).

[12] Hydro-Québec Annual Report 2016, p. 25.

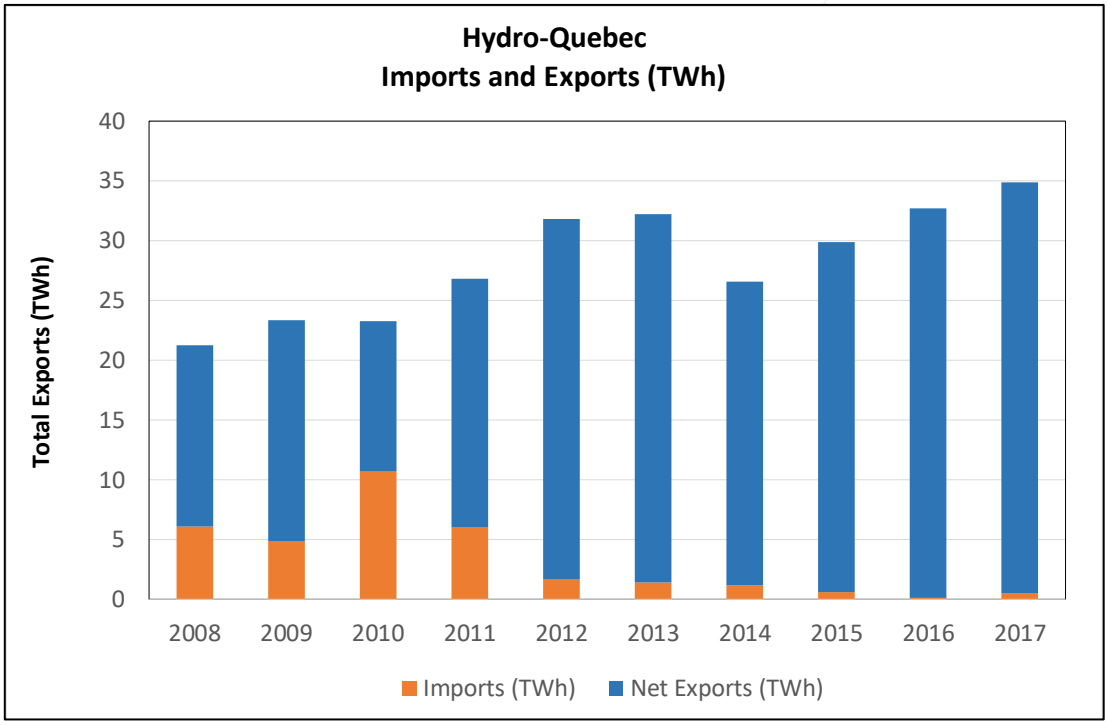
[13] Ibid., pp. 42, 44.

B.3 HYDRO-QUÉBEC'S EXPORTS

Given the extensive water flows that had occurred in 2017 and the previous five years, it is not surprising that Hydro-Québec exported a record amount of energy at around 34. 4 TWh for 2017. This record amount included annual snowmelt as well as significant draw-down of its reservoirs to maintain appropriate reservoir levels. In addition, Hydro-Québec imported less energy than it had in the past.

Hydro-Québec's annual reports show the historical amount of excess energy it has sold into external markets, net of imports (**Figure B - 6**).

Figure B - 6: Hydro-Québec total exports and imports (2008-2017)[14]



In general, Québec has excess energy over the course of the year that it can sell into other markets at a profit. This was especially true during the past five years when water flows

[14] Calculated based on Hydro-Québec Annual Reports.

were particularly heavy. During the mid- to late-2000s, when water flows were not as heavy, Hydro-Québec exported less and purchased from other markets. Between 2008 and 2012, imports were approximately one-third of Hydro-Québec's total exports; in 2010, Hydro-Québec purchased nearly half of the energy that it exported.

The percentage of imports as a portion of exports has declined over the past few years, as a combination of heavier water conditions and increased capacity build-out has allowed Hydro-Québec to engage in greater export transactions without purchases. However, history shows that Hydro-Québec is in a position to arbitrage between markets – buying low-priced energy from one market and selling stored reservoir water converted into energy into higher-priced markets.

Figure B - 7: Sales Outside of Québec in 2017[15]

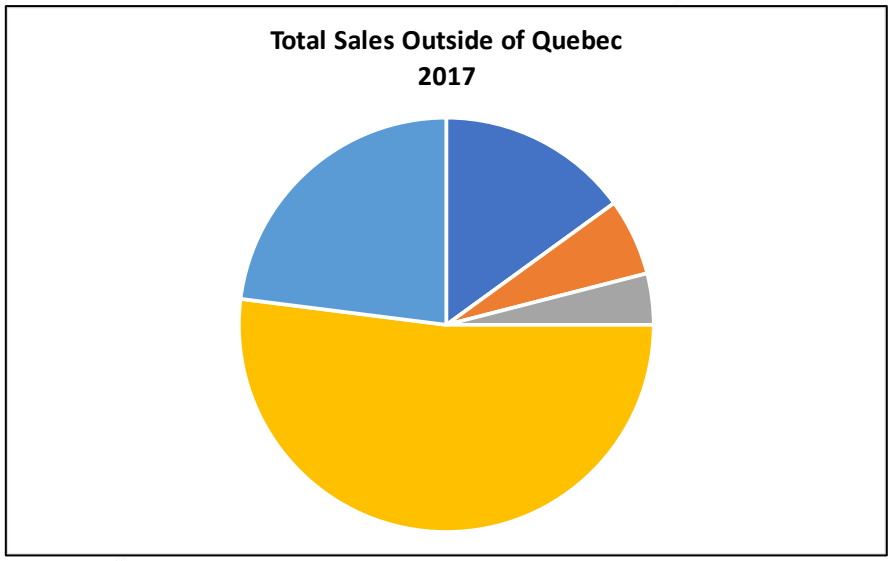
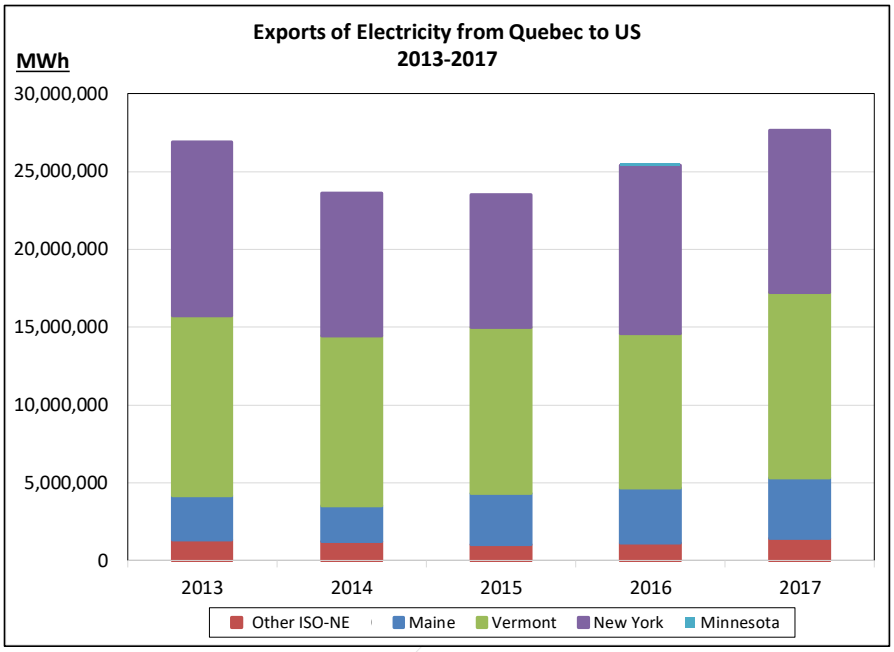


Figure B - 8 illustrates the level of exports from Québec over the past five years into the US. Total electricity exports into New York, New England and other markets ranged from 23.5 TWh to 27.7 TWh between 2013 and 2017. This is consistent with Hydro-Québec's website which claims, "Every year, Hydro-Québec has approximately 25–30 TWh

[15] Hydro-Québec 2017 Annual Report.

available for sale to markets outside Québec."[16] Approximately 90 percent of all exports into the United States from Québec are sold by Hydro-Québec or one of its affiliates.[17]

Figure B - 8: Electricity exports from Québec to the US on an annual basis[18]



Revenue from sales to external markets – which has ranged from $750 million to $1.5 billion over the past few years[19] -- is paid as a dividend to the Québec government. This level of profitability relies on exports, as indicated by Hydro-Québec's CEO Éric Martel.[20] The vast majority of Hydro-Québec's energy exports are sold to the United States.

[16] Hydro-Québec website: FAQs about exports, www.hydroquebec.com/international/en/faq.html

[17] Energyzt analysis of National Energy Board, Monthly Electricity Export Reports for Canada to the US.

[18] National Energy Board, Monthly Electricity Export Reports for Canada to the US; New England ISO represents sales into ISO-NE outside of flows into Maine and Vermont.

[19] Hydro-Québec Annual Reports.

[20] Financial Post, "Without exports our profits are in trouble: Hydro-Quebec plugs into U.S. markets for growth," April 20, 2018, https://business.financialpost.com/commodities/energy/without-exports-our-profits-are-in-trouble-hydro-quebec-plugs-into-u-s-markets-for-growth

Figure B - 9: **Electricity exports from Québec to the US on a monthly basis**[21]

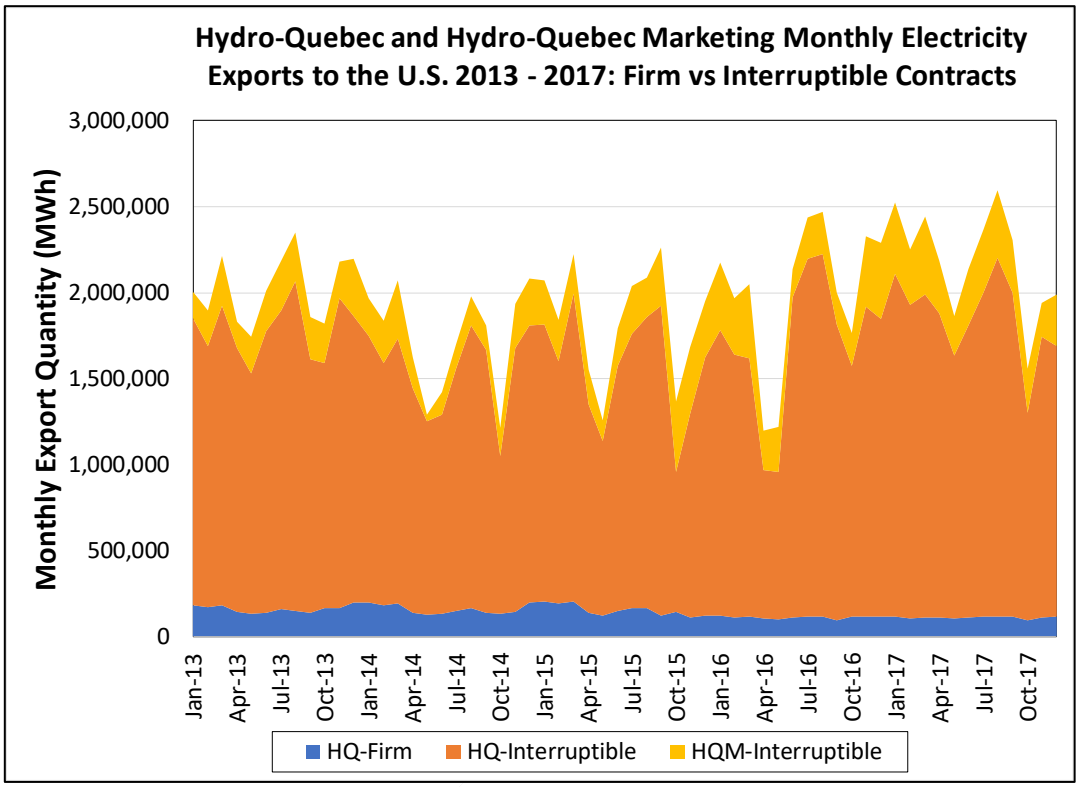


Figure B - 9 graphs sales from Hydro-Québec into U.S. markets on a monthly basis. Most of Hydro-Québec's sales are interruptible, which means that they are non-firm energy sales into non-firm spot markets. This chart also illustrates seasonal increases in sales during higher priced seasons (i.e., summer and winter). This pattern is consistent with opportunistic sales into other markets in the summer and winter peaks. Hourly flows from Québec into external markets (not shown) tell the same story -- exports generally increase during peak hours and fall during off-peak hours, illustrating Hydro-Quebec's profit motive to maximize sales during higher-priced periods.

Although total energy sales vary from year to year and month to month based on weather conditions, new capacity, reservoir management decisions and market conditions, Hydro-

[21] Energyzt analysis of National Energy Board, Monthly Electricity Export Reports for Canada to the US.

Québec has an incentive to maximize its available energy sales to the highest-priced markets during the highest-priced periods. Such sales are subject to Hydro-Québec's own firm commitments, water management decisions, generation capacity limits, and transmission constraints.

B.4 PROJECTED LOAD GROWTH IN QUÉBEC

There are multiple ways that Hydro-Québec could meet its firm capacity commitments going forward: Buy, divert, upgrade and build. **Figure B - 10** presents Hydro-Québec's own estimates of potential expansion opportunities and estimated costs (reported in US Dollars) to compare the cost of these alternatives.

Figure B - 10: Cost comparison of meeting NECEC obligations[22]

Hydro Bin	Potential (TWh)	Levelized Fixed Cost ($/kW-yr)	Levelized Cost of Electricity ($/kWh)
1	157	Current: 106 Post-2030: 133	Current: 0.02 Post 2030: 0.025
2	10	372	0.07
3	10	531	0.10
4	15+	690	0.13

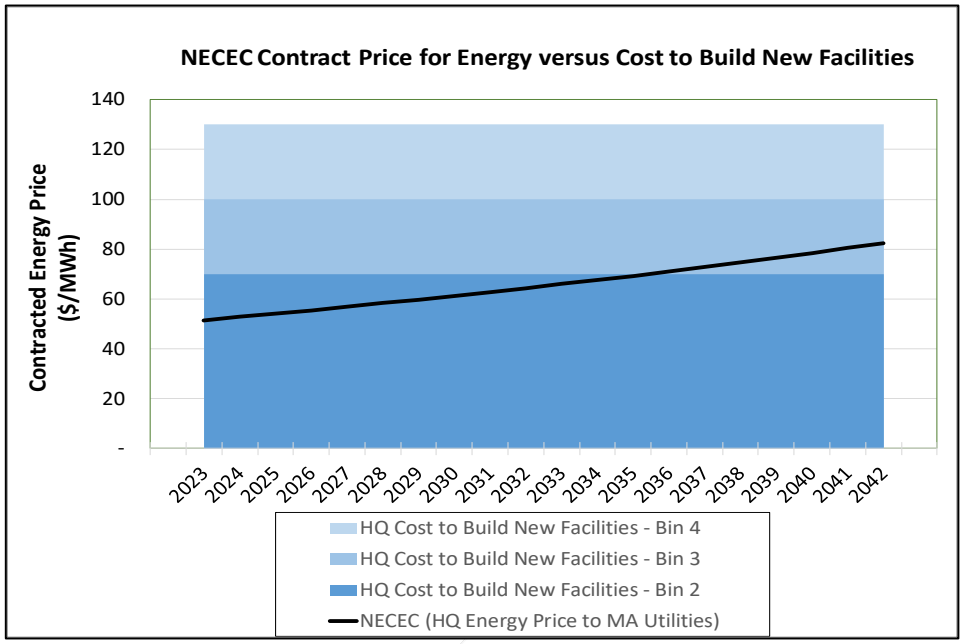
Although upgrades are the least costly option, this option is not available to Hydro-Québec for purposes of exports. Upgrades only offer 13 TWh of additional energy all of which is required to meet Hydro-Québec's growing load through 2034 (half of that amount is required through 2023, when the NECEC contract takes effect).[23] Furthermore, some of

[22] Ibid., p. 28. All dollar values are reported in US Dollars per Energyzt conversation with Evolved Energy Research, one of the authors of the report.

[23] Hydro Québec, Deep Decarbonization in the Northeastern United States and Expanded Coordination with Hydro-Québec, April 2018, pp. 27-28. Per Footnote 5 which indicates 144 TWh already is available, there would be only 13 TWh of additional energy available through upgrades. This would be consumed by Québec load growth by around 2034 given the load growth assumed by the study:

the potential for increased storage depends on wetter conditions than historically has been the case.[24]

Figure B - 11: Comparison of NECEC contract price to a new hydro facility[25]



The cost of building new impoundments is significantly higher – around $70 to $130 / MWh. The energy price in the contracts with Massachusetts utilities starts at $51/MWh and rises to around $82/MWh. As the contracted energy price is higher than the NECEC contract price for energy, it would be uneconomic for Hydro-Québec to build new facilities to meet its obligations under the contracts with Massachusetts utilities (**Figure B - 11**).

In contrast, Hydro-Québec has only been making between $20 to $40 / MWh on its exports

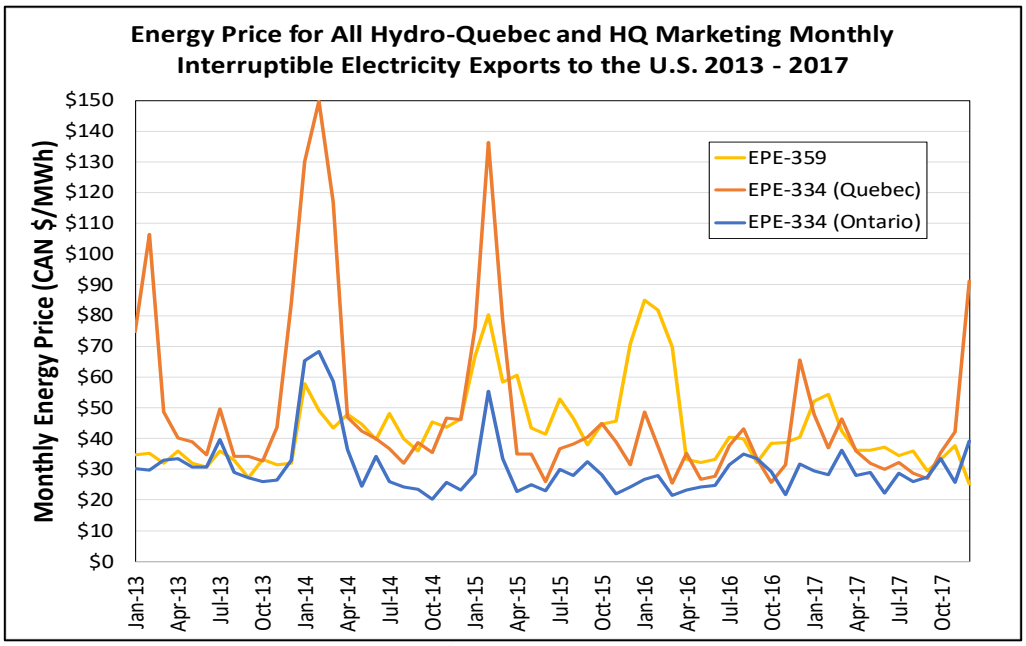
"Load in Québec was assumed in all scenarios to grow by 0.42% per year for a total increase of 28.7 TWh between 2015 and 2050."

[24] Hydro-Québec et. al., "Deep Decarbonization in the Northeastern United States and Expanded Coordination with Hydro-Québec," April 2018, p. 28.

[25] Contract prices derived from publicly-available information concerning the price under the Massachusetts contracts presented to the Massachusetts Department of Public Utilities. Cost to build new facilities is based on the Deep Decabonization Study

(peak and off-peak) except during winter price spikes (**Figure B - 12**). Off-peak hours, the periods when Hydro-Québec would be most likely to divert energy for sales to NECEC, is likely to be on the lower end of this range.

Figure B - 12: Hydro-Québec average price for interruptible energy by license[26]



The futures market indicates a projection of electrical energy prices in New York that is consistent with historical prices, and would be significantly below the contract price. Futures for New York peak prices for zone A, which tend to be higher than the North Zone where Hydro-Québec interconnects into New York, are averaging around $41/MWh for 2023. If off-peak hours are considered, Hydro-Québec could make money by simply diverting the entirety of its exports into New York into NECEC, or buying from other markets during off-peak hours to conserve its water for sale via NECEC.

[26] Energyzt analysis of National Energy Board, Monthly Electricity Export Reports for Canada to the US.

Figure B - 13: CME Group, NYISO Zone A – Peak Hour Futures Contract Price[27]

Trading | Clearing | Regulation | Data | Technology | Edu

DEC 2022	OPT		-	-	37.30	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
JAN 2023	OPT		-	-	50.60	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
FEB 2023	OPT		-	-	48.25	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
MAR 2023	OPT		-	-	37.55	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
APR 2023	OPT		-	-	34.20	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
MAY 2023	OPT		-	-	35.60	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
JUN 2023	OPT		-	-	38.70	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
JUL 2023	OPT		-	-	54.60	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
AUG 2023	OPT		-	-	50.50	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
SEP 2023	OPT		-	-	38.80	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
OCT 2023	OPT		-	-	34.50	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
NOV 2023	OPT		-	-	34.20	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018
DEC 2023	OPT		-	-	38.75	-	-	-	0	No Limit / No Limit	16:45:00 CT 11 Oct 2018

Legend: OPT Options | Price Chart | About This Report

Given where market prices are trading, it generally would be more economic for Hydro-Québec to simply divert sales away from markets with prices below that level in order to service NECEC or, if it is more economic to do so, purchase energy from lower priced markets to generate energy to sell to Massachusetts under a long-term contract.

[27] CME Group, NYISO Zone A On-peak Price as of October 11, 2018, https://www.cmegroup.com/trading/energy/electricity/nyiso-zone-a-5-mw-peak-calendar-month-day-ahead-lbmp-swap-futures.html

Hydro-Québec notes in its Section 83D application form that it may upgrade or build new facilities in the future. Given Hydro-Québec's need for new capacity, any upgrades or capacity additions that do occur would happen regardless of NECEC, and should be incorporated into the scenarios with and without NECEC when estimating the impact of NECEC on carbon emissions.

B.5 RECALCULATION OF CMP'S PROJECTIONS

In response to claims that Hydro-Québec would supply NECEC by diverting sales from other markets, CMP presented a calculation of energy available from Hydro-Québec's system going forward.[28] The calculation purports to show that Hydro-Québec would have a sufficient amount of incremental energy as a result of higher storage levels and therefore would not have to decrease exports into other markets below historical levels.

The simplistic model suffers from three fundamental flaws:

1) **The CMP Model Answers the Wrong Question:** The real question is whether NECEC reduces global emissions, and the CMP model does not address this question. To do so would require an analysis of what carbon emissions would be with and without NECEC. Given the recent set of high water conditions, Hydro-Québec has stored energy that it could use to generate energy going forward. This does not mean that sales via NECEC would be incremental over the entire term of the contract or that the stored water would not otherwise be sold as exports into other markets in the absence of NECEC. Therefore, the model cannot address what the net effect on emissions would be.

2) **CMP Assumes a Sudden Availability of Incremental Exports:** According to the CMP model, Hydro-Québec does not sell its excess energy into other markets unless NECEC is built. This results in reservoir levels remaining high up to the point where NECEC comes online. In fact, there is plenty of excess transmission

[28] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Rebuttal Testimony of Thorn Dickinson, Eric Stinneford, and Bernardo Escudero on Behalf of Central Maine Power Company, July 13, 2018; CMP Response to NRMC-032-021, Attachment 1.

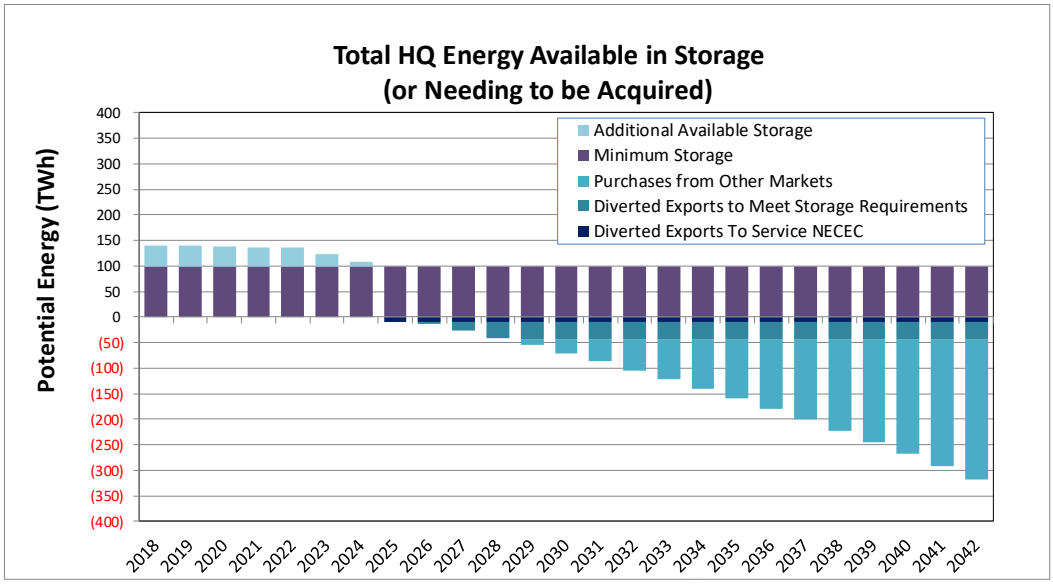
capacity servicing the interconnected markets that Hydro-Québec could use to sell its excess energy that currently is stored in its reservoirs. Historically, there has been around 16 to 18 TWh of unused transfer capacity across the tielines that Hydro-Québec could have used to sell its energy.[29] Intertie capacity is not the constraint for Hydro-Québec exports. Furthermore, by conserving water in storage to service NECEC, there would be an adverse impact on environmental emissions in other markets that otherwise could be mitigated if Hydro-Québec were to sell that energy prior to the NECEC contract.

3) **Water Conditions:** The model is incredibly sensitive to one key assumption – how much runoff would Hydro-Québec receive implicitly assumes high water conditions that have been experienced in 2017 and the years before will continue for the entirety of the contract, allowing for high levels of energy availability that allows incremental exports compared to historical levels. Assuming that Hydro-Québec will enjoy lower run-off levels – even a small reduction in the CMP assumption of 6 percent – dramatically changes the result. With this one change, Hydro-Québec would be unable to meet NECEC obligations while maintaining historical export levels without having to reduce exports and purchasing energy from other markets to meet its obligations.

Addressing only the assumed water conditions to reflect lower runoff conditions going forward compared to the recent high water years confirms that there are conditions under which: 1) Hydro-Québec would not have the excess energy required to maintain exports at recent levels; and 2) if Hydro-Québec did not divert energy from other markets into NECEC or reduce its exports to below historical levels, it would have to make other adjustments. Specifically, Hydro-Québec would have to divert exports into NECEC for sale into New England almost immediately under the contract and would have to begin greenwashing sometime during the first half of the contracts (**Figure B - 14**).

[29] *Central Maine Power Co.*, Request for approval of CPCN for the New England Clean Energy Connect, Maine P.U.C. No. 2017-000232, Exhibit No. JMS-3, Technical Report: Hydro-Québec Exports, April 2018, Figure 6, pp. 7-8.

Figure B - 14: Hydro-Québec operations with lower runoff conditions



In other words, doing nothing more to the CMP model other than reducing the assumed starting point for generation to reflect reasonable runoff conditions shows that Hydro-Québec will need to add new capacity to the system which is counter to what Hydro-Québec has stated NECEC would require and would be uneconomic given the NECEC contract prices for energy. Therefore, Hydro-Québec would have to manage its total export levels to meet its NECEC obligations and/or greenwash purchases from other markets.

In reality, Hydro-Québec is not confined to a single strategy over the course of the contract. Hydro-Québec will manage its system, sales, exports and opportunities according to water conditions and market prices. NECEC simply imposes another fixed obligation onto the system against which Hydro-Québec will optimize its operations. Such optimization will include diverting sales into other markets and greenwashing, as required to optimize profits.

B.6 CONCLUSIONS ON QUÉBEC'S SYSTEM AND SALES

According to NERC's long-term reliability assessment projections, Québec's system currently is projected to be short on capacity – without another acquisition of 1,100 MW of

potential capacity resources, the province will be short of its targeted reserve requirements by 2023. Therefore, it would be unlikely that Hydro-Québec would be able to sell additional capacity into the ISO-NE market via NECEC unless it increases purchased capacity from other markets beyond what is required to maintain its own targeted reserve margins.

In contrast to its projected shortfall in capacity, Hydro-Québec has excess energy. Hydro-Québec maximizes its profits by selling that excess energy into other markets. Historically, there has been a significant amount of unused capacity on the transmission interties between Québec and other markets indicating that the constraint is not transmission, but Hydro-Québec's availability of energy (i.e., water). Therefore, if NECEC were built, the energy would be supplied by diverting energy sales from other markets.

Hydro-Québec has issued public statements that it could meet NECEC requirements with existing reservoir storage and upgrades. Any energy available through reservoir storage could be, and most likely would be, sold into other markets. The entirety of the upgrades are required to meet projected domestic load growth through 2034. Therefore, NECEC would be supplied by diverted energy.

CMP has testified that Hydro-Québec has enough water in its reservoirs to meet its obligations to NECEC while maintaining exports into other markets at historical levels. Their conclusions, and the underlying model supporting those conclusions, assumes that the high water conditions of 2017 and the previous years would continue indefinitely. This is unrealistic. Simply changing the assumed level of potential energy to reflect alternative conditions indicates that Hydro-Québec would be unable to maintain its sales into other markets plus its energy obligations into NECEC without diverting exports and greenwashing energy purchased from other markets.

Understanding Québec's system is key to understanding potential environmental impacts of NECEC. Hydro-Québec is not likely to upgrade its system to meet incremental sales into other markets as those upgrades are needed to meet its own projected load growth. Hydro-Québec is not likely to sell capacity via NECEC as it requires an incremental 1,100 MW of capacity in order to meet its projected requirements in 2023. Lastly, Hydro-Québec is not likely to sell incremental energy into NECEC as it has the incentive to maximize sales of its excess energy into other markets and divert the lowest-priced hours into NECEC.

NECEC reflects an alternative way for Hydro-Québec to sell energy into an existing market in which it already trades. The large size of NECEC and associated energy supply commitment would enable Hydro-Québec to convert roughly one-third of its existing sales into low-priced spot markets into a higher-priced contract. In order to meet this commitment, Hydro-Québec will be able to manage its system, reservoirs, exports and imports given water conditions and market prices. The net impact on carbon emissions in the environment could be negligible and may even have adverse consequences if NECEC diverts energy from markets with higher emissions on the margin compared to New England.

NRCM's comments on the requirement for CMP to show that it has Title, Right or Interest

CMP must demonstrate right, title or interest

The Department of Environmental Protection Rules, Chapter 2, section 11(D) require an applicant to "demonstrate to the Department's satisfaction sufficient title, right or interest in all of the property that is proposed for development or use."

Likewise, the Land Use Regulation Commission requires "[e]vidence of sufficient right, title or interest in all of the property that is proposed for development or use." 12 MRS §685-B(2)(D).

CMP has failed to show valid right, title or interest to develop the proposed NECEC line across two parcels of Maine Public Reserved Lands

The proposed NECEC transmission line would cross two parcels of Maine Public Reserved Lands, the Johnson Mountain parcel and the West Forks Plantation Northeast parcel. The proposed crossing would bisect the two parcels by clear cutting a one mile by 150 foot wide corridor across the parcels. See maps, Attachment A.

As evidence of "right, title, or interest" CMP has submitted a 2014 lease between the State of Maine and CMP. As stated more fully in the attached legal memorandum (see Attachment B), the lease submitted by CMP is not a valid demonstration of right, title, or interest because it has not been approved by "2/3rds of all the members elected to each House" of the Legislature as required by the Maine Constitution, Article IX, section 23. This constitutional provision requires that vote when the uses of the public land would be "substantially altered."

The management plan for the two parcels the NECEC transmission line would cross states that the parcels are to be used for timber management, wildlife management, and recreational uses.[1] Clearing the land for a one mile long by 150 foot wide transmission corridor bisecting the parcels is clearly a substantial change in use requiring approval by the Legislature under Article IX of the Maine Constitution.

Given that CMP has failed to provide evidence of a valid lease demonstrating right, title, or interest, LUPC may not issue a certification to DEP under 12 MRS §685-B(1-A)(B-1) "that the proposed development is an allowed use within the subdistrict or subdistricts for which it is proposed."

Likewise, DEP must deny the permit application because of CMP's failure to provide evidence of right, title, or interest in <u>all of the land</u> proposed for development, specifically the failure to provide evidence of a lease that has been approved by 2/3rds of the members of the Maine Senate and House of Representatives for the portion of the project that proposes to cross Maine Public Reserved Lands.

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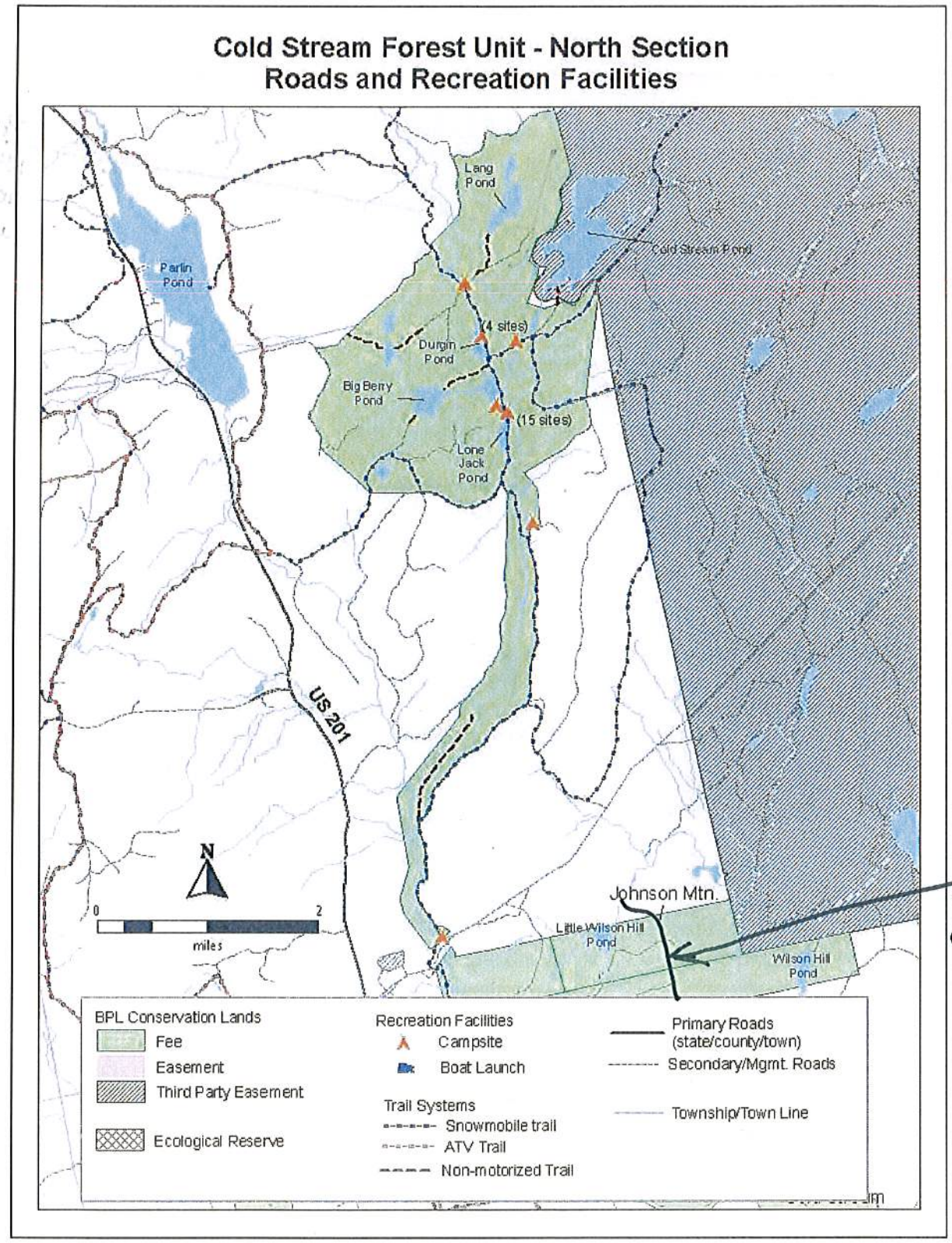
[1] Upper Kennebec Region Management Plan, p. 95 See Attachment C.

May 8, 2019

Respectfully Submitted,

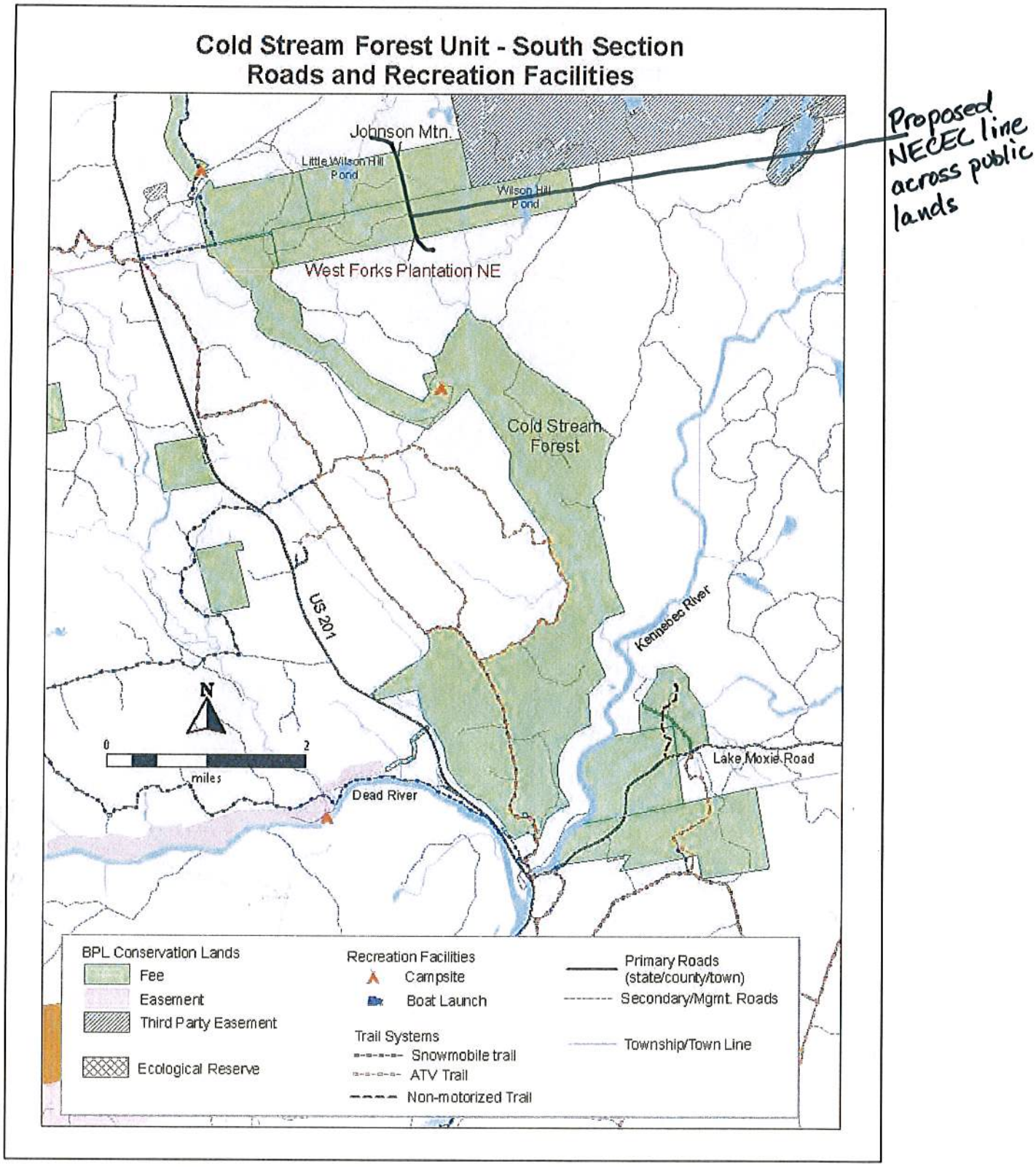
Catherine B. Johnson, Esq.
Senior Staff Attorney
Natural Resources Council of Maine.

RTI - Attachment A



Proposed NECEC line across public lands

MAP FIGURE 8a.



MAP FIGURE 8b.

RTI-Attachment B

LAMBERT/COFFIN

ATTORNEYS

MEMORANDUM

Date: May 8, 2019

By: Maureen M. Sturtevant, Esq.
Lambert Coffin

Issue: This memorandum addresses the issue of whether the Central Maine Power's ("CMP") lease with the Bureau of Parks and Lands ("BPL") to construct transmission corridor and facilities across two public reserved land lots is valid without approval of two thirds of the members of each elected House in the Maine Legislature pursuant to Article IX section 23 of the Maine Constitution and Maine statutes governing the use of such lands.

Brief conclusion: The 2014 lease between CMP and BPL is not valid unless and until it is ratified by two-thirds vote of each House of the Maine Legislature.

I. Brief Factual Background

In December 2014, Central Maine Power ("CMP") entered into a 25-year lease agreement ("the Lease"), renewable in five-year increments with seemingly no limit on the number of renewals, with the Bureau of Parks and Lands ("BPL"), which is part of the Maine Department of Agriculture, Conservation and Forestry. The Lease recites 12 M.R.S. § 1852(4)(A) as BPL's authority to enter such a lease. Section 1852(4)(A) permits BPL to lease its land to utilities, to "[s]et and maintain or use poles, electric power transmission and telecommunication transmission facilities, roads, bridges and landing strips;". The 2014 Lease gives CMP non-exclusive use of a 300-foot wide and one-mile long transmission line corridor located on two parcels of Maine's public reserved lands. The 2014 Lease also grants CMP the right, among other things, to construct and maintain "poles, towers, wires, switches, and other above-ground structures and apparatus used or useful for the above-ground transmission of electricity."

CMP has proposed construction of a new 145-mile, high-voltage, direct current transmission line to Canada. This new transmission corridor as proposed would use the 300-foot corridor through the Johnson Mountain and the West Forks Plantation Northeast parcels in northwest Maine leased in 2014 to CMP: land that is presently forested and largely without any significant permanent structures.

The Johnson Mountain parcel and the West Forks Plantation Northeast parcel are part of the approximately 43,300 acres of public lands known as the Upper Kennebec Region managed by the

BPL.[1] The proposed management plan for these two parcels designates these lands for timber management, wildlife management, and recreation.[2]

II. Constitutional & Statutory Framework

In November 1993, Maine residents voted to amend the Maine Constitution to protect certain types of Maine land, such as Johnson Mountain parcel and the West Forks Plantation Northeast parcel. The Amendment reads:

> State park land. State park land, public lots or other real estate held by the State for conservation or recreation purposes and designated by legislation implementing this section *may not be reduced or its uses substantially altered except on the vote of 2/3 of all the members elected to each House.*

Me. Const. art. IX, § 23 (emphasis added). This ballot question passed with more than 72 percent of the vote. By way of background, Maine has approximately 600,000 acres of public reserved lands that are areas now managed by the BPL.[3] 12 M.R.S. § 1803(1)(B).

Following this 1993 amendment that created additional constitutional protections for Maine's public lands, the Legislature enacted a number of statutes related to the constitutional amendment.

In 1994, the Legislature classified public reserved lands as "designated lands" which entitled such lands to certain added protections. 12 M.R.S. § 598-A(2-A)(D). Consistent with the constitutional amendment, the Legislature also passed a statute providing that "designated lands . . . may not be reduced or *substantially altered, except by a 2/3 vote of the Legislature.*" 12 M.R.S. § 598-A (emphasis added). The Legislature defined "substantially altered" as changing the land "so as to *significantly alter physical characteristics* in a way that frustrates the *essential purposes for which that land is held* by the State." 12 M.R.S. § 598(5) (emphasis added). The statute continues on to say that "[t]he essential purposes of public reserved and nonreserved lands are the protection, management and improvement of these properties for the multiple use objectives established in section 1847." *Id.* Section 1847 requires that "the public reserved lands be managed to demonstrate exemplary land management practices, including silvicultural, wildlife and recreation management practices." 12 M.R.S. § 1847(1). Under this same subchapter, the legislature defines "multiple use" as:

> A. The management of all of the various renewable surface resources of the public reserved lands including outdoor recreation, timber, watershed, fish and wildlife and other public purposes;

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[1] Final Draft of Upper Kennebec Region Management Plan, January 2019, pending adoption by Commissioner of Department of Agriculture, Conservation and Forestry, pgs. 82-83, 98, 104: available at https://www.maine.gov/dacf/parks/get_involved/planning_and_acquisition/management_plans/upper_kennebec_region.html (accessed April 26, 2019).

[2] *Id.* at pg. 98, 104.

[3] In 1995, the Legislature established the Bureau of Parks and Lands by consolidating the former Bureau of Public Lands with the former Bureau of Parks and Recreation. The laws pertaining to the two bureaus were located in separate chapters but were subsequently combined, see 12 M.R.S. §§ 1801-1900, so that management of all lands was consolidated in one bureau including numerous statutes regarding public reserved lands, 12 M.R.S.A. §§ 1845-1859. However, the legislative history indicates that the consolidation was not intended in any way to substantively alter or amend the meaning of the statutory provisions.

B. Making the most judicious use of the land for some or all of these resources over areas large and diverse enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions;

C. That some land will not be used for all of the resources; and

D. The harmonious and coordinated management of the various resources without impairing the productivity of the land and with consideration being given to the relative values of the various resources and not necessarily to the combination of uses that will give the greatest dollar return or the greatest unit output.

12 M.R.S. § 1845.

With these objectives, the director of BPL is required to create or revise a plan for the management of the public reserved lands, and after "adequate opportunity for public review and comment," the commissioner of the BPL must adopt a specific plan for each unit of public reserved land. 12 M.R.S. § 1847(2). "The plan must provide for the demonstration of appropriate management practices that will enhance the timber, wildlife, recreation, economic and other values of the lands." 12 M.R.S. § 1847(2). Further, each plan "must include consideration of the related systems of silviculture and regeneration of forest resources and must provide for outdoor recreation including remote, undeveloped areas, timber, watershed protection, wildlife and fish." *Id.*[4]

III. Legal Analysis

Pursuant to 12 M.R.S. § 1852, BPL has the authority to lease public reserved land for utilities and rights-of-way in order to "[s]et and maintain or use poles, electric power transmission and telecommunication transmission facilities, roads, bridges and landing strips . . . ." *Id.* This authority to lease, however, is necessarily tempered by the constitutional amendment and Section 598-A requiring approval by two-thirds of the legislature if any such lease would allow activity that substantially alters the public land. *See e.g. Melanson v. Belyea,* 1997 Me 150, ¶ 4, 698 A.2d 492, 493 (1997) ("Thus we consider the whole statutory scheme of which the section at issue forms a part so that a harmonious result, presumably the intent of the Legislature, may be achieved."); *Rubin v. Bd. of Envtl. Prot.,* 577 A.2d 1189, 1192 (Me. 1990) ("We must interpret a statute in a manner that preserves the meaning of all of the statute's parts.").

Thus, the question arises: Whether the present, 2014 CMP lease in and of itself, or the build out of CMP's proposed transmission line, constitute a substantial alteration of the use of the public lands that trigger the constitutional requirement to obtain two-thirds approval of the lease by the legislature?

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[4] Before adoption of a management plan, the director must allow "adequate opportunity for review and comment" by the public. 12 M.R.S.A. § 1847(2). "The director may take actions on the public reserved lands consistent with the management plans for those lands and upon any terms and conditions for any consideration the director considers reasonable." 12 M.R.S.A. § 1847(3).

If yes, then the 2014 Lease is void because BPL acted beyond its statutory authority in executing it. *See Sold, Inc. v. Town of Gorham,* 2005 ME 24, ¶ 12, 868 A.2d 172, 176 ("Subject to equitable defenses ... a governmental action may be challenged at any time, as ultra vires, when the action itself is beyond the jurisdiction or authority of the administrative body to act."); *see also Brackett v. Town of Rangeley*, 2003 ME 109, ¶ 26, 831 A.2d 422 ("When a public officer or agency exceeds its statutory authority or proceeds in a manner not authorized by law, its resulting orders, decrees or judgments are null and void and may be attacked collaterally."). In short, is BPL authorized to grant CMP the 2014 Lease rights without legislative approval?

a. The 2014 CMP Lease and BPL public documents fail to address whether CMP's intended use requires two-thirds legislature approval required by Me. Const. art. IX, § 23 and 12 M.R.S. 598-A.

As an initial matter, whether BPL undertook an analysis regarding its authority enter the Lease pursuant to the amendment and Section 598-A is unclear. The 2014 Lease itself is silent as to any consideration of either. Indeed, the parties specified that the Lease was allowed based on the authority given to the BPL pursuant to 12 M.R.S. 1852(4), yet failed to address whether BPL also had authority to lease the public land pursuant to Section 598-A.

The silence as to BPL's authority to enter into the 2014 Lease continues in BPL's Management Plan documents specific to the Upper Kennebec Region. BPL is in the final process of updating the 15-year management plan for the Upper Kennebec Region.[5] In the Final Draft Plan, which is pending approval by the commissioner, the only reference to the 2014 Lease and CMP's proposed transmission line in BPL's 114-page management plan is the following:

> A new 300-foot wide by mile-long transmission line lease crossing both lots from north to south was executed with CMP in December 2014; the line has not yet been built.[6]

Additionally, prior to the Final Draft Plan, three public meetings took place as part of this process, held on October 19, 2016, November 17, 2016, and June 20, 2018. Only the November 17, 2016 public meeting included any reference to BPL's Lease with CMP (with identical language as above), and did not reflect any analysis or discussion about the same.

Despite the absence of an affirmative determination in the Lease, BPL and CMP are clearly aware of the requirements of the Constitution and Section 598-A. For example, the legislative record reflects multiple transactions between BPL and parties obtaining, by resolve a two-thirds majority of the legislature, statutory approval to move forward with land transactions that triggered Section 598-A. Indeed, BPL has even previously obtained such legislative approval to enter into a lease agreement.[7] Similarly, CMP has also been party to multiple land transactions that required two-thirds legislative approval pursuant to Section 598-A.[8] Given these histories, the

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[5] Management Plan Documents and public meeting minutes are available at: https://www.maine.gov/dacf/parks/get_involved/planning_and_acquisition/management_plans/upper_kennebec_region.html (accessed May 1, 2019).

[6] Final Draft Plan, pg. 82.

[7] *See, e.g.* LD 2237 (123rd Legis. 2009) Resolve, Chapter 179, Authorizing the Dept. of Conservation, Bureau of Parks and Lands to Convey Certain Lands and Enter into Certain Leases with the Federal Government.

[8] *See, e.g.*, LD 1930 (123rd Legis.2008) (Resolve Chapter 161, Authorizing the Dept. of Inland Fisheries and Wildlife to Convey Certain Lands; LD 1803 (124th Legis. 2010) Resolve, Chapter 209, Authorizing Certain Land Transactions by the

absence of any recognition of Section 598-A's limitations on BPL's leasing authority is conspicuous. Regardless of BPL's position, further investigation is warranted on whether CMP's intended use will substantially alter the Johnson Mountain parcel and the West Forks Plantation Northeast parcel.

b. The 2014 Lease permits significant alteration such that it requires two-thirds Legislative approval pursuant to the Me. Const. art. IX, § 23 and 12 M.R.S. § 598-A.

The essential purpose of public reserved lands is to protect and manage the land in a way that is consistent with its multiple uses, meaning management of renewable resources such as "outdoor recreation, timber, watershed, fish and wildlife and other public purposes." 12 M.R.S. §§ 598(5), 1845, 1847. At issue here, the Johnson Mountain parcel and the West Forks Plantation Northeast parcel are designated for timber management, wildlife management, and recreation uses.

The construction of CMP's transmission corridor would frustrate the purpose of each of the three designated uses for these parcels. The installation and maintenance of the transmission line requires the permanent removal of the forest in the corridor. This would eliminate this area from the timber base of the public reserved lands for the period of the lease (which, by its terms, is renewable in perpetuity) and for decades thereafter until the forest is able to regrow to its previous condition. Such construction and maintenance would be an alternation of the habitat type and would adversely affect those plants and wildlife that live in, use, and/or travel through that one-mile long portion of the public lands parcel. Clearing a mile long, 150-foot wide corridor and erecting 100-foot-tall poles and transmission lines into previously forested public lands would also alter the opportunity for and experience of remote, backcountry recreational uses in that area. In short, the CMP Lease permits the permanent removal of the existing forest in public lands, to be replaced with a permanently maintained open area with a transmission line, on public lands designated for timber, wildlife, and recreation.

The legal error was compounded by the terms of the Lease. The transmission line contemplated in the 300-foot corridor granted in the Lease is a new use for that land. If CMP had been seeking a lease to renew a current use on the land to be leased, the use of Section 1852 by the BPL might have been feasible. CMP's proposal, however, was for a new use of the land and only the Maine Legislature has the authority to determine if that use substantially alters existing uses and whether two-thirds of them think that proposed new use is acceptable.

The entire point of the amendment was to avoid what happened with the lease. The suitability of a use can only be assessed and decided within the context of the land associated with the proposed use. And because the state values its public lands so highly, the constitution was amended to ensure that only our elected representatives make that decision.

CONCLUSION

Maine residents voted to amend the Maine Constitution, to require their legislative representatives to review, consider, and approve any use of protected Maine lands that so strays from the intended use of the public reserved land. The people of Maine felt strongly enough about

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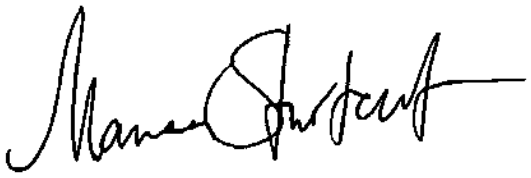
Dept. of Conversation, Bureau of Parks and Lands and the Dept. of Inland Fisheries and Wildlife and Directing the Initiation of Negotiations Regarding Easements on Certain Land.

this issue to ratify an amendment to the Constitution. This directive cannot be disregarded or misinterpreted.

In sum, the 2014 lease of a 300-foot wide one-mile long corridor through forested public land amounts to a substantial alteration of the use and frustrates these lots' essential purpose as public land. Accordingly, consistent with the vote of Maine citizens, the 2014 CMP Lease is not valid unless and until it has been ratified by two-thirds vote of the members of the Senate and House of the Maine Legislature.

Very truly yours,

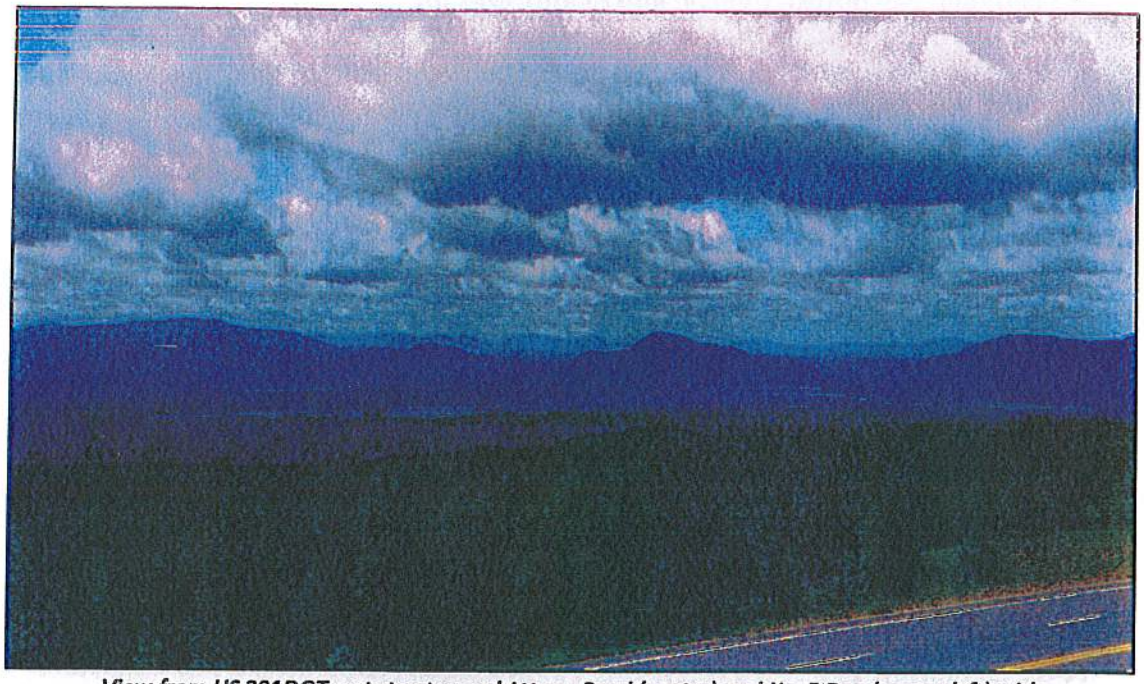


Maureen M. Sturtevant

MMS/

RTI - Attachment C

FINAL DRAFT
Upper Kennebec Region Management Plan



View from US 201DOT rest stop toward Attean Pond (center) and No. 5 Bog (center left) with Attean Mountain in the middle background.

Maine Department of Agriculture, Conservation and Forestry
Bureau of Parks and Lands

January, 2019

Johnson Mountain and West Forks Plantation Northeast Lots
Timber Management is the dominant allocation for most of the Johnson Mountain and West Forks Northeast Lots, excepting the riparian buffer associated with the streams and ponds on the lots, which are allocated to *Wildlife Management,* and the management roads providing vehicle access into the lots, which are allocated to *Developed Recreation Class 1*. Remote Recreation is a secondary use on the entire lots; Wildlife Management is a secondary use on the timber management acres.

West Forks Plantation Northwest, Central and Southwest Lots
Timber Management is the dominant allocation for most of the three West Forks Lots, excepting the riparian buffers associated with the streams on the Central and Southwest lots, which are allocated to *Wildlife Management,* and the Rt. 201 corridor within the Central lot, which is allocated to *Developed Recreation Class 1*. Remote Recreation is a secondary use on the entire lots outside the highway corridor; Wildlife Management is a secondary use on the timber management acres. *Visual Consideration Class 1* will apply as a secondary allocation on the Central lot along Rt. 201.

Moxie Gore and The Forks Plantation North Lots
Timber Management is the dominant allocation for most of the Moxie Gore and The Forks North Lots. The 300 foot riparian buffers associated with the Kennebec River and the 75 foot buffers along the streams crossing the Moxie Gore Lot are allocated to *Wildlife Management,* as is additional steep ground alongside the Kennebec River buffer zone. A 250-foot *Remote Recreation* buffer is designated on each side of the Moxie Falls Trail. The parking area and trailhead is allocated to *Developed Recreation Class 1* as is the Lake Moxie Road corridor. Remote Recreation is a secondary use on the entire lot outside the trail corridor and parking area; Wildlife Management is a secondary use on the timber management acres. *Visual Consideration Class 1* will apply as a secondary allocation along Lake Moxie Road.

The Forks Plantation South and Caratunk North Lots
Timber Management is the dominant allocation for most of The Forks Plt. and Caratunk North Lots. A 100-foot no-cut *Special Protection* buffer is designated on each side of the AT, along with a 400-foot *Remote Recreation* buffer outside that core area. The riparian buffers associated with the stream crossing The Forks Lot, outside the trail buffer, and the stream at the south margin of the Caratunk Lot are allocated to *Wildlife Management*. The Pleasant Pond Road corridor is allocated to *Developed Recreation Class 1*. Remote Recreation and Wildlife Management are secondary uses on the timber management acres. *Visual Consideration Class 1* will apply as a secondary allocation along Pleasant Pond Road.

Bald Mountain/Moxie Bald Lot
Timber Management is the dominant allocation for most of the Bald Mountain Lot. A 100-foot no-cut *Special Protection* buffer is designated on each side of the AT, along with a 400-foot *Remote Recreation* buffer outside that core area. The exemplary natural community on the high ground of Moxie Bald Mountain is allocated to *Special Protection*. The riparian buffers associated with the Bald Mountain Pond shoreline and the streams crossing the east side of the lot, outside the trail buffer, are allocated to *Wildlife Management*. Remote Recreation and Wildlife Management are secondary uses on the timber management acres. *Visual*

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

and

STATE OF MAINE
LAND USE PLANNING COMMISSION

IN THE MATTER OF

CENTRAL MAINE POWER COMPANY Application for Site Location of Development Act permit and Natural Resources Protection Act permit for the New England Clean Energy Connect ("NECEC") L-27625-26- A-N L-27625-TB-B-N L-27625-2C-C-N L-27625-VP-D-N L-27625-IW-E-N SITE LAW CERTIFICATION SLC-9	SURREBUTTAL TESTIMONY OF GROUP 4 WITNESS Dr. ARAM J.K. CALHOUN April 19, 2019

Introduction

This surrebuttal testimony is in response to rebuttal testimony of Gary Emond. Throughout Mr. Emond's rebuttal, he provides speculation in place of fact. He bases his statements on the survey work completed more than 10 years ago described in the TRC consultant position paper for the Maine Power Reliability Project (MPRP) he attached to his rebuttal testimony (Position Paper on the Presence of Significant Vernal Pools in or Adjacent to Transmission Line Corridors, TRC Engineers, LLC, March 2009). I will provide some of the most glaring examples of his overreaching statements and my responses to them below.

Responses to Mr. Emond's unsupported claims about vernal pools

On page 5 of his testimony Mr. Emond asserts that: "Constructing and maintaining transmission line corridors does not negatively affect vernal pool hydroperiod[1]." Mr. Emond cites no evidence or reference for this statement. TRC did not study hydroperiod in the pools they surveyed. In fact, vernal pool hydrology is very sensitive to disturbances in vegetation cover. We have documented responses through peer-reviewed studies showing complex interactions with both surface and groundwater and amount of light exposure resulting from canopy removal (Cohen et al.2016; Calhoun et al. 2017).

Also on page 5 of his testimony, Mr. Emond asserts that: "The early successional habitat associated with transmission line corridors is permeable to amphibian migration." The TRC position paper Mr. Emond cites has no data on the movement patterns of adult and juvenile amphibians to and from breeding pools to terrestrial activity areas. Research at the University of Maine, through my lab and collaborations with Dr. Malcolm Hunter's lab, has rigorously shown the negative effect clear cuts and scrubby vegetation have on emigration at all life stages for amphibians. On Page 13 of the TRC position paper Mr. Emond cites in his testimony, TRC cites a publication on salamander crossings on Rhode Island golf courses conducted by a colleague of mine as proof that utility rights of way (ROW) will not pose an issue for wood frog and spotted salamander emigration. TRC missed the point of the paper by Montieth and Paton, 2006. The question was: Will salamanders cross golf course if they have to. Yes, some of them, some of the time. However, the take-home message of the paper is this:

> Spotted Salamanders exhibited distinct preferences for terrestrial habitats by avoiding fairways and selecting forested uplands and forested wetlands… We documented adult Spotted Salamanders crossing fairways to adjacent forest patches; thus, fairways were not a dispersal barrier. Compared to random points, adult Spotted Salamanders selected cool microhabitats with greater leaf litter depth, more coarse woody debris, more canopy cover, less herbaceous cover,

[1] Hydroperiod refers to the period of time in which a vernal pool is filled with water

> and high densities of vertical and horizontal small mammal burrows. These results suggest that maintaining extensive upland and wetland forested habitats near breeding ponds, with significant amounts of deep leaf litter, coarse woody debris, and high small mammal densities will help sustain Spotted Salamanders (Montieth and Paton 2006).

A cleared ROW, such as the Central Maine Power (CMP) transmission corridor, will not do these things.

Furthermore, other peer-reviewed research contradicts Mr. Emond's assertion that transmission corridors are permeable to amphibian movement. The seminal power line study and edge effect study on wood frogs in Maine was published in highly respected peer-reviewed journals (deMaynadier and Hunter 1998 and 1999; Dr. deMaynadier currently works at the Maine Department of Inland Fisheries and Wildlife (IFW)). Since Mr. Emond did not address the findings of this research, I provide an excerpt from one abstract with the key relevant findings:

> For amphibians that breed in temporary pools, juvenile emigration is an important life-history movement linking the aquatic habitat of larvae to the surrounding upland habitats occupied by maturing animals and adults. Among natural populations, the abundance of juveniles and adults of both species [wood frogs and spotted salamanders] declined sharply across a gradient running from relatively mature forest-interior habitat (70-90 yr old) to recently clear cut habitat (2-11 yr old). Similarly, in the **power line experiment**, juvenile wood frogs showed an emigration preference for closed-canopy habitat immediately upon metamorphosis, with the highest capture rates occurring in microhabitats characterized by dense foliage in both the understory and canopy layers (deMaynadier and Hunter 1998).

The key conclusion of the research of deMaynadier and Hunter's work is that edges such as transmission lines and clear cuts are stressors for pool amphibians at all life stages (deMaynadier and Hunter 1999). Multiple stressors lead to lower fitness and more vulnerable populations. Fragmentation through hard or soft edges is unfavorable to these amphibians. Mr. Emond completely ignores this pivotal research.

Also on page 5 of his testimony, Mr. Emond asserts: "The MPRP data strongly indicate that several generations of spotted salamanders have successfully reproduced in these vernal pools. It is therefore logical to conclude that their offspring continue to breed in these pools."

The TRC position paper has no data on mark-recapture studies over three years that would be needed to document that the offspring continue to breed in these pools (they do not breed every year and most wood frogs breed after their second year). Because spotted salamanders may live beyond a decade, and because they have high natal fidelity, they may continue to breed in suboptimal pools (called ecological traps as they slowly reduce populations) for the rest of their lives. Because there are salamanders (or frogs for that matter) each year is not proof that there is (a) recruitment (referring to the return of juveniles to successfully breed in future years) and (b) enough recruitment to balance ecological traps. Adults are likely to continue to breed in less than ideal pools even if they dry early every year or are now permanent. Low-quality pools, such as those found in ROWs, also intercept animals heading to breed in more suitable habitats. In order to conclude that "Several generations" of spotted salamanders have bred in the pools along the MPRP corridor, it would be necessary to have 30-60 years of data on the pools in question. The TRC study had two years of data and no mark/recapture studies. Mr. Emond's conclusion that several generations of spotted salamanders are breeding in these pools is completely unsupported by any data.

On page 6 of his testimony Mr. Emond asserts that: "The above findings and proposals demonstrate that maintained transmission line ROWs are compatible with, coexist with, and support healthy and productive vernal pools and do not result in fragmentation."

This statement is pure conjecture. Demonstration requires research and peer review. The only findings TRC has are survey data and analysis of vegetative cover at the time of the study. What we do know is that wood frogs and ambystomatid salamanders are mature forest specialists; this has been documented in the peer-reviewed literature for decades. Vernal pools are recognized as specialized breeding habitat for

species highly sensitive to open canopies, predation by other amphibians, and by predators associated with edges and within-pool invertebrate predators (e.g. leeches, predaceous diving beetles) in higher densities in more open, longer hydroperiod pools. There are no genetic studies, studies of disease ecology or fitness (as we have done) in the TRC paper. This statement by Mr. Emond should be disregarded. We know that wood frogs and salamanders breed in substandard habitats including roadside ditches, skidder ruts, and ROWs. This does not speak to where their ideal habitat is. *Surviving* is NOT to be confused with *thriving*. The two-year TRC survey is not sufficient to support any conclusions about the health and long-term viability of vernal pool amphibian populations.

On page 8 of his testimony Mr. Emond asserts that: "There is no uncertainty in actual pool numbers and no uncalculated impacts to vernal pools in the project area."

As a scientist, I am hesitant to speak in absolutes. To state that there is no uncertainty in actual pool numbers is a stretch, but, ultimately, unimportant as the greater issue regarding pool numbers and mitigation is one Mr. Emond has not addressed. The more we study vernal pools, the more questions we have about the animals and all the other functions they provide, particularly with regard to interactions with other ecosystems. To state that there are **no uncalculated impacts** to vernal pools is ignorant of the scientific process and of the complexity of ecological systems. There are almost certainly uncalculated impacts. Here are some of the key ones to consider relevant to this project:

1. Significant vernal pools (SVP) are defined by a political compromise. Using the simple metric of egg mass numbers undervalues the role of all the pools with lesser egg mass numbers that function as landscape elements in a complex system. We know pools contribute broadly to biogeochemical cycles beyond the pool footprint and that other taxa use pools for parts of their life history (e.g., more than 500 species of invertebrates alone and at least half of our amphibian and reptile species)…without counting the egg masses. Unforeseen ripple effects may occur.

2. The role of pool complexes in population dynamics and hydrological functions is not accounted for in assessment of potential ROW impacts.

3. The effects of fragmentation on pool-breeding amphibians has been heavily documented, but CMP has offered no compensation for this effect (Patrick et al, 2008 a,b).

4. The role of sub-standard habitat elements (the pool and the immediate habitat surrounding the pool where traditionally metamorphs may spend their first winter) on overall population health is unknown. We know there is a forest carrying capacity for the terrestrial activity area of pool breeders. As animals exposed to compromised post-breeding habitat (from the working forest and from the ROW) are forced into the remaining optimal habitat, there may be density dependent population effects we cannot predict at this point.

5. Edge effects in our region may influence the microclimate in the forest interior 25 - 35 meters from cleared areas (deMaynadier and Hunter 1999). This is another effect of fragmentation directly impacting prime post-breeding habitat that is not accounted for as an impact in CMP's compensation package.

Also on page 8 of his testimony, Mr. Emond asserts: "The Project ROW will provide valuable vernal pool habitat, as evidenced by the MPRP vernal pool study and will not have an unreasonable impact on significant vernal pools or adverse effects to vernal pool species."

This statement is completely undocumented. The TRC position paper showed no indication that ROWs or any open canopy situations provide valuable vernal pool habitat. They did not study the health and fitness of the animals in the pools.

The TRC study is not a peer-reviewed study. Peer-reviewed studies are subject to scrutiny by one's scientific peers. Only a subset of these studies is published and often after revision or even an addition of further data. That is the highest tier of scientific rigor. Next, there is grey literature that is reviewed by insiders and open to a broader audience as well but can't be rejected per se (e.g. species management

plans, annual reports, etc.). There is a final category that should be considered dark literature that does not receive any level of peer review or public input. The MRPR is dark literature; it is a snapshot survey of vernal pools in existing ROWs. It is *not* a scientific study.

The TRC position paper does not provide a before and after study of what the density or quality of natural pools was before the MPRP ROWs were constructed. There is no baseline of comparison to state that the current pools support a completely recovered and solid population of pool-breeding amphibians and that the pool habitat is "valuable vernal pool habitat." It lends no insight into amphibian movement patterns, amphibian genetics, amphibian health, amphibian stress levels, amphibian recruitment, amphibian reproductive success rate, or effects on terrestrial activity areas. It provides no data on the microhabitat before and after in terms of density and condition of small mammal burrows, depth and nature of leaf litter, or quality of coarse woody debris. For example, stating that the ROW has burrows, has coarse woody debris, and has leaf litter gives no insight into the quality of these compared to mature forest habitat. It provides no insight on edge effects or other results of fragmentation. The fact that they found more than 600 created pools in the TRC study is alarming to me given what we know about created pools effects on natural pools and breeding amphibians. For example, created pools attract more "weedy" species (as they are often associated with changed hydrology and more open conditions) such as bull and green frogs and invertebrate predators (all prey on larvae and eggs of the pool-breeders and may transfer disease to wood frogs), they often serve as ecological traps intersecting breeders on their way to natal pools, and often suffer high rates of disease mortality owing to higher temperatures (Gahl and Calhoun 2010, Greenspan et al. 2012,Calhoun et al. 2014.)

On page 8 of his testimony, Mr. Emond asserts: "The NECEC will not result in fragmentation or adverse impacts to jurisdictional vernal pools and vernal pool species within or adjacent to the proposed ROW."

This assertion is unfounded for reasons already provided in response to Mr. Emond's other unsubstantiated inferences. A 53-mile clear cut 150 feet in width going through vernal pools is nothing but fragmentation, and it presents all the unsavory ecological outcomes that come with fragmentation.

Responses to Mr. Emond's specific objections to statements in my initial testimony

In addition, Mr. Emond took issue with a number of statements I made in my initial testimony that I will address. On page seven, Mr. Emond objected to my statement that: "It is risky assessing pool quality based on egg mass abundances over short time periods." Mr. Emond appears to have assumed that I was questioning CMP's pool survey methods. However, I was making the larger point that when we developed the metrics for assessing SVPs, we knew that "snapshot" counts would likely underestimate pool usage as breeding populations fluctuate widely based on overwintering conditions and springtime temperature and precipitation patterns. Hence, mitigation only for SVP impacts is likely to underestimate the ecological impacts on the ecological complexes of vernal pool resources.

Also on page seven, Mr. Emond objected to my statement that: "From an ecological perspective, the losses should be well-compensated, not undercompensated, given the level of uncertainty in actual pool numbers and given the level of uncalculated impacts to all vernal pools in the study area." Mr. Emond spends a fair bit of text explaining that the mitigation provided meets the IFW requirements based on the assessed pools. He also states that no pools could possibly have been missed in their survey.

Even if the proposed mitigation meets IFW's minimum requirements for mitigation pool impacts, it is certainly possible a one-year survey, which CMP did for its Site Law application, would miss SVPs. Egg mass numbers in any given pool vary from year to year depending on winter and spring weather conditions. A number of pools in the area of the new corridor are close to the regulatory thresholds of significance, and the significance of some was not able to be determined at the time of the survey. Simply put, it is reasonable to think CMP may have underestimated the number of SVPs in the proposed 53-mile stretch of new corridor. Moreover, the proposed mitigation does not address the role of pool clusters

(groups of three or more pools that share a breeding population and hence often have egg mass numbers below the SVP thresholds; Calhoun et al. 2003) or habitat fragmentation (Patrick et al. 2008 a,b). As I have stated in my initial testimony and in this surrebuttal testimony, the literature is clear that clear cuts and transmission corridors will have a fragmenting effect on pool webs. DEP should require CMP to compensate for these effects, whether or not staff at IFW felt they had the ability to ask for this compensation.

Finally, I take great exception to Mr. Emond's statement on page 9 of his testimony that: "Dr. Calhoun's assertions on potential adverse effects on the NECEC Project on vernal pools are not supported by Maine-specific data or experiences…"

I was clear in my testimony that I have been researching vernal pools for more than two decades in Maine and published more than 60 peer-reviewed articles/books on vernal pools. During this time, I have been active in vernal pool education and outreach in our state, and in organizing national and international workshops on temporary wetlands. My practical experience includes working on wetland policy at all governmental levels and training the next generation of wetland ecologists. On page 15 of the TRC paper that Mr. Emond cites, TRC further states that they likely have the largest vernal pool dataset in Maine. It is clear he did not even scan the literature I provided from my lab, which would make this statement not only ludicrous, but insulting.

In summary, based on my extensive study of and experience with vernal pool ecosystems, I believe that a significant impact on vernal pool communities will result from the proposed project and that we can barely scratch the surface of accounting for the nature and extent of damages that will be incurred. What we can do is avoid or mitigate these damages as fully and responsibly as possible.

Citations

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Notarization

I, Aram Calhoun, being first duly sworn, affirm that the above testimony is true and accurate to the best of my knowledge.

Date: April 19, 2019

Aram Calhoun

The above-named Aram Calhoun made affirmation that the above testimony is true and accurate to the best of her knowledge.

Date: April 19, 2019

Susan Ely ~~Sue Ely~~, Attorney-at-law

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

and
STATE OF MAINE
LAND USE PLANNING COMMISSION

IN THE MATTER OF

CENTRAL MAINE POWER COMPANY Application for Site Location of Development Act permit and Natural Resources Protection Act permit for the New England Clean Energy Connect ("NECEC") L-27625-26- A-N L-27625-TB-B-N L-27625-2C-C-N L-27625-VP-D-N L-27625-IW-E-N SITE LAW CERTIFICATION SLC-9	SUR-REBUTTAL TESTIMONY OF GROUP 4 WITNESS DR. DAVID PUBLICOVER April 15, 2019

This testimony is presented in sur-rebuttal to rebuttal testimony presented by CMP witness Kenneth Freye. Specifically, this rebuttal testimony focuses on the issue of the granting of a special exception for the Appalachian Trail P-RR zone. This rebuttal is relevant solely to issues before LUPC.

In response to my testimony that the construction of the new transmission line would have a significant negative effect on the experience of Appalachian Trail hikers, Mr. Freye states (p. 3), "*While Dr. Publicover may believe the Project will degrade the experience of hikers, this opinion is not supported by – and in fact is contradicted by – the visual impact analysis, the Easement, and NPS.*" He also states (p. 2) that my conclusions on the impact of the project on

AT users are "entirely subjective" and "incorrect". However, it is Mr. Freye's arguments that are incorrect.

As described in my pre-filed testimony, the visual impact analysis (Application Chapter 6 Appendix F, Scenic Resources Chart, 1/30/19) rates the visual impact of the project at the Troutdale Road crossing as "Moderate/Strong", clearly indicating that there will be a negative impact on the scenic quality at this crossing. In addition, the visual impact analysis proposes, and the Applicant has accepted the need for, vegetative screening to mitigate this impact (although I question the effectiveness of this mitigation). Rather than contradicting my conclusion that the project would degrade the experience of AT users as Mr. Freye claims, the visual impact analysis supports it.

Mr. Freye also cites the National Park Service easement, going so far to claim that the impact of the project "cannot be considered unreasonable" because the easement allows for the construction of the proposed transmission line. The primary purpose of the easement was to secure the right of the AT to cross CMP's property. The easement also recognizes and maintains CMP's pre-existing rights to construct and maintain transmission lines on their property. The fact that CMP has the legal right to construct the proposed transmission line is relevant to the issue of right, title and interest. However, the fact that CMP has this right does not necessarily mean that this use is consistent with LUPC criteria – that is a separate question. The idea that the fact that the easement allows this use constitutes a determination that LUPC criteria are satisfied is nonsensical and would eliminate the right of LUPC to make this determination on their own.

Mr. Freye also states (p. 3) "*Neither the NPS nor the Appalachian Trail Conservancy (ATC), its agent, has stated that CMP's proposed use of the Easement area is inconsistent with the purpose of the Easement.*" It would be very difficult for a party to an easement to claim that

a use which is specifically allowed by an easement was inconsistent with it. However, as I stated above, the fact that the easement allows this use is separate from the question of whether this use is consistent with LUPC criteria.

Finally, Mr. Freye notes the discussions that have been held with MATC and ATC regarding trail relocation and buffering. Mr. Freye states that CMP "would consider" additional plantings "should MATC and ATC so request". However, an action that *may* be taken if requested by a third party that is not a party to the proceedings cannot be considered mitigation. This vague possibility should be disregarded by LUPC in its determination of whether the impact on the AT has been adequately buffered.

Dated: 4/15/19

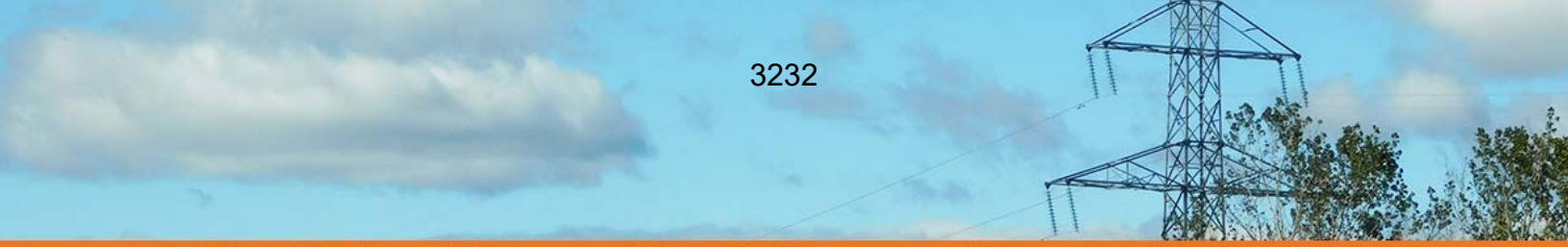
by: _____
David Publicover

Date: 4/15/19

The above-named David Publicover did personally appear before me and made oath as to the truth of the foregoing sur-rebuttal testimony.

Denise Horne
Notary Public
My Commission Expires _____

DENISE M. HORNE
Notary Public - New Hampshire
My Commission Expires April 19, 2022



Take Action: Oppose CMP's Proposed Transmission Line

Dear Maine and Massachusetts Decision Makers,

We urge you to deny Central Maine Power's (CMP's) applications for its New England Clean Energy Connect (NECEC) project because this proposed transmission line would be bad for the people of Maine and Massachusetts and our economy and environment.

CMP's proposal is designed to provide big benefits to CMP shareholders and Hydro-Québec at the expense of New England. This harmful proposal would:

- Cut a brand new, 53-mile-long corridor across Maine's western mountains, harming forests, streams, wetlands, wildlife, and scenic beauty;
- Suppress the development of clean renewable energy (like wind and solar) in Maine, which would provide greater economic and environmental benefits; and
- Fail to reduce climate change emissions, and could even increase them.

Please reject CMP's NECEC proposal. Its costs to our people and environment are too great. Maine and Massachusetts deserve better.

Sincerely,

1	Mary	Bennett	Abbot	Maine
2	Patricia	Ladd	Abbot	Maine
3	Lisa	Brown	Abbot	Maine
4	Peter	Roderick	Abbot	Maine
5	Jaco	Deertrack	Abbot	Maine
6	Adele	Scritchfield	Acton	Maine
7	Vicki	Bragg	Acton	Maine
8	Kelsey	Pelletier	Acton	Maine
9	Adele	Scritchfield	Acton	Maine
10	Gayle	Munro	Acton	Maine
11	Bryant	Jackson	Acton	Maine
12	Ann	MacEachern	Acton	Maine
13	Patricia	Harris	Albany Twp	Maine
14	Gail	Leidel	Albany Twp	Maine
15	Nolan	Meunier	Albany Twp	Maine
16	Pamela	Chodosh	Albany Twp	Maine
17	Mac	Davis	Albany Twp	Maine
18	Jonathan	Sabins	Albany Twp	Maine
19	Roger	Leidel	Albany Twp	Maine
20	Bonnie	Pooley	Albany Twp	Maine

21	Edward	Riggs	Albion	Maine
22	Sarah	Dorval	Albion	Maine
23	Robert	Fennell	Albion	Maine
24	Zoli	Nagy	Albion	Maine
25	Lee	Weeks	Albion	Maine
26	Lucinda	Gidney	Albion	Maine
27	Brian	Milliken	Albion	Maine
28	Paul	Benham	Albion	Maine
29	Eileen	Mitchel	Albion	Maine
30	Stephen	Bellavia	Albion	Maine
31	Dari	Forman	Albion	Maine
32	Paul	Forman	Albion	Maine
33	Alexander	Lee	Albion	Maine
34	Dylan	Kelley	Albion	Maine
35	Bethany	Tuttle	Albion	Maine
36	Matthew E	Rolfson	Albion	Maine
37	Peggy	Greer	Alfred	Maine
38	Chris	Letourneau	Alfred	Maine
39	Michael	Stevens	Alfred	Maine
40	Krystle	Barstow	Alfred	Maine
41	Ryan	Binette	Alfred	Maine
42	James	Sweeney	Alfred	Maine
43	Denis	Cote	Alfred	Maine
44	Craig	Heon	Alfred	Maine
45	Cynthia	Tuttle	Alfred	Maine
46	David	Norton	Alfred	Maine
47	Eric	Lane	Alfred	Maine
48	Robert	Barbarino	Alfred	Maine
49	Sarah	Redman	Alfred	Maine
50	Robert	Murray	Alfred	Maine
51	Lucas	Paradis	Alfred	Maine
52	Melanie	Laverriere	Alfred	Maine
53	Ashley	Bourque	Alfred	Maine
54	Jessica	Pelletier	Alfred	Maine
55	Diane	Payeur	Alfred	Maine
56	Thomas	Groetzinger	Alfred	Maine
57	Lisa	Black	Alfred	Maine
58	Judy	Vezina	Alfred	Maine
59	Nathan	Gile	Alfred	Maine
60	Gary	Hayward	Alna	Maine
61	Kristina	Verney	Alna	Maine
62	Spencer	Bailey	Alna	Maine
63	Olivia	Coniam	Alna	Maine
64	Jeff & Karen	Philbrick	Alna	Maine
65	Susan	Marcus	Alna	Maine
66	Cathy	Johnson	Alna	Maine

67	Deborah	Brown	Alna	Maine
68	Mark	DesMeules	Alna	Maine
69	Xavier	Comas	Alna	Maine
70	Michael	Kristan	Alna	Maine
71	Maria	Jenness	Alna	Maine
72	Kate	Nordstrom	Alna	Maine
73	Nicholas	Malone	Alton	Maine
74	Jade	Dorr	Alton	Maine
75	Kyle	McDougal	Alton	Maine
76	Malcolm	Hunter	Amherst	Maine
77	Alan	Gauvin	Amity	Maine
78	Jackie	Gammon	Andover	Maine
79	Claire	Sessions	Andover	Maine
80	Rebecca	Poland	Andover	Maine
81	Kelly	Smith	Andover	Maine
82	Aislinn	Forbes	Andover	Maine
83	Michael	Macknight	Andover	Maine
84	Rebecca	Willson	Andover	Maine
85	Jan	Bowman	Andover	Maine
86	Amanda	Pingree	Andover	Maine
87	Jimmy	V	Anson	Maine
88	Janet	Edwards	Anson	Maine
89	Melissa	Flanagin	Anson	Maine
90	Laurie	Magee	Anson	Maine
91	Taylor	Sneed	Anson	Maine
92	Kayla	Holt	Anson	Maine
93	Jacob	Sincyr	Anson	Maine
94	Michele	Godfrey	Anson	Maine
95	Joshua	Harrington	Anson	Maine
96	Mike	Sills	Anson	Maine
97	Dale	Maloney	Anson	Maine
98	Erin	Ingersoll	Anson	Maine
99	Walter	Magee	Anson	Maine
100	Joseph	Payette Sr	Anson	Maine
101	Shane	Atkinson	Anytown	Maine
102	Candace	Oneil	Appleton	Maine
103	Gary W	Roberts	Appleton	Maine
104	Jamie	Munro	Appleton	Maine
105	Heather	Wyman	Appleton	Maine
106	Carolyn	Brown	Appleton	Maine
107	Patricia	Dirlam	Appleton	Maine
108	Stephen	Coghlan	Argyle Twp	Maine
109	Peter	Crockett	Argyle Twp	Maine
110	Georgeanns	Bickmore	Argyle Twp	Maine
111	Lucy	Hull	Arrowsic	Maine
112	Robert	Elwell	Arrowsic	Maine

113	Amy	Smith	Arrowsic	Maine
114	Katherine	Smith	Arrowsic	Maine
115	Brian	Elwell	Arrowsic	Maine
116	Samuel	Woodman	Arrowsic	Maine
117	Deborah	Bassett	Arrowsic	Maine
118	Eloise	Vitelli	Arrowsic	Maine
119	Jesse	McMahon	Arrowsic	Maine
120	Derrick	Baker	Arrowsic	Maine
121	Heather	Black	Arundel	Maine
122	Heidi	Young	Arundel	Maine
123	Amy	Rush	Arundel	Maine
124	Gail	Douston	Arundel	Maine
125	Helene	Stevens	Arundel	Maine
126	Jeff	Martel	Arundel	Maine
127	Corey	Wakefield	Arundel	Maine
128	Chad	Mills	Arundel	Maine
129	Dawn	Jewett	Arundel	Maine
130	James	Gambino	Arundel	Maine
131	Brooke	Boucher	Arundel	Maine
132	Steven	Diamantopoulos	Arundel	Maine
133	Alexandria	Oliver	Arundel	Maine
134	Michelle	Petrin	Arundel	Maine
135	David	Lane	Arundel	Maine
136	Larry	Young	Arundel	Maine
137	James	Lux	Arundel	Maine
138	Dylan	Court	Arundel	Maine
139	Alicia	Soliman	Arundel	Maine
140	Alexandria	Perry	Arundel	Maine
141	Ben	Welch	Arundel	Maine
142	Tori	Lands	Arundel	Maine
143	Tiffany	Bates	Arundel	Maine
144	Gina	Wolf	Ashland	Maine
145	Christina	Darling	Ashland	Maine
146	Kaylie	Lovejoy	Athens	Maine
147	Douglas	Malloy	Athens	Maine
148	Gail	Edwards	Athens	Maine
149	Cynthia	Daniels	Athens	Maine
150	Ann	Tibbetts	Athens	Maine
151	Rosie	Soucier	Athens	Maine
152	Alisha	Fox	Athens	Maine
153	Lorri	Kibbe	Athens	Maine
154	Mary	Harlow	Athens	Maine
155	Patricia	Keene	Auburn	Maine
156	Dian	Mooar	Auburn	Maine
157	Cynthia	Grimm	Auburn	Maine
158	Dan	Carpentier	Auburn	Maine

159	Glenn	Garry	Auburn	Maine
160	Thomas	Grover	Auburn	Maine
161	Diane	Chasse	Auburn	Maine
162	Christina	Brown	Auburn	Maine
163	Janet	Laird-Lagassee	Auburn	Maine
164	Angela	Mitchell	Auburn	Maine
165	Marc	Beaudry	Auburn	Maine
166	Seth	Keene	Auburn	Maine
167	Maxwell	Goodwin	Auburn	Maine
168	Daniel	Merrill	Auburn	Maine
169	Kelly	Pomerleau	Auburn	Maine
170	Corey	Lachance	Auburn	Maine
171	Renee	Cote	Auburn	Maine
172	Christopher	Cookson	Auburn	Maine
173	Hannah	Whitcher	Auburn	Maine
174	Cynthia	Violette	Auburn	Maine
175	Daniel	Curtis	Auburn	Maine
176	Dorothy	Brown	Auburn	Maine
177	Kristen	Phillips	Auburn	Maine
178	Sonya	Caron	Auburn	Maine
179	Jamie	Verrill	Auburn	Maine
180	Annika	Black	Auburn	Maine
181	Sandra	Gauthier	Auburn	Maine
182	Darrin	Hart	Auburn	Maine
183	Marlis	Whittier	Auburn	Maine
184	Cory	Culleton	Auburn	Maine
185	Andrew	Akeley	Auburn	Maine
186	Joshua	Cannady	Auburn	Maine
187	Trent	Ouellette	Auburn	Maine
188	Adrienne	Bolton	Auburn	Maine
189	Charmaine	Raby	Auburn	Maine
190	Kenneth	Cox	Auburn	Maine
191	John	Roy	Auburn	Maine
192	Hannah	Arel	Auburn	Maine
193	Ronald	Smith	Auburn	Maine
194	Tammy	Marcellino	Auburn	Maine
195	Scott	Harriman	Auburn	Maine
196	Justin	Pardy	Auburn	Maine
197	Avery	Chisholm	Auburn	Maine
198	Eein	Breau	Auburn	Maine
199	Diane	Boone	Auburn	Maine
200	Samantha	Whitten	Auburn	Maine
201	Jacqueline	Roy-Lamiette	Auburn	Maine
202	Katelynn	Vellaro	Auburn	Maine
203	Gail	Shelley	Auburn	Maine
204	Kimberly	Jipson	Auburn	Maine

205	Lydia	Seliano	Auburn	Maine
206	Scott	Blanchard	Auburn	Maine
207	Timothy	Clough	Auburn	Maine
208	Chris	Schnopp	Auburn	Maine
209	Lea	Violette	Auburn	Maine
210	Heather	Bartlett	Auburn	Maine
211	Michael	Nyberg	Auburn	Maine
212	Kimberly	Lausier	Auburn	Maine
213	Shelley	Reno	Auburn	Maine
214	Savannah	Twitchell	Auburn	Maine
215	Jem	Schromm	Auburn	Maine
216	Vivian	Ritchie	Auburn	Maine
217	Anina	Kopka	Auburn	Maine
218	Timothy	Evrard	Auburn	Maine
219	Juliette	Dzija	Auburn	Maine
220	Marie	Rose	Auburn	Maine
221	Jennifer	Johnson	Auburn	Maine
222	Renee	Cote	Auburn	Maine
223	James	Liberty	Auburn	Maine
224	Janet	Mathieu	Auburn	Maine
225	Margaret	Montoya	Auburn	Maine
226	Kathleen	Poliquin	Auburn	Maine
227	Janice	Meserve	Auburn	Maine
228	Gary	Lapointe	Auburn	Maine
229	Margaret	Cox	Auburn	Maine
230	Mary Jo	Johnson	Auburn	Maine
231	Danielle	Brown	Auburn	Maine
232	Josh	Moody	Auburn	Maine
233	Celia	McGuckian	Auburn	Maine
234	Cindy	Greathouse	Auburn	Maine
235	Elisabeth	Salberg	Auburn	Maine
236	Jeremiah	Fongemie	Auburn	Maine
237	Anne	Kinney	Auburn	Maine
238	Taylor	Coutts	Auburn	Maine
239	Jeffrey	Haggerty	Auburn	Maine
240	Joshua	Greenleaf	Auburn	Maine
241	Beth	Bell	Auburn	Maine
242	Susan	Allen	Auburn	Maine
243	Michael A.	Koch	Auburn	Maine
244	Josh	Cousineau	Auburn	Maine
245	Susan	Cooper	Auburn	Maine
246	Kelly	Levesque	Auburn	Maine
247	Gayle	Hall	Auburn	Maine
248	Brittany	Drake	Auburn	Maine
249	Brandin	Daigneault	Auburn	Maine
250	Debora	Houdek	Auburn	Maine

251	Gillian	Stock	Auburn	Maine
252	Robin	Jarvis	Auburn	Maine
253	Ethan	Gammon	Auburn	Maine
254	Joanne	Fuller	Auburn	Maine
255	Ann	Nyberg	Auburn	Maine
256	Colby	Laflamme	Auburn	Maine
257	Alexis	Seilonen	Auburn	Maine
258	Kathryn	Begg	Auburn	Maine
259	Wes	Davis	Auburn	Maine
260	Jennifer	Mead	Auburn	Maine
261	Heather	Everly	Auburn	Maine
262	Daniel	Johnson	Auburn	Maine
263	Calvin	Bureah	Auburn	Maine
264	Scott	Burns	Auburn	Maine
265	Jason	Young	Auburn	Maine
266	Tracy	Jellison	Auburn	Maine
267	Peter	Gagnon	Auburn	Maine
268	Wendy	Schlotterbeck	Auburn	Maine
269	Brion	Gallagher	Auburn	Maine
270	Shannon	Cloutier	Auburn	Maine
271	Jamie	Verrill	Auburn	Maine
272	France	Shea	Auburn	Maine
273	Adam	Meade	Auburn	Maine
274	Suzanne	Roy	Auburn	Maine
275	Camille	Parrish	Auburn	Maine
276	Bob	Sipe	Auburn	Maine
277	Daniel	McLean	Auburn	Maine
278	Tim	Cassidy	Auburn	Maine
279	Kailee	Childs	Auburn	Maine
280	Stefan	Smith	Auburn	Maine
281	Shawn	Gallant	Auburn	Maine
282	Amelia	Bishop	Auburn	Maine
283	Rachel	Barcelou	Auburn	Maine
284	Gerald	Ritchey	Auburn	Maine
285	Karen	Thurston	Auburn	Maine
286	Erica	Lever	Auburn	Maine
287	Hannah	Deblois	Auburn	Maine
288	Donna	Rousseau	Auburn	Maine
289	Caitlyn	Gallagher	Auburn	Maine
290	Jennifer	LaPierre	Auburn	Maine
291	Matthew	Card	Auburn	Maine
292	Cotey	Smith	Auburn	Maine
293	Benjamin	Powell	Auburn	Maine
294	Joseph	Bergeron	Auburn	Maine
295	Tracy	Corey	Auburn	Maine
296	Brian	Westbye	Auburn	Maine

297	Denise	Scott	Auburn	Maine
298	Carol	Wysericker	Auburn	Maine
299	Katherine	Latlippe	Auburn	Maine
300	Gary	Lapointe	Auburn	Maine
301	Crystal	Aube	Auburn	Maine
302	Benjamin	Mace	Auburn	Maine
303	Raymond	Lebrun	Auburn	Maine
304	Kathryn	Childs	Auburn	Maine
305	Jessica	Rowe	Auburn	Maine
306	Jennifer	Jordan	Auburn	Maine
307	Carrie	Sanzone	Auburn	Maine
308	Mike	Cole	Auburn	Maine
309	Katrina	Jadocan	Auburn	Maine
310	Thomas	Michaud	Auburn And Upper Enchanted Township	Maine
311	Ryan	Trask	Augusta	Maine
312	Joy	Kipp	Augusta	Maine
313	Megan	Lewis	Augusta	Maine
314	Jean	Reed	Augusta	Maine
315	Brittany	St. Laurent	Augusta	Maine
316	Marsha	Dulac-Swain	Augusta	Maine
317	William	Garside	Augusta	Maine
318	Alan	Plummer	Augusta	Maine
319	Kalie	Hess	Augusta	Maine
320	Leif	Luzotte	Augusta	Maine
321	Christopher	Nelson	Augusta	Maine
322	Bonnie	Stratton	Augusta	Maine
323	Amy	Leighton	Augusta	Maine
324	Connie	Pelkey	Augusta	Maine
325	Nicholas	Rowe	Augusta	Maine
326	Erika	Jordan	Augusta	Maine
327	Adam	Turner	Augusta	Maine
328	Victoria	Bell	Augusta	Maine
329	Megan	Higgins	Augusta	Maine
330	Duane	Scott	Augusta	Maine
331	Genis	Timmerman	Augusta	Maine
332	Stacie	Haines	Augusta	Maine
333	Kimberly	Maxwell	Augusta	Maine
334	Deborah	Thibodeau	Augusta	Maine
335	Dale	McCormick	Augusta	Maine
336	Cheryl	Ring	Augusta	Maine
337	Will	Bridgeo	Augusta	Maine
338	Andrea	Cameron	Augusta	Maine
339	M	Hanson	Augusta	Maine
340	Courtney	Olson	Augusta	Maine
341	Roger	Leisner	Augusta	Maine

342	Mike	Veillex	Augusta	Maine
343	Matthew	Withee	Augusta	Maine
344	Mark	Bouley	Augusta	Maine
345	Colby	Ham	Augusta	Maine
346	Robert	Knox	Augusta	Maine
347	Sandra	Niles	Augusta	Maine
348	Selena	Garside	Augusta	Maine
349	Alicia	Beland	Augusta	Maine
350	Phyllis	vonHerrlich	Augusta	Maine
351	Ted	Elliott	Augusta	Maine
352	Donald	Duplessis	Augusta	Maine
353	Darcie	Waldrip	Augusta	Maine
354	Russell-	Elliot:	Augusta	Maine
355	Kevin	Judkins	Augusta	Maine
356	Linwood	Riggs	Augusta	Maine
357	Linda	Rowe	Augusta	Maine
358	Stephanie	Rinier	Augusta	Maine
359	Cecile	Sprout	Augusta	Maine
360	Lori	Gingras	Augusta	Maine
361	Cheryl	Bradford	Augusta	Maine
362	David	Mace	Augusta	Maine
363	Randice	Murphy	Augusta	Maine
364	Lisa	Pohlmann	Augusta	Maine
365	Katie	Smith	Augusta	Maine
366	Kate	Marriner	Augusta	Maine
367	Jon	Martin	Augusta	Maine
368	Adam	Oneal	Augusta	Maine
369	Rose	Griffin	Augusta	Maine
370	Erica	Haynes	Augusta	Maine
371	Anthony	Lucas	Augusta	Maine
372	Alice	Casey	Augusta	Maine
373	Pamela	Seltsam	Augusta	Maine
374	Joshua	McArthur	Augusta	Maine
375	Heidi	Lamonica	Augusta	Maine
376	Nicole	Hamlin	Augusta	Maine
377	John	Martin	Augusta	Maine
378	David	Lavallee	Augusta	Maine
379	Leon	Bresloff	Augusta	Maine
380	Carly	Peruccio	Augusta	Maine
381	Daniel	Viens	Augusta	Maine
382	Sandra	Arbour	Augusta	Maine
383	Donald	Moody	Augusta	Maine
384	Roger	Lapointe	Augusta	Maine
385	Lori	Garside	Augusta	Maine
386	Annabel	Grimshaw	Augusta	Maine
387	Jim	Kidwell	Augusta	Maine

388	Dylan	Voorhees	Augusta	Maine
389	Tyler	Olson	Augusta	Maine
390	MARK	HANSON	Augusta	Maine
391	Jasnine	Keating	Augusta	Maine
392	Shawna	Solmitz	Augusta	Maine
393	Sue	Ely	Augusta	Maine
394	janice	welch	Augusta	Maine
395	Megan	Kenyon	Augusta	Maine
396	Ashley	Wiltse	Augusta	Maine
397	Abigail	Stratton	Augusta	Maine
398	Gregory	Burchstead	Augusta	Maine
399	Terrance	Ladd	Augusta	Maine
400	Anne	Bair	Augusta	Maine
401	Chip	Eastman	Augusta	Maine
402	Abinadi	White	Augusta	Maine
403	Justina	Zayac	Augusta	Maine
404	Amy	Stevens	Augusta	Maine
405	Micheal	Parker	Augusta	Maine
406	Leisa	Hodgkins	Augusta	Maine
407	Jonathan	Woods	Augusta	Maine
408	Darren	Millington	Augusta	Maine
409	Daniel	Boynton	Augusta	Maine
410	James	Fairservice	Augusta	Maine
411	Kirk	Damborg	Augusta	Maine
412	Ty	Pooler	Augusta	Maine
413	Nancy	Pinette	Augusta	Maine
414	Trisha	Morey	Augusta	Maine
415	Mark	Laney	Augusta	Maine
416	A. Delaine	Nye	Augusta	Maine
417	Damon	Hicks	Augusta	Maine
418	Patricia	Davis	Augusta	Maine
419	Jonny	Hanson	Augusta	Maine
420	Jennifer	Paradis	Augusta	Maine
421	Audrey	Jones	Augusta	Maine
422	Mike	Cunningham	Augusta	Maine
423	Phyllis	VonHerrlich	Augusta	Maine
424	Shelby	Fairservice	Augusta	Maine
425	Nathan	Levesque	Augusta	Maine
426	Harold	Elliott	Augusta	Maine
427	Christopher	Grenier	Augusta	Maine
428	Julie	Mastrianno	Augusta	Maine
429	Elaine	Szady	Augusta	Maine
430	Robin	Gardella	Augusta	Maine
431	Cassie	Nixon	Augusta	Maine
432	Terry	Cookson	Augusta	Maine
433	Heather	Mountainland	Aunurn	Maine

434	Ashley	Pelletier	Avon	Maine
435	Clarice	Stinchfield	Avon	Maine
436	Adam	Stevens	Avon	Maine
437	Cassandra	Smith	Avon	Maine
438	Sonja	Hardy	Avon	Maine
439	Elizabeth	Leeman	Bailey Island	Maine
440	Sally	Clifford	Bailey Island	Maine
441	Trevor	Pontbriand	Bailey Island	Maine
442	Sharon	Campbell	Baileyville	Maine
443	Troy	Hatton	Baileyville	Maine
444	Kimberly	Moraisey	Baileyville	Maine
445	Lynwood	Toole	Baileyville	Maine
446	David	Case	Bangor	Maine
447	David	Strater	Bangor	Maine
448	Scot	Prudente	Bangor	Maine
449	Miriam	Devlin	Bangor	Maine
450	Steven	Santerre	Bangor	Maine
451	Riley	Kenney	Bangor	Maine
452	Dominick	Rizzo	Bangor	Maine
453	Serena	Smith	Bangor	Maine
454	Amanda	Foran	Bangor	Maine
455	John	Picone	Bangor	Maine
456	Kyle	Voisi E	Bangor	Maine
457	Sam	Le	Bangor	Maine
458	Donald	Gagner	Bangor	Maine
459	Monique	Swartz	Bangor	Maine
460	Franklin	Bragg	Bangor	Maine
461	Chong	Shaum	Bangor	Maine
462	Michelle	Bucci	Bangor	Maine
463	Faith	Griffith	Bangor	Maine
464	Marcus	McCue	Bangor	Maine
465	Edward	Troscianiec	Bangor	Maine
466	Paul	Schneider	Bangor	Maine
467	Alec	Coleman Pray	Bangor	Maine
468	Sharon	Klein	Bangor	Maine
469	Jeannette	Gregory	Bangor	Maine
470	Alexa	Merrill	Bangor	Maine
471	Helen	Goodwin	Bangor	Maine
472	Allison	Boisvert	Bangor	Maine
473	Jeff	Reynolds	Bangor	Maine
474	Chris	Salzberg	Bangor	Maine
475	Lori	Burton	Bangor	Maine
476	William	Wood	Bangor	Maine
477	Janice	Martinez	Bangor	Maine
478	Crystal	Dayton	Bangor	Maine
479	Nathaniel	Guillemette	Bangor	Maine

480	Harrison	Pojasek	Bangor	Maine
481	Cassandra	Desjardins	Bangor	Maine
482	Allison	Maidlow	Bangor	Maine
483	Robert	Caldwell	Bangor	Maine
484	Kevin	Schmersal	Bangor	Maine
485	Emily	Gerardi	Bangor	Maine
486	Diana	Townsend	Bangor	Maine
487	Jenny	Bamford-Perkins	Bangor	Maine
488	Donna	Roberts	Bangor	Maine
489	Michael	Garvey	Bangor	Maine
490	Sage	Braman	Bangor	Maine
491	Julia	Cuchelo	Bangor	Maine
492	Mariah	Hallett	Bangor	Maine
493	Susan	Winkler	Bangor	Maine
494	Brandy	Coffee	Bangor	Maine
495	Julie	Rand	Bangor	Maine
496	Mikayla	Hutchinson	Bangor	Maine
497	Rosalyn	Fisher	Bangor	Maine
498	Judith	Brosmer	Bangor	Maine
499	Jordan	Fowler	Bangor	Maine
500	Anne	Duncan	Bangor	Maine
501	Alex	Thompson	Bangor	Maine
502	Iain	Hallett	Bangor	Maine
503	Leonard	Elefson	Bangor	Maine
504	Shane	Casey	Bangor	Maine
505	Maranda	Bouchard	Bangor	Maine
506	Nicholas	Mitton	Bangor	Maine
507	Nancy	Earle	Bangor	Maine
508	Stephen	Allen	Bangor	Maine
509	James	Hutchinson	Bangor	Maine
510	Rachel	Priode	Bangor	Maine
511	Brett	Armstrong	Bangor	Maine
512	Terri	Butcher	Bangor	Maine
513	Judith	Bladen	Bangor	Maine
514	Michael	Evans	Bangor	Maine
515	Katie	Sutherland	Bangor	Maine
516	Michael	Ross	Bangor	Maine
517	Lori	Lee	Bangor	Maine
518	Justin	Springer	Bangor	Maine
519	Cortney	Levesque	Bangor	Maine
520	Ann	Marston	Bangor	Maine
521	Deborah	Case	Bangor	Maine
522	Daniel	Tandy	Bangor	Maine
523	Nate	Pritchette	Bangor	Maine
524	Amy	Pinkham	Bangor	Maine
525	Alicia	Lugdon	Bangor	Maine

526	Jack	Scovil	Bangor	Maine
527	Dawn	Neptune Adams	Bangor	Maine
528	Kaylee	Harvey	Bangor	Maine
529	Benjamin	Brown	Bangor	Maine
530	Katherine	Thompson	Bangor	Maine
531	Therese	Bailey	Bangor	Maine
532	Alexandra	Craig	Bangor	Maine
533	Joseph	Lola	Bangor	Maine
534	Kf	McLeod	Bangor	Maine
535	Caleb	Pineo	Bangor	Maine
536	Sherry	Langway	Bangor	Maine
537	Anthony	Lauritano	Bangor	Maine
538	Johanna	Lunn	Bangor	Maine
539	Dylan	Homen	Bangor	Maine
540	Cullen	Shortt	Bangor	Maine
541	Kayla	White	Bangor	Maine
542	James	Cook	Bangor	Maine
543	Jean	Redmond	Bangor	Maine
544	Mike	Reynolds	Bangor	Maine
545	Don	John	Bangor	Maine
546	Matt	Romanishan	Bangor	Maine
547	Catherine	Schmitt	Bangor	Maine
548	Michelle	Drew	Bangor	Maine
549	Jory	Tracy	Bangor	Maine
550	Kristofer	Coleman	Bangor	Maine
551	Peter	Christopher	Bangor	Maine
552	Katie	Small	Bangor	Maine
553	Ryan	Cram	Bangor	Maine
554	Linda	Stearns	Bangor	Maine
555	Gary	Thompson	Bangor	Maine
556	Karen	Marysdaughter	Bangor	Maine
557	Richard	Reardon	Bangor	Maine
558	Eric	McVay	Bangor	Maine
559	Emily	Baker	Bangor	Maine
560	Robert	Macdonald	Bangor	Maine
561	Laura	Ingerson	Bar Harbor	Maine
562	Scott	Cole	Bar Harbor	Maine
563	Mary	Anghinetti	Bar Harbor	Maine
564	Gary	Friedmann	Bar Harbor	Maine
565	Brian	Armstrong	Bar Harbor	Maine
566	Elizabeth	Selim	Bar Harbor	Maine
567	Joshua	Hurst	Bar Harbor	Maine
568	Patricia Gail	Paluga	Bar Harbor	Maine
569	Peter	Lindquist	Bar Harbor	Maine
570	Carolyn	Chappell	Bar Harbor	Maine
571	Eliot	Paine	Bar Harbor	Maine

572	Harry	Chapman	Bar Harbor	Maine
573	Mary	Ropp	Bar Harbor	Maine
574	Nate	Page	Bar Harbor	Maine
575	Steven	Katona	Bar Harbor	Maine
576	John	Craigo	Bar Harbor	Maine
577	Laila	Kuznezov	Bar Harbor	Maine
578	Cynthia	Crow	Bar Harbor	Maine
579	Ellen and Bill	Dohmen	Bar Harbor	Maine
580	Nina	Duggan	Bar Harbor	Maine
581	Chicken	Nuggets	Bar Harbor	Maine
582	Andrew	Flanagan	Bar Harbor	Maine
583	Susannah	Lewis	Bar Harbor	Maine
584	Makayla	Parsons	Bar Harbor	Maine
585	Rachael	Goldberg	Bar Harbor	Maine
586	Richard	Parker	Bar Harbor	Maine
587	Korah	Soll	Bar Harbor	Maine
588	Ellen	Decotiis	Bar Mills	Maine
589	Amy	Morin	Barpswell	Maine
590	Keri	Hayes	Bass Harbor	Maine
591	Angel	Lindsay	Bass Harbor	Maine
592	Sereena	Moodie	Bath	Maine
593	Heather	Cole	Bath	Maine
594	Sharon	Wilbraham	Bath	Maine
595	Andrew	Koehling	Bath	Maine
596	Sarah	Stambach	Bath	Maine
597	John	Donovan	Bath	Maine
598	Mikeala	Risch	Bath	Maine
599	Shelby	Leeman	Bath	Maine
600	Alicia	Romac	Bath	Maine
601	Gabriel	Lindsay	Bath	Maine
602	Judy	Martin	Bath	Maine
603	Amanda	Gaumont	Bath	Maine
604	Michael	Branca	Bath	Maine
605	Nate	Hodgkins	Bath	Maine
606	Travis	Charles	Bath	Maine
607	Moriah	Flood	Bath	Maine
608	Julie	Nolon	Bath	Maine
609	jenifer	Van Deusen	Bath	Maine
610	Tyler	Inman	Bath	Maine
611	Brianna	Pinkham	Bath	Maine
612	Sandra	Hempe	Bath	Maine
613	Amber	Scott	Bath	Maine
614	Jonathan	Rolfe	Bath	Maine
615	Alley	Marc	Bath	Maine
616	Aaron	Alexander	Bath	Maine
617	Susan	Lubner	Bath	Maine

618	Will	Blake	Bath	Maine
619	Mary FM	King	Bath	Maine
620	Derek	Wilbraham	Bath	Maine
621	Holly	Spence	Bath	Maine
622	Amanda	Bridges	Bath	Maine
623	David	Gaddy	Bath	Maine
624	Sam	Russell	Bath	Maine
625	Emma	Compton	Bath	Maine
626	Samantha	Moore	Bath	Maine
627	Lisa	Gellatly	Bath	Maine
628	Tasha	Sidelinger	Bath	Maine
629	Kathlyn	Munroe	Bath	Maine
630	Michael	Dorr	Bath	Maine
631	Larry	Hodgkins	Bath	Maine
632	Stephen	Cummings	Bath	Maine
633	Traci	Dempsey	Bath	Maine
634	Adair	DeLamater	Bath	Maine
635	Barbara	Proko	Bath	Maine
636	Charles	Reece	Bath	Maine
637	Karyn	Marden	Bath	Maine
638	Jody	Savage	Bath	Maine
639	Christopher	Zak	Bath	Maine
640	Mary	Gryspeerd	Bath	Maine
641	Cheri	Brunault	Bath	Maine
642	Natalia	Klimova	Bath	Maine
643	Kyle	Young	Bath	Maine
644	Sabrina	Conery	Bath	Maine
645	Timothy	Huebler	Bath	Maine
646	Asa	Korsen	Bath	Maine
647	Gretta	Wark	Bath	Maine
648	Stephanie	Watson	Bath	Maine
649	Allyson	Cooney	Bath	Maine
650	Alicia	Dole	Bath	Maine
651	Ryan	Dauphin	Bath	Maine
652	David	Domijan	Bath	Maine
653	Kristen	Gessner	Bath	Maine
654	Connor	Fitzpatrick	Bath	Maine
655	Phyllis	Bailey	Bath	Maine
656	Curtis	White	Bath	Maine
657	ALICIA	ROMAC	Bath	Maine
658	Siri	Beckman	Bath	Maine
659	Sarah	Chase	Bath	Maine
660	Jennifer	Jones	Bath	Maine
661	Hannah	Gabelmann	Bath	Maine
662	Tobias	Gabranski	Bath	Maine
663	Faith	Woodman	Bath	Maine

664	Sophia	Inman	Bath	Maine
665	James	Brawn	Bath	Maine
666	Breanna	Bruce	Bath	Maine
667	William	Russell	Bath	Maine
668	David	Boyle	Bath	Maine
669	Polly	Shaw	Bath	Maine
670	Joan	Atwood	Bath	Maine
671	Angela	Minard	Bath	Maine
672	Jared	Coniam	Bath	Maine
673	Padraic	Dougherty	Bath	Maine
674	Bethany	Fournier	Bath	Maine
675	Wayne	Fournier	Bath	Maine
676	Sereena	Moodie	Bath	Maine
677	Victoria	Lewis	Bath	Maine
678	Steve	King	Bath	Maine
679	Christian	Higgason	Bath	Maine
680	Collin	Leonard	Bath	Maine
681	Chris	Malloy	Bath	Maine
682	Lisa	McInnis	Bath	Maine
683	Mickaya	Brockett	Bath	Maine
684	Bill	Howell	Bath	Maine
685	Gary	Thorne	Bath	Maine
686	Ted	Davis	Bath	Maine
687	David	Elwell	Bath	Maine
688	Brandon	Williams	Beals	Maine
689	Joanna	Ellis	Beaver Cove	Maine
690	Lawrence	Deangelis	Beaver Cove	Maine
691	Michelle	Chasse	Belfast	Maine
692	Matthew	Diko	Belfast	Maine
693	Susan	Guthrie	Belfast	Maine
694	Ali	Simonds	Belfast	Maine
695	Karin	Spitfire	Belfast	Maine
696	Jeff	Shula	Belfast	Maine
697	Susie	Dixon	Belfast	Maine
698	Sharon	Goguen	Belfast	Maine
699	Anna	Strickland	Belfast	Maine
700	Jaclyn	Gordon	Belfast	Maine
701	Tim	Hughes	Belfast	Maine
702	Judy	Ottmann	Belfast	Maine
703	Alicia	Gaiero	Belfast	Maine
704	Carrie	Pierce	Belfast	Maine
705	Katherine	Harris	Belfast	Maine
706	Marilyn	Boyer	Belfast	Maine
707	Sue	McClintock	Belfast	Maine
708	Patricia	Heath	Belfast	Maine
709	Crystal	Beal	Belfast	Maine

710	Martha	Conway-Cole	Belfast	Maine
711	Lisa	Sadler	Belfast	Maine
712	Joanne	Spencer	Belfast	Maine
713	Ralph	Luken	Belfast	Maine
714	George	Faulkner	Belfast	Maine
715	Sarah	Baldwin	Belfast	Maine
716	John	Gray Sr.	Belfast	Maine
717	Michael	Hodsdon	Belfast	Maine
718	Felicia	Curtis	Belfast	Maine
719	Edward	Colson	Belfast	Maine
720	Barbara	Egan	Belfast	Maine
721	Robert	Shaw	Belfast	Maine
722	Annette	Tripp	Belfast	Maine
723	Sarah	Lozanova	Belfast	Maine
724	Corliss	Davis	Belfast	Maine
725	Barbara	Maria	Belfast	Maine
726	Louisa	Dunlap	Belfast	Maine
727	Carol	Lally	Belfast	Maine
728	Ashley	Flanders	Belfast	Maine
729	Wyatt	Ford	Belfast	Maine
730	Allen	Bucklin	Belfast	Maine
731	Priscilla	Linn	Belfast	Maine
732	Kelli	Bucklin	Belfast	Maine
733	Karen	Saum	Belfast	Maine
734	Gage	Newcomb	Belfast	Maine
735	Gavin	Holland	Belfast	Maine
736	Belinda	Pendleton	Belfast	Maine
737	Everett	Curtis	Belfast	Maine
738	Tony	Kulik	Belfast	Maine
739	Theodore	Hensley	Belfast	Maine
740	Leslie	Miller	Belfast	Maine
741	Barbara	Walls	Belfast	Maine
742			Belfast	Maine
743	Terry	Patterson	Belfast	Maine
744	Felicia	Curtis	Belfast	Maine
745	Evan	Porter	Belfast	Maine
746	Brock	Gordon	Belfast	Maine
747	Sandra	Haire	Belfast	Maine
748	Amy	Grant	Belfast	Maine
749	Alice	Ireland	Belfast	Maine
750	Lise	Leigh	Belfast	Maine
751	Shawn	Jacobs	Belfast	Maine
752	Susan	Hill	Belfast	Maine
753	Sarah	McLain	Belfast	Maine
754	Seth	Benz	Belfast	Maine
755	Phyllis	Coelho	Belfast	Maine

756	Zak	Kendall	Belfast	Maine
757	Tabitha	Gish	Belfast	Maine
758	Sandra	Haire	Belfast	Maine
759	Neva	Allen	Belfast	Maine
760	Judson	Colby	Belfast	Maine
761	Amanda	Jacobs	Belfast	Maine
762	Stephanie	Cesario	Belfast	Maine
763	Loyd	Marlow	Belfast	Maine
764	Mary	Kaldenbaugh	Belfast	Maine
765	John	Morey	Belfast	Maine
766	John	Gibbs	Belfast	Maine
767	Lauren	Jacobs	Belfast	Maine
768	Marianne	McKinney	Belfast	Maine
769	Kristy	Pottle	Belfast	Maine
770	Conny	Hatch	Belfast	Maine
771	Letitia	Manning	Belfast	Maine
772	John	Hurley	Belfast	Maine
773	Barbara	Klie	Belfast	Maine
774	Letitia	Manning	Belfast	Maine
775	Sandra	Piechocki	Belfast	Maine
776	Claudia	Burton	Belgrade	Maine
777	Justin	Shorey	Belgrade	Maine
778	Jessica	Hews	Belgrade	Maine
779	Susan	Feiner	Belgrade	Maine
780	Savannah	Stevens	Belgrade	Maine
781	Joy	Emmons	Belgrade	Maine
782	Brooke	Pelletier	Belgrade	Maine
783	Dana	Ellis	Belgrade	Maine
784	Brooke	Pellerier	Belgrade	Maine
785	Terry	Sawyer	Belgrade	Maine
786	Julie	Veilleux	Belgrade	Maine
787	Timothy	Thompson	Belgrade	Maine
788	Stephanie	Irwin	Belgrade	Maine
789	Samuel	Bessey	Belgrade	Maine
790	Barry	Bacon	Belgrade	Maine
791	Brianna	Parker	Belgrade	Maine
792	Chance	Carlson	Belgrade	Maine
793	Eric	Wacome	Belgrade	Maine
794	Linda	Warner	Belgrade	Maine
795	Kaysie	Dostie	Belgrade	Maine
796	James	Clancy	Belgrade	Maine
797	Gregory	French	Belgrade	Maine
798	Paige	Martin	Belgrade	Maine
799	Brenden	Bouchard	Belgrade	Maine
800	Dylan	Hawes	Belgrade	Maine
801	Stephanie	Barrett	Belgrade	Maine

802	Mike	Vogt	Belgrade	Maine
803	Patrick	Bond	Belgrade	Maine
804	Terry	Campbell	Belgrade	Maine
805	Marlene	Sawyer	Belgrade	Maine
806	Deanna	Jenney	Belgrade	Maine
807	Chet	Emmons	Belgrade	Maine
808	Pamela	Bacon	Belgrade	Maine
809	Heather	Stevens	Belgrade	Maine
810	Craig	Alexander	Belgrade	Maine
811	Amanda	Jewell	Belgrade	Maine
812	Jane	Manson	Belgrade Lakes	Maine
813	Kevin	Macdonald	Belgrade Lakes	Maine
814	Patrick	Donahue	Belgrade Lakes	Maine
815	Catherine	Johnson	Belgrade Lakes	Maine
816	Michael	Grove	Belgrade Lakes	Maine
817	Jane	Brown	Belmont	Maine
818	Shauna	Bryant	Belmont	Maine
819	Katia	Ancona	Belmont	Maine
820	Megan	Peterson	Belmont	Maine
821	Janice	Juettner	Belmont	Maine
822	Misty	Ames	Belmont	Maine
823	Jessica	Shaffer	Belmont	Maine
824	Lisa	Ammerman	Benedicta	Maine
825	Brandon	Gerry	Benton	Maine
826	David	Braun	Benton	Maine
827	Brian	Richardson	Benton	Maine
828	Jared	Peters	Benton	Maine
829	Cheryl	Twitchell	Benton	Maine
830	Lucas	Cole	Benton	Maine
831	Amelia	Cole	Benton	Maine
832	Kerilee	Davis	Benton	Maine
833	Eric	Robbins	Benton	Maine
834	John	Reardon	Benton	Maine
835	David	Bernier	Benton	Maine
836	Fran	Hinkel	Benton	Maine
837	Mary	Tracy	Benton	Maine
838	Justin	Walker	Benton	Maine
839	Amy	Michaud	Benton	Maine
840	Tracey	Bernier	Benton	Maine
841	Tia	Pratt	Benton	Maine
842	Diane	Glazier	Benton	Maine
843	Chantal	Beane	Benton	Maine
844	Todd	Genest	Benton	Maine
845	Nicole	Breton	Benton	Maine
846	Joan	Frisina-Bowles	Benton	Maine
847	Eric	Foster	Benton	Maine

848	Brandon	Braleu	Benton	Maine
849	Jayne	Ashworth	Bernard	Maine
850	Willing	Dandurand	Bernard	Maine
851	Dena	Talon	Berwick	Maine
852	Robert	Blake	Berwick	Maine
853	Klara-Sophia	Hill	Berwick	Maine
854	Gil	Stadig	Berwick	Maine
855	Stacy	Royer	Berwick	Maine
856	Brooke	Gebhardt	Berwick	Maine
857	Darshanna	Brooks	Berwick	Maine
858	Diane	Sirois	Berwick	Maine
859	Jim	Riley	Berwick	Maine
860	Jill	Crosbie	Berwick	Maine
861	Phyllis	Brooks	Berwick	Maine
862	Casten	Wayne	Berwick	Maine
863	Erin	Paradis	Berwick	Maine
864	Joseph	Saracina	Berwick	Maine
865	Paula	Lepore	Berwick	Maine
866	Liz	McGranaghan	Berwick	Maine
867	Peter	Quito	Berwick	Maine
868	Sean	Baker	Berwick	Maine
869	Debbie	Gelestino	Berwick	Maine
870	Jeffrey	Doyle	Berwick	Maine
871	Anonymus	Anonymus	Berwick	Maine
872	Scott	McIntire	Berwick	Maine
873	Ellen	Brouillet	Berwick	Maine
874	Corey	Simpson	Berwick	Maine
875	Don	Murray	Berwick	Maine
876	Kayla	Leveille	Bethel	Maine
877	Barry	Donohue	Bethel	Maine
878	Myles	Felch	Bethel	Maine
879	Debra	Toothaker	Bethel	Maine
880	Karen	Cole	Bethel	Maine
881	Edward	Connolly	Bethel	Maine
882	Jeannie	Rahilly	Bethel	Maine
883	Madolynne	Zimmerman	Bethel	Maine
884	Fern	Benson	Bethel	Maine
885	Becky	Secrest	Bethel	Maine
886	Anthony	Charette	Bethel	Maine
887	Karen	McElroy	Bethel	Maine
888	Helen	Adessa	Bethel	Maine
889	Alyssa	Howe	Bethel	Maine
890	Douglas	Bailey	Bethel	Maine
891	Samantha	Mallory	Bethel	Maine
892	Todd	Siekman	Bethel	Maine
893	John	Evans	Bethel	Maine

894	Jodi	Everett	Bethel	Maine
895	Dwayne	Bennett	Bethel	Maine
896	Mikel-Lee	Patten	Bethel	Maine
897	Jacquelyn	Cressy	Bethel	Maine
898	Doreen	Casey	Bethel	Maine
899	Eli	Mann	Bethel	Maine
900	Garret	Bonnema	Bethel	Maine
901	Justin	Mossey	Bethel	Maine
902	Kirk	Siegel	Bethel	Maine
903	Carol	Boden	Bethel	Maine
904	Stuart	Crocker	Bethel	Maine
905	Glen	Decarteret	Bethel	Maine
906	Mary Alice	Madden	Bethel	Maine
907	Susan	Wight	Bethel	Maine
908	Leslie	Moore	Bethel	Maine
909	Zachary	Bell	Bethel	Maine
910	John	Wendell	Bethel	Maine
911	Helen	Adessa	Bethel	Maine
912	Tina	Courtway	Bethel	Maine
913	Vicki	Lowell	Bethel	Maine
914	Ben	Pierce	Bethel	Maine
915	Matthew	Daniel	Bethel	Maine
916	Jeffrey	Sloan	Bethel	Maine
917	Donald	Angevine	Bethel	Maine
918	Roger	Zimmerman	Bethel	Maine
919	Mark	Landry	Bethel	Maine
920	Barbara	Corbeil	Biddeford	Maine
921	Cecilia	Blair	Biddeford	Maine
922	Donna	Roberts	Biddeford	Maine
923	Cynthia	Ladderbush	Biddeford	Maine
924	Joseph	Coppolino	Biddeford	Maine
925	Gloria	Laverriere	Biddeford	Maine
926	Pat	Delaney	Biddeford	Maine
927	Joanne	Twomey	Biddeford	Maine
928	Ashley	Belanger	Biddeford	Maine
929	Chris	Parsons	Biddeford	Maine
930	Claudia	Cantara	Biddeford	Maine
931	Mark	Wallbridge	Biddeford	Maine
932	Betty	Roker	Biddeford	Maine
933	Justin	St. John	Biddeford	Maine
934	L. M.	Turner	Biddeford	Maine
935	Rachel	Bowman	Biddeford	Maine
936	Ethan	Gagnon	Biddeford	Maine
937	Gary	Fontaine	Biddeford	Maine
938	Daniel	Eichman	Biddeford	Maine
939	David	Fortier	Biddeford	Maine

940	Maribeth	Amber	Biddeford	Maine
941	Molli	Loud	Biddeford	Maine
942	Jade	Coppolino	Biddeford	Maine
943	Nancy	Fowski	Biddeford	Maine
944	Ralph	Lariviere	Biddeford	Maine
945	Jennifer	Martin	Biddeford	Maine
946	Kaitlyn	Naylor	Biddeford	Maine
947	David	Hersom	Biddeford	Maine
948	Bonnie	Bernier	Biddeford	Maine
949	Royce	Stevens	Biddeford	Maine
950	Jenny	Power	Biddeford	Maine
951	Paul	Chesebrough	Biddeford	Maine
952	Mikaela	Lyons	Biddeford	Maine
953	Nathan	Reynolds	Biddeford	Maine
954	Cynthia	Powers	Biddeford	Maine
955	Derek	Eichman	Biddeford	Maine
956	Ethan	Collins	Biddeford	Maine
957	Anthony	Mininni	Biddeford	Maine
958	Carol	Granger	Biddeford	Maine
959	Scott	Whiting	Biddeford	Maine
960	john	wallach	Biddeford	Maine
961	Helene	Ahern	Biddeford	Maine
962	Mike	Mayer	Biddeford	Maine
963	Chelsea	Daigle	Biddeford	Maine
964	Megan	Rousselle	Biddeford	Maine
965	Matthew	Poirier	Biddeford	Maine
966	Dalani	Roy	Biddeford	Maine
967	Joe	Yuhas	Biddeford	Maine
968	Christopher	McRee	Biddeford	Maine
969	Bill	Riggs	Biddeford	Maine
970	Nadiah	Albasrawy	Biddeford	Maine
971	Jacqueline	Van Clief	Biddeford	Maine
972	Justice	Bailey	Biddeford	Maine
973	Lydia	Kinney	Biddeford	Maine
974	John	Boucher	Biddeford	Maine
975	Jim	Granger	Biddeford	Maine
976	Margaret	Bean	Biddeford	Maine
977	Colby	Cavagnaro	Biddeford	Maine
978	Lacey	Laverriere	Biddeford	Maine
979	Amanda	Cahill	Biddeford	Maine
980	Melissa	Souda	Biddeford	Maine
981	Jules	Dennison	Biddeford	Maine
982	Theresa	Therrien	Biddeford	Maine
983	Katelyn	Troegner	Biddeford	Maine
984	Pamela	Smith	Biddeford	Maine
985	Sharisse	Pictou	Biddeford	Maine

986	Kate	Laverriere	Biddeford	Maine
987	LAWRENCE	BOYLE	Biddeford	Maine
988	Carissa	Maurin	Biddeford	Maine
989	Keri	West	Biddeford	Maine
990	Denise	Dreher	Biddeford	Maine
991	Amanda	Cahill	Biddeford	Maine
992	Deborah	DuDevoir	Biddeford	Maine
993	Cynthia	Howard	Biddeford Pool	Maine
994	Olivia	Barberi	Biddeford Pool	Maine
995	Sheila	Nichols	Bingham	Maine
996	Edward	Knott	Bingham	Maine
997	Evelyn	Beane	Bingham	Maine
998	Rob	Goomishian	Bingham	Maine
999	Linda	Vincent	Bingham	Maine
1000	Mary	Goomishian	Bingham	Maine
1001	Iohn	Clark	Bingham	Maine
1002	Michaela	Marden	Bingham	Maine
1003	Sherry	Hovey	Bingham	Maine
1004	Adrienne	Mathieu	Bingham	Maine
1005	Jessica	Dunton	Bingham	Maine
1006	Jeromie	Papa	Bingham	Maine
1007	Greg	Hudzina	Bingham	Maine
1008	Cody	Jacques	Bingham	Maine
1009	Sonja	Abraham	Bingham	Maine
1010	Brenda	Dalka	Bingham	Maine
1011	Michael	Hilton	Bingham	Maine
1012	Kyla	White	Bingham	Maine
1013	Bethany	Szarka	Bingham	Maine
1014	Charlene	Patrick	Bingham	Maine
1015	Dana	Dibiase Jr	Bingham	Maine
1016	Jennifer	Cates	Bingham	Maine
1017	Laura	Goomishian	Bingham	Maine
1018	Cheree	Conrad	Bingham	Maine
1019	Cheree	Conrad	Bingham	Maine
1020	Marissa	Rogers	Bingham	Maine
1021	Pamela	Jollotta	Bingham	Maine
1022	Donovan	Beane	Bingham	Maine
1023	Sherry	Chase	Bingham	Maine
1024	Carol	Later	Bingham	Maine
1025	Jeromie	Papa	Bingham	Maine
1026	Steven	Dominique	Blaine	Maine
1027	Bonnie	Preston	Blue Hill	Maine
1028	Elinor	Neuhauser	Blue Hill	Maine
1029	Matthew	Bruno	Blue Hill	Maine
1030	Adam	Carter	Blue Hill	Maine
1031	Patricia	Pettigrew	Blue Hill	Maine

1032	Leslie	Clapp	Blue Hill	Maine
1033	Soul	Thyme	Blue Hill	Maine
1034	Rick	Alexander	Blue Hill	Maine
1035	Veronica	Bruno	Blue Hill	Maine
1036	Bonnie	Dean	Blue Hill	Maine
1037	Daniel	Pasternack	Blue Hill	Maine
1038	Eileen	Mulliken	Blue Hill	Maine
1039	Sonja	Leonard	Blue Hill	Maine
1040	David	Drake	Blue Hill	Maine
1041	Martin	Curlik	Blue Hill	Maine
1042	Nathaniel	Birdsall	Blue Hill	Maine
1043	Leda Beth	Gray	Blue Hill	Maine
1044	Chad	McIntire	Blue Hill	Maine
1045	semena	curlik	Blue Hill	Maine
1046	Robert	Granger	Blue Hill	Maine
1047	Gregory	Fortier	BNgor	Maine
1048	Mark	Pelletier	Booker Rd.	Maine
1049	Katherine	Schwehm	Boothbay	Maine
1050	Sara	Walbridge	Boothbay	Maine
1051	Anthony	Squillante	Boothbay	Maine
1052	Suzanne	Norton	Boothbay	Maine
1053	Winthrop	Farmer	Boothbay	Maine
1054	Sarah	Strouss	Boothbay	Maine
1055	Cassandra	Townsend	Boothbay	Maine
1056	Charles	Brooks	Boothbay	Maine
1057	Rebecca	Welsh	Boothbay	Maine
1058	Marianne	Anthony	Boothbay	Maine
1059	Caren	Minzy	Boothbay	Maine
1060	Jonathan	Tindal	Boothbay	Maine
1061	Frederick	Kraeuter	Boothbay	Maine
1062	Alan	Bellows	Boothbay	Maine
1063	Ronald	Ross	Boothbay	Maine
1064	Robert	Forge	Boothbay	Maine
1065	Sherri	Brown	Boothbay	Maine
1066	Mark	Howard	Boothbay	Maine
1067	Catherine	Coupland	Boothbay	Maine
1068	Lauren	Brown	Boothbay Harbor	Maine
1069	Merritt	Blakeslee	Boothbay Harbor	Maine
1070	Sarah	Buchanan	Boothbay Harbor	Maine
1071	Pamela	Curtis	Boothbay Harbor	Maine
1072	Brynne	Kristan	Boothbay Harbor	Maine
1073	Kelsey	Holbrook	Boothbay Harbor	Maine
1074	William	Coll	Boothbay Harbor	Maine
1075	J	Beck	Boothbay Harbor	Maine
1076	Kelsey	Holbrook	Boothbay Harbor	Maine
1077	Michael	Mayhew	Boothbay Harbor	Maine

1078	Connie	Netherton	Boothbay Harbor	Maine
1079	Melanie	Green	Boothbay Harbor	Maine
1080	Devin	Webber	Bowdoin	Maine
1081	Jane	Davis	Bowdoin	Maine
1082	Zachery	Jacques	Bowdoin	Maine
1083	Darrah	Hamlin	Bowdoin	Maine
1084	Jason	Hall	Bowdoin	Maine
1085	Justin	Levesque	Bowdoin	Maine
1086	Jay	Bickford	Bowdoin	Maine
1087	Lucinda	Marshall	Bowdoin	Maine
1088	Maranda	Burgess	Bowdoin	Maine
1089	Jett	Gould	Bowdoin	Maine
1090	Teresa	Coffey	Bowdoin	Maine
1091	Diane	Vella	Bowdoin	Maine
1092	Andrea	Schaedler	Bowdoin	Maine
1093	Destiny	Oppedisano	Bowdoin	Maine
1094	Gilbert	Plourde	Bowdoin	Maine
1095	Justin	Cochran	Bowdoin	Maine
1096	Cody	Pierce	Bowdoin	Maine
1097	Christian	Palmer	Bowdoin	Maine
1098	Robert	Nering	Bowdoin	Maine
1099	Linda	Lee	Bowdoin	Maine
1100	Matthew	Drouin	Bowdoin	Maine
1101	Cyndie	Lagrange	Bowdoin	Maine
1102	Lala	Drew	Bowdoin	Maine
1103	Tessa	Cihen	Bowdoin	Maine
1104	Rebecca	Kimball	Bowdoin	Maine
1105	Andrea	Burdick	Bowdoin	Maine
1106	Nicole	Hall	Bowdoin	Maine
1107	Branden	Dewoody	Bowdoin	Maine
1108	Pam	Geroux	Bowdoin	Maine
1109	Jason	Black	Bowdoin	Maine
1110	Brendan	Glass	Bowdoin	Maine
1111	Sarah	Watts	Bowdoin	Maine
1112	Devon	Drmonte	Bowdoin	Maine
1113	Chris	Ames	Bowdoin	Maine
1114	Anonymous	Anonymous	Bowdoin	Maine
1115	mary	brien	Bowdoinham	Maine
1116	Eric	Persson	Bowdoinham	Maine
1117	Ricky	Laliberte	Bowdoinham	Maine
1118	Thomas	Walling	Bowdoinham	Maine
1119	Jason	Caron	Bowdoinham	Maine
1120	Rachel	Evans	Bowdoinham	Maine
1121	James	OHare	Bowdoinham	Maine
1122	Marc	Berry	Bowdoinham	Maine
1123	Josh	Cote	Bowdoinham	Maine

1124	Sarah	Geis	Bowdoinham	Maine
1125	Amanda	Yenco	Bowdoinham	Maine
1126	Jo	Werther	Bowdoinham	Maine
1127	Ashlee	James	Bowdoinham	Maine
1128	Sue	Baxter	Bowdoinham	Maine
1129	David	Asmussen	Bowdoinham	Maine
1130	Cindy	Curran	Bowdoinham	Maine
1131	Kelsea	Wilson	Bowdoinham	Maine
1132	Susan	Drucker	Bowdoinham	Maine
1133	Megan	Simmons	Bowdoinham	Maine
1134	Rachel	Hardy	Bowdoinham	Maine
1135	Christopher	Scerbo	Bowdoinham	Maine
1136	Bobbi	Brown	Bowdoinham	Maine
1137	Tracey	Hall	Bowdoinham	Maine
1138	Crystal	Floccher	Bowdoinham	Maine
1139	Debra	Lipscomb	Bowdoinham	Maine
1140	L.S.	McDorman	Bowdoinham	Maine
1141	Jenny	Oliveira	Bowdoinham	Maine
1142	Henry	Mitchell	Bowdoinham	Maine
1143	Dwaine	Evans	Bowdoinham	Maine
1144	Gene	McKenna	Bowdoinham	Maine
1145	Hayley	Neiman	Bowdoinham	Maine
1146	Jason	Henderson	Bowdoinham	Maine
1147	Edith	Bailes	Bowdoinham	Maine
1148	Jeffrey	Lauder	Bowdoinham	Maine
1149	Nathan	England	Bowdoinham	Maine
1150	Vivian	Labonte'	Bowdoinham	Maine
1151	Allan	Leech	Bowdoinham	Maine
1152	Jane	McKenna	Bowdoinham	Maine
1153	Karen	Read	Bowdoinham	Maine
1154	Greg	Hurley	Bowdoinham	Maine
1155	Elaine	Buck	Bowdoinham	Maine
1156	Erynn	Taylor	Bowdoinham	Maine
1157	Kristianna	Benoit	Bowdoinham	Maine
1158	Joey	Stacks	Bowdoinham	Maine
1159	Arianna	Bennett	Bowdoinham	Maine
1160	Susan	Hobart	Bowdoinham	Maine
1161	Adele	McKenna	Bowdoinham	Maine
1162	Pamela	Fortin	Bowerbank	Maine
1163	Christine	Spearing	Bradford	Maine
1164	Konnar	Kirlin	Bradford	Maine
1165	Dennis	Dobson	Bradford	Maine
1166	Jason	Spearing	Bradford	Maine
1167	McKedra	Clements	Bradford	Maine
1168	Konnar	Kirlin	Bradford	Maine
1169	ZACH	BARTLETT	Bradley	Maine

1170	Kolbi	Currier	Bradley	Maine
1171	Kevin	Roy	Bradley	Maine
1172	Nathaniel	Laskey	Bradley	Maine
1173	Tony	Guay	Bradley	Maine
1174	Jody	Hammond	Bradley	Maine
1175	Killian	Miller	Bremen	Maine
1176	Ken	Sparkes	Bremen	Maine
1177	Edward	McCarthy	Bremen	Maine
1178	Erin	Michaud	Bremen	Maine
1179	Elaine	Milardo	Bremen	Maine
1180	Eleanor	Kinney	Bremen	Maine
1181	Mary	Voskian	Bremen	Maine
1182	Joan	Ray	Bremen	Maine
1183	Ryan	Gideon	Brewer	Maine
1184	Drew	Lunt	Brewer	Maine
1185	Craig	Rand	Brewer	Maine
1186	Brooke	Staton	Brewer	Maine
1187	Morgan	Forrest	Brewer	Maine
1188	Arthur	Allen	Brewer	Maine
1189	Trina	Dorion	Brewer	Maine
1190	Patricia	Rand	Brewer	Maine
1191	Ben	Lee	Brewer	Maine
1192	Jason	Gross	Brewer	Maine
1193	Nicholas	Dorr	Brewer	Maine
1194	Arthur	Allen	Brewer	Maine
1195	Tonya	Ashe	Brewer	Maine
1196	Krista	Watson	Brewer	Maine
1197	Grant	Lufkin	Brewer	Maine
1198	Jean	Malo	Brewer	Maine
1199	Russ	Vickery	Brewer	Maine
1200	Mary	Briggs	Brewer	Maine
1201	Joshua	Pellegrino	Brewer	Maine
1202	Tyler	Timms	Brewer	Maine
1203	Evan	Roy	Brewer	Maine
1204	Janel	Worcester-Brown	Brewer	Maine
1205	Charles	Doughty	Brewer	Maine
1206	Leonard	Dorion	Brewer	Maine
1207	Nicole	Foss	Brewer	Maine
1208	Dylan	Cormier	Brewer	Maine
1209	Jason	Allen	Bridgton	Maine
1210	Tim	Moore	Bridgton	Maine
1211	Tom	Washburn	Bridgton	Maine
1212	Melinda	Thomas	Bridgton	Maine
1213	Julia	Dobson	Bridgton	Maine
1214	John	Keelan	Bridgton	Maine

1215	Brianna	Shaffer	Bridgton	Maine
1216	Tom	Hartley	Bridgton	Maine
1217	Donald	Maclean Iii	Bridgton	Maine
1218	Crystal	Feeney	Bridgton	Maine
1219	Renee	Baer	Bridgton	Maine
1220	Corinna	Goodwin	Bridgton	Maine
1221	Jamie	Leland	Bridgton	Maine
1222	John	Keelan	Bridgton	Maine
1223	Daniel	Nowell	Bridgton	Maine
1224	Dorothy	Smith	Bridgton	Maine
1225	Elizabeth	Scott	Bridgton	Maine
1226	Greg	Roberts	Bridgton	Maine
1227	Marita	Wiser	Bridgton	Maine
1228	Sebastion	King	Bridgton	Maine
1229	James	Dahlberg	Bridgton	Maine
1230	Kristen	Obrien	Bridgton	Maine
1231	Maureen	Harpell	Bridgton	Maine
1232	Michael	Goodwin	Bridgton	Maine
1233	Jeff	Stern	Bridgton	Maine
1234	Laura	McCabe	Bridgton	Maine
1235	Stephen	Lyons	Bridgton	Maine
1236	Jimmy	Fleming	Bridgton	Maine
1237	Christine	Moore	Bridgton	Maine
1238	David	Breton	Bridgton	Maine
1239	William	Preis	Bridgton	Maine
1240	Eric	Hodgkin	Bridgton	Maine
1241	Heather	Thurston	Bridgton	Maine
1242	Jonathan	Chappell	Bridgton	Maine
1243	Maureen	Harpell	Bridgton	Maine
1244	Edward	Ziegler	Bridgton	Maine
1245	Athena	Miller	Brighton Plt	Maine
1246	David	Longden	Brighton Plt	Maine
1247	Michelle	Henkin	Bristol	Maine
1248	Daphne Lehava	Stern	Bristol	Maine
1249	Alexander	Davis	Bristol	Maine
1250	Anita	Upham	Bristol	Maine
1251	Allen	Mathieson	Bristol	Maine
1252	Jilian	Noriega	Bristol	Maine
1253	Rennie	Welch	Bristol	Maine
1254	Joanna	Holland	Bristol	Maine
1255	Edward	Hodgdon	Bristol	Maine
1256	Grady	Hayford	Bristol	Maine
1257	Brooke	Sanborn	Bristol	Maine
1258	Rosario	Vitanza	Bristol	Maine
1259	Barbara	Wyeth	Brooklin	Maine
1260	Jonathan	Carroll	Brooklin	Maine

1261	Claire	Mortimer	Brooklin	Maine
1262	Michael	Percy	Brooklin	Maine
1263	Jane	Whitney	Brooklin	Maine
1264	Richard	Hero	Brooklin	Maine
1265	Paula	Hogan	Brooklin	Maine
1266	Susan	Snider	Brooklin	Maine
1267	Jared	Crawford	Brooks	Maine
1268	Christopher	Cunningham	Brooks	Maine
1269	edward	sousa	Brooks	Maine
1270	Sarah	Gilman	Brooks	Maine
1271	Ann	Humphrey	Brooksville	Maine
1272	Jody	Spear	Brooksville	Maine
1273	Elizabeth	Hill	Brooksville	Maine
1274	Galen	Davis	Brooksville	Maine
1275	Anne	Ferrara	Brooksville	Maine
1276	Cindy	Houde	Brookton	Maine
1277	Theodor	Mommers	Brownfield	Maine
1278	Heather	Rhoda	Brownfield	Maine
1279	Rhonda	Johnson	Brownfield	Maine
1280	John	Rice	Brownfield	Maine
1281	Vickie	Duggan	Brownfield	Maine
1282	Lauren	McBride	Brownfield	Maine
1283	Mabel	Hidden	Brownfield	Maine
1284	Gregg	Hesslein	Brownfield	Maine
1285	Todd	Bergstein	Brownfield	Maine
1286	Mary	Smith	Brownfield	Maine
1287	Jeffrey	MacDonald	Brownville	Maine
1288	Karen	Rollins	Brownville	Maine
1289	Brent	Stoppe	Brownville	Maine
1290	Bonnie	Conley	Brownville	Maine
1291	Diane	McDonald	Brownville	Maine
1292	Jordan	Durant	Brownville	Maine
1293	Brandee	Herbest	Brownville	Maine
1294	Mae	Billington	Brumswicl	Maine
1295	Priscilla	Laskey	Brunswick	Maine
1296	Jean	Shaw	Brunswick	Maine
1297	Christina	Baker	Brunswick	Maine
1298	Neil	Gallagher	Brunswick	Maine
1299	Bonnie	Wood	Brunswick	Maine
1300	Weston	Neal	Brunswick	Maine
1301	Donna	Ewert	Brunswick	Maine
1302	Molly	Macgregor	Brunswick	Maine
1303	Jesse	Smith	Brunswick	Maine
1304	Kelsey	Harrell	Brunswick	Maine
1305	Cordana	Dingley	Brunswick	Maine
1306	Averil	Fessenden	Brunswick	Maine

1307	Sterling	Brown	Brunswick	Maine
1308	Dillion	Sabins-Sprague	Brunswick	Maine
1309	Finnegan	Woodruff	Brunswick	Maine
1310	Jackie	Stevens	Brunswick	Maine
1311	Seamus	Woodruff	Brunswick	Maine
1312	Emily	Hubert	Brunswick	Maine
1313	Tim	Hanson	Brunswick	Maine
1314	David	Billings	Brunswick	Maine
1315	Colleen	McKenna	Brunswick	Maine
1316	Gabriel	Gargiulo	Brunswick	Maine
1317	Thelma	Toth	Brunswick	Maine
1318	Eleanor	Wilson	Brunswick	Maine
1319	Jeffrey	Morrill	Brunswick	Maine
1320	Peter	Simmons	Brunswick	Maine
1321	Jeremy	Blackman	Brunswick	Maine
1322	Judy	Gatchell	Brunswick	Maine
1323	Steve	Sandau	Brunswick	Maine
1324	Adam	Austin	Brunswick	Maine
1325	Lauren	Hickey	Brunswick	Maine
1326	Stephan	Stack	Brunswick	Maine
1327	Sande	Updegraph	Brunswick	Maine
1328	Ryan	Maciejewski	Brunswick	Maine
1329	Ethan	Foss	Brunswick	Maine
1330	Stephen	Wood	Brunswick	Maine
1331	Danielle	Gainey	Brunswick	Maine
1332	Samuel	Witt	Brunswick	Maine
1333	Mary	Sullivan	Brunswick	Maine
1334	Pat	Rathbone	Brunswick	Maine
1335	Suzanne	Bleau	Brunswick	Maine
1336	Christopher	Dauphin	Brunswick	Maine
1337	Nancy	Bliss	Brunswick	Maine
1338	Tammy	Pelletier	Brunswick	Maine
1339	Lisa	Bossi	Brunswick	Maine
1340	Joanne	Hardy	Brunswick	Maine
1341	Savannah	Leclerc	Brunswick	Maine
1342	Ashley	Ambrose	Brunswick	Maine
1343	Scott	Manter	Brunswick	Maine
1344	Eben	Baker	Brunswick	Maine
1345	David	Roberts	Brunswick	Maine
1346	James	Neron	Brunswick	Maine
1347	Lee	White	Brunswick	Maine
1348	Sydney	Alberg	Brunswick	Maine
1349	Rusty	Pearson	Brunswick	Maine
1350	Carl	Chandler	Brunswick	Maine
1351	Kevin	Delong	Brunswick	Maine
1352	John	Hamilton	Brunswick	Maine

1353	Cheryl	Martin	Brunswick	Maine
1354	Amber	Rock	Brunswick	Maine
1355	Mackenzie	Yeaton	Brunswick	Maine
1356	Nathaniel	Blackford	Brunswick	Maine
1357	Dawne-Marie	Powers	Brunswick	Maine
1358	Shaunacy	Mains	Brunswick	Maine
1359	Henry	Heyburn	Brunswick	Maine
1360	Fauna	Spaulding	Brunswick	Maine
1361	Kelsie	Labbe	Brunswick	Maine
1362	Ann	Ruthsdottir	Brunswick	Maine
1363	Marcia	Sewall	Brunswick	Maine
1364	Louisa	Hart	Brunswick	Maine
1365	Savanna	Austin	Brunswick	Maine
1366	Samuel	Milligan	Brunswick	Maine
1367	Sarah	Greene	Brunswick	Maine
1368	Alexa	Demers	Brunswick	Maine
1369	Nancy	Hasenfus	Brunswick	Maine
1370	Charlotte	Nash	Brunswick	Maine
1371	Hannah	Cooper	Brunswick	Maine
1372	Megan	Hanson	Brunswick	Maine
1373	Nick	Cardone	Brunswick	Maine
1374	Lorene	Nadeau	Brunswick	Maine
1375	Gordon	Smith	Brunswick	Maine
1376	Michael	Brewer	Brunswick	Maine
1377	Andrew	Blunt	Brunswick	Maine
1378	Jay	Foley	Brunswick	Maine
1379	Phyllis	Goodnow	Brunswick	Maine
1380	Elliot	Malis	Brunswick	Maine
1381	Michael	Woodruff	Brunswick	Maine
1382	Chrissy	Adamowicz	Brunswick	Maine
1383	Chris	Betit	Brunswick	Maine
1384	Chris	Barter	Brunswick	Maine
1385	Linda	Voigt	Brunswick	Maine
1386	Jacob	Bernier	Brunswick	Maine
1387	Debra	Kopansky	Brunswick	Maine
1388	Robert	Adam	Brunswick	Maine
1389	Bronda and Alfred	Niese	Brunswick	Maine
1390	Jordanne	Day	Brunswick	Maine
1391	James	Ouellette	Brunswick	Maine
1392	Camilla	Beale	Brunswick	Maine
1393	Gayle	Stephenson	Brunswick	Maine
1394	Rosemarie	Perry	Brunswick	Maine
1395	Lorian	Lachance	Brunswick	Maine
1396	Kathleen	Stack	Brunswick	Maine
1397	Nathan	Brassard	Brunswick	Maine

1398	Ellen	Steinbart	Brunswick	Maine
1399	Samantha	Sherwood	Brunswick	Maine
1400	Michelle	McDonough	Brunswick	Maine
1401	Natasha	Titus	Brunswick	Maine
1402	Elizabeth	Hamilton	Brunswick	Maine
1403	Stephen	Cowperthwaite	Brunswick	Maine
1404	Douglas	Hardy	Brunswick	Maine
1405	Dusty	Post	Brunswick	Maine
1406	Susan	Goodwin	Brunswick	Maine
1407	Bethan	Jerome	Brunswick	Maine
1408	Bruce	Burnham	Brunswick	Maine
1409	Heather	Augustine	Brunswick	Maine
1410	Garry	Clark	Brunswick	Maine
1411	Matthew	Randall	Brunswick	Maine
1412	susan	jackson	Brunswick	Maine
1413	Jae Min	Yoo	Brunswick	Maine
1414	Evelyn	Bryant	Brunswick	Maine
1415	Bruce	Bishoff	Brunswick	Maine
1416	Jessica	Tracy	Brunswick	Maine
1417	Lenoir	Kelley	Brunswick	Maine
1418	Eleanor	Hagenbuch	Brunswick	Maine
1419	Robert	Broderick	Brunswick	Maine
1420	Candace	Gregory	Brunswick	Maine
1421	Karlene	Saucier	Brunswick	Maine
1422	Carol	Antonak	Brunswick	Maine
1423	Paula	Wolfe	Brunswick	Maine
1424	Ellen	Rice	Brunswick	Maine
1425	Ruth	Zumstein	Brunswick	Maine
1426	Joan	Dumont	Brunswick	Maine
1427	Elaina	Owens	Brunswick	Maine
1428	Nikolas	Merrill	Brunswick	Maine
1429	Susan	Weems	Brunswick	Maine
1430	Kendra	Almy	Brunswick	Maine
1431	Valery	Harris	Brunswick	Maine
1432	Margery	Sholes	Brunswick	Maine
1433	Max	Verhey	Brunswick	Maine
1434	Paul	Whitcomb	Brunswick	Maine
1435	Alicia	Talbot	Brunswick	Maine
1436	Karen	Demers	Brunswick	Maine
1437	Marianne	Haughwout	Brunswick	Maine
1438	Alicia	Heyburn	Brunswick	Maine
1439	Kevin	Ridge	Brunswick	Maine
1440	Joel	Siano	Brunswick	Maine
1441	Valery	Harris	Brunswick	Maine
1442	Maxwell	Verhey	Brunswick	Maine
1443	Daniel	Schurman	Brunswick	Maine

1444	Britney	Stack	Brunswick	Maine
1445	Craig	Snapp	Brunswick	Maine
1446	Terry	Sheerer	Brunswick	Maine
1447	John	Stormer	Brunswick	Maine
1448	Christine A.	DeTroy	Brunswick	Maine
1449	Elizabeth	Pierson	Brunswick	Maine
1450	Julie	Pease	Brunswick	Maine
1451	Lorrel	Nichols	Brunswick	Maine
1452	Linda	Dugan-Woodbury	Brunswick	Maine
1453	Kaye	Currier	Brunswick	Maine
1454	Melissa	Adams	Brunswick	Maine
1455	Caroline	Headley	Brunswick	Maine
1456	Elizabeth	Grobe	Brunswick	Maine
1457	Caroline	Heyburn	Brunswick	Maine
1458	Elizabeth	Muther	Brunswick	Maine
1459	Molly	Bisson	Brunswick	Maine
1460	Sue	Stableford	Brunswick	Maine
1461	David	Vail	Brunswick	Maine
1462	Savanna	Austin	Brunswick	Maine
1463	Benjamin	Fields	Brunswick	Maine
1464	Elizabeth	Murray	Brunswick	Maine
1465	Jane	Donelon	Brunswick	Maine
1466	Carolyn	Bryant	Brunswick	Maine
1467	Lucretia	Woodruff	Brunswick	Maine
1468	Kelsie	West-Ezzo	Brunswick	Maine
1469	Meagan	Doyle	Brunswick	Maine
1470	Kristen	Neron	Brunswick	Maine
1471	Roberta	Schwartz	Brunswick	Maine
1472	Barbara	Kantner	Brunswick	Maine
1473	Kevin	Ross	Brunswick	Maine
1474	Marcia	Harrington	Brunswick	Maine
1475	Helen	Boucher	Brunswick	Maine
1476	Christine	Simonson	Brunswick	Maine
1477	Joel	Tompkins	Brunswick	Maine
1478	Lynn	Smith	Brunswick	Maine
1479	Piers	Kaniuka	Brunswick	Maine
1480	Dugan	Slovenski	Brunswick	Maine
1481	Elizabeth	Libby	Brunswick	Maine
1482	Meredith	Atkinson	Brunswick	Maine
1483	Mabel	Bushee	Brunswick	Maine
1484	Rosalie	Paul	Brunswick	Maine
1485	Andrew	Baer	Brunswick	Maine
1486	Brooke	Parkin	Brunswick	Maine
1487	Jennifer	Granger	Brunswick	Maine
1488	Paul	Ross	Brunswick	Maine

1489	Roxanne	Williams	Brunswick	Maine
1490	Carl	Smith	Brunswick	Maine
1491	Richard	Magalis	Brunswick	Maine
1492	John	Cotton	Brunswick	Maine
1493	Susan	Speer	Brunswick	Maine
1494	Samuel	Balentine	Brunswick	Maine
1495	John	Daly	Brunswick	Maine
1496	Jacob	Schurman	Brunswick	Maine
1497	Frances	Woodring	Brunswick	Maine
1498	Daniel	Johnson	Brunswick	Maine
1499	Joshua	Shean	Brunswick	Maine
1500	Graham	Bendickson	Brunswick	Maine
1501	Rob	Elder	Brunswick	Maine
1502	Betty	Hartley	Brunswick	Maine
1503	Kerri	Hansen	Brunswick	Maine
1504	Heather	Moffat	Brunswick	Maine
1505	Melissa	St Pierre	Brunswick	Maine
1506	Presley	Wallace	Brunswick	Maine
1507	Tristan	Scilipoti	Brunswick	Maine
1508	Valorie	Martin	Brunswick	Maine
1509	Erica	Hill	Brunswick	Maine
1510	Stephen	Shaw	Brunswick	Maine
1511	Frances	Woodring	Brunswick	Maine
1512	Linda	Washburn	Brunswick	Maine
1513	Anonymous	Anonymous	Brunswick	Maine
1514	Daniel	Possumato	Brunswick	Maine
1515	Derik	Shean	Brunswick	Maine
1516	Curtis	Roberts	Brunswick	Maine
1517	Grace	Lalime	Brunswick	Maine
1518	William	McCullough	Brunswick	Maine
1519	Ryan	Helean	Brunswick	Maine
1520	Meg	Haskell	Brunswick	Maine
1521	Luke	Schurman	Brunswick	Maine
1522	Sarah	Cucinelli	Brunswick	Maine
1523	Anastasia	Hicks	Brunswick	Maine
1524	Zachary	Sharpe	Brunswick	Maine
1525	Jailyn	Gray	Brunswick	Maine
1526	Barbara	Clark	Brunswick	Maine
1527	Desha	Shean	Brunswick	Maine
1528	Gillian	Raley	Brunswick	Maine
1529	Stephen	Martin	Brunswick	Maine
1530	robin	Schmidt	Brunswick	Maine
1531	Paul	Carpentier	Brunswick	Maine
1532	Rosemary	Roberts	Brunswick	Maine
1533	Jessica	McIntosh	Brunswick	Maine
1534	Patrick	McInnis	Brunswick	Maine

1535	Candi	Walker	Bryant Pond	Maine
1536	Nathan	Hilton	Bryant Pond	Maine
1537	Vincent	Palmer	Bryant Pond	Maine
1538	David	Locke	Bryant Pond	Maine
1539	Emily	Ecker	Bryant Pond	Maine
1540	Jeff	Brackett Jr	Bryant Pond	Maine
1541	Chris	Walker	Bryant Pond	Maine
1542	Robert	Sweetser	Bryant Pond	Maine
1543	Walter	Inman Jr.	Bryant Pond	Maine
1544	Arne	Schussler	Bryant Pond	Maine
1545	Leola	Ballweber	Bryant Pond	Maine
1546	Brooke	Hallett	Bryant Pond	Maine
1547	Michael	Smith	Bryant Pond	Maine
1548	Kristin	Buck	Bryant Pond	Maine
1549	Elijah	Laird	Bryant Pond	Maine
1550	Marcel	Po;lak	Bryant Pond	Maine
1551	Tracy	Poland	Bryant Pond	Maine
1552	Brett	Engler	Bryant Pond	Maine
1553	Ariana	Poland	Bryant Pond	Maine
1554	Diana	Charest	Buckfield	Maine
1555	Matt	Whalen	Buckfield	Maine
1556	Natasha	Labranche	Buckfield	Maine
1557	James	Brooks	Buckfield	Maine
1558	Nancy	Irvine	Buckfield	Maine
1559	Jason	Adams	Buckfield	Maine
1560	Kerri	Monto	Buckfield	Maine
1561	Evan	Lucas	Buckfield	Maine
1562	Mark	Fox	Buckfield	Maine
1563	Donna	Coburn	Buckfield	Maine
1564	Diane	McAlister	Buckfield	Maine
1565	Tina	Brooks	Buckfield	Maine
1566	Wendy	Turner	Buckfield	Maine
1567	Marisa	Averill	Buckfield	Maine
1568	Collin	Jack	Buckfield	Maine
1569	Brittany	Foley	Buckfield	Maine
1570	Peggy	Tilton	Buckfield	Maine
1571	Patricia	Ledlie	Buckfield	Maine
1572	Sherry	Carrier	Buckfield	Maine
1573	Jill	Piper	Buckfield	Maine
1574	Dan	Levesque	Buckfield	Maine
1575	Jeffery	McNeil	Buckfield	Maine
1576	Donald	Saunders	Buckfield	Maine
1577	Karen	Vasil-Busch	Buckfield	Maine
1578	Diana	Dunn	Buckfield	Maine
1579	Jared	Ouellette	Buckfield	Maine
1580	Rivky	Jewell	Buckfield	Maine

1581	Nathan	Corson	Buckfield	Maine
1582	Paula	McNeil	Buckfield	Maine
1583	Michelle	Casey	Buckfield	Maine
1584	Samantha	Jeselskis	Buckfield	Maine
1585	Willie	Marquart	Bucksport	Maine
1586	Kimberly	Mills	Bucksport	Maine
1587	Scott	Bridges	Bucksport	Maine
1588	Robert W	Mercer	Bucksport	Maine
1589	Jamie	Ireland	Bucksport	Maine
1590	Adrienne	Caldwell	Bucksport	Maine
1591	Denise	Michaud-Smith	Bucksport	Maine
1592	Margaret	Gerry	Bucksport	Maine
1593	Corey	Pelletier	Bucksport	Maine
1594	Emery	Deabay	Bucksport	Maine
1595	Roxanne	Sovis	Bucksport	Maine
1596	Mary	Durost	Bucksport	Maine
1597	Linda	Hill	Bucksport	Maine
1598	Joshua	Dewitt	Bucksport	Maine
1599	Charleyne	Gilbert	Bucksport	Maine
1600	Sharon	Dunbar	Bucksport	Maine
1601	Matthew	Hileman	Bucksport	Maine
1602	Rosalind	Ivens	Bucksport	Maine
1603	Kathleen	Mills	Bucksport	Maine
1604	Laurence	French	Burnham	Maine
1605	Teresa	Reynolds	Burnham	Maine
1606	Richice	Stevens	Burnham	Maine
1607	Greg	Salaoutis	Burnham	Maine
1608	Jessica	Huff	Burnham	Maine
1609	Culley	Lasselle	Burnham	Maine
1610	Raymond	Rayeski	Burnham	Maine
1611	Jeannette	Segerson	Burnham	Maine
1612	Scott	Merrithew	Burnham	Maine
1613	Stephen	Landry	Buxton	Maine
1614	Breslin	Macneir	Buxton	Maine
1615	Christopher	Ross	Buxton	Maine
1616	Jeremy	Court	Buxton	Maine
1617	Alexander	Caron	Buxton	Maine
1618	Kaitlynn	Leavitt	Buxton	Maine
1619	Robert	Durost	Buxton	Maine
1620	Krista	Newman	Buxton	Maine
1621	Kathleen	Gesner	Buxton	Maine
1622	Gage	Parker	Buxton	Maine
1623	Erin	Silvera	Buxton	Maine
1624	Michelle	Krigbaum	Buxton	Maine
1625	Joe	Lynch	Buxton	Maine
1626	Peter	Mills	Buxton	Maine

1627	Bennett	Allen	Buxton	Maine
1628	Michael	Poisson	Buxton	Maine
1629	Luke	Coney	Buxton	Maine
1630	Steven	Talbot	Buxton	Maine
1631	Joanna	Bulger	Buxton	Maine
1632	Judy	Welch	Buxton	Maine
1633	Cathy	Sargent	Buxton	Maine
1634	Justice	Hartford	Buxton	Maine
1635	Lorilyn	Ferrao	Buxton	Maine
1636	Robert	Metayer	Buxton	Maine
1637	Miriam	Rubin	Buxton	Maine
1638	Bonnie	Baillargeon	Buxton	Maine
1639	James	Macdonald	Buxton	Maine
1640	Peter	Brown	Buxton	Maine
1641	Marvin	Rubin	Buxton	Maine
1642	Allen	Berry	Buxton	Maine
1643	Kaitlyn	Moran	Buxton	Maine
1644	Melissa	Shatney	Buxton	Maine
1645	Andrew	Spires	Buxton	Maine
1646	Barry	King	Buxton	Maine
1647	William	Allen	Buxton	Maine
1648	Dwayne	Welch	Buxton	Maine
1649	William	Jefferson	Buxton	Maine
1650	Sandra	Sherry	Buxton	Maine
1651	Susan	Beliveau	Buxton	Maine
1652	Angela	Desruisseaux	Buxton	Maine
1653	Peter	Mills	Buxton	Maine
1654	Donald	Haggett	Buxton	Maine
1655	Tammy	Noyes	Byron	Maine
1656	Coyote	Freeman	Byron	Maine
1657	Cheryl	Wade	Byron	Maine
1658	Steve	May	Byron	Maine
1659	Gerald Ine	Richards	Byron	Maine
1660	Andrew	Prescott	Byron	Maine
1661	Tracy	Wright	Byron	Maine
1662	Jeffrey	Wade	Byron	Maine
1663	Howard	Noyes	Byron	Maine
1664	William	Gould	Calais	Maine
1665	John	Mitchell	Calais	Maine
1666	Anna-Maria	Herrick	Cambridge	Maine
1667	Marylin	Famosi	Cambridge	Maine
1668	Ethan	Pratt	Camden	Maine
1669	John	Parkman	Camden	Maine
1670	Kit	Harrison	Camden	Maine
1671	John	Orlando	Camden	Maine
1672	Kim	Linden	Camden	Maine

1673	Alexander	Winn	Camden	Maine
1674	Gavin	Boyd	Camden	Maine
1675	Randy	Stearns	Camden	Maine
1676	Alison	McKellar	Camden	Maine
1677	Michael	Remsen	Camden	Maine
1678	Eleanor	Masin-Peters	Camden	Maine
1679	Sarah	Rheault	Camden	Maine
1680	Chris	Haines	Camden	Maine
1681	Tara	Barker	Camden	Maine
1682	Jean	Strom	Camden	Maine
1683	Barbara	Buss	Camden	Maine
1684	Dee	Urquhart	Camden	Maine
1685	Bonnie	Rukin	Camden	Maine
1686	Barbara	Moore	Camden	Maine
1687	Kayleigh	Bernier	Camden	Maine
1688	Kate	McMorrow	Camden	Maine
1689	Jean	Crawford	Camden	Maine
1690	Patricia	Clark	Camden	Maine
1691	Nancy	Linkin	Camden	Maine
1692	Peter	Kalajian	Camden	Maine
1693	Lorna	Cummings	Camden	Maine
1694	Kristen	Lindquist	Camden	Maine
1695	Marina	Schauffler	Camden	Maine
1696	Gabriel	Zacchai	Camden	Maine
1697	kristine	federle	Camden	Maine
1698	Brita	Light	Camden	Maine
1699	Cortney	Sukeforth	Camden	Maine
1700	Christy	Shockley	Camden	Maine
1701	Kristen	Eckmann	Camden	Maine
1702	Thomas	Edge	Camden	Maine
1703	Brian	Robinson	Camden	Maine
1704	Nancy	Jenkins	Camden	Maine
1705	Laura	Evans	Camden	Maine
1706	Stephanie	Smith	Camden	Maine
1707	Denis	Moonan	Camden	Maine
1708	Kevin	Malmstrom	Camden	Maine
1709	Sarah	Ruef-Lindquist	Camden	Maine
1710	Gary	Born	Camden	Maine
1711	Mark	Siegenthaler	Camden	Maine
1712	Kate	Edge	Camden	Maine
1713	Jane	Babbitt	Camden	Maine
1714	Pamela	MacBrayne	Camden	Maine
1715	Sara	Skrivanich	Camden	Maine
1716	Eve	Marden	Camden	Maine
1717	Daniel	Daly	Camden	Maine
1718	Susan	Shaw	Camden	Maine

1719	Karrah	York	Camden	Maine
1720	Karen	Tooley	Camden	Maine
1721	Fay Larkin	Larkin	Camden	Maine
1722	Edith	Manns	Camden	Maine
1723	Judith	Valentine	Camden	Maine
1724	Jean	Brewer	Camden	Maine
1725	Denyse	Robinson	Camden	Maine
1726	Sharon	Sampson	Camden	Maine
1727	Michael	Gasser	Camden	Maine
1728	Gretchen	Ebbesson-Keegan	Camden	Maine
1729	Erin	Meyer	Camden	Maine
1730	John	Tooley	Camden	Maine
1731	Marsha	Smith	Camden	Maine
1732	Deborah	Brooke	Camden	Maine
1733	Matthew	Dempsey	Camden	Maine
1734	Kevin	Strong	Camden	Maine
1735	Karin	Thomas	Camden	Maine
1736	Bridget	Qualey	Camden	Maine
1737	Petra	Remsen	Camden	Maine
1738	DM	Jolliffe	Camden	Maine
1739	Carole	Esley	Camden	Maine
1740	Mark	Abb	Camden	Maine
1741	Jillian	Reid	Camden	Maine
1742	Susan	Neisingh	Camden	Maine
1743	Stephen	Winn	Camden	Maine
1744	Paul	Cartwright	Camden	Maine
1745	Carol	Miller	Camden	Maine
1746	Silvio	Calabi	Camden	Maine
1747	Tara	Wagner	Camden	Maine
1748	Nathan	Marvin	Camden	Maine
1749	Edward	Doudera	Camden	Maine
1750	Gordon	Gushee	Camden	Maine
1751	Michael	Frank	Camden	Maine
1752	Norman	Fournier	Canaan	Maine
1753	Adam	Woodworth	Canaan	Maine
1754	Arica	Burwood	Canaan	Maine
1755	Tucker	Freeman	Canaan	Maine
1756	Susanne	Curtis	Canaan	Maine
1757	Joel	Dupre	Canaan	Maine
1758	Cherie	Coriz	Canaan	Maine
1759	Destiny	Murray	Canaan	Maine
1760	Lauren	Watson	Canaan	Maine
1761	James	Macarthur	Canaan	Maine
1762	Jack	Sullivan	Canaan	Maine
1763	Diane	Cayford	Canaan	Maine

1764	Louise	Townsend	Canaan	Maine
1765	Billy	Grotton	Canaan	Maine
1766	Caleb	Wade	Canaan	Maine
1767	Delma	Richard	Canaan	Maine
1768	Cynthia	Dupre	Canaan	Maine
1769	Scot	Dunbar	Canaan	Maine
1770	Jeffrey	Clarke	Canaan	Maine
1771	Katie	Bussiere	Canaan	Maine
1772	Jayne	Miner	Canaan	Maine
1773	Monique	Allen	Canton	Maine
1774	Courtney	Deroehn	Canton	Maine
1775	Pamela	Keene	Canton	Maine
1776	Jamie	Spear	Canton	Maine
1777	Luke	Dalton	Canton	Maine
1778	Renee	Spear	Canton	Maine
1779	Sara	Moore	Canton	Maine
1780	Kelsie	Butterfield	Canton	Maine
1781	Allisen	Beane	Canton	Maine
1782	Kyle	Campbell	Canton	Maine
1783	Kaicey	Conant	Canton	Maine
1784	Dean	Ellis	Canton	Maine
1785	Kimberly	Ellis	Canton	Maine
1786	Emily	Bourassa	Canton	Maine
1787	Briana	Noniewicz	Canton	Maine
1788	Daniel	Chase	Cape Elizabeth	Maine
1789	David	Plimpton	Cape Elizabeth	Maine
1790	Laura	Libby	Cape Elizabeth	Maine
1791	Gail	Rowe	Cape Elizabeth	Maine
1792	Julia	Beckett	Cape Elizabeth	Maine
1793	Nina	Trowbridge	Cape Elizabeth	Maine
1794	Steven	McGrath	Cape Elizabeth	Maine
1795	Julia	Beckett	Cape Elizabeth	Maine
1796	Robert	Dawson	Cape Elizabeth	Maine
1797	Heidi	McInerney	Cape Elizabeth	Maine
1798	Donna	Downing	Cape Elizabeth	Maine
1799	William	Luneburg	Cape Elizabeth	Maine
1800	Julian	Brandmaier	Cape Elizabeth	Maine
1801	Dieter And Karen	Hessel	Cape Elizabeth	Maine
1802	Julie	Schinstock	Cape Elizabeth	Maine
1803	Amy	Holmes	Cape Elizabeth	Maine
1804	Jill	Fogg	Cape Elizabeth	Maine
1805	Edward	Hollidge	Cape Elizabeth	Maine
1806	Pete	Marston	Cape Elizabeth	Maine
1807	Constance	Jordan	Cape Elizabeth	Maine
1808	Tony	Owens	Cape Elizabeth	Maine

1809	Priscilla	Velentgas	Cape Elizabeth	Maine
1810	Jennifer	McCann	Cape Elizabeth	Maine
1811	James	Cavanaugh	Cape Elizabeth	Maine
1812	Sarah	MacColl	Cape Elizabeth	Maine
1813	Keith	Citrine	Cape Elizabeth	Maine
1814	ron	Letourneau	Cape Elizabeth	Maine
1815	William	Laverty	Cape Elizabeth	Maine
1816	Nancy	Miles	Cape Elizabeth	Maine
1817	Cameron	Robbins	Cape Elizabeth	Maine
1818	Rj	Sarka	Cape Elizabeth	Maine
1819	Sharon	Balzer	Cape Elizabeth	Maine
1820	Meredith	Hall	Cape Elizabeth	Maine
1821	Kathleen	Mikulka	Cape Elizabeth	Maine
1822	Judith	Dinmore	Cape Elizabeth	Maine
1823	Julia Bassett	Schwerin	Cape Elizabeth	Maine
1824	Amy	Hodshon	Cape Elizabeth	Maine
1825	James	Haller	Cape Elizabeth	Maine
1826	Eric	Matheson	Cape Elizabeth	Maine
1827	Leslie	Broadbent	Cape Elizabeth	Maine
1828	Peter	Darling	Cape Elizabeth	Maine
1829	Suzanne	McGinn	Cape Elizabeth	Maine
1830	Daniel	Horning	Cape Neddick	Maine
1831	Terri	Neill	Cape Neddick	Maine
1832	Dennis	Sayward	Cape Neddick	Maine
1833	Michael	Meyer	Cape Neddick	Maine
1834	Karen	McElmurry	Cape Neddick	Maine
1835	Mark	Drew	Cape Neddick	Maine
1836	Jessica	Meyer	Cape Neddick	Maine
1837	Richard	McKinnon	Cape Neddick	Maine
1838	Len	Loomans	Cape Neddick	Maine
1839	Carol	Howard	Caratunk	Maine
1840	Lisa	Elliott	Caratunk	Maine
1841	Elizabeth	Caruso	Caratunk	Maine
1842	Calvin	Deal	Caratunk	Maine
1843	John	Mullinax	Caratunk	Maine
1844	Heather	McKinnon	Caratunk	Maine
1845	Billy	Hughes	Caratunk	Maine
1846	andrew	massucco	Caratunk	Maine
1847	Michael	Thornton	Caratunk	Maine
1848	Sandra	Howard	Caratunk	Maine
1849	Cheryl	Bolton	Caratunk	Maine
1850	Ryan	Roderick	Caratunk	Maine
1851	Jeff	Pacheco	Caratunk	Maine
1852	Chris	Russell	Caratunk	Maine
1853	Stephanie	Lanman	Caratunk	Maine
1854	Mike	Pilsbury	Caratunk	Maine

1855	Jeffrey	Thompson	Caratunk	Maine
1856	Nellie	Booth	Caratunk	Maine
1857	Greg	Caruso	Caratunk	Maine
1858	Ashley	Tempesta	Caratunk	Maine
1859	Brent	Arsenault	Caratunk	Maine
1860	Daniel	Beane	Caratunk	Maine
1861	Patty	Blackstone	Caribou	Maine
1862	Suzanna	Heidrich	Caribou	Maine
1863	Kathryn	Olmstead	Caribou	Maine
1864	Dana	Lowell	Caribou	Maine
1865	Mark	Shea	Caribou	Maine
1866	Patty	Blackstone	Caribou	Maine
1867	Abagail	Hyson	Carmel	Maine
1868	Jim	Hooper	Carmel	Maine
1869	Frank	Tibbetts	Carmel	Maine
1870	Aaron	Hawes Jr	Carmel	Maine
1871	Donna	Wilson	Carmel	Maine
1872	Peter	Parsons	Carmel	Maine
1873	Devan	Demmons	Carmel	Maine
1874	Julia	Bemis	Carmel	Maine
1875	Tiffany	Tannwr	Carmel	Maine
1876	Neil	Giles	Carmel	Maine
1877	Jessica	Meek	Carmel	Maine
1878	Cathy	Russell	Carmel	Maine
1879	Eric	Goodale	Carmel	Maine
1880	Lorene	Perry	Carmel	Maine
1881	Tammy	Noyes	Carmel	Maine
1882	Jeremy	Bemis	Carmel	Maine
1883	Joan	DeLusso	Carmel	Maine
1884	Alicia	Bryant	Carmel	Maine
1885	J	Blais	Carrabassett Valley	Maine
1886	Lindsay	Dakers	Carrabassett Valley	Maine
1887	Nadene	McLeod	Carrabassett Valley	Maine
1888	Patrick	Scanlan	Carrabassett Valley	Maine
1889	Catherine	Wilson	Carrabassett Valley	Maine
1890	Kerry	Casler	Carrabassett Valley	Maine
1891	Danielle	Lavertu	Carrabassett Valley	Maine
1892	Justin	Taylor	Carrabassett Valley	Maine
1893	Margaret	Bishop	Carrabassett Valley	Maine
1894	Stephen	Ryle	Carrabassett Valley	Maine
1895	James	Wilson	Carrabassett Valley	Maine
1896	Jeffrey	Jacques	Carrabassett Valley	Maine
1897	Roy	Forsberg	Carrabassett Valley	Maine
1898	Jill	Snyder Wallace	Carrabassett Valley	Maine
1899	Margaret	Bishop	Carrabassett Valley	Maine
1900	Shelby	Downing	Carrabassett Valley	Maine

1901	Anne	Tuell	Carrabassett Valley	Maine
1902	Nicole	Thibodeau	Carrabassett Valley	Maine
1903	Lori	Russell	Carrabassett Valley	Maine
1904	Shelley	Koenig	Carrabassett Valley	Maine
1905	Jennifer	Jones	Carrabassett Valley	Maine
1906	Thomas	Bird	Carrabassett Valley	Maine
1907	Daniel	Brown	Carrabassett Valley	Maine
1908	Jaysen	Cobb	Carrying Place Township	Maine
1909	Randall	Ellis	Carthage	Maine
1910	Marcia	Luick	Carthage	Maine
1911	Alexis	Cunningham	Carthage	Maine
1912	Nicole	Porter	Carthage	Maine
1913	Susan	Hunter-Whalen	Carthage	Maine
1914	Isak	Porter	Carthage	Maine
1915	John	Pulk	Carthage	Maine
1916	Valerie	Page	Casco	Maine
1917	Sierra	Leavitt	Casco	Maine
1918	Michael	Plummer	Casco	Maine
1919	Hannah	Smith	Casco	Maine
1920	Judi	Fawcett	Casco	Maine
1921	Nicole	Harmon	Casco	Maine
1922	Celine	Rolerson	Casco	Maine
1923	Katherine	Cosgrove	Casco	Maine
1924	Michael	Smallwood	Casco	Maine
1925	Hannah	McFarland	Casco	Maine
1926	Karlee	Kist	Casco	Maine
1927	Grant	Plummer	Casco	Maine
1928	Angela	Moen	Casco	Maine
1929	Karley	Nichols	Casco	Maine
1930	Monique	Leamon	Casco	Maine
1931	Natalie Rose	Liberace	Casco	Maine
1932	Laurie	Attwood	Casco	Maine
1933	Terron	McCourt	Casco	Maine
1934	Ryan	Thoits	Casco	Maine
1935	Hunter	Thorpe	Casco	Maine
1936	James	Leamon	Casco	Maine
1937	Paul	Cricones	Casco	Maine
1938	Shane	Allen	Casco	Maine
1939	Steven	Preston	Casco	Maine
1940	Matthew	Neal	Casco	Maine
1941	Kevin	Peterson	Casco	Maine
1942	Keith	Morehouse	Casco	Maine
1943	Sheila	Philpot	Casco	Maine
1944	Valerie	Page	Casco	Maine
1945	Megan	Joyce	Casco	Maine
1946	Rebecca	Paul	Casco	Maine

1947	Sarah	Wyman	Casco	Maine
1948	Nicholas	Anderson	Casco	Maine
1949	Greg	Brown	Casco	Maine
1950	Erik	Olander	Casco	Maine
1951	James	Gerry	Casco	Maine
1952	Sara	Dayon	Casco	Maine
1953	Jennifer	Lewis	Casco	Maine
1954	Joshua	Appleton	Casco	Maine
1955	Marygrace	Barber	Casco	Maine
1956	Wendy	Knickerbocker	Castine	Maine
1957	Allison	Fleck	Castine	Maine
1958	Gary	Willhide	Castle Hill	Maine
1959	Gary	Sharp Sr	Castle Hill	Maine
1960	Anonymous	A	Central	Maine
1961	Gill	l	Chamberlain	Maine
1962	Gill	Iltis	Chamberlain	Maine
1963	Gary	Johnson	Chapman	Maine
1964	James	Churchill	Chapman	Maine
1965	Terrence	Hanlon	Chapman	Maine
1966	Cynthia	Drake	Charleston	Maine
1967	Joan	Morrison	Charleston	Maine
1968	John	Albertini	Charleston	Maine
1969	Charlotte	Nystrom	Charleston	Maine
1970	Christine	Carpenter	Charleston	Maine
1971	Norris	Oakes	Charleston	Maine
1972	Dylan	Flagg	Charleston	Maine
1973	Melissa	Yosua-Davis	Chebeague Island	Maine
1974	Victoria	Bonebakker	Chebeague Island	Maine
1975	Jennifer	Swan	Chelsea	Maine
1976	Alixx	Canwell	Chelsea	Maine
1977	Brianna	Theriault	Chelsea	Maine
1978	Judith	Reed	Chelsea	Maine
1979	Tiah	Marois	Chelsea	Maine
1980	Jesse	Chapman	Chelsea	Maine
1981	Chris	Burns	Chelsea	Maine
1982	Justin	Walton	Chelsea	Maine
1983	Brian	Rideout	Chelsea	Maine
1984	Laurianne	Brewer	Chelsea	Maine
1985	Charlotte	Guarino	Chelsea	Maine
1986	Daria	Walton	Chelsea	Maine
1987	Sarah	Christopher	Chelsea	Maine
1988	Lewis	Frazier	Chelsea	Maine
1989	Gerald	Galbreath	Chelsea	Maine
1990	Brenda	Corkum	Chelsea	Maine
1991	Nathan	Gagne	Chelsea	Maine
1992	William	Marois	Chelsea	Maine

1993	Patrick	McDonald	Chelsea	Maine
1994	Kathryn	Gay	Chelsea	Maine
1995	Celeste	Turner	Chelsea	Maine
1996	Brenda	Marois	Chelsea	Maine
1997	Nathan	Taczli	Chelsea	Maine
1998	Sandra	Dunn	Chelsea	Maine
1999	Debra	Walker	Chelsea	Maine
2000	Ronnie	Harpole	Chelsea	Maine
2001	Chad	Foye	Chelsea	Maine
2002	Ramsey	Stickney	Chelsea	Maine
2003	Kimberly	Baker	Chelsea	Maine
2004	Miranda	Marquis	Chelsea	Maine
2005	Marylou	Binrau	Chelsra	Maine
2006	Patricia	Olsen	Cherryfield	Maine
2007	Don and Leslie	Bush	Cherryfield	Maine
2008	Stephanie	Verwey	Cherryfield	Maine
2009	Micheal	Micheal	Cherryfield	Maine
2010	Brian	Drost	Chester	Maine
2011	Carol	Anderson	Chesterville	Maine
2012	Ken	Rohan	Chesterville	Maine
2013	Sandra	Powers	Chesterville	Maine
2014	Carolyn	Drugge	Chesterville	Maine
2015	Kristin	Overton	Chesterville	Maine
2016	Elizabeth	Lambert	Chesterville	Maine
2017	Tyler	Cote	Chesterville	Maine
2018	Jon	Ziolkowski	Chesterville	Maine
2019	Ashley	Trask	Chesterville	Maine
2020	Tyler	Cote	Chesterville	Maine
2021	Mackenzie	Bessey	Chesterville	Maine
2022	Judith	Rawlings	Chesterville	Maine
2023	Adam	Wright	Chesterville	Maine
2024	Charles	Meisner	Chesterville	Maine
2025	Joshua	Lambert	Chesterville	Maine
2026	Alexis	Merrifield	Chesterville	Maine
2027	Kimberly	Anthony	Chesterville	Maine
2028	Jessica	Rundlett	Chesterville	Maine
2029	April	Mulherin	Chesterville	Maine
2030	Francis	Fuller	Chesterville	Maine
2031	Basil	Mosher	Chesterville	Maine
2032	Jessica	Farrington	Chesterville	Maine
2033	Shirley	Hager	Chesterville	Maine
2034	Richard	Storer	Chesterville	Maine
2035	Marie	Hupper	Chesterville	Maine
2036	Bob	Webber	China	Maine
2037	Leanna	Prime	China	Maine
2038	Mike	Bickford	China	Maine

2039	Cindy	Witham	China Village	Maine
2040	Faith	Rawding	Cliff Island	Maine
2041	Ben	Bernard	Cliff Island	Maine
2042	Brooke	Kingsbury	Clifton	Maine
2043	Matthew	Coleman	Clifton	Maine
2044	Scott	Coleman	Clifton	Maine
2045	Amanda	Ellis	Clifton	Maine
2046	Jeffrey	Roberts	Clifton	Maine
2047	Zachary	Lecleire	Clifton	Maine
2048	Elaine	Culleton	Clinton	Maine
2049	Donald	Constable	Clinton	Maine
2050	Carrie	Murray	Clinton	Maine
2051	Gavin	Lachance	Clinton	Maine
2052	Cecelia	Corey	Clinton	Maine
2053	Victoria	Fraser	Clinton	Maine
2054	Rebecca	Plasse	Clinton	Maine
2055	Craig	Chapman	Clinton	Maine
2056	Pam	Tatham	Clinton	Maine
2057	Sara	Carter	Clinton	Maine
2058	Toby	Rose Ii	Clinton	Maine
2059	Rebecca	Heath	Clinton	Maine
2060	Susan	Spencer	Clinton	Maine
2061	Jessica	Carter	Clinton	Maine
2062	Robert	Wright	Clinton	Maine
2063	Deborah	Gh	Clinton	Maine
2064	Faith	Robbins	Clinton	Maine
2065	Shannon	Kasevich	Clinton	Maine
2066	Joann	Bolduc	Clinton	Maine
2067	Ivey	Fogg	Clinton	Maine
2068	ROBERT	WRIGHT	Clinton	Maine
2069	Venessa	Languet	Clinton	Maine
2070	Lyndsee	Raven	Clinton	Maine
2071	Taylor	Constable	Clinton	Maine
2072	Robert	Hopkins	Clinton	Maine
2073	Alfred	Wing Jr.	Clinton	Maine
2074	Jared	Buck	Clinton	Maine
2075	David	Reynolds	Columbia	Maine
2076	Taylor	Colbeth	Columbia	Maine
2077	Derek	Thaxter	Columbia Falls	Maine
2078	Tracy	Farmer	Concord	Maine
2079	Sally	Barrows	Concord Twp	Maine
2080	Nancy	Soule	Concord Twp	Maine
2081	Zoe	Pellegrino	Concord Twp	Maine
2082	Gail	Parker	Concord Twp	Maine
2083	Correy	Gordon	Concord Twp	Maine
2084	Mark	Pellegrino	Concord Twp	Maine

2085	Maria Ausilia	Evans	Coplin Plantation	Maine
2086	Michael	Barton	Corinna	Maine
2087	David	Gillaspie	Corinna	Maine
2088	Roger	Ricker	Corinna	Maine
2089	Nick	Kondax	Corinna	Maine
2090	Emily	Nyman	Corinna	Maine
2091	Margaret	Gilbert	Corinna	Maine
2092	Daniel	Donovan	Corinna	Maine
2093	Michele	Soule	Corinna	Maine
2094	Marcia	Meagher	Corinna	Maine
2095	Elizabeth	Poulin	Corinna	Maine
2096	Sharon	Sprague	Corinth	Maine
2097	Sandra	Obar	Corinth	Maine
2098	Ashley	Moore	Corinth	Maine
2099	Amy	Cioffi	Corinth	Maine
2100	Jenni	Reis	Corinth	Maine
2101	Stephanie	Ross	Corinth	Maine
2102	Rosanne	Young	Corinth	Maine
2103	Mary	Starbird	Corinth	Maine
2104	Sara	Uitti	Cornish	Maine
2105	Janette	Lynch	Cornish	Maine
2106	Sara	Banks	Cornish	Maine
2107	John	Bleakney	Cornish	Maine
2108	Edmond	Nadau	Cornish	Maine
2109	Steven	Tripp	Cornish	Maine
2110	Jennifer	Otenti	Cornish	Maine
2111	Shirley	Hafford	Cornish	Maine
2112	Jessica	Benson	Cornish	Maine
2113	Merle	Sanborn	Cornish	Maine
2114	Robert	Wehmeyer	Cornish	Maine
2115	Matt	Ross	Cornish	Maine
2116	Mary Ann	Vitalone	Cornish	Maine
2117	Jon	Bailey	Cornish	Maine
2118	Scott	Cecil	Cornish	Maine
2119	Matthew	Perreault-Linscott	Cornish	Maine
2120	Barbara	Bouchard	Cornish	Maine
2121	Fred	Reinhard	Cornish	Maine
2122	David	Drake	Cornville	Maine
2123	John	Alward	Cornville	Maine
2124	Megan	Smith	Cornville	Maine
2125	Jessica	Turgeon	Cornville	Maine
2126	Bo	Locke	Cornville	Maine
2127	Kevin	Wickett	Cornville	Maine
2128	stanley	spencer	Cornville	Maine
2129	Charles	Moody	Cornville	Maine

2130	Amanda	Spencer	Cornville	Maine
2131	Michael	Bowman	Cornville	Maine
2132	Raymond	Swett	Cornville	Maine
2133	Pam	Tunks	Cornville	Maine
2134	Johanna	McLaughlin	Cornville	Maine
2135	Brian	Andre	Cornville	Maine
2136	clarence	gould	Cornville	Maine
2137	Skyla	Hamilton Holderman	Cornville	Maine
2138	Victor	Campbell	Crystal	Maine
2139	Debra	Wilkins	Crystal	Maine
2140	John	Tarling	Cumberland	Maine
2141	Joy	Kaplan	Cumberland	Maine
2142	Zak	Kaplan	Cumberland	Maine
2143	Robert	Timberlake	Cumberland Center	Maine
2144	Christine	Curci	Cumberland Center	Maine
2145	Peter	Rubins	Cumberland Center	Maine
2146	Wendy	Copp	Cumberland Center	Maine
2147	Nichole	Engel	Cumberland Center	Maine
2148	Troy	Cochran	Cumberland Center	Maine
2149	Sarah	Keep	Cumberland Center	Maine
2150	Rhonda	Small	Cumberland Center	Maine
2151	Patrick	Rose	Cumberland Center	Maine
2152	Meeghan	carrigan	Cumberland Center	Maine
2153	Mary	Lowery	Cumberland Center	Maine
2154	Calvin	Soule	Cumberland Center	Maine
2155	Jean	Woodward	Cumberland Center	Maine
2156	Karhy	Leighton	Cumberland Center	Maine
2157	Laura	Willis	Cumberland Center	Maine
2158	Tanya	Marston	Cumberland Center	Maine
2159	Avril	Roux	Cumberland Center	Maine
2160	Judith	Wohl	Cumberland Center	Maine
2161	Robert	Hall	Cumberland Center	Maine
2162	Hilary	Doane	Cumberland Center	Maine
2163	Elton	Drummond	Cumberland Center	Maine
2164	Fran	Bruns	Cumberland Center	Maine
2165	Ronald	Copp Jr	Cumberland Center	Maine
2166	Angela	Chaffee	Cumberland Center	Maine
2167	Ayres	Stockly	Cumberland Center	Maine
2168	Emily	Gray	Cumberland Center	Maine
2169	Alita	Dolloff	Cumberland Center	Maine
2170	Jesse	Altman	Cumberland Center	Maine
2171	Ben	May	Cumberland Center	Maine
2172	Nate	Grandchamp	Cumberland Center	Maine
2173	Molly	Weegar	Cumberland Center	Maine
2174	Jared	Harmon	Cumberland Center	Maine

2175	David	Robinson	Cumberland Center	Maine
2176	David	Dube	Cumberland Center	Maine
2177	Jana	Spaulding	Cumberland Center	Maine
2178	Dan	Seaver	Cumberland Center	Maine
2179	Connor	Terison	Cumberland Center	Maine
2180	George	Violette	Cumberland Center	Maine
2181	Gwen	Dyer	Cumberland Center	Maine
2182	Karen	Herold	Cumberland Center	Maine
2183	Chris	Montgomery	Cumberland Center	Maine
2184	Stephen	Heinz	Cumberland Foreside	Maine
2185	Alison	Prawer	Cumberland Foreside	Maine
2186	Hugh	Judge	Cumberland Foreside	Maine
2187	Emily	Cass	Cumberland Foreside	Maine
2188	Linda	Dowling	Cumberland Foreside	Maine
2189	Iwona	Tarling	Cumberland Foreside	Maine
2190	Nuck	Prawer	Cumberland Foreside	Maine
2191	Tyler	Judkins	Cumberland Foreside	Maine
2192	Nancy	Anderson	Cumberland Foreside	Maine
2193	Pat	Ryan	Cushing	Maine
2194	Trevor	Polk	Cushing	Maine
2195	Joshua	Sturtevant	Cushing	Maine
2196	Cheryl	Steeves	Cushing	Maine
2197	Meggan	Peters	Cushing	Maine
2198	Christoffer	Keizer	Cushing	Maine
2199	Josh	Mitchell	Cushing	Maine
2200	Randall	McKee	Cushing	Maine
2201	Kristi	Niedermann	Cushing	Maine
2202	Cheryl	Steeves	Cushing	Maine
2203	Melissa	Gates	Cushing	Maine
2204	David	Vickery	Cushing	Maine
2205	Stephen	Kennedy	Cushing	Maine
2206	Christopher	Rheault	Cushing	Maine
2207	Jon	Leclair	Cutler	Maine
2208	Molly	Hamel	Dallas Plt	Maine
2209	Gabrielle	Grunkemeyer	Damariscotta	Maine
2210	Katherine	Moore	Damariscotta	Maine
2211	Amy	Lalime	Damariscotta	Maine
2212	Christine	Szalay	Damariscotta	Maine
2213	Jessica	Sirois	Damariscotta	Maine
2214	catherine	blount	Damariscotta	Maine
2215	William	Child	Damariscotta	Maine
2216	Sean	Fleming	Damariscotta	Maine
2217	Arifa	Boehler	Damariscotta	Maine
2218	Paul	Fenton	Damariscotta	Maine
2219	chris	elliott	damariscotta	Maine
2220	Nichole	Hannan	Damariscotta	Maine

2221	Rosalind	Welsh	Damariscotta	Maine
2222	Zev	Keisch	Damariscotta	Maine
2223	Linda	Bla	Damariscotta	Maine
2224	Elaine	Waldron	Damariscotta	Maine
2225	Chuck	Dinsmore	Damariscotta	Maine
2226	Danny	Gardiner	Damariscotta	Maine
2227	Michael	Herz	Damariscotta	Maine
2228	William	Bausch	Damariscotta	Maine
2229	Brittani	Pendleton	Damariscotta	Maine
2230	Elizabeth	McPherson	Damariscotta	Maine
2231	Carolyn	Siegel	Damariscotta	Maine
2232	Natalie	Allen	Damariscotta	Maine
2233	Kate	Josephs	Damariscotta	Maine
2234	Mikal	Crawford	Damariscotta	Maine
2235	Robert	Sykes	Damriscotta	Maine
2236	Isaiah	Gillis	Danforth	Maine
2237	Robert	Bourque	Dayton	Maine
2238	Scott	Masteller	Dayton	Maine
2239	Nancy	Danis	Dayton	Maine
2240	Ken	Gilmore	Dayton	Maine
2241	Nick	Donilon	Dayton	Maine
2242	Ashley	Whitten	Dayton	Maine
2243	Samantha	Monroe	Dayton	Maine
2244	Elizebeth	St Louis	Dayton	Maine
2245	Sharon	Martel	Dayton	Maine
2246	Lincoln	Kimball	Dayton	Maine
2247	Courtney	Martin	Dayton	Maine
2248	Michael	Rafkin	Dayton	Maine
2249	Courtney	Shay	Dayton	Maine
2250	Michaela	Royea	Dayton	Maine
2251	Glenn	Pierce	Dedham	Maine
2252	Lillian	Audibert	Dedham	Maine
2253	Bryce	Smith	Dedham	Maine
2254	Cara	Audibert	Dedham	Maine
2255	Craig	Shane	Dedham	Maine
2256	Robin	Harmon	Dedham	Maine
2257	Heather	Pierce	Dedham	Maine
2258	Robert	Benton	Dedham	Maine
2259	Jean	Wheeler	Deer Isle	Maine
2260	Roger	Hooke	Deer Isle	Maine
2261	Darwin	Davidson	Deer Isle	Maine
2262	Patricia	Eaton	Deer Isle	Maine
2263	Elwood	Cobb	Deer Isle	Maine
2264	Jacqueline	Davidson	Deer Isle	Maine
2265	Judith	O'Callaghan	Deer Isle	Maine
2266	Mike	Shrier	Denmark	Maine

2267	Lori	Talman	Denmark	Maine
2268	Chrisopher	Wentworth	Denmark	Maine
2269	Leigh	Kiesman	Denmark	Maine
2270	Nicole	Shrier	Denmark	Maine
2271	Joshua	Shrier	Denmark	Maine
2272	Bonnie	Marsh	Denmark	Maine
2273	Carisa	Hammer	Denmark	Maine
2274	Rick	Towle	Denmark	Maine
2275	Keith	Pacheco	Denmark	Maine
2276	Rene	Guay	Dennistown	Maine
2277	Danielle	Guay	Dennistown	Maine
2278	Jason	Bell	Dennistown	Maine
2279	Jason	Brough	Derby	Maine
2280	Wendy	Rolfe	Detroit	Maine
2281	Cole	Whitaker	Detroit	Maine
2282	Arthur	Jasmin	Detroit	Maine
2283	Lillian.	Sands	Dexter	Maine
2284	Rhonda	Pfeil	Dexter	Maine
2285	Lori	Robinson	Dexter	Maine
2286	Robert	Fritsch	Dexter	Maine
2287	Dawn	Pratt	Dexter	Maine
2288	Gordon	Canning	Dexter	Maine
2289	Richard	Ahern	Dexter	Maine
2290	Alessandra	Smith	Dexter	Maine
2291	Meredith	Josselyn	Dexter	Maine
2292	Robert	Webb	Dexter	Maine
2293	Charles	Bither Jr	Dexter	Maine
2294	Linda	Tisdale	Dexter	Maine
2295	Hillary	Langlais	Dexter	Maine
2296	Thomas	Linnell	Dexter	Maine
2297	Jeff	Richards	Dexter	Maine
2298	Ronald	Grant	Dexter	Maine
2299	Sonya	Church	Dexter	Maine
2300	Heather	Miller	Dexter	Maine
2301	tracy	sommers	Diamond Cove	Maine
2302	Rachel	Martineau	Dixfield	Maine
2303	Tasha	Hutchinson	Dixfield	Maine
2304	Jack	Brown	Dixfield	Maine
2305	Learned	Littlehale	Dixfield	Maine
2306	Deven	Parent	Dixfield	Maine
2307	Leo	Kersey	Dixfield	Maine
2308	Ryan	Flagg	Dixfield	Maine
2309	Jim	Hutch	Dixfield	Maine
2310	Brittany	Wardwell	Dixfield	Maine
2311	Theresa	Richard	Dixfield	Maine
2312	Wanda	Hamilton	Dixfield	Maine

2313	Scott	Noyes	Dixfield	Maine
2314	Sandra	Hebert	Dixfield	Maine
2315	Sawyer	Smith	Dixfield	Maine
2316	Justin	Richards	Dixfield	Maine
2317	Jillian	Rice	Dixfield	Maine
2318	Heatherï¿½s	Theriault	Dixfield	Maine
2319	Benjamin	Dolloff	Dixfield	Maine
2320	Laurie	Taylor	Dixfield	Maine
2321	Samantha	Hill	Dixfield	Maine
2322	Charles	Sastamoine	Dixfield	Maine
2323	Jacob	Jellison	Dixmont	Maine
2324	anne	warner	Dixmont	Maine
2325	Kimberly	Walker	Dixmont	Maine
2326	Brittany	Laurent	Dixmont	Maine
2327	James	Ricardo	Dixmont	Maine
2328	Lynne	Lamstein	Dixmont	Maine
2329	Shane	Averill	Dixmont	Maine
2330	Faye	Randall	Dixmont	Maine
2331	Mitchell	Sowa	Dixmont	Maine
2332	Sam	Kenney	Dixmont	Maine
2333	Garnett	Robinson	Dixmont	Maine
2334	Michelle	Ricardo	Dixmont	Maine
2335	Sally	Robinson	Dixmont	Maine
2336	Margaret	Mackie	Dover Foxcroft	Maine
2337	Jean	Harding	Dover Foxcroft	Maine
2338	Virginia	Redman	Dover Foxcroft	Maine
2339	Sara	Willis	Dover Foxcroft	Maine
2340	Kathi	Lewis	Dover Foxcroft	Maine
2341	Jody	Richmond	Dover Foxcroft	Maine
2342	Hilda	Roberts	Dover Foxcroft	Maine
2343	Nicholas	Miller	Dover Foxcroft	Maine
2344	Sidney	Mitchell	Dover Foxcroft	Maine
2345	Sarah	Hanson	Dover Foxcroft	Maine
2346	Kelly	Nally	Dover Foxcroft	Maine
2347	Brigitte	Gidman	Dover Foxcroft	Maine
2348	Judy	Cross	Dover Foxcroft	Maine
2349	David	Jameson	Doverfoxcroft	Maine
2350	Amy	Lowery	Dresden	Maine
2351	Chris	Dowdy	Dresden	Maine
2352	Reid	Anderson	Dresden	Maine
2353	Cynthia	Martin	Dresden	Maine
2354	Susan	Horan Boyd	Dresden	Maine
2355	Paul	Tunkle	Dresden	Maine
2356	Sabrina	Doray	Dresden	Maine
2357	Nathaniel	Blake	Dresden	Maine
2358	Patricia	Buck Welton	Dresden	Maine

2359	Keith	Perkins, Jr	Dresden	Maine
2360	Deborah	Burk	Dresden	Maine
2361	Erica	Reno	Dresden	Maine
2362	Nicole	Warman	Dresden	Maine
2363	Patricia	Stewart	Dresden	Maine
2364	Lindsey	Chasteen	Dresden	Maine
2365	Lauren	Cromwell	Dresden	Maine
2366	Alexander	Colon	Dresden	Maine
2367	Lewis	Turco	Dresden	Maine
2368	Felicia	Richards	Dresden	Maine
2369	Rose	Harris	Dresden	Maine
2370	Shaina	Swift	Dresden	Maine
2371	Tammy	Houdlette	Dresden	Maine
2372	Tom	Laverdiere	Dresden	Maine
2373	Linda	Nichols	Dresden	Maine
2374	Curtis	Jirsa	Dresden	Maine
2375	Laureen	Labar	Dresden	Maine
2376	Clista	Stevens	Dryden	Maine
2377	Nancy	Gilbert	Durham	Maine
2378	Jennifer	Macdonald	Durham	Maine
2379	Kirsten	Copp	Durham	Maine
2380	J	Yeo	Durham	Maine
2381	Richard	Lauck	Durham	Maine
2382	Cindy	Torrey	Durham	Maine
2383	Belinda	Stewart	Durham	Maine
2384	Jennifer	McNamee	Durham	Maine
2385	Jerome	Osullivan	Durham	Maine
2386	Jordan	Stubbs	Durham	Maine
2387	Tricia	Emery	Durham	Maine
2388	Andrea	Goulet	Durham	Maine
2389	Rae	Tourigny	Durham	Maine
2390	Michelle	Harripsn	Durham	Maine
2391	Carrie	Bowen	Durham	Maine
2392	Chelsie	Diconzo	Durham	Maine
2393	Jessica	Costa	Durham	Maine
2394	Kelly	Carter	Durham	Maine
2395	Aimee	Pfeffer	Durham	Maine
2396	Irene	Barber	Durham	Maine
2397	David	Hendrix	Durham	Maine
2398	Barbara	Maxfield	Durham	Maine
2399	Robert	Sevigny	Durham	Maine
2400	Aaron	Coslet	Durham	Maine
2401	Nicole	McNeill	Durham	Maine
2402	Shellyrae	Dugal	Durham	Maine
2403	Mark	Durisko	Durham	Maine
2404	Cara	Ng	Durham	Maine

2405	Ashley	Gendron	Durham	Maine
2406	Jack	Bruce IV	Durham	Maine
2407	Jessica	Anderson	Durham	Maine
2408	James	Kinne	Durham	Maine
2409	George	Samiljan	Durham	Maine
2410	Susan	Hussey	Durham	Maine
2411	Valarie	Banker	Durham	Maine
2412	Russell	Jabaut	Durham	Maine
2413	Heather	Roy	Durham	Maine
2414	Peter	Lowe	Durham	Maine
2415	Danica	Hanson	Durham	Maine
2416	Pamela	Lussier	Durham	Maine
2417	Nathan	Wight	Durham	Maine
2418	Michael	Carver	Durham	Maine
2419	Barbara	Olson	Durham	Maine
2420	Dustin	Sulak	Durham	Maine
2421	Eric	Cameron	Durham	Maine
2422	Tyler	Vallieres	Durham	Maine
2423	Jack	Bruce	Durham	Maine
2424	Keith	Olson	Durham	Maine
2425	Kenneth	Scribner	Durham	Maine
2426	Brandon	Wilkins	Durham	Maine
2427	Jennifer	Fitzpatrick	Durham	Maine
2428	Suzanne	McLain	Durham	Maine
2429	Donovan	Maxfield	Durham	Maine
2430	Mary Ellen	Samiljan	Durham	Maine
2431	Jessica	Baker	E Dixfield	Maine
2432	Lendell	Allen	East Andover	Maine
2433	Margaretta	Kroenke	East Andover	Maine
2434	Sidney	Pew	East Andover	Maine
2435	Elizabeth	Lunt	East Baldwin	Maine
2436	Emily	Graham	East Baldwin	Maine
2437	Rachel	Jones	East Boothbay	Maine
2438	Cheryl	Blaydon	East Boothbay	Maine
2439	Martha	Holbrook	East Boothbay	Maine
2440	Mary Jo	Poitras	East Boothbay	Maine
2441	Abigail	Jones	East Boothbay	Maine
2442	Gail	Sampson	East Livermore	Maine
2443	Shri	Verrill	East Machias	Maine
2444	Zoie	Zanoni	East Machias	Maine
2445	Carmen	Gonzalez	East Madison	Maine
2446	Maria	Gifford	East Millinocket	Maine
2447	Dale	Hayes	East Millinocket	Maine
2448	Devin	Whitney	East Millinocket	Maine
2449	Kirk	Fernald	East Millinocket	Maine
2450	Aaron	Lyons	East Millinocket	Maine

2451	Stephen	Sheehan	East Orland	Maine
2452	Christine	Charette	East Parsonsfield	Maine
2453	Janice	Murton	East Vassalboro	Maine
2454	Jim	Murton	East Vassalboro	Maine
2455	Ron	Young	East Waterboro	Maine
2456	Cory	Boissonneault	East Waterboro	Maine
2457	Mark	Roussin	East Waterboro	Maine
2458	Joyce	Woodman	East Waterboro	Maine
2459	KENNETH	MCNALLY	East Waterboro	Maine
2460	Luke	Barker	East Waterboro	Maine
2461	Everett	Allen	East Waterboro	Maine
2462	Brendan	Fedrizzi	East Waterboro	Maine
2463	Amy	LeVasseur	East Waterboro	Maine
2464	Abigail	Lemieux	East Waterboro	Maine
2465	Neil	Raymond	East Waterboro	Maine
2466	Diane	Meade	East Waterboro	Maine
2467	Ron	Young	East Waterboro	Maine
2468	Alan	Whitmore	East Waterboro	Maine
2469	Melissa	Brandt	East Waterboro	Maine
2470	m	leach	East Waterboro	Maine
2471	Noah	Gochie	East Waterboro	Maine
2472	Andrew	Meyer	East Wilton	Maine
2473	Deborah	Burke	East Wilton	Maine
2474	Gary	Burke	East Wilton	Maine
2475	Kathleen	Molatch	Eastbrook	Maine
2476	Ellen	Trask	Easton	Maine
2477	Bradley	Trask	Easton	Maine
2478	Jeffrey	Kimball	Easton	Maine
2479	Tina	Ireland	Easton	Maine
2480	Richard	Kimball	Easton	Maine
2481	William	Altvater	Eastport	Maine
2482	Edward	Stapes	Eastport	Maine
2483	Thomas	Kimes	Eastport	Maine
2484	Jean	Wilhelm	Eastport	Maine
2485	Lisa	Stephen	Eastport	Maine
2486	Richard	Craig	Eastport	Maine
2487	Linda	Lingley	Eastport	Maine
2488	Colleen	Dana-Cummings	Eastport	Maine
2489	Hilda	Lewis	Eastport	Maine
2490	Robert	Godfrey	Eastport	Maine
2491	Robert	Lee	Ebeemee Twp	Maine
2492	Jack	Schroder	Eddington	Maine
2493	April	Ridlon	Eddington	Maine
2494	Jason	Watters	Eddington	Maine
2495	Richard	Cheverie	Eddington	Maine
2496	Jeffery	Webb Sr	Eddington	Maine

2497	Judy	Mitchell	Eddington	Maine
2498	George	Warren	Edgecomb	Maine
2499	Osborn	Curtis	Edgecomb	Maine
2500	Arthur	Garey	Edgecomb	Maine
2501	David	Nutt	Edgecomb	Maine
2502	Linda	Rohr	Edgecomb	Maine
2503	Kelsey	Sprague	Edgecomb	Maine
2504	Sherrie	Hersom	Edgecomb	Maine
2505	Rob	Hoffman	Edgecomb	Maine
2506	Allen	Hersom	Edgecomb	Maine
2507	Elizabeth	Kerr	Edgecomb	Maine
2508	Alex	Gordon	Edgecomb	Maine
2509	Anne	Burt	Edgecomb	Maine
2510	Daniel	Chubbuck	Edgecomb	Maine
2511	Toryann	Colby	Edgecomb	Maine
2512	Cory	Mullins	Edgecomb	Maine
2513	Elizabeth	Kerr	Edgecomb	Maine
2514	Duncan	Kerr	Edgecomb	Maine
2515	Carrie	Warren	Edgecomb	Maine
2516	Carolry	Fowler	Edgecomb	Maine
2517	Audrey	Wilkicki	Edgecomb	Maine
2518	Donna	Pottle	Edmunds Twp	Maine
2519	Teresa	Robinson	Edmunds Twp	Maine
2520	Linda	Moulton	Eliot	Maine
2521	Joseph	Giniusz	Eliot	Maine
2522	Mary	Fournier	Eliot	Maine
2523	Sam	Schmir	Eliot	Maine
2524	Denis	Whyte	Eliot	Maine
2525	Christine	Magruder-Bennett	Eliot	Maine
2526	Karen	Lovejoy	Eliot	Maine
2527	Carol	Whitten	Eliot	Maine
2528	Valerie	Manchester	Eliot	Maine
2529	Marcia	Swanick	Eliot	Maine
2530	Iara	Manchester	Eliot	Maine
2531	Waynette	Eaton	Eliot	Maine
2532	Aimee	Kardulas	Eliot	Maine
2533	Elizabeth	Turner	Eliot	Maine
2534	Bryan	Weisse	Eliot	Maine
2535	Jeff	Volk	Eliot	Maine
2536	Alexandra	Conover Bennett	Elliottsville Twp	Maine
2537	Mark	Whiting	Ellsworth	Maine
2538	Shelly	Van Camp	Ellsworth	Maine
2539	Hans	Cote	Ellsworth	Maine
2540	jeff	paine	Ellsworth	Maine
2541	Cindy	Avery	Ellsworth	Maine

2542	Morgan	Traxler	Ellsworth	Maine
2543	Tyler	Saunders	Ellsworth	Maine
2544	Mary	Doherty	Ellsworth	Maine
2545	Stephen	Cowles	Ellsworth	Maine
2546	Brian	Estes	Ellsworth	Maine
2547	Michael	Vittum	Ellsworth	Maine
2548	Gary	Shellehamer	Ellsworth	Maine
2549	Richard	Blease	Ellsworth	Maine
2550	Aaron	Stevens	Ellsworth	Maine
2551	Julia	Ventresco	Ellsworth	Maine
2552	Jacqueline	Grohoski	Ellsworth	Maine
2553	Joseph	Merrill	Ellsworth	Maine
2554	Anne	Norwood	Ellsworth	Maine
2555	Leslie	Harlow	Ellsworth	Maine
2556	Valerie	Peer-Cort	Ellsworth	Maine
2557	Ashley	Pennartz	Ellsworth	Maine
2558	Linda	Keady	Ellsworth	Maine
2559	Nancy	Daly	Ellsworth	Maine
2560	Harry	Luhrs	Ellsworth	Maine
2561	David A.	Woolsey	Ellsworth	Maine
2562	Gwendolyn	Clark	Ellsworth	Maine
2563	Ross	Hill	Ellsworth	Maine
2564	Craig	Terrell	Ellsworth	Maine
2565	Gail	Thompson	Ellsworth	Maine
2566	Jorge	Rosa	Ellsworth	Maine
2567	Michael	Eastman	Ellsworth	Maine
2568	margaret	ober	Ellsworth	Maine
2569	Bret	Van Camp	Ellsworth	Maine
2570	Barbara	Presson	Ellsworth	Maine
2571	Edward	Grohoski	Ellsworth	Maine
2572	Wendy	Lessard	Ellsworth	Maine
2573	Ainsley	Tozier	Embden	Maine
2574	Michael	Aitken	Embden	Maine
2575	Steven	Brooks	Embden	Maine
2576	Steve	Skory	Embden	Maine
2577	Gerald	Michaud	Embden	Maine
2578	Richard	Padham	Embden	Maine
2579	Timothy J	Earle	Embden	Maine
2580	Louise	Padham	Embden	Maine
2581	Amy	Friel	Embden	Maine
2582	James	Manzer	Embden	Maine
2583	Kenneth	Ingalls	Embden	Maine
2584	Sharon	Mccarthy	Etna	Maine
2585	Emily	Canham	Etna	Maine
2586	Jesse	Lupo	Etna	Maine
2587	Kasey	Lupo	Etna	Maine

2588	Eron	Whittington	Etna	Maine
2589	Tim	Groves	Etna	Maine
2590	Kasey	Lupo	Etna	Maine
2591	Scott	Leeman	Etna	Maine
2592	Mr Gregory	Henderson Sr	Etna	Maine
2593	Jesse	Lupo	Etna	Maine
2594	Debra	Giroux	Etna	Maine
2595	Loretta	Boivin	Eustis	Maine
2596	Mary Ellen	Mayo	Eustis	Maine
2597	Garry	Mayo	Eustis	Maine
2598	Gina	Taylor	Eustis	Maine
2599	Patricia	Tufts	Eustis	Maine
2600	Sandra	Godin	Eustis	Maine
2601	Darren	Boivin	Eustis	Maine
2602	Matthew	Beauregard	Eustis	Maine
2603	Raymond	Craemer	Eustis	Maine
2604	Heather	Firestine	Eustis	Maine
2605	James	Bellwood	Eustis	Maine
2606	Stacey	Keene	Eustis	Maine
2607	Doris	Neptune	Exeter	Maine
2608	Ruth	Provost	Exeter	Maine
2609	Tonya	Quimby	Exeter	Maine
2610	Laura	Sholtz	Exeter	Maine
2611	David	Iverson	Exeter	Maine
2612	Prudence	Burgess	Fairfield	Maine
2613	Allyson	Karter	Fairfield	Maine
2614	Cathy	Mccarthy	Fairfield	Maine
2615	Tamie	Trainer	Fairfield	Maine
2616	Rebecca	Gilbert	Fairfield	Maine
2617	Jan	Hallee	Fairfield	Maine
2618	PAUL	WHEELOCK	Fairfield	Maine
2619	Asia	Sweet	Fairfield	Maine
2620	Nicholas	Lykling	Fairfield	Maine
2621	Danielle	Ellsworth	Fairfield	Maine
2622	David	Grant	Fairfield	Maine
2623	Pelkey	Chenyrene	Fairfield	Maine
2624	Cormick	Frizzell	Fairfield	Maine
2625	Gerald	Sylvester	Fairfield	Maine
2626	William	Hixon	Fairfield	Maine
2627	Jena	Bartsch	Fairfield	Maine
2628	Devin	Chenevert	Fairfield	Maine
2629	Steven	Meyerhans	Fairfield	Maine
2630	Mark	Reiland	Fairfield	Maine
2631	Alexis	Kelley	Fairfield	Maine
2632	Joshua	Vanadestine	Fairfield	Maine
2633	Nicholas	Mansfield	Fairfield	Maine

2634	Austin	Woodburh	Fairfield	Maine
2635	Colby	Davis	Fairfield	Maine
2636	Allan	Richards	Fairfield	Maine
2637	Nancy	Halsey	Fairfield	Maine
2638	Lucas	Leblanc	Fairfield	Maine
2639	Edward	Griffith	Fairfield	Maine
2640	Angie	Foster	Fairfield	Maine
2641	Richard	Flanagan	Fairfield	Maine
2642	Torrey	Witham	Fairfield	Maine
2643	Jacob	Bilodeau	Fairfield	Maine
2644	Melissa	Williams	Fairfield	Maine
2645	Kurt	Randall	Fairfield	Maine
2646	Samantha	Cote	Fairfield	Maine
2647	Dylan	Day	Fairfield	Maine
2648	Christopher	Weeks	Fairfield	Maine
2649	Jen	Mayo	Fairfield	Maine
2650	Gary	Quirion	Fairfield	Maine
2651	Karen	Dostie	Fairfield	Maine
2652	Nancy	Halsey	Fairfield	Maine
2653	Sally	Melcher-McKeagney	Fairfield	Maine
2654	Cathy	McCarthy	Fairfield	Maine
2655	Ira	Cohen	Fairfield	Maine
2656	Ashley	Quirion	Fairfield	Maine
2657	Katherine	Day	Fairfield	Maine
2658	Ronald	Gagnon	Fairfield	Maine
2659	Gordon	Pelotte	Fairfield	Maine
2660	Karen	Tobias	Falmouth	Maine
2661	Marni	Maynard	Falmouth	Maine
2662	Chris	Norton	Falmouth	Maine
2663	Fred	Conti	Falmouth	Maine
2664	Mark	Weston	Falmouth	Maine
2665	Marilyn	Detroy	Falmouth	Maine
2666	Sarah	Dupont	Falmouth	Maine
2667	Tose	Bartiws	Falmouth	Maine
2668	Pamelia	Strayer	Falmouth	Maine
2669	Nina	Edwards	Falmouth	Maine
2670	Patrick	Will	Falmouth	Maine
2671	Colette	Twigg-Rowse	Falmouth	Maine
2672	Emily	Kopans	Falmouth	Maine
2673	Isabel	Denham	Falmouth	Maine
2674	Susan	Sterling	Falmouth	Maine
2675	Samantha	Riegel	Falmouth	Maine
2676	Christina	Ferland	Falmouth	Maine
2677	Dianne	Wilkins	Falmouth	Maine
2678	Nancy	Jordan	Falmouth	Maine

2679	Fritz and Cyndi	Farquhar	Falmouth	Maine
2680	Daniel	Funk	Falmouth	Maine
2681	Megan	Markgren	Falmouth	Maine
2682	Dylan	Gillis	Falmouth	Maine
2683	Robert	Rowse	Falmouth	Maine
2684	Oliah	Fahrenwald	Falmouth	Maine
2685	Richard	Burbank	Falmouth	Maine
2686	Dennis	Buhelt	Falmouth	Maine
2687	Derek	Markgren	Falmouth	Maine
2688	Lynn	Breckinridge	Falmouth	Maine
2689	Peter	Verrill	Falmouth	Maine
2690	John	Beliveau	Falmouth	Maine
2691	Matthew	Fernald	Falmouth	Maine
2692	Meredith	Mayberry	Falmouth	Maine
2693	Susan	Gilpin	Falmouth	Maine
2694	Tracy	Thibodeau	Falmouth	Maine
2695	Deena	Weinstein	Falmouth	Maine
2696	Jason	Ronco	Falmouth	Maine
2697	Ann	Tracy	Falmouth	Maine
2698	Sarah	Perry	Falmouth	Maine
2699	Jane	Hersey	Falmouth	Maine
2700	Jenifer	Lawson	Falmouth	Maine
2701	Margo	Simmons	Falmouth	Maine
2702	Lori	Pride	Falmouth	Maine
2703	Bren	Cagle	Falmouth	Maine
2704	Catherine	Field	Falmouth	Maine
2705	Nancy	Hinkel	Falmouth	Maine
2706	Alan	Fitzgerald	Falmouth	Maine
2707	Lawrence	Pixley	Falmouth	Maine
2708	Olivia	Rowse	Falmouth	Maine
2709	Bharat	Moorthy	Falmouth	Maine
2710	Debra	Coyman	Falmouth	Maine
2711	Claudia	King	Falmouth	Maine
2712	Martyn	Payson	Falmouth	Maine
2713	Beth	Pauls	Falmouth	Maine
2714	Andy	Meyer	Falmouth	Maine
2715	Chloe	Rowse	Falmouth	Maine
2716	Catherine	Chamberlain	Falmouth	Maine
2717	Ellie	Hooper	Falmouth	Maine
2718	Lori	Stimson	Falmouth	Maine
2719	Lauren	Sterling	Falmouth	Maine
2720	Joseph	Bean	Falmouth	Maine
2721	Virginia	Hughes	Falmouth	Maine
2722	Margo	Simmons	Falmouth	Maine
2723	Beth	Pauls	Falmouth	Maine
2724	John	Flumerfelt	Falmouth	Maine

2725	A.	Stockly	Falmouth	Maine
2726	Robert	Hooper	Falmouth	Maine
2727	Jane	Funkhouser	Falmouth	Maine
2728	John	Fessenden	Farmingdale	Maine
2729	Howard	Betts	Farmingdale	Maine
2730	Devin	Shepherd	Farmingdale	Maine
2731	Brenda	Colfer	Farmingdale	Maine
2732	Michael	Truland	Farmingdale	Maine
2733	Mark	Koenig	Farmingdale	Maine
2734	Christopher	Shannon	Farmingdale	Maine
2735	Nichole	Clark	Farmingdale	Maine
2736	Sue	Kistenmacher	Farmingdale	Maine
2737	Sarah	Land	Farmingdale	Maine
2738	Michael	Maxwell	Farmingdale	Maine
2739	Peter	Dionne	Farmingdale	Maine
2740	Jason	Austin	Farmingdale	Maine
2741	Lucy	Poland	Farmingdale	Maine
2742	Tyler	Cummings	Farmingdale	Maine
2743	Penny	Ellis	Farmingdale	Maine
2744	Todd	McArthur	Farmingdale	Maine
2745	Dana	Upson	Farmingdale	Maine
2746	Nathanial	Bartlett	Farmingdale	Maine
2747	Kelly	Hayes	Farmingdale	Maine
2748	Steve	Brooke	Farmingdale	Maine
2749	Daniel	Sabattis	Farmingdale	Maine
2750	Alexis	Bernier	Farmingdale	Maine
2751	Drew	Webster	Farmingdale	Maine
2752	Carol	Leighton	Farmingdale	Maine
2753	Renee	Ouellette	Farmingdale	Maine
2754	Tera	Lane	Farmington	Maine
2755	Roger	Condit	Farmington	Maine
2756	Cheyenne	Malloy	Farmington	Maine
2757	Jessica	Ellis	Farmington	Maine
2758	Rhonda	Kinney	Farmington	Maine
2759	Keith	Amatk	Farmington	Maine
2760	Carolyn	Poliquin	Farmington	Maine
2761	Willena	Jennings	Farmington	Maine
2762	Sally	Speich	Farmington	Maine
2763	Taylor	Dunham	Farmington	Maine
2764	Charles H	Snell Jr	Farmington	Maine
2765	Gary	Stillman	Farmington	Maine
2766	Nicholas	Gray	Farmington	Maine
2767	Roger	Condit	Farmington	Maine
2768	Ginger	D	Farmington	Maine
2769	Kayla	Bard	Farmington	Maine
2770	Colton	Lawrence	Farmington	Maine

2771	Jane	Woodman	Farmington	Maine
2772	Zoe	Stonetree	Farmington	Maine
2773	John	Murray	Farmington	Maine
2774	Jared	Davis	Farmington	Maine
2775	Chelsea	Steele	Farmington	Maine
2776	Amanda	Beane	Farmington	Maine
2777	Anita	Stevens	Farmington	Maine
2778	Drew	Hufnagel	Farmington	Maine
2779	Drew	Bates	Farmington	Maine
2780	Nathan	Kendall	Farmington	Maine
2781	Deborah	Hiltz	Farmington	Maine
2782	Alexis	Luker	Farmington	Maine
2783	Katherine	Brittain	Farmington	Maine
2784	Bonnie	Burnham	Farmington	Maine
2785	Keith	Couture	Farmington	Maine
2786	mort	stabulis	Farmington	Maine
2787	L&J	Dubord	Farmington	Maine
2788	Elizabeth	Neeley	Farmington	Maine
2789	Katherine	Spahr	Farmington	Maine
2790	Amy	Hayes	Farmington	Maine
2791	John	Charette	Farmington	Maine
2792	Melissa	Allen	Farmington	Maine
2793	Orre-Ann	Robbins	Farmington	Maine
2794	Michael	Staples	Farmington	Maine
2795	Lynn	Caldwell	Farmington	Maine
2796	Emery	Goff	Farmington	Maine
2797	Patricia	Chick	Farmington	Maine
2798	Emmye	Abbott	Farmington	Maine
2799	Mary	Batt	Farmington	Maine
2800	Joseph	Hastings	Farmington	Maine
2801	Sadie	Storer	Farmington	Maine
2802	Andrea	Callahan	Farmington	Maine
2803	Kirk	Wallace	Farmington	Maine
2804	Kelly	Nichols	Farmington	Maine
2805	Brighid	Rose	Farmington	Maine
2806	Marshall	Cassidy	Farmington	Maine
2807	Lisa	Gund	Farmington	Maine
2808	Arleen	Masselli	Farmington	Maine
2809	Linda	Myhaver	Farmington	Maine
2810	Josh	Sweet	Farmington	Maine
2811	Summer	Tilton	Farmington	Maine
2812	Drew	Bates	Farmington	Maine
2813	Ashley	Girard	Farmington	Maine
2814	Donna	Stabulis	Farmington	Maine
2815	Angela	Daniels	Farmington	Maine
2816	Wayne	Deri	Farmington	Maine

2817	Aron	Smiley	Farmington	Maine
2818	Jonathan	Galouch	Farmington	Maine
2819	Patricia	Aishton	Farmington	Maine
2820	Jared	Brown	Farmington	Maine
2821	Wendy	Huish	Farmington	Maine
2822	Ann	Nile	Farmington	Maine
2823	Erynn	Hiscock	Farmington	Maine
2824	Joseph	Moore	Farmington	Maine
2825	Diane	Thompson	Farmington	Maine
2826	Jennifer	Abbott	Farmington	Maine
2827	Sabrina	Bachelder	Farmington	Maine
2828	Terry	Collins	Farmington	Maine
2829	Sharon	Edgar	Farmington	Maine
2830	Neal	Yeaton	Farmington	Maine
2831	Kayleigh	Fontaine	Farmington	Maine
2832	Greg	Williams	Farmington	Maine
2833	Marcia	Kelson	Farmington	Maine
2834	Logan	Whitley	Farmington	Maine
2835	Derek	Katzenbach	Farmington	Maine
2836	Gloria	Pierson	Farmington	Maine
2837	Amy	Bradford	Farmington	Maine
2838	Anne Marie	Wolf	Farmington	Maine
2839	Melissa	Brady	Farmington	Maine
2840	Valerie	Huebner	Farmington	Maine
2841	Gary	Bryant	Farmington	Maine
2842	Paula	Widmer	Farmington	Maine
2843	Travis	Stevens	Farmington	Maine
2844	Courtney	Austin	Farmington	Maine
2845	Crystal	Williams	Farmington	Maine
2846	Peggy	Mayette	Farmington	Maine
2847	John	Sullivan	Farmington	Maine
2848	Michael	Colella	Farmington	Maine
2849	Gregory	O'Donal	Farmington	Maine
2850	Thomas	Falk	Farmington	Maine
2851	Camillia	Yeaton	Farmington	Maine
2852	David	Betts	Farmington	Maine
2853	Ann	Moulton	Farmington	Maine
2854	Troy	Hull	Farmington	Maine
2855	Linda	Hallett	Farmington	Maine
2856	Corey	Ellis	Farmington	Maine
2857	Cassidy	Whitley	Farmington	Maine
2858	Margaret	Gould Wescott	Farmington	Maine
2859	Heather	Farrington	Farmington	Maine
2860	Darlene	Patrick	Farmington	Maine
2861	Alexis	Gilbert	Farmington	Maine
2862	Donna	Wheeler	Farmington	Maine

2863	James	Guillaume	Farmington	Maine
2864	Kevin	Joyce	Farmington	Maine
2865	Zakkery	Macdonald	Farmington	Maine
2866	John	Nichols	Farmington	Maine
2867	Geraldine	Bryant	Farmington	Maine
2868	Rebecca	Dennison	Farmington	Maine
2869	Nathan	Gregory	Farmington	Maine
2870	Laurie	Danforth	Farmington	Maine
2871	Joanna	Wilhelm	Farmington	Maine
2872	Anna	Howton	Farmington	Maine
2873	Stephanie	Clark	Farmington	Maine
2874	Adam	Pottle	Farmington	Maine
2875	Linda	Tate	Farmington	Maine
2876	Jeffrey	Field	Farmington	Maine
2877	Cheriese	Shanti	Farmington	Maine
2878	Mary	Lello	Farmington	Maine
2879	Grace	Libby	Farmington	Maine
2880	Nathan	Leeman	Farmington	Maine
2881	Gabriel	Gunning	Farmington	Maine
2882	Alison	Haines	Farmington Falls	Maine
2883	Peter	Brennick	Farmington Falls	Maine
2884	Ellen	Hopkins	Farmington Falls	Maine
2885	Ryan	Adams	Fayette	Maine
2886	Mark	Burhoe	Fayette	Maine
2887	Zachary	Caouette	Fayette	Maine
2888	Edward	Jarius	Fayette	Maine
2889	Garrett	Neal	Fayette	Maine
2890	Kayla	Skehan	Fayette	Maine
2891	Shelby	Hicks	Fayette	Maine
2892	Rhonda	Bryant	Fayette	Maine
2893	Marissa	Adams	Fayette	Maine
2894	Belinda	Bothwick	Fayette	Maine
2895	Jared	Gilbert	Fayette	Maine
2896	John	Fischer	Fayette	Maine
2897	Kelli	Burnham	Fayette	Maine
2898	Carroll	Berry	Fayette	Maine
2899	Fred	Jackman	Fayette	Maine
2900	Sally	Giddings	Fayette	Maine
2901	Karan	Smith	Fort Fairfield	Maine
2902	Andrea	Hadfield	Fort Fairfield	Maine
2903	Jacob	Bynion-Cullins	Fort Fairfield	Maine
2904	Marissa	Sutherland	Fort Kent	Maine
2905	Tyler	Pelletier	Fort Kent	Maine
2906	Celina	Babin	Fort Kent	Maine
2907	Gary	Voisine	Fort Kent	Maine
2908	Nancy	Sosman	Frankfort	Maine

2909	Chandler	Littlefield	Frankfort	Maine
2910	Emily	Barney	Frankfort	Maine
2911	Holly	Hughes	Frankfort	Maine
2912	William	Pupkis	Frankfort	Maine
2913	Chris	Percival	Frankfort	Maine
2914	Mo	Oliver	Franklin	Maine
2915	Tyler	Bunker	Franklin	Maine
2916	Tammy	Desjardin	Franklin	Maine
2917	Caleb	Sandstrom	Franklin	Maine
2918	Soren	Hansen	Franklin	Maine
2919	Medea	Steinman	Franklin	Maine
2920	Mia	Bowden	Franklin	Maine
2921	Kyle	Alspach	Freedom	Maine
2922	Joan	Proudman	Freedom	Maine
2923	David	Bridges	Freedom	Maine
2924	Linda	Mattson	Freedom	Maine
2925	Margaret	Fitzgerald	Freedom	Maine
2926	Thomas	Clay	Freedom	Maine
2927	Brian	Jones	Freedom	Maine
2928	rhoda	waller	Freedom	Maine
2929	Kyla	Hershey-Wilson	Freedom	Maine
2930	Fred	Luce	Freeman Twp	Maine
2931	Zephyra	Staples	Freeman Twp	Maine
2932	Andrew	Kempf	Freeport	Maine
2933	Colin	Baker	Freeport	Maine
2934	Deanna	Guimond	Freeport	Maine
2935	Robert C. and Judith C.	Foster	Freeport	Maine
2936	Davis	Ritger	Freeport	Maine
2937	Steven	Ridley	Freeport	Maine
2938	N David	Semon	Freeport	Maine
2939	Nina	Weyl	Freeport	Maine
2940	Brian	Haddock	Freeport	Maine
2941	Chandler	St.Clair	Freeport	Maine
2942	Ian	Nichols	Freeport	Maine
2943	Steven	Konstantino	Freeport	Maine
2944	Kay	Sullivan	Freeport	Maine
2945	Pamela	Grondin	Freeport	Maine
2946	Mary	Nichols	Freeport	Maine
2947	Joan	Campbell	Freeport	Maine
2948	Kevin	Mattson	Freeport	Maine
2949	Caroline	Thorne-Lyman	Freeport	Maine
2950	Elizabeth	White	Freeport	Maine
2951	Kate	Olson	Freeport	Maine
2952	Heather	McClelland	Freeport	Maine
2953	Aaron	Holmberg	Freeport	Maine

2954	Darren	Jensen	Freeport	Maine
2955	Jenny	Yasi	Freeport	Maine
2956	Lucy	Birkett	Freeport	Maine
2957	Robin	Bonney	Freeport	Maine
2958	Mark	Sprinkle	Freeport	Maine
2959	Whitney	Cox	Freeport	Maine
2960	Scott	Burrill	Freeport	Maine
2961	Lesley	Proctor	Freeport	Maine
2962	Rhon	Bell	Freeport	Maine
2963	Thomas	Lawton	Freeport	Maine
2964	Mary	Mraz	Freeport	Maine
2965	Blake	Dickison	Freeport	Maine
2966	Linda	Albert	Freeport	Maine
2967	Randall	Nichols	Freeport	Maine
2968	William	Vaughan	Freeport	Maine
2969	Russell	Carfagno	Freeport	Maine
2970	Hilary	Jessen	Freeport	Maine
2971	Melissa	Gormley	Freeport	Maine
2972	Pauline	Hunneman	Freeport	Maine
2973	Sheila	Nappi	Freeport	Maine
2974	Shelby	Sawyer	Freeport	Maine
2975	Hannah	Osborne	Freeport	Maine
2976	Douglas	Hall	Freeport	Maine
2977	james	chute	Freeport	Maine
2978	Renee	Seavey	Freeport	Maine
2979	Jackie	Kruse	Freeport	Maine
2980	Jane	Bastey	Freeport	Maine
2981	Thomas	Lawrence	Freeport	Maine
2982	Norma Fish	Fish	Freeport	Maine
2983	Josh	Burke	Freeport	Maine
2984	Karl and Louisa	Gerstenberger	Freeport	Maine
2985	John	Stroud	Freeport	Maine
2986	Robert	Hornschild-Bear	Freeport	Maine
2987	Sarah	Finnegan	Freeport	Maine
2988	Kimberly	Burke	Freeport	Maine
2989	Thomas	Russell	Freeport	Maine
2990	Trace	Salter	Freeport	Maine
2991	Kathleen	Arsenault	Freeport	Maine
2992	Pam	Blake	Freeport	Maine
2993	Suanne	Williams	Freeport	Maine
2994	Joli	Greene	Freeport	Maine
2995	Justin	Dotey	Freeport	Maine
2996	Alan	Weiner	Freeport	Maine
2997	Tyler	Kolle	Freeport	Maine
2998	Maryellen	Carew	Freeport	Maine
2999	Thomas	McKibben	Freeport	Maine

3000	Jesse	Weyl	Freeport	Maine
3001	Bob	Lyman	Freeport	Maine
3002	Stephan	Kruse	Freeport	Maine
3003	Sally	Leland	Freeport	Maine
3004	David	Kidder	Freeport	Maine
3005	Raymond	Ramage	Freeport	Maine
3006	Catherine	Wolinsky	Freeport	Maine
3007	Kayla	Bly	Freeport	Maine
3008	Christopher	Hoffmann	Freeport	Maine
3009	Courtney	Newell	Freeport	Maine
3010	Josh	Johnstone	Freeport	Maine
3011	Ken	Coslet	Freeport	Maine
3012	Jacob	Crone	Freeport	Maine
3013	Peter	Bulkeley	Friendship	Maine
3014	Sierra	Weeks	Friendship	Maine
3015	Jennifer	Fore	Friendship	Maine
3016	Diane	Crowley	Friendship	Maine
3017	Donna	Jameson	Friendship	Maine
3018	Richard	Nelson	Friendship	Maine
3019	William	Sutton	Fryeburg	Maine
3020	Reed	Jenks	Fryeburg	Maine
3021	Nickie	Sekera	Fryeburg	Maine
3022	Julia	Taylor	Fryeburg	Maine
3023	Samuel	Nesbitt	Fryeburg	Maine
3024	Jeremy	Goodwin	Fryeburg	Maine
3025	Nels	Liljedahl	Fryeburg	Maine
3026	Megan	Harmon	Fryeburg	Maine
3027	Jenny	Huang-Dale	Fryeburg	Maine
3028	Isabelle	Boyd	Fryeburg	Maine
3029	Gabe	Watson	Fryeburg	Maine
3030	Nora	Schwarz	Fryeburg	Maine
3031	Lori	Descoteaux	Fryeburg	Maine
3032	Jessica	Hart	Fryeburg	Maine
3033	Nicole	Xanders	Fryeburg	Maine
3034	Robert	Babb	Gardiner	Maine
3035	Jason	Joseph	Gardiner	Maine
3036	Levi	Hahn	Gardiner	Maine
3037	Jeffrey	Kobrock	Gardiner	Maine
3038	Benda	Stevens	Gardiner	Maine
3039	Joel	Pagliarulo	Gardiner	Maine
3040	Stephen	Lapointe	Gardiner	Maine
3041	Tom	Reeves	Gardiner	Maine
3042	Mike	Cleary	Gardiner	Maine
3043	Danielle	Lapointe	Gardiner	Maine
3044	Patrick	Wentworth	Gardiner	Maine
3045	Liz	Grady	Gardiner	Maine

3046	Bethany	Burgess	Gardiner	Maine
3047	Rebecca	Fles	Gardiner	Maine
3048	Steven	Briere	Gardiner	Maine
3049	Tyler	Kalloch	Gardiner	Maine
3050	Connor	Nation	Gardiner	Maine
3051	Samantha	Holt	Gardiner	Maine
3052	Kyle	Emmons	Gardiner	Maine
3053	Kate	Buehner	Gardiner	Maine
3054	Lisa	Copenhaver	Gardiner	Maine
3055	Joshua	Moore	Gardiner	Maine
3056	David	St Jarre	Gardiner	Maine
3057	Marc	Cloutier	Gardiner	Maine
3058	Robert	Schurman	Gardiner	Maine
3059	Cody	Wyman	Gardiner	Maine
3060	Nicholas	Grover	Gardiner	Maine
3061	Autumn	Doucette	Gardiner	Maine
3062	Crystal	Roberts	Gardiner	Maine
3063	Donald	Strickland	Gardiner	Maine
3064	Bill	Pond	Gardiner	Maine
3065	Riley	Grady	Gardiner	Maine
3066	Matthew	Myatt	Gardiner	Maine
3067	Haylee	Larrabee	Gardiner	Maine
3068	Caleb	Chadbourne	Gardiner	Maine
3069	Harmony	Wyman	Gardiner	Maine
3070	Danny	Maines	Gardiner	Maine
3071	Tony	Sousa	Gardiner	Maine
3072	Robert	Abbey	Gardiner	Maine
3073	Michael	Alden	Gardiner	Maine
3074	Ben	Fuller	Gardiner	Maine
3075	George	Cook	Gardiner	Maine
3076	Bradley	Bailey	Gardiner	Maine
3077	John	Maxwell	Gardiner	Maine
3078	Elizabeth	Cuprak	Gardiner	Maine
3079	Martialia	Files	Gardiner	Maine
3080	Matthew	Buczkowski	Gardiner	Maine
3081	Morgan	Macmaster	Gardiner	Maine
3082	Deborah	Gallagher	Gardiner	Maine
3083	Gail	Trask	Gardiner	Maine
3084	Sophia	Douvielle	Gardiner	Maine
3085	Denise	Terrell	Gardiner	Maine
3086	Shayna	Webber	Garland	Maine
3087	Gerald	Laffey	Garland	Maine
3088	Dennis	Girard	Garland	Maine
3089	Sheila	Schoolcraft	Garland	Maine
3090	Kathy	Jackson	Garland	Maine
3091	Ann	Marquis	Garland	Maine

3092	Marjorie	Burgess	Georgetown	Maine
3093	Jill	Ventry	Georgetown	Maine
3094	Maureen	Stanton	Georgetown	Maine
3095	Mackenzie	Snowdon	Georgetown	Maine
3096	Bernard	Goodman	Georgetown	Maine
3097	Charlene	Barter	Georgetown	Maine
3098	Ed	Campbell	Georgetown	Maine
3099	Elizabeth	Carpenter	Georgetown	Maine
3100	Rachel	Madsen	Georgetown	Maine
3101	Brian	Whalen	Georgetown	Maine
3102	Judy	Preble	Georgetown	Maine
3103	Maxfield	Knizeski	Georgetown	Maine
3104	Sandra	Jaeger	Georgetown	Maine
3105	Jonathan	Kimball	Georgetown	Maine
3106	Michael	White	Georgetown	Maine
3107	Sara	Barnes	Georgetown	Maine
3108	Angela	Mead	Georgetown	Maine
3109	Jacob	Chapman	Gilead	Maine
3110	Nick	Graham	Glenburn	Maine
3111	Ashley	Richard	Glenburn	Maine
3112	Bryce	Hatch	Glenburn	Maine
3113	Robin	Merchant	Glenburn	Maine
3114	Shawn	Graham	Glenburn	Maine
3115	Patricia	Lad	Glenburn	Maine
3116	Roger	Merchant	Glenburn	Maine
3117	Tammy	Pelletier	Glenburn	Maine
3118	Joseph	Landry	Glenburn	Maine
3119	Katie	Rublee	Glenburn	Maine
3120	Kathi	Heath	Glenburn	Maine
3121	Robert	McDonald	Glenburn	Maine
3122	Joseph	Cousins	Glenburn	Maine
3123	Robert	Wiley	Glenburn	Maine
3124	Mary	Ellingwood	Glenburn	Maine
3125	Sean	Tocci	Glenburn	Maine
3126	Greg	Westrich	Glenburn	Maine
3127	Tylor	Perry	Glenburn	Maine
3128	Tracy	Rickett	Gorham	Maine
3129	Patrick	Monica	Gorham	Maine
3130	Eric	Anderson	Gorham	Maine
3131	Justin	Crossman	Gorham	Maine
3132	Cynthia	Pawlina	Gorham	Maine
3133	Keith	Cook	Gorham	Maine
3134	Max	Poulin	Gorham	Maine
3135	Deanna	Taylor	Gorham	Maine
3136	Briana	Pastore	Gorham	Maine
3137	Hannah	Berry	Gorham	Maine

3138	Brian	Plowman	Gorham	Maine
3139	Daniel	Golding	Gorham	Maine
3140	David	Gushee	Gorham	Maine
3141	Alice Brenda	Frigon	Gorham	Maine
3142	Lisa	Carroll	Gorham	Maine
3143	Julie	Hopkins	Gorham	Maine
3144	Scott	Nickerson	Gorham	Maine
3145	Karen	Curtis	Gorham	Maine
3146	Cheryl	Bacon	Gorham	Maine
3147	Angela	Simmons	Gorham	Maine
3148	Cole	McMannus	Gorham	Maine
3149	Ronald	Graff	Gorham	Maine
3150	Anne	Kwoka	Gorham	Maine
3151	Andrew	Brokos	Gorham	Maine
3152	Chris	Lee	Gorham	Maine
3153	Karen	Davidson	Gorham	Maine
3154	Diana	Libby	Gorham	Maine
3155	Brad	Hall	Gorham	Maine
3156	Benjamin	Pineo	Gorham	Maine
3157	Devan	Bartlett	Gorham	Maine
3158	Roger	Turner	Gorham	Maine
3159	Jennalee	Macmillan	Gorham	Maine
3160	Morgan	Baxter	Gorham	Maine
3161	Garvin	Desjardin	Gorham	Maine
3162	Stephen	McDonald	Gorham	Maine
3163	Jonathan	Souza	Gorham	Maine
3164	Ashley	Barnhart	Gorham	Maine
3165	Michael	Johnson	Gorham	Maine
3166	Daisy	Thomas	Gorham	Maine
3167	Joe	Gardner	Gorham	Maine
3168	Mark	Blunden	Gorham	Maine
3169	Barbara	Taylor	Gorham	Maine
3170	Grant	Gushee	Gorham	Maine
3171	Isabelle	Jackson	Gorham	Maine
3172	Taylor	Plowman	Gorham	Maine
3173	Joseph	Martin	Gorham	Maine
3174	Ron	Chasse	Gorham	Maine
3175	Travis	Emerson	Gorham	Maine
3176	Hilary	Twaddel	Gorham	Maine
3177	Chris	Burton	Gorham	Maine
3178	Christopher	Hannon	Gorham	Maine
3179	Kay	Hurteau	Gorham	Maine
3180	Melanie	Ranger	Gorham	Maine
3181	Dawna	Lamson	Gorham	Maine
3182	Denise	Smith	Gorham	Maine
3183	Joseph	Catoggio	Gorham	Maine

3184	Robert	Marsh	Gorham	Maine
3185	Doris	Thomas	Gorham	Maine
3186	Hilary	Brochu	Gorham	Maine
3187	Lucas	Merrifield	Gorham	Maine
3188	Fred	Thomas	Gorham	Maine
3189	Jason	Catoggio	Gorham	Maine
3190	Steve	Perry	Gorham	Maine
3191	Casey	Corkum	Gorham	Maine
3192	Hannah	Clark	Gorham	Maine
3193	Patrick	Macvane	Gorham	Maine
3194	Jeremy	Gadbois	Gorham	Maine
3195	Sandra	Jensen	Gorham	Maine
3196	Susan	Smith	Gouldsboro	Maine
3197	Brett	Binns	Gouldsboro	Maine
3198	Jacob	Knowles	Gouldsboro	Maine
3199	Susan	Dickson-Smith	Gouldsboro	Maine
3200	Hunter	Rivers	Gouldsboro	Maine
3201	Leah	Cook	Grand Isle	Maine
3202	Jeff	McEvoy	Grand Lake Stream	Maine
3203	Linda	Bailey	Grand Lake Stream	Maine
3204	David	Tobey	Grand Lake Stream	Maine
3205	Olivia	Viola	Gray	Maine
3206	Marissa	Caminiti	Gray	Maine
3207	Jesse	Miller	Gray	Maine
3208	Doreen	Thompson	Gray	Maine
3209	Toby	Vosmus	Gray	Maine
3210	Sharon	Anderson	Gray	Maine
3211	Robin	Googins	Gray	Maine
3212	Travis	Moreau	Gray	Maine
3213	Mark	Dufresne	Gray	Maine
3214	Vincent	Bertino	Gray	Maine
3215	Jayne	Chandler	Gray	Maine
3216	Scott	Lowell	Gray	Maine
3217	Ralph	Doughty	Gray	Maine
3218	Brad	Laughlin	Gray	Maine
3219	Michael	Maines	Gray	Maine
3220	Scott	Wood	Gray	Maine
3221	Anneliese	Schultz	Gray	Maine
3222	Nicole	Barter	Gray	Maine
3223	Howard	Shaw	Gray	Maine
3224	Matthew	Nason	Gray	Maine
3225	David	Blanchard	Gray	Maine
3226	Emma	Waldron	Gray	Maine
3227	Amy	Clary	Gray	Maine
3228	Michael	Sawyer	Gray	Maine
3229	Lance	Hutchins	Gray	Maine

3230	Alex	Donka	Gray	Maine
3231	Steven	Emery	Gray	Maine
3232	Jeff	Caulfield	Gray	Maine
3233	Maryella	Rawnsley	Gray	Maine
3234	Jarod	Castonguay	Gray	Maine
3235	Kristen	Periard	Gray	Maine
3236	Lance	Vigue	Gray	Maine
3237	Jeffrey	Gagne	Gray	Maine
3238	Missy	Stalnik	Gray	Maine
3239	Shelley	Vosmus	Gray	Maine
3240	Chris	Dupuis	Gray	Maine
3241	Catherine	Mathews	Gray	Maine
3242	Stephen	Trumble	Gray	Maine
3243	Michael	Morrone	Gray	Maine
3244	Kristina	Spaulding	Gray	Maine
3245	John	Cassidy	Gray	Maine
3246	Carol	Brown	Gray	Maine
3247	Emily	Benner	Gray	Maine
3248	Traci	Oneill	Gray	Maine
3249	Robert	Doyle	Gray	Maine
3250	Jeffrey	Bearce	Gray	Maine
3251	Jeffrey	Watson	Gray	Maine
3252	Robert	Anania	Gray	Maine
3253	Sonia	Turgeon	Gray	Maine
3254	Pam	Wilkinson	Gray	Maine
3255	Seamus	Haley	Gray	Maine
3256	Dennis	Berry	Gray	Maine
3257	Beth	Mitchell	Gray	Maine
3258	Kyle	Exchange	Gray	Maine
3259	Johnathan	Strout	Gray	Maine
3260	Alicia	Fowler	Greenbush	Maine
3261	Jill	Cross	Greenbush	Maine
3262	Vivian	Betters	Greenbush	Maine
3263	Scott	Turner	Greenbush	Maine
3264	Keith	Fowler	Greenbush	Maine
3265	Claire	Labonte	Greene	Maine
3266	Denise	Longchamps	Greene	Maine
3267	Andre	Leblanc	Greene	Maine
3268	Mary	Sylvain-Leonas	Greene	Maine
3269	Christina	Lappin	Greene	Maine
3270	Lisa	Davis	Greene	Maine
3271	Susan	Burgess	Greene	Maine
3272	Taylor	Woodbury	Greene	Maine
3273	Christian	Fullerton	Greene	Maine
3274	Michael	Rifkin	Greene	Maine
3275	Norma	Boulet	Greene	Maine

3276	Mary	McRae	Greene	Maine
3277	Erin	Dostie	Greene	Maine
3278	Roxanne	Couillard	Greene	Maine
3279	Ben	Labrecque	Greene	Maine
3280	Lyndsy	Turmel	Greene	Maine
3281	Zachary	Pike	Greene	Maine
3282	Shuler	Lamothe	Greene	Maine
3283	Lawrence	Pooley	Greene	Maine
3284	Jon	Austin	Greene	Maine
3285	Philip	Veilleux	Greene	Maine
3286	Patrick	Levesque	Greene	Maine
3287	Rickie	Hudson	Greene	Maine
3288	Carrie	Bolduc	Greene	Maine
3289	Christian	Howe	Greene	Maine
3290	Brian	Gauthier	Greene	Maine
3291	Ronald	Nadeau	Greene	Maine
3292	Shayla	Lapierre	Greene	Maine
3293	Scott	Perkins	Greene	Maine
3294	Cody	Bernard	Greene	Maine
3295	Karen	Twidwell	Greene	Maine
3296	Susan	Allison	Greene	Maine
3297	Joshua	Lappin	Greene	Maine
3298	Shelby	Roux	Greene	Maine
3299	Todd	Bowden	Greene	Maine
3300	Lexi	White	Greene	Maine
3301	Cody	Coburn	Greene	Maine
3302	Janet	Morissette	Greene	Maine
3303	Alyssa	Thompson	Greene	Maine
3304	Sheryl	Milliken	Greene	Maine
3305	Heidi	Audet	Greene	Maine
3306	Memarie	Christoforo	Greene	Maine
3307	Jennifer	Springer	Greene	Maine
3308	Hannah	Shumway	Greene	Maine
3309	Lucas	Perry	Greene	Maine
3310	Julie	Burgess	Greene	Maine
3311	Karen	Nadeau	Greene	Maine
3312	Brian	Nadeau	Greene	Maine
3313	Lisa	Mason	Greene	Maine
3314	Sherri	Hathorne	Greene	Maine
3315	Aaron	Gosselin	Greene	Maine
3316	Michelle	Woodbury	Greene	Maine
3317	Forest	Clark	Greene	Maine
3318	Matt	Lavoie	Greene	Maine
3319	Dawn	Cloutier	Greene	Maine
3320	Patricia	Driscoll	Greene	Maine
3321	Mark	Dunham	Greene	Maine

3322	Judith	Milbert	Greene	Maine
3323	Paul	Dumond	Greene	Maine
3324	Cory	Brassbridge	Greene	Maine
3325	William	Adams	Greene	Maine
3326	Sarah	Boehm	Greene	Maine
3327	Melissa	Pratt	Greene	Maine
3328	Tina	Parent	Greene	Maine
3329	John	Neal	Greene	Maine
3330	Christine	Duplissis	Greene	Maine
3331	Robert	Plourde	Greene	Maine
3332	Bruce	Johnson	Greenfield Twp	Maine
3333	Roxanne	Cunningham	Greenville	Maine
3334	April	Collins	Greenville	Maine
3335	Amy	Haynes	Greenville	Maine
3336	Ruth	Ganev	Greenville	Maine
3337	Yvette	Roy	Greenville	Maine
3338	Doug	McCulloch	Greenville	Maine
3339	Ruth	McLaughlin	Greenville	Maine
3340	Cheryl	Goodspeed	Greenville	Maine
3341	Roland	Wortman	Greenville	Maine
3342	Hugh & Linda	McEachern	Greenville	Maine
3343	Barbara	Caron	Greenville	Maine
3344	Grace	Bardsley	Greenville	Maine
3345	Dennis	Jordan	Greenville	Maine
3346	Thomas	Gilbert	Greenville	Maine
3347	Cheryl	Goodpeed	Greenville	Maine
3348	Scott	Hanson	Greenville	Maine
3349	Stacey	Duncan	Greenville	Maine
3350	Jan	Douglass	Greenville	Maine
3351	Kathryn	Larabee	Greenville	Maine
3352	Karl	Watler	Greenville	Maine
3353	Brenda	McIvr	Greenville	Maine
3354	Makenzie	Ward	Greenville	Maine
3355	Keith	Smith	Greenville	Maine
3356	John	Owens	Greenville	Maine
3357	Tricia	Sherman	Greenville	Maine
3358	Kathy	Cobb	Greenville	Maine
3359	Stefanie	Thornton	Greenville	Maine
3360	Heather	Lizotte	Greenville	Maine
3361	Ruby	Rockwell	Greenville	Maine
3362	Danielle	Spaulding	Greenville	Maine
3363	Kathleen	Bishop	Greenville	Maine
3364	John F	Hussey	Greenville	Maine
3365	E.B.	Pike	Greenville	Maine
3366	Anthony	Pike	Greenville	Maine
3367	Colin	Arey	Greenville	Maine

3368	Ellen	Edgerly	Greenville	Maine
3369	Linda	Wohlforth	Greenville	Maine
3370	Eric	Sherman	Greenville	Maine
3371	Eric	Sherman	Greenville	Maine
3372	Jer-Ann	Hilbert	Greenville	Maine
3373	Dan	McLaughlin	Greenville	Maine
3374	Aubrey	Kronholm	Greenville	Maine
3375	Candace	Morrell	Greenville	Maine
3376	Tricia	Sherman	Greenville	Maine
3377	Eric	Johnsen	Greenville Junction	Maine
3378	Wendy	Weiger	Greenville Junction	Maine
3379	Shana	Cirulli	Greenville Junction	Maine
3380	Brendon	Tolman	Greenville Junction	Maine
3381	Karyn	Ellwood	Greenville Junction	Maine
3382	Jamie	Duncan	Greenville Junction	Maine
3383	Kate	Baldwin	Greenville Junction	Maine
3384	Michael	Boucher	Greenville Junction	Maine
3385	Jeffrey	Stafford	Greenville Junction	Maine
3386	Donald	Anderson	Greenville Junction	Maine
3387	Zach	Brewster	Greenville Junction	Maine
3388	Scott	Snell	Greenville Junction	Maine
3389	Tiffany	Howard	Greenville Junction	Maine
3390	Natalie	Stafford	Greenville Junction	Maine
3391	George	Bakajza	Greenville Junction	Maine
3392	James	Blynn	Greenville Junction	Maine
3393	Paul	Duclos	Greenwood	Maine
3394	Kristine	Keeney	Greenwood	Maine
3395	Samantha	Wormwood	Greenwood	Maine
3396	Evie	Marcolini	Greenwood	Maine
3397	Samuel	Wheeler	Greenwood	Maine
3398	Paul	Marcolini	Greenwood	Maine
3399	Candance	Podolsky	Greenwood	Maine
3400	Brent	Lake	Greenwood	Maine
3401	Tayler	Pomerleau	Guilford	Maine
3402	Ly	Ha	Guilford	Maine
3403	Stephanie	Jacob	Guilford	Maine
3404	Martha	Ward	Guilford	Maine
3405	Wade	Cookson	Guilford	Maine
3406	Amy	Cookson	Guilford	Maine
3407	Donna	Brochu	Hallowell	Maine
3408	Sam	Day	Hallowell	Maine
3409	Michelle	Stanley	Hallowell	Maine
3410	Alicia	Warren	Hallowell	Maine
3411	Beth	Jones	Hallowell	Maine
3412	Nancy	Murray	Hallowell	Maine
3413	Barbara	Watson	Hallowell	Maine

3414	Annette And Oliver	Cromwell	Hallowell	Maine
3415	Jane	Swain	Hallowell	Maine
3416	Stephanie	Colgan	Hallowell	Maine
3417	Angela	Arnold	Hallowell	Maine
3418	Michelle	McDougal	Hallowell	Maine
3419	Rebecca	Singer	Hallowell	Maine
3420	Nancy	Bixler	Hallowell	Maine
3421	Judith	McKernan	Hallowell	Maine
3422	Karen	Wing	Hallowell	Maine
3423	Natalie	Delano	Hallowell	Maine
3424	David	Wood	Hallowell	Maine
3425	Karen	Doughty	Hallowell	Maine
3426	Elizabeth	Cooke	Hallowell	Maine
3427	Debbie	Mattson	Hallowell	Maine
3428	Sue	Magee	Hallowell	Maine
3429	SYLVIE	CHARRON	Hallowell	Maine
3430	Scott	Place	Hallowell	Maine
3431	Nancy	Gerrier	Hallowell	Maine
3432	Rebecca	Cromwell	Hallowell	Maine
3433	Diane	Hanscom	Hallowell	Maine
3434	Brian	Allen	Hallowell	Maine
3435	Karen	Smith	Hallowell	Maine
3436	Nancy	Fuller	Hallowell	Maine
3437	Sophie	Janeway	Hallowell	Maine
3438	John	Gibson	Hallowell	Maine
3439	Michael	Hudak	Hallowell	Maine
3440	Scott	Baker	Hallowell	Maine
3441	Kimberly	Cox	Hallowell	Maine
3442	Tanya	Busch	Hallowell	Maine
3443	Joshua	Dawbin	Hallowell	Maine
3444	Tinothy	Holbrook	Hallowell	Maine
3445	Richard	Donovan	Hallowell	Maine
3446	Nicholas	Bennett	Hallowell	Maine
3447	Cathy	Cumler-Dennis	Hallowell	Maine
3448	Jeannie	Sullivan	Hallowell	Maine
3449	Pamela	Lombard	Hallowell	Maine
3450	Fern	Stearns	Hallowell	Maine
3451	Emmie	Theberge	Hallowell	Maine
3452	Steve	Vellani	Hallowell	Maine
3453	Danielle	Gardea	Hallowell	Maine
3454	Catherine	Perham	Hallowell	Maine
3455	Barbara	Vellani	Hallowell	Maine
3456	Deb	Sewall	Hallowell	Maine
3457	Michael	Gervasi	Hampden	Maine
3458	Judith	Hardy	Hampden	Maine

3459	Margo	Mallory	Hampden	Maine
3460	Amanda	Prescott	Hampden	Maine
3461	Courtney	Cyr	Hampden	Maine
3462	William	Hughes	Hampden	Maine
3463	Sue	Dunning	Hampden	Maine
3464	Christine	Garnett	Hampden	Maine
3465	Kathryn	Walsh	Hampden	Maine
3466	pamela	Tremblay	Hampden	Maine
3467	Linda	Dubois	Hampden	Maine
3468	Natalie	Michelle	Hampden	Maine
3469	Alexandra	Horne	Hampden	Maine
3470	Sean	Dubois	Hampden	Maine
3471	Richard	Kelley, Sr.	Hampden	Maine
3472	Jo-Ann	Estes	Hampden	Maine
3473	Hillary	Miller	Hampden	Maine
3474	Matthew	Palmer	Hampden	Maine
3475	Stephen	Estes	Hampden	Maine
3476	Matthew	Deering	Hampden	Maine
3477	Dante	Bowden	Hampden	Maine
3478	Allen	Fournier	Hampden	Maine
3479	Chris	Hawkins	Hampden	Maine
3480	Jeremy	Miller	Hampden	Maine
3481	Riley	Lizotte	Hampden	Maine
3482	Carol	Turner	Hampden	Maine
3483	Donald	Shumaker	Hampden	Maine
3484	Kayla	Worster	Hampden	Maine
3485	Susan	White	Hampden	Maine
3486	Mitchell	Gillette	Hampden	Maine
3487	Tyler	Wheaton	Hampden	Maine
3488	Antonio	Blasi	Hancock	Maine
3489	Harold	Fairbanks	Hancock	Maine
3490	James	Fortier	Hancock	Maine
3491	Sam	Di Bella	Hancock	Maine
3492	Barbara	McClure	Hancock	Maine
3493	David	Johnston	Hancock	Maine
3494	Gale	mccullough	Hancock	Maine
3495	Sam	Bergman	Hancock	Maine
3496	Florence	Wilder	Hancock	Maine
3497	Russell	Wray	Hancock	Maine
3498	Renata	Moise	Hancock	Maine
3499	Andrew	Hanf	Hancock	Maine
3500	Heidi	Ferguson	Hanover	Maine
3501	Jo	Mason	Hanover	Maine
3502	Elizabeth	Wright	Hanover	Maine
3503	Lisa	Jae	Harborside	Maine
3504	Paul	Somerville	Harborside	Maine

3505	Beatrice	Borden	Harmony	Maine
3506	Steve	Hall	Harmony	Maine
3507	Rodena	Clowry	Harmony	Maine
3508	Stacey	Brown	Harmony	Maine
3509	Joanna	Peatfield-Patterson	Harmony	Maine
3510	Roger And Judy	Ricker	Harmony	Maine
3511	Jewel	Lamb	Harmony	Maine
3512	Lee	Cart	Harmony	Maine
3513	Sherry	Proctor	Harpswell	Maine
3514	Brandon	Wyman	Harpswell	Maine
3515	Jennifer	Verplanck	Harpswell	Maine
3516	John	VerPlanck	Harpswell	Maine
3517	Laura	Plunkett	Harpswell	Maine
3518	Tara	Graves	Harpswell	Maine
3519	Susan	Lowery	Harpswell	Maine
3520	Hannah	Dring	Harpswell	Maine
3521	Edward	Holt	Harpswell	Maine
3522	Eleanor C	French	Harpswell	Maine
3523	Carol	Taylor	Harpswell	Maine
3524	Elizabeth	Bouve	Harpswell	Maine
3525	harry	shaw sr	Harpswell	Maine
3526	Susan	Comey	Harpswell	Maine
3527	Kailyn	Powers	Harpswell	Maine
3528	Ann	Standridge	Harpswell	Maine
3529	Benjamin	Below	Harpswell	Maine
3530	Robyn	Bichrest	Harpswell	Maine
3531	Karin	Lapping	Harpswell	Maine
3532	Margaret	Leonard	Harpswell	Maine
3533	Deirdre	Strachan	Harpswell	Maine
3534	Vida	Leeman	Harpswell	Maine
3535	Seth	Hetherington	Harpswell	Maine
3536	Harriette	Griffin	Harpswell	Maine
3537	Amanda	Conant	Harpswell	Maine
3538	Joshua	Dennison	Harpswell	Maine
3539	Michelle	Bosse	Harpswell	Maine
3540	Denise	Schwartz	Harpswell	Maine
3541	Connie	Conner	Harpswell	Maine
3542	Colby	Austin	Harpswell	Maine
3543	Esther	Morrell	Harpswell	Maine
3544	Parker	Bradbury	Harpswell	Maine
3545	Jaremy	Lynch	Harpswell	Maine
3546	Prescott	McCurdy	Harpswell	Maine
3547	Madison	Yeaton	Harpswell	Maine
3548	Gene	Graffam	Harpswell	Maine
3549	Jeffrey	Conant	Harpswell	Maine

3550	Robert	Patterson	Harpswell	Maine
3551	Anne	Perry	Harpswell	Maine
3552	Logan	Wyman	Harpswell	Maine
3553	Pamela	Bichrest	Harpswell	Maine
3554	Tina	Ramsey	Harpswell	Maine
3555	Helen	Norton	Harpswell	Maine
3556	Erin	Perry	Harpswell	Maine
3557	Heather	Carr	Harpswell	Maine
3558	Glenda	Coffin	Harpswell	Maine
3559	jennifer	verPlanck	Harpswell	Maine
3560	Charlene	Danielson	Harpswell	Maine
3561	Jacob	Endre	Harrington	Maine
3562	Michelle	Fecteau-Chaplin	Harrison	Maine
3563	Danielle	Cash	Harrison	Maine
3564	william	turner	Harrison	Maine
3565	Stephen	Mickeriz	Harrison	Maine
3566	Linda	Foss	Harrison	Maine
3567	Kimberly	Lorrain	Harrison	Maine
3568	Patricia	Murphy	Harrison	Maine
3569	Annette	Stevens	Harrison	Maine
3570	Cass	Newell	Harrison	Maine
3571	Cynthia	Berthaume	Harrison	Maine
3572	Lily	Turner	Harrison	Maine
3573	Michael	Vane	Harrison	Maine
3574	Lynn	Beaudoin	Harrison	Maine
3575	Ronald	Loring	Harrison	Maine
3576	Kevin	Scribner	Harrison	Maine
3577	Brian	Nile	Harrison	Maine
3578	Miranda	Macleod	Harrison	Maine
3579	Michael	Rehmert	Harrison	Maine
3580	Trevor	Brown	Harrison	Maine
3581	John	Morton	Harrison	Maine
3582	Robert	Wilcox	Harrison	Maine
3583	Connie	Allen	Harrison	Maine
3584	Scott	Burnham	Harrison	Maine
3585	Sean	Baker	Harrison	Maine
3586	Haley	Grant	Harrison	Maine
3587	Ian	Floster	Harrison	Maine
3588	Michael	Mango	Harrison	Maine
3589	Albert	Grant	Harrison	Maine
3590	Dennis	Croy	Harrison	Maine
3591	Sierra	Clark	Harrison	Maine
3592	Patrick	Beaudoin	Harrison	Maine
3593	James	Whitman	Harrison	Maine
3594	Gloria Jo	Roth	Harrison	Maine
3595	Ashley	Snowdale	Hartford	Maine

3596	Luke	Thomason	Hartford	Maine
3597	Dana	Whittemoe Sr.	Hartford	Maine
3598	Lee	Ellingwood	Hartford	Maine
3599	Tamara	McNeil	Hartford	Maine
3600	Kevin	Philbrick	Hartford	Maine
3601	Doreen	Jackson	Hartford	Maine
3602	Valerie	Patenaude	Hartford	Maine
3603	Anthony	Patenaude	Hartford	Maine
3604	Kevin	Newton	Hartford	Maine
3605	John	Adams	Hartford	Maine
3606	Louis	Doyon	Hartford	Maine
3607	Seth	Turner	Hartford	Maine
3608	Patrick	Dunham	Hartford	Maine
3609	Patrick	Griffith	Hartland	Maine
3610	Debbie	Cooper	Hartland	Maine
3611	Mark	Kantor	Hartland	Maine
3612	Randy	Robbins	Hartland	Maine
3613	Shirley	Gould	Hartland	Maine
3614	Brandon	Pease	Hartland	Maine
3615	Brian	Hewns	Hartland	Maine
3616	Frederick	Killam	Hartland	Maine
3617	Victoria	Kilton	Hartland	Maine
3618	Dale	Hubbard	Hartland	Maine
3619	Heather	Fitzpatrick	Haynesville	Maine
3620	Harold	Shultz	Hebron	Maine
3621	Kym	Grant	Hebron	Maine
3622	Michael	Yenco	Hebron	Maine
3623	Kelly	Dyer	Hebron	Maine
3624	Theresa	Saunders	Hebron	Maine
3625	Bethany	Gilbert	Hebron	Maine
3626	Carl	Douglass	Hebron	Maine
3627	Alyson	Farrington	Hebron	Maine
3628	Thomas	Bolduc	Hebron	Maine
3629	Michelle	Barbioni	Hebron	Maine
3630	Shauna	Baker	Hebron	Maine
3631	Vicki	Schmidt	Hebron	Maine
3632	Brandon	Shaw	Hermon	Maine
3633	Brian	Thayer	Hermon	Maine
3634	Penelope	Andrews	Hermon	Maine
3635	Tiffany	Warner	Hermon	Maine
3636	Janet	McInnis	Hermon	Maine
3637	Krystal	Walsh	Hermon	Maine
3638	Lucian	Stahl	Hermon	Maine
3639	James	Buttitta	Hermon	Maine
3640	Donald	Shepley	Hermon	Maine
3641	Alyssa	Kajkowski	Hermon	Maine

3642	Benjamin	Getchell	Hermon	Maine
3643	Erick	Emery	Hermon	Maine
3644	Anthony	Martin	Hermon	Maine
3645	Christopher	Richards	Hermon	Maine
3646	Dakota	Miles	Hermon	Maine
3647	Francis	Morin	Hermon	Maine
3648	Patricia	Watson	Hermon	Maine
3649	Matthew	Holden	Hermon	Maine
3650	Sierra	Snow	Hermon	Maine
3651	Kevin	Gifford	Hermon	Maine
3652	Susan	Hines	Highland Plt	Maine
3653	Melissa	McIver	Hinckley	Maine
3654	Kenneth	Anderson	Hiram	Maine
3655	Ann Marie	Kilbride	Hiram	Maine
3656	Katherine	Fyler	Hiram	Maine
3657	Eli	Moulton	Hiram	Maine
3658	Kathleen	Hewey	Hiram	Maine
3659	Zach	Gross	Hiram	Maine
3660	Katherine	Rhoda	Hiram	Maine
3661	Karah	Coburn	Hiram	Maine
3662	Mary	Cobb	Hiram	Maine
3663	Justin	Stacey	Hiram	Maine
3664	Sally	Williams	Hiram	Maine
3665	Andrew	Stewart	Hodgdon	Maine
3666	Jeanine	York	Holden	Maine
3667	Christy	Stout	Holden	Maine
3668	Rochelle	Dorr	Holden	Maine
3669	Cody	Winchester	Holden	Maine
3670	Aaron	Muth	Holden	Maine
3671	Joshua	Brown	Holden	Maine
3672	Thomas	Archambault	Holden	Maine
3673	Ann	Pedreschi	Holden	Maine
3674	Jessie	Cormier	Holden	Maine
3675	Philip	Brown	Holden	Maine
3676	Michelle	Hiltz	Hollis Center	Maine
3677	Derek	Dunn	Hollis Center	Maine
3678	Thomas	Clegg	Hollis Center	Maine
3679	Willis	Dicentes	Hollis Center	Maine
3680	Megan	Moody	Hollis Center	Maine
3681	Madison	Moody	Hollis Center	Maine
3682	Christopher	Delisle	Hollis Center	Maine
3683	Richard	Leighton	Hollis Center	Maine
3684	Brett	Garland	Hollis Center	Maine
3685	Rodney	Littlefield	Hollis Center	Maine
3686	Ryin	Rumery	Hollis Center	Maine
3687	Doris	Luther	Hollis Center	Maine

3688	Kris	Minor	Hollis Center	Maine
3689	Sonny	Pierce	Hollis Center	Maine
3690	Patricia	Welch	Hollis Center	Maine
3691	Kelley	Holland	Hollis Center	Maine
3692	Catherine	Chapman	Hollis Center	Maine
3693	Tyler	Emmons	Hollis Center	Maine
3694	Kathy	Rice	Hollis Center	Maine
3695	Brad	Swasey	Hollis Center	Maine
3696	Amanda	Dicentes	Hollis Center	Maine
3697	Nelson	Crockett	Hope	Maine
3698	Allie	Feener	Hope	Maine
3699	Peter	Perry	Hope	Maine
3700	Eleanor	Lacombe	Hope	Maine
3701	Harold	Mosher	Hope	Maine
3702	Alison	Welch	Hope	Maine
3703	Janet	Puddister	Hope	Maine
3704	Kay	Burgess	Hope	Maine
3705	Alexis	Porter	Hope	Maine
3706	Chris	Sewall	Hope	Maine
3707	Patrick	McGrath	Hope	Maine
3708	Willow	Hall	Hope	Maine
3709	Julie	Jones	Hope	Maine
3710	Bruce	Haffner	Hope	Maine
3711	Joshua	Reilly	Hope	Maine
3712	Marcie	Howard	Hope	Maine
3713	Susan	Oakes	Hope	Maine
3714	ron	smith	Hope	Maine
3715	Patrick	Coville	Houlton	Maine
3716	Charles	Jones	Houlton	Maine
3717	Justin	Tuck	Houlton	Maine
3718	Anthony	Coldwell	Houlton	Maine
3719	Corinne	Sternlieb	Houlton	Maine
3720	Hunter	Sargent	Houlton	Maine
3721	Alane	Rush	Houlton	Maine
3722	Sharri	Venno	Houlton	Maine
3723	Jacob	Forest	Houlton	Maine
3724	John	Rowe	Hudson	Maine
3725	Arthur	Nickerson	Hudson	Maine
3726	Asiah	Hinckley	Hudson	Maine
3727	Theresa	Allen	Hudson	Maine
3728	Bruce	Watt	Hudson	Maine
3729	Stephen	Brown	Hulls Cove	Maine
3730	Jeremy	Vroom	Hulls Cove	Maine
3731	Kyle	Lolar	Indian Island	Maine
3732	Kathleen	Paul	Indian Island	Maine
3733	Joe	Koller	Indian Purchase Twp	Maine

3734	Alberta	White	Indian Twp	Maine
3735	Elona	Muwin	Indian Twp	Maine
3736	Mark	Pomeroy	Industry	Maine
3737	Colin	Richards	Industry	Maine
3738	Gail	Lange	Industry	Maine
3739	Randi	Smith	Industry	Maine
3740	Evan	Dorr	Industry	Maine
3741	Kim	Reynolds	Industry	Maine
3742	Joshua	Firmin	Industry	Maine
3743	Megan	Gaboury	Industry	Maine
3744	Thai	Sinkinson	Industry	Maine
3745	Ryan	Rackliffe	Industry	Maine
3746	Chenye	Arnaout	Industry	Maine
3747	Karen	Cain	Industry	Maine
3748	David	Parlin	Industry	Maine
3749	Lucy Anna	Gadilauskas	Industry	Maine
3750	Kim	Roberts	Industry	Maine
3751	Jessica	Gray	Industry	Maine
3752	Rebecca	Parkhurst	Industry	Maine
3753	Travis	Tierney	Industry	Maine
3754	Jesse	Sillanpaa	Industry	Maine
3755	Donna	Davidge	Island Falls	Maine
3756	Joleen	Porter	Island Falls	Maine
3757	Linda	Depew	Island Falls	Maine
3758	Frank	Porter	Island Falls	Maine
3759	Candace	Rupley	Island Falls	Maine
3760	Barry	Smith	Island Falls	Maine
3761	Elinor	Savage	Island Falls	Maine
3762	Dane	Stevens	Isle Au Haut	Maine
3763	Jennifer	West	Islesboro	Maine
3764	John	Mitton	Islesboro	Maine
3765	Kimberly	Nadeau	Jackman	Maine
3766	Meg	Welch	Jackman	Maine
3767	Keely	Taylor	Jackman	Maine
3768	Timothy	Daigle	Jackman	Maine
3769	Heidi	Grindahl	Jackman	Maine
3770	Julie	Ross	Jackman	Maine
3771	Melany	McAllister	Jackman	Maine
3772	Rachel	Murphy	Jackman	Maine
3773	Kimberly	Varney	Jackman	Maine
3774	Vanessa	Harnois	Jackman	Maine
3775	Anna	Begin	Jackman	Maine
3776	Rena	Lumbert	Jackman	Maine
3777	Edward	McCall	Jackman	Maine
3778	Wilhelmina	Daigle	Jackman	Maine
3779	Joanne	Van Camp	Jackman	Maine

3780	Pat	Hughey	Jackman	Maine
3781	Andrew	Rancourt	Jackman	Maine
3782	Lauraine	Varecka	Jackman	Maine
3783	James	Darrow	Jackman	Maine
3784	Danielle	Hale	Jackman	Maine
3785	Larry	Harth	Jackman	Maine
3786	Mike	Stevens	Jackman	Maine
3787	Deke	Sawyer	Jackman	Maine
3788	John	Connolly	Jackman	Maine
3789	Wanda	Chaisson	Jackman	Maine
3790	Maria	Sepers	Jackman	Maine
3791	Marisa	Achey	Jackman	Maine
3792	Melanie	Pinard	Jackman	Maine
3793	Gay	Tibbetts-Hodgkins	Jackman	Maine
3794	Chris	Williams	Jackman	Maine
3795	Jessica	Spano	Jackman	Maine
3796	Kim	Kelly	Jackman	Maine
3797	Valerie	Shelley	Jackman	Maine
3798	Patricia	Giroux	Jackman	Maine
3799	Noah	Hale	Jackman	Maine
3800	Richard	Hopkins	Jackman	Maine
3801	Eve	Morin	Jackman	Maine
3802	David	Bowman	Jackman	Maine
3803	Cassie	Gray	Jackman	Maine
3804	Sandra	Achey	Jackman	Maine
3805	Christy	Brown	Jackman	Maine
3806	Samantha	Lemaire	Jackman	Maine
3807	James	Shelley	Jackman	Maine
3808	Jonathan	Benway	Jackman	Maine
3809	Kerry	Hegarty	Jackman	Maine
3810	Brenda	Davis	Jackman	Maine
3811	Chester	Gilbert	Jackman	Maine
3812	Andrew	Durgin	Jackman	Maine
3813	Matthew	McCourt	Jackman	Maine
3814	Tania	Merette	Jackman	Maine
3815	Anna	Vito Cruz	Jackman	Maine
3816	Lucas	Talpey	Jackman	Maine
3817	Latisha	Brown	Jackman	Maine
3818	Leisa	Heal	Jackman	Maine
3819	Frances	Fox	Jackman	Maine
3820	Lawrence	Dawes	Jackman	Maine
3821	Raelyn	Hamilton	Jackman	Maine
3822	Theresa	Gilbert	Jackman	Maine
3823	Steve	Camite	Jackman	Maine
3824	Lawrence &	Simm	Jackman	Maine

	Marilyn			
3825	Amy	Hegarty	Jackman	Maine
3826	Nathalie	Haggan	Jackman	Maine
3827	Than	Oliver	Jackman	Maine
3828	Thomas	Hamilton	Jackman	Maine
3829	Lucinda	Lacasse	Jackman	Maine
3830	Tim	Casey	Jackman	Maine
3831	Patsy	Hughey	Jackman	Maine
3832	Claudette	Grenier	Jackman	Maine
3833	Crystal	Allen	Jackman	Maine
3834	Joshua	Scrivner	Jackman	Maine
3835	Corey	Hegarty	Jackman	Maine
3836	Dakota	Fox	Jackman	Maine
3837	Mari	Carello-Bigner	Jackman	Maine
3838	Jeff	Charron	Jackman	Maine
3839	Leon	Gilbert	Jackman	Maine
3840	Karen	Finnegan	Jackman	Maine
3841	Lucas	Levesque	Jackman	Maine
3842	Evelyn	Gilbert	Jackman	Maine
3843	Bill	Allen	Jackman	Maine
3844	Jane	McCall	Jackman	Maine
3845	Michelle	Hewke-Oliver	Jackman	Maine
3846	Jane	McCall	Jackman	Maine
3847	Harold	Blood	Jackman	Maine
3848	Jack	Allen	Jackman	Maine
3849	Thomas	Haggan	Jackman	Maine
3850	Betty	O'Sickey	Jackman	Maine
3851	Nathanael	Grindahl	Jackman	Maine
3852	Duane and Sally	Hanson	Jackman	Maine
3853	Gloria	Sevigny	Jackman	Maine
3854	Russell	Shelley	Jackman	Maine
3855	Shannon	Breton	Jackman	Maine
3856	Jonathan	Lorenz	Jackson	Maine
3857	Janice	Anthony	Jackson	Maine
3858	Anthony	Codega	Jackson	Maine
3859	George	Faulkner	Jackson	Maine
3860	Matt	Bush	Jackson	Maine
3861	Rachel	Bush	Jackson	Maine
3862	Pat	Lamperta	Jackson	Maine
3863	Ray	Mansfield	Jackson	Maine
3864	Rachel	Bush	Jackson	Maine
3865	Donna	White	Jay	Maine
3866	Meredith	Fahey	Jay	Maine
3867	Leslie	Geissinger	Jay	Maine
3868	Terry	Bickford	Jay	Maine
3869	Kyle	Pillsbury	Jay	Maine

3870	Diana	Waleik	Jay	Maine
3871	Benjamin	Creznic	Jay	Maine
3872	Trudy	Marshall	Jay	Maine
3873	Samantha	Cormier	Jay	Maine
3874	Jayne	Costa	Jay	Maine
3875	Clinton	Brooks	Jay	Maine
3876	Nancy	Crosby	Jay	Maine
3877	Betsy	Dorr	Jay	Maine
3878	Matthew	Smith	Jay	Maine
3879	Matthew	Beaudette	Jay	Maine
3880	Vicki	McLeod	Jay	Maine
3881	Lauren	Cornelio	Jay	Maine
3882	Nikki	Goodhart	Jay	Maine
3883	Robert	Caldwell	Jay	Maine
3884	Ali	Clark	Jay	Maine
3885	Cristina	Johnson	Jay	Maine
3886	Derrick	Doucette	Jay	Maine
3887	Robin	Hall	Jay	Maine
3888	Kenneth	Zitzelberger	Jay	Maine
3889	Jason	Higgins	Jay	Maine
3890	Caryn	TRUE	Jay	Maine
3891	Regina	Cote	Jay	Maine
3892	Arlene	Welchx	Jay	Maine
3893	Heather	Hiscock	Jay	Maine
3894	Steve	Offord	Jay	Maine
3895	Joann	Domey	Jay	Maine
3896	Autumn	Semones	Jay	Maine
3897	Tricia	Bradley	Jay	Maine
3898	Jon	Robichaud	Jay	Maine
3899	Chelsea	Fortier	Jay	Maine
3900	Alexis	Burbank	Jay	Maine
3901	Corinne	Hutchinson	Jay	Maine
3902	Marc	Cochran	Jay	Maine
3903	Jordan	Demillo	Jay	Maine
3904	Barbara	Richard	Jay	Maine
3905	Tammy	Thibodeau	Jay	Maine
3906	Gerald	Hutchinson	Jay	Maine
3907	Linda	Coates	Jay	Maine
3908	Crystal	Smith	Jay	Maine
3909	Cherie	Parker	Jay	Maine
3910	Meredith	Wheeler	Jay	Maine
3911	Jennifer	Beaulieu	Jay	Maine
3912	Abigail	Popoloski	Jay	Maine
3913	Jennifer	Hatch	Jay	Maine
3914	Deaken	Trask	Jay	Maine
3915	Peter	Theberge	Jay	Maine

3916	Heather	Nadeau	Jay	Maine
3917	Brigette	Henderson	Jay	Maine
3918	Laura	Ward	Jay	Maine
3919	Oliver Jr.	Blood	Jay	Maine
3920	Tom	White	Jay	Maine
3921	Ashley	Pillsbury	Jay	Maine
3922	Tanya	Demillo	Jay	Maine
3923	Terri	Harris	Jay	Maine
3924	Linda	Flagg	Jay	Maine
3925	Jaimie	Paine	Jay	Maine
3926	Karen	Brackett	Jay	Maine
3927	susan	Theberge	Jay	Maine
3928	Tiffany	Tuttle	Jay	Maine
3929	Hillary	Chaney	Jay	Maine
3930	Donna	White	Jay	Maine
3931	Nancy	Chaney	Jay	Maine
3932	Caroline	Bond	Jefferson	Maine
3933	Kelly	Mann	Jefferson	Maine
3934	Hillary	Moody	Jefferson	Maine
3935	Anastasia	McGinnis	Jefferson	Maine
3936	Stacy	Bettencourt	Jefferson	Maine
3937	Jon	Olsen	Jefferson	Maine
3938	Jeff	Cook	Jefferson	Maine
3939	James	Barton	Jefferson	Maine
3940	Dakota	Peaslee	Jefferson	Maine
3941	Gail	MacInnis	Jefferson	Maine
3942	Elli	Hunt	Jefferson	Maine
3943	Zachary	Wissman	Jefferson	Maine
3944	Jennifer	Brennan	Jefferson	Maine
3945	Breanna	Lawrence	Jefferson	Maine
3946	Susan	Cramer	Jefferson	Maine
3947	Stephanie	Mazerolle	Jefferson	Maine
3948	Christopher	Rigaud	Jefferson	Maine
3949	Anthony	Hopkins	Jefferson	Maine
3950	Cameron	Prock	Jefferson	Maine
3951	Samantha	Regan	Jefferson	Maine
3952	Laura	Sullivan	Jefferson	Maine
3953	Kay	Liss	Jefferson	Maine
3954	Sheryl	Crockett	Jefferson	Maine
3955	Jennifer	Brennan	Jefferson	Maine
3956	Melissa	Bryant	Jefferson	Maine
3957	Alan	Lessner	Jefferson	Maine
3958	Peter	Camplin	Jefferson	Maine
3959	Samantha	Maynard	Jefferson	Maine
3960	Kathleen	Hayes	Jefferson	Maine
3961	Lisa	Cunningham	Jefferson	Maine

3962	Caleb	Nottingham	Joe Town Road	Maine
3963	Colin	Pineo	Jonesboro	Maine
3964	Nancy	Oden	Jonesboro	Maine
3965	Laura	Fish	Jonesport	Maine
3966	Matthew	Moraisey	Jonesport	Maine
3967	Lisa	Noreen	Jonesport	Maine
3968	Jason	McCubbin	Kenduskeag	Maine
3969	Audrie	Seluke	Kenduskeag	Maine
3970	Tammie	Breen	Kenduskeag	Maine
3971	Ryan	Stroud	Kenduskeag	Maine
3972	Marie	Clark	Kenduskeag	Maine
3973	Denise	Turmel	Kenduskeag	Maine
3974	Carl	Pribus	Kenduskeag	Maine
3975	Timothy	Weeks	Kenduskeag	Maine
3976	David	Beaulieu	Kennebunk	Maine
3977	Bruce	Ottomano	Kennebunk	Maine
3978	andrea	kimmich	Kennebunk	Maine
3979	Matt	Richwalder	Kennebunk	Maine
3980	sharon	finley	Kennebunk	Maine
3981	Bruce	Coyne	Kennebunk	Maine
3982	Derek	Peters	Kennebunk	Maine
3983	Steven	Jacobsen	Kennebunk	Maine
3984	Lisa	Eaton	Kennebunk	Maine
3985	Stephen	Doane	Kennebunk	Maine
3986	Sarah	Nunan	Kennebunk	Maine
3987	Jennifer	Braddick	Kennebunk	Maine
3988	Mitchell	Nunan	Kennebunk	Maine
3989	Cam	D	Kennebunk	Maine
3990	Montress	Kenniston	Kennebunk	Maine
3991	Oliver	Payne	Kennebunk	Maine
3992	Joseph	Dolan	Kennebunk	Maine
3993	Laura	Slap-Shelton	Kennebunk	Maine
3994	Will	Jones	Kennebunk	Maine
3995	Teri	Kruszenski	Kennebunk	Maine
3996	Aron	Bayreuther	Kennebunk	Maine
3997	Tracey	Cornell	Kennebunk	Maine
3998	Mark	Brown	Kennebunk	Maine
3999	Jolene	Lemelin	Kennebunk	Maine
4000	James	Liscomb	Kennebunk	Maine
4001	Emily	Sharood	Kennebunk	Maine
4002	Mary Beth	Brown	Kennebunk	Maine
4003	Anastasia	Morgan	Kennebunk	Maine
4004	Jennifer	Armstrong	Kennebunk	Maine
4005	Amy	Brooks	Kennebunk	Maine
4006	Lois	Merrill	Kennebunk	Maine
4007	Donna	Gomez	Kennebunk	Maine

4008	Joy	Conant	Kennebunk	Maine
4009	Natalia	Davidenko	Kennebunk	Maine
4010	Bruce	Church	Kennebunk	Maine
4011	Richard	Martin	Kennebunk	Maine
4012	Fred	Clough	Kennebunk	Maine
4013	Andrew	Evans	Kennebunk	Maine
4014	Ruth	Stackpole	Kennebunk	Maine
4015	Jean	Thompson	Kennebunk	Maine
4016	John	Field	Kennebunkport	Maine
4017	John	Pierce	Kennebunkport	Maine
4018	Edward	Jellison	Kennebunkport	Maine
4019	Mary	McLaughlin	Kennebunkport	Maine
4020	Max	Hutchins	Kennebunkport	Maine
4021	Joshua	Strack	Kennebunkport	Maine
4022	Brian	Rutt	Kennebunkport	Maine
4023	Susan	Flynn	Kennebunkport	Maine
4024	Gail	Roller	Kennebunkport	Maine
4025	Lucas	Brown	Kennebunkport	Maine
4026	Elizabeth	Conrad	Kennebunkport	Maine
4027	Alfred	McHugh	Kennebunkport	Maine
4028	Carol	Laboissonniere	Kennebunkport	Maine
4029	Larry	Landau	Kennebunkport	Maine
4030	Johnny	Dickinson	Kennebunkport	Maine
4031	Bruce	Bartley	Kennebunkport	Maine
4032	Joanne	Church	Kennebunkport	Maine
4033	Chris	Moulton	Kennebunkport	Maine
4034	Pamela	Thompson	Kennebunkport	Maine
4035	Keith	Truesdale	Kennebunkport	Maine
4036	Susan	Graham	Kennebunkport	Maine
4037	Carol	Boyd	Kennebunkport	Maine
4038	Ronald	Giard	Kents Hill	Maine
4039	Jane	Barron	Kingfield	Maine
4040	Steven	Sitz	Kingfield	Maine
4041	Steven	Prince	Kingfield	Maine
4042	Kyle	Crowell	Kingfield	Maine
4043	Elizabeth	Listowich	Kingfield	Maine
4044	Jason	Moody	Kingfield	Maine
4045	Kyle	Kolesnikoff	Kingfield	Maine
4046	Gregory	Veayo	Kingfield	Maine
4047	Deirdre	Warren	Kingfield	Maine
4048	Stephanie	Dunn	Kingfield	Maine
4049	Holly	Taylor	Kingfield	Maine
4050	Savannah	Steele	Kingfield	Maine
4051	Cinder	Savage	Kingfield	Maine
4052	Jarod	Frigon	Kingfield	Maine
4053	Eliza	Sitz	Kingfield	Maine

4054	Kate	Hatfield	Kingfield	Maine
4055	Tom	Hildreth	Kingfield	Maine
4056	Diane	Keoskie	Kingfield	Maine
4057	Thomas	Bessey	Kingfield	Maine
4058	Pam	Ellis	Kingfield	Maine
4059	Claudia	Diller	Kingfield	Maine
4060	Jake	Kilbreth	Kingfield	Maine
4061	Cayce	Frigon	Kingfield	Maine
4062	Todd	Towle	Kingfield	Maine
4063	Rob	Macmichael	Kingfield	Maine
4064	Stacey	McCluskey	Kingfield	Maine
4065	Hunter	Lander	Kingfield	Maine
4066	Joan	Meldrum	Kingfield	Maine
4067	Shawn	Mahar	Kingfield	Maine
4068	Kate	Byrd	Kingfield	Maine
4069	Ethan	Gile	Kingfield	Maine
4070	Kimberly	Lyman	Kingfield	Maine
4071	Guy	Atwood	Kingfield	Maine
4072	Todd	Towle	Kingfield	Maine
4073	Virginia	Bousum	Kingfield	Maine
4074	Heidi	Murphy	Kingfield	Maine
4075	Kathy	Hardin	Kingfield	Maine
4076	Crystal	Knapp Polk	Kingfield	Maine
4077	Isn	Hersom	Kingfield	Maine
4078	Nick	Halsdorff	Kingfield	Maine
4079	Linnea	Mesaric-Davis	Kingsbury	Maine
4080	Igor	Sikorsky	Kittery	Maine
4081	Abby	Cruz	Kittery	Maine
4082	Eric	Waleryszak	Kittery	Maine
4083	Arilda	Densch	Kittery	Maine
4084	Rebecca	Hoffman	Kittery	Maine
4085	John	Johnson	Kittery	Maine
4086	Sarah	Brown	Kittery	Maine
4087	John	Werner	Kittery	Maine
4088	Bryan	Cantara	Kittery	Maine
4089	Elizabeth	Olivolo	Kittery	Maine
4090	Everett	Leland	Kittery	Maine
4091	Melissa	Cantara	Kittery	Maine
4092	Robert	Kline	Kittery	Maine
4093	Jean	Lincoln	Kittery	Maine
4094	Sheilagh	Durkin	Kittery	Maine
4095	Jennifer	Brewer	Kittery	Maine
4096	Jill	Plaisted	Kittery	Maine
4097	Claire	Barbour	Kittery	Maine
4098	Sally	Martin	Kittery	Maine
4099	Melissa	Cantara	Kittery	Maine

4100	Gail	Burns	Kittery	Maine
4101	Linda	Tuttle	Kittery	Maine
4102	Lauren	Kohlhoff	Kittery	Maine
4103	Rita	Chute	Kittery	Maine
4104	Beth	Sehlmeyer	Kittery	Maine
4105	Heidiï¿½s	Feinstein	Kittery	Maine
4106	Cynthia	Lareau	Kittery	Maine
4107	Lauren	Loomis	Kittery	Maine
4108	Joshua	Philbrick	Kittery	Maine
4109	STEVEN	WORKMAN	Kittery	Maine
4110	Valerie	Sousa	Kittery	Maine
4111	Sally	Martin	Kittery	Maine
4112	john	mercer	Kittery	Maine
4113	Kathy	Mercer	Kittery	Maine
4114	Brennen	Pingree	Kittery	Maine
4115	Andrew	Pearson	Kittery Point	Maine
4116	Jessie	Batchelder	Kittery Point	Maine
4117	Matt	Damigella	Kittery Point	Maine
4118	John	Camden	Kittery Point	Maine
4119	Jennifer	Camden	Kittery Point	Maine
4120	Donald	Clark	Kittery Point	Maine
4121	Matt	Wagner	Knox	Maine
4122	David	Wessels	Knox	Maine
4123	Caitlin	Hutt	Knox	Maine
4124	Rory	Brennan	Lagrange	Maine
4125	Jack	Gagnon	Lakeville	Maine
4126	Shaun	Donovan	Lamoine	Maine
4127	Kathryn	Gaianguest	Lamoine	Maine
4128	Kathy	Massimini	Lamoine	Maine
4129	Margaret	Parsons	Lamoine	Maine
4130	Gleason	Smith	Lamoine	Maine
4131	Jered	Heath	Lebanon	Maine
4132	Brandy	Berger	Lebanon	Maine
4133	Jolene	Brown	Lebanon	Maine
4134	Steven	Beckwith	Lebanon	Maine
4135	Braden	Ott	Lebanon	Maine
4136	Benjamin	Smith	Lebanon	Maine
4137	Regina	Lang	Lebanon	Maine
4138	Brandy	Berger	Lebanon	Maine
4139	Ronald	Havu	Lebanon	Maine
4140	Dwayne	Ryder	Lebanon	Maine
4141	Luke	Weiser	Lebanon	Maine
4142	Nicole	Newton	Lebanon	Maine
4143	Cori	Chandler	Lebanon	Maine
4144	Betsey	Clark	Lebanon	Maine
4145	Greg	Sirois	Lebanon	Maine

4146	Alexa	Anderson	Lebanon	Maine
4147	Cheryl	Hoffman	Lebanon	Maine
4148	Carina	Cameron	Lebanon	Maine
4149	David	Boucher	Lebanon	Maine
4150	Kennard	Lang	Lebanon	Maine
4151	Heidi	Flint	Lebanon	Maine
4152	Daniel	Webb	Lebanon	Maine
4153	Crystal	Adams	Lebanon	Maine
4154	John	Furbush	Lebanon	Maine
4155	Kassandra	Lane	Lebanon	Maine
4156	Jolene	Colwell	Lebanon	Maine
4157	Kathy	Ossinger	Lebanon	Maine
4158	Mike	Chambers	Lebanon	Maine
4159	Matthew	Bilodeau	Leeds	Maine
4160	Jessica	Dubois	Leeds	Maine
4161	Cindy	Hartford	Leeds	Maine
4162	Samantha	Murphy	Leeds	Maine
4163	Johnathan	Rousseau	Leeds	Maine
4164	Nicole	Dube	Leeds	Maine
4165	Henry	Aube	Leeds	Maine
4166	Brandon	Morissette	Leeds	Maine
4167	Virginia	Byron	Leeds	Maine
4168	Courtney	Wheeler	Leeds	Maine
4169	Bobbi	Crooker	Leeds	Maine
4170	Pamela	Chittenden	Leeds	Maine
4171	Mary	Melanson	Leeds	Maine
4172	Marguerite	Grant	Leeds	Maine
4173	John	Wright	Leeds	Maine
4174	Elizabeth	Clark	Leeds	Maine
4175	Peter	Soucy	Leeds	Maine
4176	Robin	Winant	Leeds	Maine
4177	Ashley	English	Leeds	Maine
4178	Scott	Gosselin	Leeds	Maine
4179	Erik	Holbrook	Leeds	Maine
4180	Jacob	Dill	Leeds	Maine
4181	Garrett	Addison	Leeds	Maine
4182	Kenneth	Dickey	Leeds	Maine
4183	Scott	Crooker	Leeds	Maine
4184	Derek	Gosselin	Leeds	Maine
4185	Vickie	Hartford	Leeds	Maine
4186	Joy	Butterfield	Leeds	Maine
4187	Shelby	Lawrence	Leeds	Maine
4188	Ashley	Whitmore	Leeds	Maine
4189	Tiffani	Hopkins	Leeds	Maine
4190	Rosealie	Weymouth	Leeds	Maine
4191	Ryan	Beaulieu	Leeds	Maine

4192	William	Gayton	Leeds	Maine
4193	Nicholas	Whitmore	Leeds	Maine
4194	Nick	Harrington	Leeds	Maine
4195	Eileen	Coyne	Leeds	Maine
4196	Joshua	Varney	Leeds	Maine
4197	Jacob	Johnston	Leeds	Maine
4198	Derek	Lapointe	Leeds	Maine
4199	Victoria	Jipson	Leeds	Maine
4200	Dustin Child	Child	Leeds	Maine
4201	Scott	Gosselin	Leeds	Maine
4202	Julia	Coady	Leeds	Maine
4203	Cassidy	Bunker	Leeds	Maine
4204	David	Hopkins	Leeds	Maine
4205	Jammie	Twitchell	Leeds	Maine
4206	Andrew	Rudnicki	Levant	Maine
4207	Wendy	Taggart	Levant	Maine
4208	Travis	Mason	Levant	Maine
4209	Vonda	Paradise	Levant	Maine
4210	Ashley	Haggan	Levant	Maine
4211	Clint	Sochulak	Levant	Maine
4212	Kyle	Wyman	Levant	Maine
4213	Janet	Townsend	Levant	Maine
4214	Ronald	Spelman	Lewiston	Maine
4215	Leah	Pham	Lewiston	Maine
4216	Megan	Carter	Lewiston	Maine
4217	Tracy	Grondin	Lewiston	Maine
4218	Crystal	Grover	Lewiston	Maine
4219	Chantelle	Moore	Lewiston	Maine
4220	Shaughnessy	Robitaille	Lewiston	Maine
4221	Andrew	Walton	Lewiston	Maine
4222	Jeff	Cassidy	Lewiston	Maine
4223	Caleb	Laberge	Lewiston	Maine
4224	Shelby	Smith	Lewiston	Maine
4225	McAyla	St Laurent	Lewiston	Maine
4226	Bruce	Noddin	Lewiston	Maine
4227	Melinda	Gervais	Lewiston	Maine
4228	Brittany	Parker	Lewiston	Maine
4229	Elaine	Landry	Lewiston	Maine
4230	Kevin	Roy	Lewiston	Maine
4231	Joshua	Sweetser	Lewiston	Maine
4232	Kathleen	Caron	Lewiston	Maine
4233	Michael	Petrie	Lewiston	Maine
4234	Stephen	Hofacker	Lewiston	Maine
4235	Nelson	Peterson	Lewiston	Maine
4236	Bobby	Rand Jr	Lewiston	Maine
4237	John	Cook	Lewiston	Maine

4238	John	Racine	Lewiston	Maine
4239	Evan	Gagne	Lewiston	Maine
4240	David	Enos	Lewiston	Maine
4241	Cheryl	North	Lewiston	Maine
4242	Aaron	Desrosiers	Lewiston	Maine
4243	Joshua	Tucci	Lewiston	Maine
4244	Hollis	Curtis	Lewiston	Maine
4245	Devon	Burgess	Lewiston	Maine
4246	Suzanne	Renaud	Lewiston	Maine
4247	Julie	Plummer	Lewiston	Maine
4248	Anya	Lee	Lewiston	Maine
4249	Jenny	Presby	Lewiston	Maine
4250	Cheryl	Parker	Lewiston	Maine
4251	Jeffrey	Barnum	Lewiston	Maine
4252	Samantha	Trask	Lewiston	Maine
4253	Isaac	F	Lewiston	Maine
4254	Glison	Smith	Lewiston	Maine
4255	Cody	Mousseau	Lewiston	Maine
4256	Andrew	Tasker	Lewiston	Maine
4257	Rachel	Swanson	Lewiston	Maine
4258	Paul	Allarie	Lewiston	Maine
4259	Andrew	Tracy	Lewiston	Maine
4260	Suellen	Shaw	Lewiston	Maine
4261	Greg	Morin	Lewiston	Maine
4262	Tiffany	Sinclair	Lewiston	Maine
4263	Sadie	Sadie Landry	Lewiston	Maine
4264	Chris	Grimmel	Lewiston	Maine
4265	Jen	Stuart	Lewiston	Maine
4266	Jennifer	Martin	Lewiston	Maine
4267	Austin	Greeley	Lewiston	Maine
4268	Heather	Letourneau	Lewiston	Maine
4269	Rich	Deister Jr	Lewiston	Maine
4270	Matthew	Beckim	Lewiston	Maine
4271	Sherri	Elie	Lewiston	Maine
4272	Tiffany	Levesque	Lewiston	Maine
4273	Keith	Greaton	Lewiston	Maine
4274	Tonia	Sawyer	Lewiston	Maine
4275	Deborah	Burd	Lewiston	Maine
4276	Sarah	Legare	Lewiston	Maine
4277	Arline	Howe	Lewiston	Maine
4278	Jacob	Nason	Lewiston	Maine
4279	Lisa	Johnson	Lewiston	Maine
4280	Lise	Cyr	Lewiston	Maine
4281	Ted	Walworth	Lewiston	Maine
4282	Molly	Sasseville	Lewiston	Maine
4283	Lori	Morris	Lewiston	Maine

4284	Brian	Tracy	Lewiston	Maine
4285	Thomas	Lepage	Lewiston	Maine
4286	Samuel	Smith	Lewiston	Maine
4287	Curtis	Coleman	Lewiston	Maine
4288	Noah	Ackley	Lewiston	Maine
4289	Annette	Lapointe	Lewiston	Maine
4290	Jennifer	Desjardins	Lewiston	Maine
4291	Helene	Bernier	Lewiston	Maine
4292	Brenda	Smith	Lewiston	Maine
4293	Shawn	Breton	Lewiston	Maine
4294	Donna	Racine	Lewiston	Maine
4295	Angela	West	Lewiston	Maine
4296	Karem	Deister	Lewiston	Maine
4297	John	Pelletier	Lewiston	Maine
4298	Chuck	Mathieu	Lewiston	Maine
4299	Dustin	Moore	Lewiston	Maine
4300	Jeannie	Grover	Lewiston	Maine
4301	Mindy	Cote	Lewiston	Maine
4302	David	Toothaker Iii	Lewiston	Maine
4303	Anne	Hunter	Lewiston	Maine
4304	Lisa	Letourneau-Bonn	Lewiston	Maine
4305	Alicia	Howe	Lewiston	Maine
4306	Valarie	Maguire	Lewiston	Maine
4307	Judith	Williams	Lewiston	Maine
4308	Avery	Gagnon	Lewiston	Maine
4309	Janet	Allen	Lewiston	Maine
4310	Mary	Kidd	Lewiston	Maine
4311	Eric	Tanguay	Lewiston	Maine
4312	Jedidiah	Pulsifer	Lewiston	Maine
4313	Travis	Nichols	Lewiston	Maine
4314	Kayleigh	Pulsifer	Lewiston	Maine
4315	Tori	Denid	Lewiston	Maine
4316	John	Dprague	Lewiston	Maine
4317	Wayne	Fraser	Lewiston	Maine
4318	Stephanie	Ridlon	Lewiston	Maine
4319	Marcus	Curtis	Lewiston	Maine
4320	Jeremy	Barth	Lewiston	Maine
4321	Anthony	Souza	Lewiston	Maine
4322	Sean	Caron	Lewiston	Maine
4323	Michael	Sullivan	Lewiston	Maine
4324	Patricia	Cloutier	Lewiston	Maine
4325	Makenzy	Tome	Lewiston	Maine
4326	Larry	Cummins	Lewiston	Maine
4327	Beau	Decourcy	Lewiston	Maine
4328	Deana	Kane	Lewiston	Maine

4329	Timothy	McNulty	Lewiston	Maine
4330	Wesley	Edwards	Lewiston	Maine
4331	Amy	Latham	Lewiston	Maine
4332	Justin	Fontaine	Lewiston	Maine
4333	Tiffany	Petrie	Lewiston	Maine
4334	Alicia	Potvin	Lewiston	Maine
4335	Stephanie	Simmons	Lewiston	Maine
4336	Sandra	Paine	Lewiston	Maine
4337	Ben	Fournier	Lewiston	Maine
4338	Aaron	Davis	Lewiston	Maine
4339	Eve	Duplissis	Lewiston	Maine
4340	Beth	Wing	Lewiston	Maine
4341	Debora	Grenier	Lewiston	Maine
4342	Paris	Noddin	Lewiston	Maine
4343	Zack	Ouellette	Lewiston	Maine
4344	Evan	Bourassa	Lewiston	Maine
4345	Jamie	Reynolds	Lewiston	Maine
4346	Deborah	Pomerleau	Lewiston	Maine
4347	Keiley	Gosselin	Lewiston	Maine
4348	Kayla	Blackwell	Lewiston	Maine
4349	Mariah	Couture	Lewiston	Maine
4350	Elaine	Dumais	Lewiston	Maine
4351	Arielle	Lagasse	Lewiston	Maine
4352	Charles	Atwell	Lewiston	Maine
4353	Jennifer	Barker	Lewiston	Maine
4354	ROBERT D.	CLOUTIER	Lewiston	Maine
4355	Erin	Stevens	Lewiston	Maine
4356	Carolyn	Arenburg	Lewiston	Maine
4357	Daniel	Ranger	Lewiston	Maine
4358	Jean	Elie	Lewiston	Maine
4359	Joshua	Martel	Lewiston	Maine
4360	Richard	Mills	Lewiston	Maine
4361	Macy	Welch	Lewiston	Maine
4362	Tara	Cassidy	Lewiston	Maine
4363	Gail	Bucklin	Lewiston	Maine
4364	Tyler	Smith	Lewiston	Maine
4365	Michael	Hendricks	Lewiston	Maine
4366	Chad	Waning	Lewiston	Maine
4367	James	Parakilas	Lewiston	Maine
4368	Lars	Gundersen	Lewiston	Maine
4369	Margaret	Fraser	Lewiston	Maine
4370	Albert	Thibodeau	Lewiston	Maine
4371	Jason	Landry	Lewiston	Maine
4372	Darlene	Whitley	Lewiston	Maine
4373	Aaron	Buzzell	Lewiston	Maine
4374	Ashley	Giguere	Lewiston	Maine

4375	Laura	Pescatore	Lewiston	Maine
4376	Joanne	Caron	Lewiston	Maine
4377	Kalib	Nadeau	Lewiston	Maine
4378	Lauren	Farago	Lewiston	Maine
4379	Alysia	Smith	Lewiston	Maine
4380	Albert	Roux	Lewiston	Maine
4381	Meagan	Sullivan	Lewiston	Maine
4382	Tracey	Wright	Lewiston	Maine
4383	Sonia	Roy	Lewiston	Maine
4384	Emily	Turner	Lewiston	Maine
4385	Elizabeth	Dixon	Lewiston	Maine
4386	Kaci	Rugg	Lewiston	Maine
4387	Diane	Blais	Lewiston	Maine
4388	Louise	Champoux	Lewiston	Maine
4389	Tin	Reynolds	Lewiston	Maine
4390	Peter	Lauze	Lewiston	Maine
4391	Candis	Henaon	Lewiston	Maine
4392	Ryan	Baillargeon	Lewiston	Maine
4393	Timothy	Cayouette	Lewiston	Maine
4394	Kristyna	Rowe	Lewiston	Maine
4395	Jessica	Dearborn	Lewiston	Maine
4396	Jamie	Poliquin	Lewiston	Maine
4397	Patrick	Wyman	Lewiston	Maine
4398	Savannah	Hadfield	Lewiston	Maine
4399	Blaize	Arsenault	Lewiston	Maine
4400	Scott	Frazer	Lewiston	Maine
4401	John	Pomelow	Lewiston	Maine
4402	Joe	Theriault	Lewiston	Maine
4403	Susan	Soucy	Lewiston	Maine
4404	Cynthia	Smith	Lewiston	Maine
4405	Ashley	Rackliff	Lewiston	Maine
4406	Elizabeth	Cormier	Lewiston	Maine
4407	Gregory	Arneault	Lewiston	Maine
4408	Stephanie	Sisk	Lewiston	Maine
4409	Alex	Brochu	Lewiston	Maine
4410	Darlene	Denis	Lewiston	Maine
4411	Meredith	Carver	Lewiston	Maine
4412	JOLINE	CLOUTIER	Lewiston	Maine
4413	Alisha	Thibeault	Lewiston	Maine
4414	Deb	Lafond	Lewiston	Maine
4415	Deb	Higgins	Lewiston	Maine
4416	Brandon	Glover	Lewiston	Maine
4417	Scott	Worthing	Lewiston	Maine
4418	Henrietta	Roberts	Lexington Twp	Maine
4419	Shelly	Edwards	Lexington Twp	Maine
4420	Christopher	Short	Lexington Twp	Maine

4421	Dianne	Chamberlain	Lexington Twp	Maine
4422	Richard	Whittier	Liberty	Maine
4423	Diane	Messer	Liberty	Maine
4424	Andrew	Legere	Liberty	Maine
4425	ROBERT	KOHL	Liberty	Maine
4426	Nancy	Soule	Liberty	Maine
4427	Claire	Perry	Liberty	Maine
4428	Tom	Eickenberg	Liberty	Maine
4429	Summer	Ariza	Liberty	Maine
4430	Keith	Bruns	Liberty	Maine
4431	Michael	Bunker	Liberty	Maine
4432	Mariah	Williams	Liberty	Maine
4433	Ellen	Mallow	Liberty	Maine
4434	Janet	Stoddard	Lily Bay Twp	Maine
4435	Scott	Samiya	Limerick	Maine
4436	Sammy	Dudley	Limerick	Maine
4437	Steve	Henry	Limerick	Maine
4438	Derek	Beaulieu	Limerick	Maine
4439	Lynn	Gray	Limerick	Maine
4440	Michelle	Violette	Limerick	Maine
4441	Colin	Hubbard	Limerick	Maine
4442	Victor	Wakefield	Limerick	Maine
4443	Nichole	Greenwood	Limerick	Maine
4444	Christine	Pacheco	Limerick	Maine
4445	Anneliese	Douglas	Limerick	Maine
4446	Brandi	Goodwin	Limerick	Maine
4447	Jacob	Bartlett	Limerick	Maine
4448	Sean	Baker	Limerick	Maine
4449	Joseph F	McHugh	Limerick	Maine
4450	Jason	Steeves	Limerick	Maine
4451	Joshua	Benson	Limerick	Maine
4452	Hallie	Benton	Limerick	Maine
4453	Cheryl	Sawyer	Limerick	Maine
4454	James	Engle	Limerick	Maine
4455	Sylvia	Gray	Limerick	Maine
4456	Victor	Wakefield	Limerick	Maine
4457	Karralena	Castaway	Limestone	Maine
4458	Annah	Bean	Limington	Maine
4459	Bethany	Brown	Limington	Maine
4460	Joseph	Davis	Limington	Maine
4461	Denise	Laverriere	Limington	Maine
4462	Christopher	Albert	Limington	Maine
4463	Andrew	Lambert	Limington	Maine
4464	Lisa	Waite	Limington	Maine
4465	Eileen	McGlynn	Limington	Maine
4466	Nathan	Pendergrass	Limington	Maine

4467	Dick	Jarrett	Limington	Maine
4468	Brittany	Lambert	Limington	Maine
4469	Jordan	Trafford	Limington	Maine
4470	Samantha	Myers	Limington	Maine
4471	Ralph	Cleale	Limington	Maine
4472	Bethany	Brown	Limington	Maine
4473	Sarah	Yates	Limington	Maine
4474	Derek	Sawyer	Limington	Maine
4475	Patricia	Rodriguez	Limington	Maine
4476	Vanessa	Sawyer	Limington	Maine
4477	Sheryl	Simpson	Limington	Maine
4478	Cory	Kimball	Lincoln	Maine
4479	Danielle	Summers	Lincoln	Maine
4480	Riley	Coburn	Lincoln	Maine
4481	Diana	Sanderson	Lincolnville	Maine
4482	Krista	Hazlett	Lincolnville	Maine
4483	John	Krumrein	Lincolnville	Maine
4484	Robin	Chace	Lincolnville	Maine
4485	Susan	Silverio	Lincolnville	Maine
4486	Jayson	Emrich	Lincolnville	Maine
4487	Jane	Hardy	Lincolnville	Maine
4488	Jessica	Scott	Lincolnville	Maine
4489	Karen	Federle	Lincolnville	Maine
4490	Lori	Eaton	Lincolnville	Maine
4491	Christopher	Osgood	Lincolnville	Maine
4492	JoAnna	Greenwood	Lincolnville	Maine
4493	David	McLean	Lincolnville	Maine
4494	Lesley	Devoe	Lincolnville	Maine
4495	Jaclyn	Flye	Lincolnville	Maine
4496	Andrea	Palise	Lincolnville	Maine
4497	Sharon	Sampson	Lincolnville	Maine
4498	Greta Zorn	Gulezian	Lincolnville	Maine
4499	Emily	Berry	Lincolnville	Maine
4500	Jason	Rawn	Lincolnville	Maine
4501	Arlene	Jurewicz-Leighton	Lincolnville	Maine
4502	Lynn	Tauss	Lincolnville	Maine
4503	Jamie	Mathiau	Lincolnville	Maine
4504	Nick	Fernandez	Lincolnville	Maine
4505	Robert M	McKee, Sr.	Lincolnville	Maine
4506	Gary	Gulezian	Lincolnville	Maine
4507	Judith	Cookson	Lincolnville	Maine
4508	JoAnna	Greenwood	Lincolnville	Maine
4509	Meredith	Lyon	Lincolnville	Maine
4510	Brandon	Porter	Lincolnville	Maine
4511	Ryan	Jackson	Lincolnville	Maine

4512	Susan	McGovern	Lincolnville	Maine
4513	John	Williams	Lincolnville	Maine
4514	Karen	Blatchford	Lincolnville Center	Maine
4515	Jennifer	Little	Linneus	Maine
4516	Angela	Reed	Linneus	Maine
4517	Danielle	Doucette	Lisbon	Maine
4518	Zachary	Ouellette	Lisbon	Maine
4519	Nancy	Ridley	Lisbon	Maine
4520	Renae	Samay	Lisbon	Maine
4521	Brian	Ingalls	Lisbon	Maine
4522	Secha	Beane	Lisbon	Maine
4523	Toby	Conroy	Lisbon	Maine
4524	Katherine	Guerrette	Lisbon	Maine
4525	Miranda	Yanez	Lisbon	Maine
4526	Kathryn	Hinderks	Lisbon	Maine
4527	Rhonda	Briggs	Lisbon	Maine
4528	Mary	Wierzbicki	Lisbon	Maine
4529	Taylor	Colson	Lisbon	Maine
4530	Kathy	Pagr	Lisbon	Maine
4531	James	Hughes	Lisbon	Maine
4532	Kaci	Wedberg	Lisbon	Maine
4533	robin	reagan	Lisbon	Maine
4534	Leah	Sthilaire	Lisbon	Maine
4535	Tori	Graves	Lisbon	Maine
4536	James	Carville	Lisbon	Maine
4537	Jake	Palmer	Lisbon	Maine
4538	Tucker	Brannon	Lisbon	Maine
4539	Doreen	Mann	Lisbon	Maine
4540	John	Spaulding	Lisbon	Maine
4541	Melissa	Leask	Lisbon	Maine
4542	Kelsey	Macomber	Lisbon	Maine
4543	Levi	Buteau	Lisbon	Maine
4544	Jeff	Staggs	Lisbon	Maine
4545	Juliana	Britt	Lisbon	Maine
4546	J	Francis	Lisbon	Maine
4547	Don	Fellows	Lisbon	Maine
4548	Sherry	Crosman	Lisbon	Maine
4549	Diann	Akerley	Lisbon	Maine
4550	Robert	Lussier	Lisbon	Maine
4551	Carl	Pinkham	Lisbon	Maine
4552	Brenda	Heath	Lisbon	Maine
4553	Ashley	Belanger	Lisbon	Maine
4554	Christina	Kessler	Lisbon	Maine
4555	Linda	Garland	Lisbon	Maine
4556	Natalie	Thomsen	Lisbon	Maine
4557	Douglas	Goodell	Lisbon	Maine

4558	Jaclyn	Spaulding	Lisbon	Maine
4559	Jessica	Ouellette	Lisbon	Maine
4560	Tori	Graves	Lisbon	Maine
4561	Karen	Crafts	Lisbon Falls	Maine
4562	Amanda	Dolloff	Lisbon Falls	Maine
4563	Steven	Paquette	Lisbon Falls	Maine
4564	Anna	Guest	Lisbon Falls	Maine
4565	Jo-Jean	Keller	Lisbon Falls	Maine
4566	Abigail	Kenney	Lisbon Falls	Maine
4567	Brian	Dwinal	Lisbon Falls	Maine
4568	Lacey	McCarthy	Lisbon Falls	Maine
4569	Amanda	Gould	Lisbon Falls	Maine
4570	Katelyn	Syphers	Lisbon Falls	Maine
4571	Jonathan	Paul	Lisbon Falls	Maine
4572	Francine	Hicks	Lisbon Falls	Maine
4573	Heather	Proctor	Lisbon Falls	Maine
4574	Karen	Saindon	Lisbon Falls	Maine
4575	Nicole	Bessett	Lisbon Falls	Maine
4576	Dylan	Dehetre	Lisbon Falls	Maine
4577	Brandon	Kay	Lisbon Falls	Maine
4578	Linda	Jay	Lisbon Falls	Maine
4579	Leigh	Trueworthy	Lisbon Falls	Maine
4580	Michele	Pease	Lisbon Falls	Maine
4581	Jason	Desrosiers	Lisbon Falls	Maine
4582	David	McCarthy	Lisbon Falls	Maine
4583	Lisa	Bosse	Lisbon Falls	Maine
4584	Judy	Field	Lisbon Falls	Maine
4585	Jean	Litchfield	Lisbon Falls	Maine
4586	Andrew	Trueworthy	Lisbon Falls	Maine
4587	Karen	Hinckley	Lisbon Falls	Maine
4588	Megan	P	Lisbon Falls	Maine
4589	Stephen	Decatur	Lisbon Falls	Maine
4590	Wlliam	Kuhl	Lisbon Falls	Maine
4591	Cassidy	Therrien	Lisbon Falls	Maine
4592	Alison	Ross	Lisbon Falls	Maine
4593	Lisa	Small	Lisbon Falls	Maine
4594	Jacob	Eastman	Lisbon Falls	Maine
4595	Ann	Delsignor	Lisbon Falls	Maine
4596	Robyn	Carter	Lisbon Falls	Maine
4597	Marsha	Stubbs	Litchfield	Maine
4598	Betty	Bailey	Litchfield	Maine
4599	Brandt	McCollett	Litchfield	Maine
4600	Francine	Rudoff	Litchfield	Maine
4601	Anne	Lachance	Litchfield	Maine
4602	Darby	Beaulieu	Litchfield	Maine
4603	Stefen	Severy	Litchfield	Maine

4604	Anntonia	Kendrick	Litchfield	Maine
4605	Matt	Eaton	Litchfield	Maine
4606	Corey	Stubbs	Litchfield	Maine
4607	Joey	Daigle	Litchfield	Maine
4608	Mark	Nelsen	Litchfield	Maine
4609	Darryn	Bailey	Litchfield	Maine
4610	Ann	Gosline	Litchfield	Maine
4611	Kassandra	Trask	Litchfield	Maine
4612	Stephen	Custer	Litchfield	Maine
4613	Nelson	Peterson	Litchfield	Maine
4614	Jonathan	Averill	Litchfield	Maine
4615	Earl	Severance	Litchfield	Maine
4616	George	Rogers	Litchfield	Maine
4617	Jaymz	Childs	Litchfield	Maine
4618	Terry	Averill	Litchfield	Maine
4619	MATTHEW	AVERILL	Litchfield	Maine
4620	Hannah	Averill	Litchfield	Maine
4621	Christine	Bolton-Pistole	Litchfield	Maine
4622	William	Peddie	Litchfield	Maine
4623	Katelyn	Fletcher	Litchfield	Maine
4624	Tara	Thornton	Litchfield	Maine
4625	Diane	Clay	Litchfield	Maine
4626	Tanya	Kandris	Litchfield	Maine
4627	Evan	Morse	Litchfield	Maine
4628	Kaylanna	Daley	Litchfield	Maine
4629	Moe	Flaherty	Litchfield	Maine
4630	Morgan	Ayer	Litchfield	Maine
4631	Philip	Rowe	Litchfield	Maine
4632	Samantha	Kieltyka	Litchfield	Maine
4633	Christopher	Lane	Litchfield	Maine
4634	Randolph	Gayton	Litchfield	Maine
4635	Isaiah	Mills	Litchfield	Maine
4636	Cheryl	Avis	Litchfield	Maine
4637	Brian	Emery	Litchfield	Maine
4638	Sheena	Smith	Litchfield	Maine
4639	Joanne	Landry	Litchfield	Maine
4640	Tyler	Michaud	Litchfield	Maine
4641	Roger	Obie	Litchfield	Maine
4642	Douglas	Averill	Litchfield	Maine
4643	Justin	Cartonio	Litchfield	Maine
4644	Brittany	Hausknecht	Litchfield	Maine
4645	Kenneth	Newton	Litchfield	Maine
4646	Josh	Levesque	Litchfield	Maine
4647	Marilyn	Dunn	Litchfield	Maine
4648	Mary-Jo	Foley	Litchfield	Maine
4649	Dylan	Dube	Litchfield	Maine

4650	Scott	Gooding	Litchfield	Maine
4651	Edward	Avis	Litchfield	Maine
4652	Kelly	Burgess	Litchfield	Maine
4653	Haley	Tuttle	Litchfield	Maine
4654	Douglas	Wilson	Little Deer Isle	Maine
4655	Tom	van Buren	Little Deer Isle	Maine
4656	Jeff	Titon	Little Deer Isle	Maine
4657	Angela	Quintal-Snowman	Little Deer Isle	Maine
4658	Bruce	Glick	Littleton	Maine
4659	Tiffany	Sirois	Littleton	Maine
4660	Nathan	Colson	Livermore	Maine
4661	Roland	Hodges	Livermore	Maine
4662	Frank	Harris	Livermore	Maine
4663	Jonnie	Maloney	Livermore	Maine
4664	Jason	Robbins	Livermore	Maine
4665	Meagan	Pomeroy	Livermore	Maine
4666	Whitney	Soucy	Livermore	Maine
4667	Ernest	Deluca	Livermore	Maine
4668	Justine	Burhoe	Livermore	Maine
4669	George	Bowen	Livermore	Maine
4670	Bonita	Boothby	Livermore	Maine
4671	Gerald	Hiscock	Livermore	Maine
4672	John	Neal	Livermore	Maine
4673	Veronica	Hiscock	Livermore	Maine
4674	Robert	Tracy	Livermore	Maine
4675	Jason	Lofgren	Livermore	Maine
4676	Peter	Rollins	Livermore	Maine
4677	Autumn	Vining	Livermore	Maine
4678	Vicky	Emerson	Livermore	Maine
4679	Chad	Bryant	Livermore	Maine
4680	Mary	Deane	Livermore	Maine
4681	Eric	Turbide	Livermore	Maine
4682	Ashley	Greenleaf	Livermore	Maine
4683	Duncan	Miller	Livermore	Maine
4684	Judy	Ridley	Livermore	Maine
4685	Allison	Caron	Livermore Falls	Maine
4686	Tammy	Knox	Livermore Falls	Maine
4687	Frank	Shaw	Livermore Falls	Maine
4688	Robert	Mills	Livermore Falls	Maine
4689	Cody	Jacques	Livermore Falls	Maine
4690	Mary	Lord	Livermore Falls	Maine
4691	Ryan	Mills	Livermore Falls	Maine
4692	Marie	Gagnon	Livermore Falls	Maine
4693	Jeannette	Whitman	Livermore Falls	Maine
4694	Monica	Snow	Livermore Falls	Maine

4695	Rheanna	Woodford	Livermore Falls	Maine
4696	Carla	Dionne	Livermore Falls	Maine
4697	Peter	Morse	Livermore Falls	Maine
4698	Stacey	Reeves	Livermore Falls	Maine
4699	Michaela	Smith	Livermore Falls	Maine
4700	Nathan	Thibeault	Livermore Falls	Maine
4701	Barrett	Bishop	Livermore Falls	Maine
4702	Audrey	Gidman	Livermore Falls	Maine
4703	Ann	Barnett	Livermore Falls	Maine
4704	Richard	Cooper	Livermore Falls	Maine
4705	Sarah	Trafford	Livermore Falls	Maine
4706	Jody	Strickland	Livermore Falls	Maine
4707	Austin	Koehling	Livermore Falls	Maine
4708	David	Gunn	Livermore Falls	Maine
4709	Nickolas	Bray	Livermore Falls	Maine
4710	Heather	W	Livermore Falls	Maine
4711	Jacob	Dumont	Livermore Falls	Maine
4712	Angela	Lake	Livermore Falls	Maine
4713	Felicia	Gilks	Livermore Falls	Maine
4714	Arin	Quintel	Livermore Falls	Maine
4715	Angela	Courchesney	Livermore Falls	Maine
4716	Katie	Chicoine	Livermore Falls	Maine
4717	Linda	Deane	Livermore Falls	Maine
4718	Logan	Spain	Livermore Falls	Maine
4719	Tammy	Horne	Livermore Falls	Maine
4720	Terry	Cooper	Livermore Falls	Maine
4721	Gary	Arenson	Long Pond Twp	Maine
4722	Megan	Leach	Long Pond Twp	Maine
4723	Bryan	Sylvester	Long Pond Twp.	Maine
4724	Heinrich	Wurm	Lovell	Maine
4725	Mary	Jamison	Lovell	Maine
4726	Shirley	Hale	Lovell	Maine
4727	Bruce	Taylor	Lovell	Maine
4728	Toni	Seger	Lovell	Maine
4729	Kristen	Haskell	Lovell	Maine
4730	Jane	Dineen	Lovell	Maine
4731	Michael	Jolicoeur	Lovell	Maine
4732	June	Romeo	Lubec	Maine
4733	William	Schlesinger	Lubec	Maine
4734	Ethan	Bien	Lubec	Maine
4735	Philip	Fyfe	Lubec	Maine
4736	Eli	Willson	Lubec	Maine
4737	Jennah	Rand	Ludlow	Maine
4738	Michael	Matheson	Ludlow	Maine
4739	Michael	Polakowski	Lusbon	Maine
4740	Eric	Carroll	Lyman	Maine

4741	Stephen	Roscia	Lyman	Maine
4742	Bob	Theriault	Lyman	Maine
4743	Rosemary	Boissonneault	Lyman	Maine
4744	Normand	Picard	Lyman	Maine
4745	Nancy	Soule	Lyman	Maine
4746	Mike	Sukalas	Lyman	Maine
4747	Charles	Savoie	Lyman	Maine
4748	Jessica	Picard	Lyman	Maine
4749	Sally	Wood	Lyman	Maine
4750	Emilee	Burgess	Lyman	Maine
4751	Walter	Alexander	Lyman	Maine
4752	Abigail	Taylor	Lyman	Maine
4753	Michael	Morse	Lyman	Maine
4754	Rebecca	Jones	Lyman	Maine
4755	Ajay	Cates	Lyman	Maine
4756	Dustin	Donegan	Lyman	Maine
4757	Wilfred	Edwin	Lyman	Maine
4758	Dennis	Levesque	Lyman	Maine
4759	Corey	Day	Lyman	Maine
4760	George	Davenport	Lyman	Maine
4761	Ethan	Madore	Lyman	Maine
4762	Lynda	Carscallen	Lyman	Maine
4763	Paul	Chase Jr	Lyman	Maine
4764	Michael	Cadorette	Lyman	Maine
4765	Balinda	Kilton	Lyman	Maine
4766	Nancy	Harrison	Lyman	Maine
4767	Haley	Grondin	Lyman	Maine
4768	David	Fosgate	Lyman	Maine
4769	Jeremy	Raymond	Lyman	Maine
4770	Aaron	Fortin	Lyman	Maine
4771	Donna	Johnston	Lyman	Maine
4772	Judith	Brown	Lyman	Maine
4773	Kevin	Gilpatric	Lyman	Maine
4774	Samara	Swett	Lyman	Maine
4775	Taryn	Canney	Lyman	Maine
4776	Richard	Couture	Lyman	Maine
4777	Dakota	Robinson	Machias	Maine
4778	Morgan	Swan	Machias	Maine
4779	Mariah	Babin	Madawaska	Maine
4780	Ariana	Gagnon	Madawaska	Maine
4781	Ryan	Deschaine	Madawaska	Maine
4782	Gary	Picard	Madawaska	Maine
4783	Mackenzie	Tranten	Madison	Maine
4784	Emily	Benoit	Madison	Maine
4785	Janette	Franck	Madison	Maine
4786	Donna	Churchill	Madison	Maine

4787	Angela	Ostiguy	Madison	Maine
4788	Kate	Drummond	Madison	Maine
4789	Brandy	Roderick	Madison	Maine
4790	Tracy	Kniffin	Madison	Maine
4791	Lindsey	Kandiko	Madison	Maine
4792	Susan	Lahti	Madison	Maine
4793	Reginald&Mavis	Malloy	Madison	Maine
4794	Aaron	Baum	Madison	Maine
4795	Kyle	Austin	Madison	Maine
4796	Jacob	Van Tuinen	Madison	Maine
4797	Tyler	Paine	Madison	Maine
4798	Cherris	Sincyr	Madison	Maine
4799	George	Foster	Madison	Maine
4800	Desireah	Howes	Madison	Maine
4801	Devon	Watt	Madison	Maine
4802	Kelly	Taylor	Madison	Maine
4803	Elizabeth	Richardson	Madison	Maine
4804	Cliftine	Fortin	Madison	Maine
4805	Richard	Roderick	Madison	Maine
4806	Cathleen	Staehli	Madison	Maine
4807	Leon	Dorr	Madison	Maine
4808	Letitia	Chapman	Madison	Maine
4809	Kelly	Clauson	Madison	Maine
4810	Jody	Peterson	Madison	Maine
4811	Brooklyn	Chadbourne	Madison	Maine
4812	Judy	Hamblin	Madison	Maine
4813	Courtney	Taylor	Madison	Maine
4814	Charles	Churchill	Madison	Maine
4815	Vinnie	Marro	Madison	Maine
4816	Deborah	Heald	Madison	Maine
4817	Barbara	Robbins	Madison	Maine
4818	Matthew	Peck	Madison	Maine
4819	Mallory	Stratton	Madison	Maine
4820	James	Flanagin	Madison	Maine
4821	Melissa	McDonald	Madison	Maine
4822	Richard	Goodwin	Madison	Maine
4823	Gary	York	Madrid Twp	Maine
4824	Kaleb	D	Main St	Maine
4825	Pauline	Kontrafouris	Maine	Maine
4826	David	Worthley	Maine	Maine
4827	Richard	Filion	Maine St.	Maine
4828	Karen	Tims	Manchester	Maine
4829	Sarah	Chace	Manchester	Maine
4830	Daisy	Dore	Manchester	Maine
4831	Tom	Mickewich	Manchester	Maine
4832	April	Gay	Manchester	Maine

4833	Deborah	Stuart	Manchester	Maine
4834	Zach	Stewart	Manchester	Maine
4835	Emma	Farrell	Manchester	Maine
4836	Alexander	Florek	Manchester	Maine
4837	James	Cumming	Manchester	Maine
4838	John	Cote	Manchester	Maine
4839	Mary Ellen	Guimond	Manchester	Maine
4840	Heisi	Roy	Manchester	Maine
4841	Paul	Giguere	Manchester	Maine
4842	Dennis	Pollock	Manchester	Maine
4843	Vicki	Russell	Manchester	Maine
4844	Derek	Crommett	Manchester	Maine
4845	Jeff	Dejongh	Manchester	Maine
4846	Elizabeth	Pollock	Manchester	Maine
4847	Tyler	Hamlin	Manchester	Maine
4848	Jeremy	Guimond	Manchester	Maine
4849	Kelsey	Broad	Manchester	Maine
4850	Susan	Morse	Manchester	Maine
4851	Shelly	Mountain	Mapleton	Maine
4852	Adrien	Tourtelotte	Mapleton	Maine
4853	Ariana	Myshrall	Mapleton	Maine
4854	Sandy	Walczyk	Mariaville	Maine
4855	William	Szczesny	Mariaville	Maine
4856	Debra	Dane	Mariaville	Maine
4857	Lorette	Adams	Mars Hill	Maine
4858	Amber	Rice	Mason Twp	Maine
4859	Taylor	Shorey	Mattawamkeag	Maine
4860	No	Power Line	Me	Maine
4861	Rudolph	Kyllonen Jr	Mechanic Falls	Maine
4862	Elizabeth	Heath	Mechanic Falls	Maine
4863	Matthew	Emerson	Mechanic Falls	Maine
4864	Rena	Berry	Mechanic Falls	Maine
4865	Joyce	Crane	Mechanic Falls	Maine
4866	Clayton	Grimm	Mechanic Falls	Maine
4867	Nicole	Cary	Mechanic Falls	Maine
4868	Nathan	Cavers	Mechanic Falls	Maine
4869	Kimberly	Mitchell	Mechanic Falls	Maine
4870	Jennifer	Boyce	Mechanic Falls	Maine
4871	Jessica	Richards	Mechanic Falls	Maine
4872	Angelique	Desmarais	Mechanic Falls	Maine
4873	Maria	Ham	Mechanic Falls	Maine
4874	Kerry	Flint	Mechanic Falls	Maine
4875	Timothy	Bright	Mechanic Falls	Maine
4876	Matthew	Herrick	Mechanic Falls	Maine
4877	Ann	Hobart	Mechanic Falls	Maine
4878	Sarah	Remer	Mechanic Falls	Maine

4879	Fred	Mitchell	Mechanic Falls	Maine
4880	Aliyah-Marie	Hamel	Mechanic Falls	Maine
4881	Natalie	Kyllonen	Mechanic Falls	Maine
4882	Carl	Beckett	Mechanic Falls	Maine
4883	Tonya	Troiani	Meddybemps	Maine
4884	Jessica	Laverty	Medford	Maine
4885	Daniel	Russell	Medway	Maine
4886	Paige	Redlevske	Mercer	Maine
4887	Amanda	Enos	Mercer	Maine
4888	Robert	Tibbetts	Mercer	Maine
4889	Chase	Noble	Mercer	Maine
4890	Jeffrey	Mukai	Mercer	Maine
4891	Scott	Corson	Mercer	Maine
4892	Chris	Beeuwkes	Mercer	Maine
4893	Kathy	Dellarma	Mercer	Maine
4894	Cassidy	Wyman	Mercer	Maine
4895	Kelly	Lee	Mercer	Maine
4896	Cassidy	Wyman	Mercer	Maine
4897	Diane	McNair	Mercer	Maine
4898	Tina	George-Lee	Mercer	Maine
4899	Douglas	Fickett	Mercer	Maine
4900	Jodie	Walker	Mercer	Maine
4901	Donice	Whitney	Mercer	Maine
4902	Kristin	Cooley	Mercer	Maine
4903	Chelsea	Page	Mercer	Maine
4904	Terrence	Belyea	Mexico	Maine
4905	Leah	Hodsdon	Mexico	Maine
4906	Cody	Magoon	Mexico	Maine
4907	Daniel	Robichaud	Mexico	Maine
4908	Heather-Anne	Arsenault	Mexico	Maine
4909	Sheena	Arsenault	Mexico	Maine
4910	Diane	Arsenault	Mexico	Maine
4911	Lyndsay	Donahue	Mexico	Maine
4912	Victoria	Errington	Mexico	Maine
4913	Michele	Patneaude	Mexico	Maine
4914	Nathan	Henderson	Mexico	Maine
4915	Donald	Stevens	Mexico	Maine
4916	Ken	Snow	Mexico	Maine
4917	Tia	Roberts	Mexico	Maine
4918	Michael	Rocray	Mexico	Maine
4919	Corey	Heath	Mexico	Maine
4920	Victoria	Giberson	Mexico	Maine
4921	Eliza	Buccina	Mexico	Maine
4922	Ciara	Cushman	Mexico	Maine
4923	John	Georgopoulos	Mexico	Maine
4924	Denise	Duguay	Mexico	Maine

4925	Kristy	Grasruck	Mexico	Maine
4926	Laura	Pingree	Mexico	Maine
4927	Cody	Smith	Mexico	Maine
4928	David	Thurston Jr	Mexico	Maine
4929	Jackie	Sinclair	Mexico	Maine
4930	Elmer	Pinkham	Milbridge	Maine
4931	Sandra	Larsen	Milbridge	Maine
4932	Cole	Willey	Milbridge	Maine
4933	Michael	Macpherson	Milbridge	Maine
4934	William	Sargent	Milbridge	Maine
4935	Pat	Sharp	Milbridge	Maine
4936	Debra	Carey	Milford	Maine
4937	Mike	Richard	Milford	Maine
4938	Saige	Purser	Milford	Maine
4939	Kristen	Quill	Milford	Maine
4940	Jenny	Cody	Milford	Maine
4941	Rebecca	Van Beneden	Milford	Maine
4942	David	Groff	Milford	Maine
4943	Jordyn	Camic	Milford	Maine
4944	Sean	Garceau	Milford	Maine
4945	Paul	Coble	Milford	Maine
4946	Gage	Reynolds	Milford	Maine
4947	Cameron	Depaola	Milford	Maine
4948	Johnathan	Bemis	Milford	Maine
4949	Caitlin	Goodwin	Milford	Maine
4950	Ricky	Doane	Milford	Maine
4951	Pamela	Bell	Milford	Maine
4952	Katy	Tickle	Milford	Maine
4953	Joe	Voisine	Millinocket	Maine
4954	Linda	Albert	Millinocket	Maine
4955	Tyler	Matthews	Millinocket	Maine
4956	Harrison	McLean	Millinocket	Maine
4957	Tim	Pfaff	Millinocket	Maine
4958	Mark	Sulander	Millinocket	Maine
4959	Justin	Waceken	Millinocket	Maine
4960	Roland	Voisine	Millinocket	Maine
4961	Kyle	Corcoran	Millinocket	Maine
4962	Mark	Albert	Millinocket	Maine
4963	Al	Nakas	Millinocket	Maine
4964	Anthony	Filauro	Millinocket	Maine
4965	Miles	Bradbury	Millinocket	Maine
4966	Gary	Theriault Jr	Millinocket	Maine
4967	Stephen	Martin	Millinocket	Maine
4968	Joshua	Stahl	Millinocket	Maine
4969	Daniel	Reed	Millinocket	Maine
4970	Jennifer	McKinney	Millinocket	Maine

4971	Marsha	Donahue	Millinocket	Maine
4972	Addison	Matthews	Millinocket	Maine
4973	Lorrie	Voisine	Millinocket	Maine
4974	Lynn	Beaulier	Millinocket	Maine
4975	Andrew	Caruso	Millinocket	Maine
4976	Dylan	Drohan	Millinocket	Maine
4977	Sherri	Downes	Millinocket	Maine
4978	Charles	Reitze Sr	Millinocket	Maine
4979	Nicole	Davis	Millinocket	Maine
4980	Lisa	Lewin	Millinocket	Maine
4981	Wilbur	Nichols	Milo	Maine
4982	Betty	Gormley	Milo	Maine
4983	Seth	Moody	Milo	Maine
4984	Craig	Anthony	Milo	Maine
4985	Amy	Lynch	Milton Twp	Maine
4986	Ryan	Kirkey	Milton Twp	Maine
4987	Sharon	Potvin	Minot	Maine
4988	Bob	Bennett	Minot	Maine
4989	Betty	Ostrander	Minot	Maine
4990	Susan	Kane	Minot	Maine
4991	Jamie	Anderson	Minot	Maine
4992	Nina	Hicks	Minot	Maine
4993	Georgette	Hunt	Minot	Maine
4994	Amy	Vaillancourt	Minot	Maine
4995	Tony	Rotolico	Minot	Maine
4996	Henry	Foster Jr	Minot	Maine
4997	William	Wallace	Minot	Maine
4998	Robert	Poirier	Minot	Maine
4999	Aubrey	Russell	Minot	Maine
5000	Chris	Fuller	Minot	Maine
5001	Matt	Cooper	Minot	Maine
5002	Brian	Lalemand	Minot	Maine
5003	Tasha	Cooper	Minot	Maine
5004	Jennifer	Tucci	Minot	Maine
5005	Heather	Campbell	Minot	Maine
5006	Samuel	Whittemore	Minot	Maine
5007	David	CARON	Minot	Maine
5008	Bradley	Hatfield	Minot	Maine
5009	Jason	Rouleau	Minot	Maine
5010	Ashlyn	Scruggs	Minot	Maine
5011	Joshua	Cooper	Minot	Maine
5012	Tasha	Cooper	Minot	Maine
5013	Rebecca	Martin	Monmouth	Maine
5014	Michele	Bonenfant	Monmouth	Maine
5015	Liza	Saucier	Monmouth	Maine
5016	David	Hobson	Monmouth	Maine

5017	Kathleen	Brush	Monmouth	Maine
5018	Kordell	Barcomb	Monmouth	Maine
5019	PAMELA	Stinson	Monmouth	Maine
5020	Inna	Young	Monmouth	Maine
5021	Matt	Fortin	Monmouth	Maine
5022	Josephine	Stevens	Monmouth	Maine
5023	Dori	Burnham	Monmouth	Maine
5024	Anthony	Dumont	Monmouth	Maine
5025	Hope	Olmstead	Monmouth	Maine
5026	Pauline	Pelletier	Monmouth	Maine
5027	Kimberly	Brown	Monmouth	Maine
5028	Paula	Nagy	Monmouth	Maine
5029	John	Garbacki	Monmouth	Maine
5030	Ann	Bragdon	Monmouth	Maine
5031	Cody	Pelletier	Monmouth	Maine
5032	Chanel	Thompson	Monmouth	Maine
5033	Deborah	Derosby	Monmouth	Maine
5034	Rebecca	Stanley	Monmouth	Maine
5035	Julie	Sawtelle	Monmouth	Maine
5036	Heidi	Weymouth	Monmouth	Maine
5037	Susan	Harris-Pomerleau	Monmouth	Maine
5038	Robin	Macdonald	Monmouth	Maine
5039	Tiffany	Bussiere	Monmouth	Maine
5040	Kathy	Perless	Monmouth	Maine
5041	Christopher	Armstrong	Monmouth	Maine
5042	Marcia	Marron	Monmouth	Maine
5043	Nichole	Campbell	Monmouth	Maine
5044	Paul	Sullivan	Monmouth	Maine
5045	Alicia	Wing	Monmouth	Maine
5046	Gerard	Boulet	Monmouth	Maine
5047	Nick	Mocciola	Monmouth	Maine
5048	Benjamin	Lund	Monmouth	Maine
5049	Joshua	Fournier	Monmouth	Maine
5050	Elaine	Davidson	Monmouth	Maine
5051	D	Porter	Monroe	Maine
5052	Aimee	Moffitt	Monroe	Maine
5053	Jennifer	Mayo	Monroe	Maine
5054	Jennifer	Smith-Mayo	Monroe	Maine
5055	Tom	Cheetham	Monroe	Maine
5056	Allyn	Beecher	Monroe	Maine
5057	Nathan	Hillman	Monroe	Maine
5058	Paula	Fulford	Monroe	Maine
5059	D	Porter	Monroe	Maine
5060	Greg	Purinton-Brown	Monroe	Maine
5061	Nancy	Putnam	Monson	Maine

5062	Crystal	MacClintock	Monson	Maine
5063	Diane	Dube	monson	Maine
5064	Lisa	Brown	Monson	Maine
5065	Anthony	Lancisi	Monson	Maine
5066	Richard	Doucette	Monson	Maine
5067	Cynthia	Leclair	Monson	Maine
5068	Kathie	Madigan	Monticello	Maine
5069	Kathie	Madigan	Monticello	Maine
5070	Linda	Dartt	Montville	Maine
5071	Bo Robert	Atkinson	Montville	Maine
5072	Elizabeth	Luce	Montville	Maine
5073	Patricia	Crawford	Montville	Maine
5074	Buck	O'Herin	Montville	Maine
5075	Christina	Dimmitt	Montville	Maine
5076	Susie	O'Keeffe	Montville	Maine
5077	Danielle	Freeman	Montville	Maine
5078	Josephine	Richards	Montville	Maine
5079	Deborah	Lasky	Montville	Maine
5080	Constance's	Obrient	Montville	Maine
5081	Justin	Perry	Moody	Maine
5082	Kirstie	Hale	Moose River	Maine
5083	Keith	Hall	Moose River	Maine
5084	Desniege	Pierce	Moose River	Maine
5085	Nigel	Fauteux	Moose River	Maine
5086	Karen	Camire	Moose River	Maine
5087	Jacobb	Hale	Moose River	Maine
5088	Linda	Good	Moose River	Maine
5089	Roxanne	Vining	Moose River	Maine
5090	Will	Hughey	Moose River	Maine
5091	Dorothy	Eaton	Moose River	Maine
5092	Judsen	Bell	Moose River	Maine
5093	Ashley	Krukowski	Moose River	Maine
5094	Brad	Guay	Moose River	Maine
5095	Wayne	Lumbert	Moose River	Maine
5096	Kevin	Cavanaugh	Moose River	Maine
5097	Wendy	Sloat	Moose River	Maine
5098	Michele	Porter	Morrill	Maine
5099	Donna	Kirk	Morrill	Maine
5100	Kathy	Cormier	Morrill	Maine
5101	Geri	Vistein	Morrill	Maine
5102	Mary	Peterson	Morrill	Maine
5103	Maryann	Farrell	Morrill	Maine
5104	Matt	Porter	Morrill	Maine
5105	Geri	Vistein	Morrill	Maine
5106	David	Gibson	Morrill	Maine
5107	Cameron	Chalmers	Morrill	Maine

5108	Mark	Galarneau	Moscow	Maine
5109	Hali	McQuilkin	Moscow	Maine
5110	Chris	Santos	Moscow	Maine
5111	Edward	Pereira	Moscow	Maine
5112	Teagan	Laweryson	Moscow	Maine
5113	Adrienne	Mathieu	Moscow	Maine
5114	Lauren	Heulitt	Moscow	Maine
5115	Emily	Ames	Moscow	Maine
5116	Christine	Vellucci	Moscow	Maine
5117	Mary	Brown	Moscow	Maine
5118	Sam	Mathieu	Moscow	Maine
5119	Tobin	Belanger	Moscow	Maine
5120	Leslie	Labossiere	Moscow	Maine
5121	samuel	mathieu	Moscow	Maine
5122	John	Marsh	Moscow	Maine
5123	Janine	Ames	Moscow	Maine
5124	Jane	Linn	Moscow	Maine
5125	Sandra	Orcutt	Moscow	Maine
5126	Jody	Brown	Moscow	Maine
5127	Josh	Beane	Moscow	Maine
5128	Natalie	Thibodeau	Moscow	Maine
5129	Shane	Lay	Moscow	Maine
5130	Robert	Robinson	Mount Chase	Maine
5131	Carl	Little	Mount Desert	Maine
5132	Thomas	Walker	Mount Desert	Maine
5133	Francoise	Leyman	Mount Desert	Maine
5134	Catherine	Richardson	Mount Desert	Maine
5135	Nicole	Pacheco	Mount Desert	Maine
5136	Jeannie	Merchant	Mount Desert	Maine
5137	Carey	Kish	Mount Desert	Maine
5138	Richard	Higgins	Mount Desert	Maine
5139	Annah	Houston	Mount Desert	Maine
5140	Rita	Redfield	Mount Desert	Maine
5141	Chris	Stevenson	Mount Desert	Maine
5142	Evelyn	Sargent	Mount Desert	Maine
5143	Ignacio	Pessoa	Mount Desert	Maine
5144	Teri	Robertson	Mount Desert	Maine
5145	Jaki	Erdoes	Mount Desert	Maine
5146	Ashley	Matthews	Mount Vernon	Maine
5147	Jennifer	Wright	Mount Vernon	Maine
5148	Bonnie	Gasper	Mount Vernon	Maine
5149	Lisa	Cote	Mount Vernon	Maine
5150	Melani	Darrell	Mount Vernon	Maine
5151	Elizabeth	Hart	Mount Vernon	Maine
5152	Quimby	Robinson	Mount Vernon	Maine
5153	June	Cauldwell	Mount Vernon	Maine

5154	Jacquelyn	Judkins	Mount Vernon	Maine
5155	Connie	Hoffman	Mount Vernon	Maine
5156	Deborah	Stahler	Mount Vernon	Maine
5157	Melani	Darrell	Mount Vernon	Maine
5158	Dean	Emmons	Mount Vernon	Maine
5159	Bethany	Brown	Mount Vernon	Maine
5160	Debbie	Potter	Mount Vernon	Maine
5161	Scott	Pinkham	Mount Vernon	Maine
5162	Harald	Bredesen	Mount Vernon	Maine
5163	Jeanett	Reight	Mount Vernon	Maine
5164	Amy	Grant Trefethen	Mount Vernon	Maine
5165	Jon	Berry	Mount Vernon	Maine
5166	Matthew	Marcelonis	Mount Vernon	Maine
5167	Teresa	Schmidt	Mount Vernon	Maine
5168	Christopher	Dumaine	Mount Vernon	Maine
5169	Connie	Hoffman	Mount Vernon	Maine
5170	Brett	Trefethen	Mount Vernon	Maine
5171	Patrick	Sheehan	Mount Vernon	Maine
5172	Katherine	Smith	Mount Vernon	Maine
5173	Jill	Hastings	Mount Vernon	Maine
5174	Arnold	Banner	Mount Vernon	Maine
5175	Ethan	Pooler	Mount Vernon	Maine
5176	Maryann	Ayotte	Moxie Gore Twp	Maine
5177	Linda	Griffin	Moxie Gore Twp	Maine
5178	Barbara	Damren	Mt. Vernon	Maine
5179	Paul	Dubay	Naples	Maine
5180	Haley	Cole	Naples	Maine
5181	Dan	Spinzola	Naples	Maine
5182	Walter	Smith	Naples	Maine
5183	Mychal	Morissette	Naples	Maine
5184	Thomas	Ferent	Naples	Maine
5185	Leta	Cross	Naples	Maine
5186	Sharon	Devorss	Naples	Maine
5187	David	Macdonald	Naples	Maine
5188	Melissa	Smith	Naples	Maine
5189	Janelle	Plummer	Naples	Maine
5190	Patricia	Raitto	Naples	Maine
5191	Dian	Brooks	Naples	Maine
5192	Linda	Fox	Naples	Maine
5193	Chris	Mitchell	Naples	Maine
5194	Michael	Fleck	Naples	Maine
5195	Alysia	Doherty	Naples	Maine
5196	Brittany	Carroll	Naples	Maine
5197	Do	Martin	Naples	Maine
5198	Kimberly	Sukeforth	Naples	Maine
5199	Jason	Ashe	Naples	Maine

5200	Ashlea	Shrier	Naples	Maine
5201	Nick	Prouty	Naples	Maine
5202	Anne	Geisler	Naples	Maine
5203	Antallia	Thomas	Naples	Maine
5204	Jennifer	Sinsabaugh	Naples	Maine
5205	Bayne	Richardson	Naples	Maine
5206	Heather	Blake	Naples	Maine
5207	Ashley	Andrews	Naples	Maine
5208	Erica	Gagnon	New Gloucester	Maine
5209	Sean	Damboise	New Gloucester	Maine
5210	Tammy	Donovan	New Gloucester	Maine
5211	Normand	Bourret	New Gloucester	Maine
5212	Sarah	Pierce	New Gloucester	Maine
5213	Katlyn	Bourret	New Gloucester	Maine
5214	Brandon	Berry	New Gloucester	Maine
5215	Warren	Kimball	New Gloucester	Maine
5216	Denise	D'Amboise	New Gloucester	Maine
5217	Sam	Mason	New Gloucester	Maine
5218	Matthew	Farrington	New Gloucester	Maine
5219	Arenda	Chamberland	New Gloucester	Maine
5220	Jonah	King	New Gloucester	Maine
5221	Phoebe	Hardesty	New Gloucester	Maine
5222	Erin	Day	New Gloucester	Maine
5223	Jeff	Belanger	New Gloucester	Maine
5224	Field	Rider	New Gloucester	Maine
5225	Charlotte	Coggins	New Gloucester	Maine
5226	Danielle	Pike	New Gloucester	Maine
5227	David	Labbe	New Gloucester	Maine
5228	Robin	Jordan	New Gloucester	Maine
5229	Peter	Jederlinic	New Gloucester	Maine
5230	Katherine	Oliver	New Gloucester	Maine
5231	Renee	Jones	New Gloucester	Maine
5232	Robin	Jordan	New Gloucester	Maine
5233	Christina	Carey	New Gloucester	Maine
5234	Kevin	Cole	New Gloucester	Maine
5235	Debra	May	New Gloucester	Maine
5236	Adam	Pike	New Gloucester	Maine
5237	Keith	Forest	New Gloucester	Maine
5238	H. Lloyd	May, Jr.	New Gloucester	Maine
5239	Pamela	Fischer	New Gloucester	Maine
5240	Ken	Brinnick	New Gloucester	Maine
5241	Nicole	King	New Gloucester	Maine
5242	Mark	Norton	New Gloucester	Maine
5243	Patrick	D'Amboise	New Gloucester	Maine
5244	Suzanna	Leighton	New Gloucester	Maine
5245	Mark	Power	New Gloucester	Maine

5246	Clifford	Dow	New Gloucester	Maine
5247	Emma	Bernier	New Gloucester	Maine
5248	Susan	Percy	New Gloucester	Maine
5249	Deborah	Bastian	New Gloucester	Maine
5250	Patricia	Norton	New Gloucester	Maine
5251	Valerie	Sawyer	New Gloucester	Maine
5252	Janet	Wilcox	New Gloucester	Maine
5253	Paul	Fedorczyk	New Gloucester	Maine
5254	Pat	O'Brien	New Gloucester	Maine
5255	lenore	sivulich	New Gloucester	Maine
5256	Kevin	Tar	New Gloucester	Maine
5257	Amy	Ramsdell	New Gloucester	Maine
5258	Garrett	Jordan	New Gloucester	Maine
5259	Vaughn	Hardesty	New Gloucester	Maine
5260	Troy	Babb	New Gloucester	Maine
5261	Stephanie	Berry	New Gloucester	Maine
5262	Robert	Maheu	New Gloucester	Maine
5263	Beth	Andersen	New Gloucester	Maine
5264	Charles	Mollica	New Gloucester	Maine
5265	David	Wroniak	New Gloucester	Maine
5266	Elizabeth	Randall	New Gloucester	Maine
5267	Alan	Reed	New Gloucester	Maine
5268	Kathleen	Potter	New Gloucester	Maine
5269	Scott	Spaulding	New Gloucester	Maine
5270	David	Bilski	New Harbor	Maine
5271	Henry	Newhouse	New Harbor	Maine
5272	Anne	Winchester	New Harbor	Maine
5273	Lynne	Thompson	New Harbor	Maine
5274	Jill	Linzee	New Harbor	Maine
5275	John	Winchester	New Harbor	Maine
5276	Jessica	Yates	New Harbor	Maine
5277	Linda	Shaffer	New Harbor	Maine
5278	Barbara	Brinkerhoff	New Limerick	Maine
5279	Nicole	Bellerose	New Limerick	Maine
5280	Juliana	Rothschild	New Portland	Maine
5281	Stephen	Gorr	New Portland	Maine
5282	Sarah	Nadeau	New Portland	Maine
5283	Geraldine	Doble	New Portland	Maine
5284	Cassity	Hargreaves	New Portland	Maine
5285	Emily	Wahl	New Portland	Maine
5286	Julia	Bouwsma	New Portland	Maine
5287	Dave	Veilleux	New Portland	Maine
5288	Shannon	Nicoll	New Portland	Maine
5289	Danielle	White	New Portland	Maine
5290	Debra	Wales	New Portland	Maine
5291	Pamela	Sorrentino	New Portland	Maine

5292	Sawyer	Shaw	New Portland	Maine
5293	Suzanne	Gorr	New Portland	Maine
5294	Theresa	Ledoux	New Portland	Maine
5295	Breanna	Lebeau	New Portland	Maine
5296	Devin	McGlashing	New Portland	Maine
5297	Heather	Stickney	New Portland	Maine
5298	Pamela	Sorrentino	New Portland	Maine
5299	Rachel	Lykourgos	New Portland	Maine
5300	Joseph	Lattin	New Portland	Maine
5301	William	Serafino	New Portland	Maine
5302	Richard H.	Smith	New Sharon	Maine
5303	Eileen	Almy	New Sharon	Maine
5304	Victoria	Sears-Gordon	New Sharon	Maine
5305	Jean	Stewart	New Sharon	Maine
5306	Peggy	Anderson-Smith	New Sharon	Maine
5307	Heather	McCormick	New Sharon	Maine
5308	Bertrand	Poisson	New Sharon	Maine
5309	Marya	Goettsche Spurling	New Sharon	Maine
5310	Tor	Goettsche Spurling	New Sharon	Maine
5311	Lori	Baxter	New Sharon	Maine
5312	Melissa	Shackley	New Sharon	Maine
5313	Laura	Garson	New Sharon	Maine
5314	Mazie	Gordon	New Sharon	Maine
5315	Robert	Nichols	New Sharon	Maine
5316	Bradley	Durrell	New Sharon	Maine
5317	Amanda	Dow-Smith	New Sharon	Maine
5318	John	Evans	New Sharon	Maine
5319	Ann	Field	New Sharon	Maine
5320	Tracy	Brackett	New Sharon	Maine
5321	Felicia	Bell	New Sharon	Maine
5322	Laura	Savage	New Sharon	Maine
5323	Sabina	Tosch	New Sharon	Maine
5324	Margaret	Cox	New Sharon	Maine
5325	jeff	brown	New Sharon	Maine
5326	Maryann	Blood	New Sharon	Maine
5327	Skyler	Gordon	New Sharon	Maine
5328	Darryl	Wood	New Sharon	Maine
5329	James	Luce	New Sharon	Maine
5330	Dana	Bullen	New Sharon	Maine
5331	Andrea	Federico	New Sharon	Maine
5332	Melissa	Pound	New Sharon	Maine
5333	Tye	Nichols	New Sharon	Maine
5334	Audrey	Brown	New Sharon	Maine
5335	Bill	Hensley	New Sharon	Maine

5336	Annie	Philbrick	New Sharon	Maine
5337	Ashley	Green	New Sharon	Maine
5338	Rodney	Porter	New Sharon	Maine
5339	Kirk	Butterfield	New Sharon	Maine
5340	Henry	Washburn	New Sharon	Maine
5341	Kate	Weatherby	New Sharon	Maine
5342	Leigh Ann	Fish	New Vineyard	Maine
5343	Ann	Wattles	New Vineyard	Maine
5344	Carolyn	Holmes Luce	New Vineyard	Maine
5345	Judy	Wacome	New Vineyard	Maine
5346	Ted	Ryan	New Vineyard	Maine
5347	Drake	Daniels	New Vineyard	Maine
5348	Duane	Schanz	New Vineyard	Maine
5349	Tom	Callahan	New Vineyard	Maine
5350	Lucinda	Hinds	New Vineyard	Maine
5351	Chris	Bailey	New Vineyard	Maine
5352	Heather	Earle	New Vineyard	Maine
5353	Jessica	Roberts	New Vineyard	Maine
5354	Ann	Wattlws	New Vineyard	Maine
5355	Pamela	Schanz	New Vineyard	Maine
5356	Craig	Pinkham	New Vineyard	Maine
5357	Kate	Bailey	New Vineyard	Maine
5358	Dustin	Welch	New Vineyard	Maine
5359	Hope	Willis	New Vineyard	Maine
5360	Jonathan	Clements	Newburgh	Maine
5361	Gerald	Gunn	Newburgh	Maine
5362	Robert	Frye	Newburgh	Maine
5363	Craig	Rines	Newburgh	Maine
5364	Beth	Kiernan	Newburgh	Maine
5365	Amanda	Woodard	Newburgh	Maine
5366	Robin	Downs	Newburgh	Maine
5367	Ross	Woodard	Newburgh	Maine
5368	Alex	Guerretteï¿½s	Newburgh	Maine
5369	Pam	Smith	Newburgh	Maine
5370	Matthew	Kiernan	Newburgh	Maine
5371	David	Miller	Newcastle	Maine
5372	Nigel	Calder	Newcastle	Maine
5373	Matthew	Weaver	Newcastle	Maine
5374	C	Boyd	Newcastle	Maine
5375	Merrylyn	Sawyer	Newcastle	Maine
5376	Jonathan	Mess	Newcastle	Maine
5377	Brad	Russell	Newcastle	Maine
5378	Robin	Lincoln	Newcastle	Maine
5379	Paul	Garber	Newcastle	Maine
5380	Dan	Hatch	Newcastle	Maine
5381	David	Johnson	Newcastle	Maine

5382	Lexie	Fossett	Newcastle	Maine
5383	Margaret	Schuler	Newcastle	Maine
5384	Del	Merritt	Newcastle	Maine
5385	Mariellen	Whelan	Newcastle	Maine
5386	Stanley	Brown	Newcastle	Maine
5387	Tally	Benner	Newcastle	Maine
5388	Stephanie	Nelson	Newcastle	Maine
5389	Erica	Berman	Newcastle	Maine
5390	Jennifer	Burns	Newcastle	Maine
5391	Glenn	Kessler	Newcastle	Maine
5392	Martha	Grant	Newcastle	Maine
5393	Del	Merritt	Newcastle	Maine
5394	Grace	Phillips	Newcastle	Maine
5395	Kimberly	Carew	Newcastle	Maine
5396	Dana	Tavares	Newcastle	Maine
5397	Jeanne	Thompson	Newcastle	Maine
5398	Diane	McClement	Newfield	Maine
5399	Cody	Zimmer	Newfield	Maine
5400	Peter	Baily	Newfield	Maine
5401	Desiree	Lyon-Johnson	Newport	Maine
5402	Hali	Hardy	Newport	Maine
5403	Meagan	Moody	Newport	Maine
5404	Cynthia	Morris	Newport	Maine
5405	Del	Cote	Newport	Maine
5406	Vicki	Patchell	Newport	Maine
5407	Meredith	Bennett	Newport	Maine
5408	Joanna	Deetjen	Newport	Maine
5409	Mollie	McKnight	Newport	Maine
5410	The Real	Uptown	Newport	Maine
5411	Eeic	Souther	Newry	Maine
5412	Steve	Wight	Newry	Maine
5413	Candace	Hall	Newry	Maine
5414	Rick	Churchill	Newry	Maine
5415	Nancy	Babcock	Newry	Maine
5416	Suzanne	Pierce	Newry	Maine
5417	Iris	Roberts	Newry	Maine
5418	William	Bastian	Newry	Maine
5419	Bruce	Pierce	Newry	Maine
5420	Weneeda	Effingbreak	NIMBY	Maine
5421	Diana	Williams	Nobleboro	Maine
5422	Colton	Spear	Nobleboro	Maine
5423	Robert	Barkalow	Nobleboro	Maine
5424	Hunter	Allen	Nobleboro	Maine
5425	Abagail	Styles	Nobleboro	Maine
5426	Mark	Moody	Nobleboro	Maine
5427	Matt	Silverman	Nobleboro	Maine

5428	Carol	Knapp	Nobleboro	Maine
5429	Don	May	Nobleboro	Maine
5430	Jonathan	Smith	Nobleboro	Maine
5431	Irene	Sodergren	Nobleboro	Maine
5432	Alan	Reed	Nobleboro	Maine
5433	Robert	Lailer	Nobleboro	Maine
5434	Suzanne	Hedrick	Nobleboro	Maine
5435	Kelsey	Gibbs	Nobleboro	Maine
5436	Steve	Plumb	Nobleboro	Maine
5437	Terry	Hapach	Nobleboro	Maine
5438	Joy	Campbell	Nobleboro	Maine
5439	Mike	Kane	Nobleboro	Maine
5440	Richard	Burns	Nobleboro	Maine
5441	Patrick	Styles	Nobleboro	Maine
5442	Nicole	Olivier	Nobleboro	Maine
5443	John	Dow	Nobleboro	Maine
5444	Kelly	Kingsbury	Nobleboro	Maine
5445	Max	Vinal	Nobleboro	Maine
5446	Trevor	Persons	Norridgewock	Maine
5447	Justin	Adams	Norridgewock	Maine
5448	Joann	Roden	Norridgewock	Maine
5449	John	Malek	Norridgewock	Maine
5450	Jasmine	Worster	Norridgewock	Maine
5451	Patrick	Powers	Norridgewock	Maine
5452	Alex	Pakulski	Norridgewock	Maine
5453	Caleb	Bois	Norridgewock	Maine
5454	Katherine	Northcutt	Norridgewock	Maine
5455	Erin	Basch	Norridgewock	Maine
5456	Dusty	Chapman	Norridgewock	Maine
5457	Melissa	Keister	Norridgewock	Maine
5458	Christine	Tarpen	Norridgewock	Maine
5459	Chelsea	Roderick	Norridgewock	Maine
5460	Ruth	Keister	Norridgewock	Maine
5461	Roberta	Sutton	Norridgewock	Maine
5462	Jason	Garland	Norridgewock	Maine
5463	Brian	Hubbard	Norridgewock	Maine
5464	Robert	Pomelow	Norridgewock	Maine
5465	Katherine	Wilder	Norridgewock	Maine
5466	Diane	Drew	Norridgewock	Maine
5467	Kristina	Gossman	Norridgewock	Maine
5468	Leah	Agren	Norridgewock	Maine
5469	Kerri	Everett	Norridgewock	Maine
5470	Linda	Phillips	Norridgewock	Maine
5471	Joseph	McGraw	Norridgewock	Maine
5472	Brent	Sites	Norridgewock	Maine
5473	Skye	Carpenter	Norridgewock	Maine

5474	Helen	Balgooyen	Norridgewock	Maine
5475	Brittany	Garland	Norridgewock	Maine
5476	Warren	Balgooyen	Norridgewock	Maine
5477	Barbara	Austin	Norridgewock	Maine
5478	Katrina	Billings	Norridgewock	Maine
5479	Carrie	Carpenter	Norridgewock	Maine
5480	Nicholas	Young	Norridgewock	Maine
5481	Holly	Antinarelli	Norridgewock	Maine
5482	Alixandra	Cobb	Norridgewock	Maine
5483	Arthur	Wilder	Norridgewock	Maine
5484	Angela	Godbout	Norridgewock	Maine
5485	Kevin	Miller	Norridgewock	Maine
5486	Adam	Higgins	Norridgewock	Maine
5487	Rachel	Northcutt	Norridgewock	Maine
5488	Matthew	Woodbury	Norridgewock	Maine
5489	David	Van Burgel	Norridgewock	Maine
5490	Bridget	Messer	Norridgewock	Maine
5491	Sarah	Ellis-Humphrey	Norridgewock	Maine
5492	Shaylin	Gilchrist	Norridgewock	Maine
5493	Christine	Corson	Norridgewock	Maine
5494	Ann	Dorney	Norridgewock	Maine
5495	Cheyenne	Malloy	Norridgewock	Maine
5496	Kristi	Grover	Norridgewock	Maine
5497	Michael	Miller	Norridgewock	Maine
5498	Leah	Agren	Norridgewock	Maine
5499	steven	mess	Norridgewock	Maine
5500	Julie	Bickford	Norridgewock	Maine
5501	Debra	Sirois	Norridgewock	Maine
5502	Deborah	Baker	Norridgewock	Maine
5503	Tasha	McLaughlin	North Anson	Maine
5504	Garret	St.Peter	North Anson	Maine
5505	Clarence	Ayotte	North Anson	Maine
5506	Rhonda	Blanchard	North Anson	Maine
5507	walter	bailey	North Anson	Maine
5508	MySadie	Ayotte	North Anson	Maine
5509	Carol	Lehto	North Anson	Maine
5510	Brooklyn	McLean	North Anson	Maine
5511	Nancy	Bickford	North Anson	Maine
5512	Cynthia	Soma-Hernandez	North Anson	Maine
5513	Sylvia	Bailey	North Anson	Maine
5514	Lisa	Brown	North Anson	Maine
5515	Frederick	Carrigan	North Anson	Maine
5516	Suwayne	Miller	North Anson	Maine

5517	Mike	Davendonis	North Anson	Maine
5518	Clarence	Ayotte	North Anson	Maine
5519	Cole	Rugh	North Anson	Maine
5520	Joseph	King	North Anson	Maine
5521	Vicki	Myers	North Anson	Maine
5522	Frances	Caron	North Anson	Maine
5523	Harold	Gayne	North Anson	Maine
5524	Michael	Paine	North Berwick	Maine
5525	Louise	Ford	North Berwick	Maine
5526	Karen	Saracina	North Berwick	Maine
5527	Karen	Mathis	North Berwick	Maine
5528	Jo	Kilburn	North Berwick	Maine
5529	Debra	Austin	North Berwick	Maine
5530	Robin	Renaud	North Berwick	Maine
5531	Dan	Hashem	North Berwick	Maine
5532	Chris	Forbes	North Berwick	Maine
5533	CHARLES	BYRNE	North Berwick	Maine
5534	Samantha	Gallaher	North Berwick	Maine
5535	Thomas	Richard	North Berwick	Maine
5536	William	Dileo	North Berwick	Maine
5537	Joseph	Young	North Berwick	Maine
5538	Laura	Kohler	North Berwick	Maine
5539	Jeffrey	Fisher	North Berwick	Maine
5540	Stephanie	Gallagher	North Berwick	Maine
5541	Kai	Gehring	North Berwick	Maine
5542	Mark	Cross	North Bridgton	Maine
5543	Lauri	Washburn	North Bridgton	Maine
5544	Jon	Emerson	North Haven	Maine
5545	Kendra	Baker	North Jay	Maine
5546	Glenn	Griswold	North Monmouth	Maine
5547	Teri	Sherrets	North Monmouth	Maine
5548	Kaitlin	Wade	North Monmouth	Maine
5549	Troy	Michaud	North Monmouth	Maine
5550	Todd	Hartford	North Monmouth	Maine
5551	Dennis	McHugh	North Monmouth	Maine
5552	Brent	Gagnon	North Monmouth	Maine
5553	Faye	Jean	North Monmouth	Maine
5554	Donald	Hale	North New Portland	Maine
5555	Jamie	Harlow	North Turner	Maine
5556	Dominic	Pfeiffer	North Waterboro	Maine
5557	Joshua	Fecteau	North Waterboro	Maine
5558	Matthew	Mason	North Waterboro	Maine
5559	David	Garrity	North Waterboro	Maine
5560	Ronna	Rault	North Waterboro	Maine
5561	Scott	Davis	North Waterboro	Maine
5562	Joseph	Rocray	North Waterboro	Maine

5563	James	Keating	North Waterboro	Maine
5564	Thomas L.	Decker Iii	North Waterboro	Maine
5565	Lindsay	Miner	North Waterboro	Maine
5566	Matthew	McBean	North Waterboro	Maine
5567	Adam	Davis	North Waterboro	Maine
5568	Stephanie	Garrastazu	North Waterboro	Maine
5569	Diana	Simonds	North Yarmouth	Maine
5570	Nikolai	Lane	North Yarmouth	Maine
5571	Deborah	Lawless	North Yarmouth	Maine
5572	Sarah	Fitzpatrick	North Yarmouth	Maine
5573	Tricia	Bowdoin	North Yarmouth	Maine
5574	Chris	Cabot	North Yarmouth	Maine
5575	Jack	Kostelnik	North Yarmouth	Maine
5576	David	Sanford	North Yarmouth	Maine
5577	Alex	Briggs	North Yarmouth	Maine
5578	Brian	Olas	North Yarmouth	Maine
5579	Abraham	Lebel	North Yarmouth	Maine
5580	Sharon	Grover	North Yarmouth	Maine
5581	Dr. Ann	McGarvey	North Yarmouth	Maine
5582	Rod	Nadeau	North Yarmouth	Maine
5583	John	Furey	North Yarmouth	Maine
5584	Barbara	Haskell	North Yarmouth	Maine
5585	Wendy	Furey	North Yarmouth	Maine
5586	Dr. Ann	McGarvey	North Yarmouth	Maine
5587	Hannah	Rose	North Yarmouth	Maine
5588	Matthew	Dubois	North Yarmouth	Maine
5589	Eric	Bowdoin	North Yarmouth	Maine
5590	Alexander	Rose	North Yarmouth	Maine
5591	Gary	Dilisio	North Yarmouth	Maine
5592	Conor	Nadeau	North Yarmouth	Maine
5593	Kathleen	Conrad	North Yarmouth	Maine
5594	Louis	Demers	North Yarmouth	Maine
5595	Isabel	Halperin-Dusch	North Yarmouth	Maine
5596	Donald	Piper	North Yarmouth	Maine
5597	Stephanie	Cheney	North Yarmouth	Maine
5598	John	McCarthy	North Yarmouth	Maine
5599	Michael	Skypeck	North Yarmouth	Maine
5600	Paris	Mansmann	North Yarmouth	Maine
5601	Galen	Arnold	North Yarmouth	Maine
5602	Fortunat	Mueller	North Yarmouth	Maine
5603	Brian	Goldburg	North Yarmouth	Maine
5604	Brian	Olas	North yarmouth	Maine
5605	Justin	Mitchell	Northeast Harbor	Maine
5606	Francis	Weld	Northeast Harbor	Maine
5607	Jamie	Walter	Northeast Harbor	Maine
5608	Helen	Koch	Northeast Harbor	Maine

5609	Heidi	Duso	Northport	Maine
5610	Tracey	Outerbridge	Northport	Maine
5611	Ina	Hollins	Northport	Maine
5612	Bill	Duso	Northport	Maine
5613	Deborah	Tonner	Northport	Maine
5614	Bruce	Grant	Northport	Maine
5615	Gloria	Howard	Northport	Maine
5616	Barbara	Nathanson	Northport	Maine
5617	Paul	Sheridan	Northport	Maine
5618	Katenia	Keller	Northport	Maine
5619	Kevin	Howard	Northport	Maine
5620	Judy	Berk	Northport	Maine
5621			Northport	Maine
5622	Maya	Robinson	Northport	Maine
5623	Gene	Ellis	Norway	Maine
5624	Rebecca	Thomas	Norway	Maine
5625	Amy	Peet	Norway	Maine
5626	Glenn	Tikkanen	Norway	Maine
5627	Jackson	Bonanno	Norway	Maine
5628	Christopher	Thomas	Norway	Maine
5629	Zebulon	Morgan	Norway	Maine
5630	Matthew	Brackett	Norway	Maine
5631	Tyler	Melville	Norway	Maine
5632	Trenton	Levesque	Norway	Maine
5633	Ian	Trundy	Norway	Maine
5634	Logan	Hallee	Norway	Maine
5635	Jason	Trask	Norway	Maine
5636	Josh	Grover	Norway	Maine
5637	Michelle	Wells	Norway	Maine
5638	Dorothy	Raymond	Norway	Maine
5639	Richard	Johnson	Norway	Maine
5640	Chelsea	Gould	Norway	Maine
5641	Corey	Merrill	Norway	Maine
5642	Amy	Laverdiere	Norway	Maine
5643	Kristy	Bell	Norway	Maine
5644	Shawn	Thomas	Norway	Maine
5645	Jeff	Greene	Norway	Maine
5646	Natalie	Delvisco	Norway	Maine
5647	Skylar	Kennison	Norway	Maine
5648	Ben	Flagg	Norway	Maine
5649	Kathleen	Bolduc	Norway	Maine
5650	Dillon	Frechette	Norway	Maine
5651	Donna	Keen	Oakfield	Maine
5652	Glady	Gordon	Oakfield	Maine
5653	Gordon	Keen	Oakfield	Maine
5654	Jared	Bolduc	Oakland	Maine

5655	Greg	Spaulding	Oakland	Maine
5656	Paul	Stevens	Oakland	Maine
5657	Mary	Dunn	Oakland	Maine
5658	Kelsey	Saucier	Oakland	Maine
5659	Stanley	Brown	Oakland	Maine
5660	Sarah	Fredette	Oakland	Maine
5661	Kimberly	Sherman	Oakland	Maine
5662	Stephen	Zambelli	Oakland	Maine
5663	Matthew	Clements	Oakland	Maine
5664	Denise	Willey	Oakland	Maine
5665	Stephen	Collins	Oakland	Maine
5666	Michelle	Magoon-White	Oakland	Maine
5667	Paul	Ashbrook	Oakland	Maine
5668	Bridget	Gehrling	Oakland	Maine
5669	Douglas	Handy	Oakland	Maine
5670	Brian	Lademann	Oakland	Maine
5671	Chalbi	French	Oakland	Maine
5672	Tyler	Whitney	Oakland	Maine
5673	Barbara	Labbe	Oakland	Maine
5674	Michael	Ellis	Oakland	Maine
5675	Brenda	Hodgson	Oakland	Maine
5676	Steven	Brockway	Oakland	Maine
5677	Ryan	Doucette	Oakland	Maine
5678	Jennifer	Hart	Oakland	Maine
5679	Jeffrey	Brown	Oakland	Maine
5680	Bryer	Gallagher	Oakland	Maine
5681	Kathleen	Levesque	Oakland	Maine
5682	Liz	Kingsbury	Oakland	Maine
5683	Shawn	Collins	Oakland	Maine
5684	Barbara	Covey	Oakland	Maine
5685	Robyn	Deveney	Oakland	Maine
5686	Jeffrey	Davis	Oakland	Maine
5687	Dana	Labbe	Oakland	Maine
5688	Heather	Hodgson	Oakland	Maine
5689	Tricia	Simpson	Oakland	Maine
5690	Mary	Fosnough	Oakland	Maine
5691	Shantia	Wright-Gray	Ocean Park	Maine
5692	Justin	Petelle	Ogunquit	Maine
5693	Kacy	Crowder	Ogunquit	Maine
5694	Barbara	Pellon	Old Orchard Beach	Maine
5695	Mitchell	Blow	Old Orchard Beach	Maine
5696	Lauriejean	Gombar	Old Orchard Beach	Maine
5697	Julie	Court	Old Orchard Beach	Maine
5698	Morganne	Meunier	Old Orchard Beach	Maine
5699	Joan	Bullock	Old Orchard Beach	Maine
5700	Kelly	Weeks	Old Orchard Beach	Maine

5701	Dave	Shirley	Old Orchard Beach	Maine
5702	Jason	Moxcey	Old Orchard Beach	Maine
5703	Lori	Rich	Old Orchard Beach	Maine
5704	Nicole	Broz	Old Orchard Beach	Maine
5705	Stephen	Pate	Old Orchard Beach	Maine
5706	Nathan	Dewitt	Old Orchard Beach	Maine
5707	Celeste	Glover	Old Orchard Beach	Maine
5708	Kathy	McKenna	Old Orchard Beach	Maine
5709	Janet	Ordway	Old Orchard Beach	Maine
5710	Bradley	Junkins	Old Orchard Beach	Maine
5711	Karl	Ramsdell	Old Orchard Beach	Maine
5712	Glen	Richardson	Old Orchard Beach	Maine
5713	Kate	Lauzon	Old Orchard Beach	Maine
5714	Ava	Oliver	Old Orchard Beach	Maine
5715	James	Waite	Old Orchard Beach	Maine
5716	Josh	Eon	Old Orchard Beach	Maine
5717	Robert	Lauzon	Old Orchard Beach	Maine
5718	Cari-Lyn	Lane	Old Orchard Beach	Maine
5719	Tim	Vanrosendael	Old Orchard Beach	Maine
5720	Vernetta	Mariello	Old Orchard Beach	Maine
5721	Nancy	Mackin	Old Orchard Beach	Maine
5722	Victoria	White	Old Orchard Beach	Maine
5723	Korrie	Beverley-Waters	Old Orchard Beach	Maine
5724	Lloyd	Day	Old Town	Maine
5725	Jordan	Duffy	Old Town	Maine
5726	Jessica	Briggs	Old Town	Maine
5727	Josh	Towle	Old Town	Maine
5728	James	Doucette	Old Town	Maine
5729	Teddy	Hanson	Old Town	Maine
5730	Timothy	Macdougall	Old Town	Maine
5731	Jenica	Frazier	Old Town	Maine
5732	Shaun	O'Connor	Old Town	Maine
5733	McKenzie	Michaud	Old Town	Maine
5734	Tanner	Luther	Old Town	Maine
5735	Tim	Taylor	Old Town	Maine
5736	Amy	Baron	Old Town	Maine
5737	Kelsi	Whelden	Old Town	Maine
5738	Maria	Girouard	Old Town	Maine
5739	Lois Ann	Hol	Old Town	Maine
5740	Nick	Bartholomew	Old Town	Maine
5741	Dempsey	Oliver	Old Town	Maine
5742	Christopher	Preble	Old Town	Maine
5743	Paula K	Pietrowski	Old Town	Maine
5744	Stefanie	Lemieux	Old Town	Maine
5745	Andrew	Richards	Old Town	Maine
5746	Bryan	Wells	Old Town	Maine

5747	Jason	Baker	Old Town	Maine
5748	Katie	Honnell	Old Town	Maine
5749	Rae	Fournier-Wren	Old Town	Maine
5750	Jason	Foley	Old Town	Maine
5751	Roland	Blenkhorn	Oldtown	Maine
5752	Sue	Paul	Oquossoc	Maine
5753	Susan	Gingras-Eames	Oquossoc	Maine
5754	Lori	Weaver	Oquossoc	Maine
5755	Stan	Grzyb	Oquossoc	Maine
5756	Thomas	O'Rourke	Oquossoc	Maine
5757	Kevin	Bliss	Oquossoc	Maine
5758	Thomas	Taylor	Orland	Maine
5759	Christine	West	Orland	Maine
5760	Chris	Soper	Orland	Maine
5761	Dana	PolojÃ¤rvi	Orland	Maine
5762	Margaret	Fernald	Orland	Maine
5763	Christine	West	Orland	Maine
5764	Jasmine	Berube	Orland	Maine
5765	Anne	Price	Orland	Maine
5766	Wayne	Mayo	Orland	Maine
5767	Joseph	Leach	Orland	Maine
5768	Carolyn	Bennatti	Orland	Maine
5769	Aaron	Morrison	Orland	Maine
5770	Michaela	Ames	Orland	Maine
5771	Julee	Hallowell	Orland	Maine
5772	Kristi	King	Orland	Maine
5773	Shawn	Mercer	Orland	Maine
5774	Ivy	Murphy-Dulac	Orland	Maine
5775	Sherry	Treworgy	Orland	Maine
5776	Carol	Gorecki	Orneville Twp	Maine
5777	Lucia	Smitherman	Orono	Maine
5778	Jacob	Fandel	Orono	Maine
5779	Emily	Moore	Orono	Maine
5780	Dawn	Lamb	Orono	Maine
5781	Jason	Langley	Orono	Maine
5782	Mili	Wright	Orono	Maine
5783	Deanna	Prince	Orono	Maine
5784	Susan	Pinette	Orono	Maine
5785	Donald	Tilbury	Orono	Maine
5786	Brendan	Gilpatrick	Orono	Maine
5787	Matthew	Williamson	Orono	Maine
5788	Kate	Follansbee	Orono	Maine
5789	Shirley	Davis	Orono	Maine
5790	Megan	Correia	Orono	Maine
5791	Patricia	Eldershaw	Orono	Maine
5792	Evan	Goodwin	Orono	Maine

5793	Sharon	Tisher	Orono	Maine
5794	Benjamin	Disalvatore	Orono	Maine
5795	Roger	King	Orono	Maine
5796	Lowell	Ruck	Orono	Maine
5797	Mark	Lena	Orono	Maine
5798	Nancy	Hall	Orono	Maine
5799	Nancy	Larson	Orono	Maine
5800	John	Grillo	Orono	Maine
5801	Kathryn	Bourgoin	Orono	Maine
5802	Leslie	Hudson	Orono	Maine
5803	Geoffrey	Wingard	Orono	Maine
5804	Morgan	Webster	Orono	Maine
5805	George	Mayfield	Orono	Maine
5806	David	Blodgett	Orono	Maine
5807	Craig	Butler	Orono	Maine
5808	Deyrell	Vargas	Orono	Maine
5809	Joseph R	Boucher	Orono	Maine
5810	Kris	Reed	Orono	Maine
5811	Rachel	Shropshire	Orono	Maine
5812	Nicole	Lafrenaye	Orono	Maine
5813	Cheryl	Robertson	Orono	Maine
5814	Linda	Koehler	Orono	Maine
5815	Kimberly	Cordon	Orono	Maine
5816	Chandler	Gallant	Orono	Maine
5817	Doug	Kavanaugh	Orono	Maine
5818	Lydia	Horne	Orono	Maine
5819	Benjamin	Waterman	Orono	Maine
5820	Frances	Haines	Orono	Maine
5821	Kearney	Nash	Orono	Maine
5822	Ariadne	Dimoulas	Orono	Maine
5823	Randall	Young	Orrington	Maine
5824	Patricia	Judd	Orrington	Maine
5825	Jeri	Murphy	Orrington	Maine
5826	Nick	Jordan	Orrington	Maine
5827	Christopher	Leek	Orrington	Maine
5828	Stephanie	Jamieson	Orrington	Maine
5829	Louise M	Plourde-Jameson	Orrington	Maine
5830	Jaimie	Roberts	Orrington	Maine
5831	Ed	Barrood	Orrington	Maine
5832	Katrina	Furrow	Orrington	Maine
5833	Andrew	Gladu	Orrington	Maine
5834	Elizabeth	Alexander	Orrington	Maine
5835	Joseph	Baillargeon	Orrington	Maine
5836	John	Hallett	Orrington	Maine
5837	Terrance	Leavitt	Orrington	Maine
5838	Benjamin	Wheeler	Orrington	Maine

5839	Jonathan	Stitt	Orrington	Maine
5840	Andrew	Cooper	Orrs Island	Maine
5841	Jeanne	Brooks	Orrs Island	Maine
5842	Donna	Cottle	Orrs island	Maine
5843	Michael	Floccher	Orrs Island	Maine
5844	Gretchen	Kamilewicz	Orrs Island	Maine
5845	Molly	Cyr	Orrs Island	Maine
5846	Philip	Cottle	Orrs Island	Maine
5847	Tim	Prindall	Orrs Island	Maine
5848	Elizabeth	Boerstling	Orrs Island	Maine
5849	S	King	Orrs Island	Maine
5850	Mary Louise	Seldenfleur	Orrs Island	Maine
5851	Catherine	Gibson	Orrs Island	Maine
5852	Robin	Brooks	Orrs Island	Maine
5853	Matt	Whitegiver	Otis	Maine
5854	Ann	Patterson	Otis	Maine
5855	Elric	Bleau	Otisfield	Maine
5856	Gregory	Miller	Otisfield	Maine
5857	Hillary	Kahkonen	Otisfield	Maine
5858	Jason	Beeler	Otisfield	Maine
5859	Karen	Turino	Otisfield	Maine
5860	Bill	Sprague	Otisfield	Maine
5861	Abigail	Egan	Otisfield	Maine
5862	Jacob	Edwards	Otisfield	Maine
5863	Raeburn	White	Otisfield	Maine
5864	Tanya	Danowski	Otisfield	Maine
5865	Brendon	David	Otisfield	Maine
5866	Julie	Tibbetts	Otisfield	Maine
5867	Shawn	Kane	Otisfield	Maine
5868	Ellie	Childers	Otisfield	Maine
5869	Ethel	Turner	Otisfield	Maine
5870	Todd	Gustaitis	Otisfield	Maine
5871	Brenna	Hall	Otisfield	Maine
5872	William	Griffin	Otisfield	Maine
5873	Matthew	Sherbinski	Otisfield	Maine
5874	Cynthia	Wurst	Owls Head	Maine
5875	Catherine	Syrett	Owls Head	Maine
5876	Jill	Delaney	Owls Head	Maine
5877	James	Krosschell	Owls Head	Maine
5878	Cynthia	Wurst	Owls Head	Maine
5879	Therese	O'Hara	Owls Head	Maine
5880	Shannon	Brady-Franklin	Owls Head	Maine
5881	Sally	Perkins	Owls Head	Maine
5882	Michael	Silvia	Owls Head	Maine
5883	Ruth	McGhee	Owls Head	Maine
5884	Alan	Philbrook	Owls Head	Maine

5885	Antonia	Daly	Owls Head	Maine
5886	Angela	Hall	Owls Head	Maine
5887	Scott	Hoyt	Owls Head	Maine
5888	Dale	Grass	Oxbow	Maine
5889	Emilee	Taylor	Oxford	Maine
5890	Dakota	Durgin	Oxford	Maine
5891	Jordyn	Sanborn	Oxford	Maine
5892	Kevin	Norcross	Oxford	Maine
5893	Christopher	Kovales	Oxford	Maine
5894	Joshua	Hart	Oxford	Maine
5895	Branfi	Peters	Oxford	Maine
5896	Cynthia	Heald	Oxford	Maine
5897	Michael	Taylor	Oxford	Maine
5898	Renee	Poliquin	Oxford	Maine
5899	Thomas	Givens Jr.	Oxford	Maine
5900	Jean	Larson	Oxford	Maine
5901	Pam	Veilleux	Oxford	Maine
5902	Wayne	Smith	Oxford	Maine
5903	Brendalee	Toothaker	Oxford	Maine
5904	Suzanne	Bottomley	Oxford	Maine
5905	Ross	Damon	Oxford	Maine
5906	Jeffrey	Witham	Oxford	Maine
5907	William	Wentworth	Oxford	Maine
5908	Donnamarie	Damon	Oxford	Maine
5909	Zandi	Noble	Oxford	Maine
5910	Maegan	Hewison	Oxford	Maine
5911	Terri	Coolidge	Oxford	Maine
5912	Tina	Vazquez	Oxford	Maine
5913	Amy	Thompson	Oxford	Maine
5914	Ashly	Rolfe	Oxford	Maine
5915	Tracy	Polisky	Oxford	Maine
5916	Michelle	Bartlett	Oxford	Maine
5917	Georgia	Clarke	Oxford	Maine
5918	Liz	Douglas	Oxford	Maine
5919	David	Hart	Oxford	Maine
5920	Mabel	Crane	Oxford	Maine
5921	Stephen	Knowlton	Oxford	Maine
5922	Caryn	Balcom	Oxford	Maine
5923	Haylee	Hopkins	Oxford	Maine
5924	Courtney	Fox	Oxford	Maine
5925	James	Turcotte	Oxford	Maine
5926	Marcy	Wright	Oxford	Maine
5927	William	Peters	Oxford	Maine
5928	Paul	Cain	Oxford	Maine
5929	Emma	Weekly-Fletes	Oxford	Maine
5930	Heather	Flanders	Oxford	Maine

5931	Nate	Meserve	Oxgord	Maine
5932	David	Henderson	Palermo	Maine
5933	Joshua	Webb	Palermo	Maine
5934	Grace	Crouse	Palermo	Maine
5935	Logan	Parker	Palermo	Maine
5936	Frank	Arbour	Palermo	Maine
5937	Robert	Morrison	Palermo	Maine
5938	Kathleen	Shannon	Palermo	Maine
5939	Jason	Murphy	Palermo	Maine
5940	Maroulla	Gleaton	Palermo	Maine
5941	Nathaniel	Nichols	Palermo	Maine
5942	Rebecca	Loveland	Palermo	Maine
5943	Emily	Foss	Palermo	Maine
5944	Nastassja	Seigars	Palermo	Maine
5945	Hallee	Pottle	Palermo	Maine
5946	Merval	Porter	Palermo	Maine
5947	Micah	Kelly	Palermo	Maine
5948	Lori	Corliss	Palmyra	Maine
5949	Kent	Frati	Palmyra	Maine
5950	Ashley	Klabe	Palmyra	Maine
5951	Cheryl	Simpson	Palmyra	Maine
5952	Kaitlyn	Stafford	Palmyra	Maine
5953	Eunice	McLaughlin	Palmyra	Maine
5954	Kathie	Hood	Palmyra	Maine
5955	Heather	Mackenzie	Palmyra	Maine
5956	Chris	Perkins	Palmyra	Maine
5957	Amy	Beem	Palmyra	Maine
5958	Danielle	McGrath	Palmyra	Maine
5959	Josh	Basso	Paris	Maine
5960	Barbara	Kafka	Parkman	Maine
5961	Fred	Howard	Parkman	Maine
5962	Linda	Hall	Parkman	Maine
5963	Sam	Brown	Parkman	Maine
5964	Annie	Bakajza	Parkman	Maine
5965	James	Meikle	Parkman	Maine
5966	Andrea	Kruse	Parlin Pond Twp	Maine
5967	Heather	Sullivan	Parsonsfield	Maine
5968	Megan	Worthley	Parsonsfield	Maine
5969	Kesia	Campbell	Parsonsfield	Maine
5970	Emma	Banks	Parsonsfield	Maine
5971	Brady	Twomey	Parsonsfield	Maine
5972	Walter	Baily	Parsonsfield	Maine
5973	Clifford	Krolick	Parsonsfield	Maine
5974	Patricia	Leroyer	Parsonsfield	Maine
5975	Kim	Hubbard	Parsonsfield	Maine
5976	Lyn	Sudlow	Parsonsfield	Maine

5977	Lenard	Iannantuoni	Parsonsfield	Maine
5978	Amanda	Mudgett	Parsonsfield	Maine
5979	Patricia	O'Day-Senior	Parsonsfield	Maine
5980	Courtney	Benson	Parsonsfield	Maine
5981	Mackenzie	C	Passadumkeag	Maine
5982	Mary Alice	Mowry	Patten	Maine
5983	John	Flannery	Patten	Maine
5984	Reginald	Porter	Patten	Maine
5985	Hannah	Anderson	Patten	Maine
5986	Raydavis	Murdoch Curry	Peaks Island	Maine
5987	Robert	Villforth	Peaks Island	Maine
5988	Judith	Nelson	Peaks Island	Maine
5989	Kathleen	McCarthy	Peaks Island	Maine
5990	Kristen	Chalmers	Peaks Island	Maine
5991	Paul	Nakroshis	Peaks Island	Maine
5992	Jenny	Kordick	Peaks Island	Maine
5993	Mary Anne	Mitchell	Peaks Island	Maine
5994	Marjorie	Phyfe	Peaks Island	Maine
5995	Marina	Penalver	Peaks Island	Maine
5996	Martha	Gibson	Peaks Island	Maine
5997	Nancy	Dickinson	Pemaquid	Maine
5998	Walter	Johansson	Pemaquid	Maine
5999	Colin	Brown	Pembroke	Maine
6000	Ruby	Sosa	Pembroke	Maine
6001	James	Sosa	Pembroke	Maine
6002	Jacob	White-Rogers	Penobscot	Maine
6003	Dawn	Freeman	Penobscot	Maine
6004	Jane	Washburn	Penobscot	Maine
6005	Bailey	Bowden	Penobscot	Maine
6006	Marianne	Vandiver	Penobscot	Maine
6007	Geoffrey	Miller	Penobscot	Maine
6008	Michelle	Yoder	Penobscot	Maine
6009	Kathleen	Michaud	Perham	Maine
6010	Mike	Szwec	Perry	Maine
6011	Jaques	Skriletz	Perry	Maine
6012	Patrick	Bassett	Perry	Maine
6013	Annette	Socksbasin	Perry	Maine
6014	Addison	Jamieson	Perry	Maine
6015	Pauline	Lola	Perry	Maine
6016	Shirley	Lacoute	Perry	Maine
6017	Gary	Guisinger	Perry	Maine
6018	Dalejo	Longfellow	Perry	Maine
6019	Annastasia	Defeo	Peru	Maine
6020	Tiffany	Libby	Peru	Maine
6021	Michael	E Rocray Sr	Peru	Maine
6022	Jeffrey	Colpitts	Peru	Maine

6023	Jesse	Merrill	Peru	Maine
6024	Raquel	Welch	Peru	Maine
6025	Craig	Wade	Peru	Maine
6026	Karolyn	Buotte	Peru	Maine
6027	Barry	Gallant	Peru	Maine
6028	David	Buck	Peru	Maine
6029	Natalee	Maurais	Peru	Maine
6030	Justin	Dowland	Peru	Maine
6031	Mary Jane	Thorndike	Phillips	Maine
6032	Craig	Reynolds	Phillips	Maine
6033	Melanie	Haggan	Phillips	Maine
6034	Kathleen	Gould	Phillips	Maine
6035	Starr	Galusha	Phillips	Maine
6036	Debbie	McCarthy	Phillips	Maine
6037	Larry	Pinkham	Phillips	Maine
6038	Jen	Pillsbury	Phillips	Maine
6039	Amy	Woodward	Phillips	Maine
6040	John	Ebinger	Phillips	Maine
6041	Sandra	Reynolds	Phillips	Maine
6042	Sylvia	Lambert	Phillips	Maine
6043	Garret	Devisser	Phillips	Maine
6044	Angela	Ebinger	Phillips	Maine
6045	Jewel	Pinkham	Phillips	Maine
6046	Anne	Richard	Phillips	Maine
6047	Pamela	Matthews	Phillips	Maine
6048	Marcy	Caton	Phillips	Maine
6049	Bertrand	Lambert	Phillips	Maine
6050	Regan	Pingree	Phillips	Maine
6051	Tony	Richard	Phippsburg	Maine
6052	Valerie	Peaslee	Phippsburg	Maine
6053	April	Jubett	Phippsburg	Maine
6054	Nancy	Chandler	Phippsburg	Maine
6055	Owen	Murphy	Phippsburg	Maine
6056	Cody	Scott	Phippsburg	Maine
6057	Rebecca	Doyle	Phippsburg	Maine
6058	Peter	Brown	Phippsburg	Maine
6059	Norma	Burpee	Phippsburg	Maine
6060	Hank	Halterman	Phippsburg	Maine
6061	Troy	Wallace	Phippsburg	Maine
6062	Liz	Alexander	Phippsburg	Maine
6063	Michael	Levy	Phippsburg	Maine
6064	Peter	Wark	Phippsburg	Maine
6065	Jacob	Field	Phippsburg	Maine
6066	Jennifer	Condon	Phippsburg	Maine
6067	Isobel	Curtis	Phippsburg	Maine
6068	Sean	Vaillancourt	Phippsburg	Maine

6069	Debra	Freeman	Phippsburg	Maine
6070	Jean	Perkins	Phippsburg	Maine
6071	Jennifer	Wurst	Phippsburg	Maine
6072	Anne	Heminway	Phippsburg	Maine
6073	Laura	Perkins	Phippsburg	Maine
6074	Stephen	Freeman	Phippsburg	Maine
6075	Charles	Chandler	Phippsburg	Maine
6076	April	Burgess	Phippsburg	Maine
6077	Tristan	Brewer	Phippsburg	Maine
6078	Derek	Freeman	Phippsburg	Maine
6079	Cody	Yelland	Phippsburg	Maine
6080	Jolene	Nickerson	Phippsburg	Maine
6081	Debbie	Wing	Phippsburg	Maine
6082	Ashley	Campbell	Phippsburg	Maine
6083	Matthew	Beam	Phippsburg	Maine
6084	Charlene	Cummings	Phippsburg	Maine
6085	Billiejo	Brown	Phippsburg	Maine
6086	David	Pappalardo	Phippsburg	Maine
6087	Edward	Grondin	Phippsburg	Maine
6088	Samuel	Burgess Iii	Phippsburg	Maine
6089	Haley	Barnes	Phippsburg	Maine
6090	Heather	Spencer	Pittsfield	Maine
6091	Vaughan	Woodruff	Pittsfield	Maine
6092	Laurie	Bryson	Pittsfield	Maine
6093	Morgan	Mitchell	Pittsfield	Maine
6094	Edwin	Buzzell	Pittsfield	Maine
6095	Taylor	Hall	Pittsfield	Maine
6096	Elaine	Woodworth	Pittsfield	Maine
6097	Donald	Woodruff	Pittsfield	Maine
6098	Amanda	Johnson	Pittsfield	Maine
6099	George	Yarbrough	Pittsfield	Maine
6100	Victoria	Cormier	Pittsfield	Maine
6101	Sylvia	Kennedy	Pittsfield	Maine
6102	Ray	Berthelette	Pittsfield	Maine
6103	Laura	Danskin	Pittsfield	Maine
6104	Lisa	Dezso	Pittsfield	Maine
6105	Barbara	McPherson	Pittsfield	Maine
6106	Sharon	Kimball	Pittsfield	Maine
6107	Caleb	Moody	Pittston	Maine
6108	Steven	Macmaster	Pittston	Maine
6109	Frederick	Dube	Pittston	Maine
6110	James	Donnell	Pittston	Maine
6111	Levi	Magee	Pittston	Maine
6112	Jordan	Dean	Pittston	Maine
6113	Mary	Granade	Pittston	Maine
6114	Dwayne	Dumais	Pittston	Maine

6115	Christopher	Hand	Pittston	Maine
6116	Travis	Ouellette	Pittston	Maine
6117	Mark	McKenna	Pittston	Maine
6118	Abby	Snow	Pittston	Maine
6119	Sean	Scanlon	Pittston	Maine
6120	Jill	Greenlaw	Pittston	Maine
6121	Suzanne	Callahan	Pittston	Maine
6122	Heather	McAloney	Pittston	Maine
6123	Victoria	Trussell	Pittston	Maine
6124	Mikayla	Shaw	Pittston	Maine
6125	Jeremiah	Haws	Pittston	Maine
6126	Dustin	Gray	Pittston	Maine
6127	Ann	Pistell	Pittston	Maine
6128	Jeremy	Porter	Pittston	Maine
6129	Jim	Rodrigue	Pittston	Maine
6130	Hope	Dube	Pittston	Maine
6131	Tammy	Jewett	Pittston	Maine
6132	Ritchie	Cunningham	Pittston	Maine
6133	Shelley	Chadwick	Pittston	Maine
6134	Glen	Fitzmaurice	Pittston	Maine
6135	Rebecca	Folsom	Pittston	Maine
6136	Sheila	Thsyer	Pittston	Maine
6137	Jared	Nightingale	Pittston	Maine
6138	Roy	Gutfinski	Pittston	Maine
6139	Jared	Reitze	Pittston	Maine
6140	Nathaniel	McFadden	Pittston	Maine
6141	Rhonda	Pehrson	Pleasant Point	Maine
6142	Erik	Francis	Pleasant Point	Maine
6143	Marilynn	Smith	Pleasant Ridge Plt	Maine
6144	Jonathan	Miller	Pleasant Ridge Plt	Maine
6145	Jane	Bowden	Pleasant Ridge Plt	Maine
6146	Colleen	Maguire	Plymouth	Maine
6147	Nicholas	Bragg	Plymouth	Maine
6148	Drew	Curran	Plymouth	Maine
6149	Mary	Smith	Plymouth	Maine
6150	Cortney	Hladik	Poland	Maine
6151	Randy	Kimball	Poland	Maine
6152	Beau	Taylor	Poland	Maine
6153	Courtney	Lachapelle	Poland	Maine
6154	Alicya	Vachon	Poland	Maine
6155	Hannah	Jackson	Poland	Maine
6156	Cassandra	Patnode	Poland	Maine
6157	Abbie	Mannett	Poland	Maine
6158	Deven	Pendexter	Poland	Maine
6159	Daniel	Bernier	Poland	Maine
6160	Brian	Merrill	Poland	Maine

6161	Jack	Parshall	Poland	Maine
6162	Joshua	Chouinard	Poland	Maine
6163	Kelly	Reardon	Poland	Maine
6164	Ronald	Andersen	Poland	Maine
6165	Carrie	Hesketh	Poland	Maine
6166	Jasmine	Lamb	Poland	Maine
6167	Olivia	Ouellette	Poland	Maine
6168	Autumn	Beckwith	Poland	Maine
6169	Lynn	Bernier	Poland	Maine
6170	Amy	Webster	Poland	Maine
6171	Julie	Ames	Poland	Maine
6172	Nicholas	Labbe	Poland	Maine
6173	Tyler	Bumpus	Poland	Maine
6174	Logan	Laliberte	Poland	Maine
6175	Jenna	Chouinard	Poland	Maine
6176	Nathan	McNally	Poland	Maine
6177	Mary	Morin	Poland	Maine
6178	Thomas	Powell	Poland	Maine
6179	Kelly	Strout	Poland	Maine
6180	Peter	Beaudry	Poland	Maine
6181	Chrissy	Kimball	Poland	Maine
6182	Colleen	Verreault	Poland	Maine
6183	Markie	Shaw	Poland	Maine
6184	Chad	Levasseur	Poland	Maine
6185	Adam	McKay	Poland	Maine
6186	Nick	Strout	Poland	Maine
6187	Kandace	Perron	Poland	Maine
6188	Zach	Rickards	Poland	Maine
6189	Kelly	Cronin	Poland	Maine
6190	Kelly	White Gregory	Poland	Maine
6191	Stephanie	Turmenne	Poland	Maine
6192	Sarah	Turgeon	Poland	Maine
6193	Amanda	Robbins-Rowe	Poland	Maine
6194	Christopher	Jackson	Poland	Maine
6195	CLIFFORD C	BENJAMIN	Poland	Maine
6196	Deborah	Perkins	Poland	Maine
6197	Kimberli	Antonelli	Poland	Maine
6198	Catherine	Farrell	Poland	Maine
6199	Cara	Deister	Poland	Maine
6200	Matthew	Deister	Poland	Maine
6201	Abbie	Litalien	Poland	Maine
6202	Cody	Russell	Poland	Maine
6203	Eric	Rosengren	Poland	Maine
6204	Jacolyn	Bailey	Poland	Maine
6205	Emilee	Mercer	Poland	Maine
6206	Ron	Leighton	Poland	Maine

6207	Conrad	Parent	Poland	Maine
6208	Regina	Anderson	Poland	Maine
6209	Michele	Boles	Poland	Maine
6210	Chelsea	Martin	Poland	Maine
6211	Kim	Moody	Poland	Maine
6212	Debra	Fitch	Poland	Maine
6213	Kathleen	Fox	Poland	Maine
6214	John	McIlwain	Port Clyde	Maine
6215	WILLIAM	CLARKE	Port Clyde	Maine
6216	William	Clarke	Port Clyde	Maine
6217	William	Clarke	Port Clyde	Maine
6218	Jack	Routhier	Portage	Maine
6219	Ed	Lilley	Portage	Maine
6220	Lawrence	Duchette	Portage Lake	Maine
6221	Robert R	Marshall	Porter	Maine
6222	Terry	Glidden	Porter	Maine
6223	David	Brennan	Porter	Maine
6224	Rosalind	Bachelder	Porter	Maine
6225	Dawn	Barrett	Porter	Maine
6226	Samantha	Murchie	Porter	Maine
6227	William	Fyler	Porter	Maine
6228	Kenneth	Lunt	Porter	Maine
6229	Sara	Brooke	Portland	Maine
6230	Jiwana	Soleimani	Portland	Maine
6231	Joel	Brown	Portland	Maine
6232	Amanda	Lacourse	Portland	Maine
6233	Anna	Rich	Portland	Maine
6234	Maryann	Larson	Portland	Maine
6235	Anthony	Esposito	Portland	Maine
6236	Joel	Monaghan	Portland	Maine
6237	Andrew	Young	Portland	Maine
6238	Kelly	Merrill	Portland	Maine
6239	Michael	McAllister	Portland	Maine
6240	James	Guy	Portland	Maine
6241	Emily	Lad	Portland	Maine
6242	Jennifer	Angelone	Portland	Maine
6243	Larry	Buchholz	Portland	Maine
6244	Bruce	Jacobs	Portland	Maine
6245	Julia	Durgee	Portland	Maine
6246	Monika	Kirtland	Portland	Maine
6247	Derek	Hengstenberg	Portland	Maine
6248	Pete	Lund	Portland	Maine
6249	Meri	Lowry	Portland	Maine
6250	Ellen	Farnsworth	Portland	Maine
6251	Leslie	Kaynor	Portland	Maine
6252	Mischa	Schuler	Portland	Maine

6253	Susan	Nielsen	Portland	Maine
6254	Andrew	Taylor	Portland	Maine
6255	Jill	Osgood	Portland	Maine
6256	Paul	Wilson	Portland	Maine
6257	Lydia	Futcher	Portland	Maine
6258	Georgia	Harlow	Portland	Maine
6259	Jasmine	Haines	Portland	Maine
6260	Shannon	Oï¿½Connor	Portland	Maine
6261	Marilynn	Vander Schaaf	Portland	Maine
6262	Chris	Hopper	Portland	Maine
6263	Katie	Godin	Portland	Maine
6264	Michael	Jarrett	Portland	Maine
6265	James	McLaughlin	Portland	Maine
6266	Kathleen	Mulkern	Portland	Maine
6267	Mihku	Paul-Anderson	Portland	Maine
6268	Adinah	Barnett	Portland	Maine
6269	Jennifer	O'Connell	Portland	Maine
6270	Chelsea	Hutchinson	Portland	Maine
6271	Jennifer	Lunden	Portland	Maine
6272	Crystal	Gamet	Portland	Maine
6273	Victoria	Randall	Portland	Maine
6274	Mary Jayne	Gould	Portland	Maine
6275	John	Phillips	Portland	Maine
6276	Pamela	Szalajeski	Portland	Maine
6277	Brandon	Carrigan	Portland	Maine
6278	Richard	Ray	Portland	Maine
6279	Melanie	Allen	Portland	Maine
6280	Brynna	Skov	Portland	Maine
6281	Paul	Young	Portland	Maine
6282	Chris	Wall	Portland	Maine
6283	Brandon	Bagley	Portland	Maine
6284	Veronica	Dudar	Portland	Maine
6285	Lauren	Strohmeier	Portland	Maine
6286	Maria	Cron	Portland	Maine
6287	Diane	Lankton	Portland	Maine
6288	Katherine	Sasser	Portland	Maine
6289	Elizabeth	Everett	Portland	Maine
6290	Suzanne	Brewer	Portland	Maine
6291	Camille	Clifford	Portland	Maine
6292	Amy	Crawford	Portland	Maine
6293	Liesel	Krout	Portland	Maine
6294	Luke	Truman	Portland	Maine
6295	Elissa	Armstrong	Portland	Maine
6296	Eliot	Marshall	Portland	Maine
6297	Lee	Attix	Portland	Maine
6298	Howard	Hatch	Portland	Maine

6299	Kathy	Remmel	Portland	Maine
6300	Joshua	Maxwell	Portland	Maine
6301	Colin	Kelly	Portland	Maine
6302	Daryl	Kelley	Portland	Maine
6303	Pamela	Drivas McTigue	Portland	Maine
6304	Alison	Traver	Portland	Maine
6305	Andy	Schmidt	Portland	Maine
6306	Kristal	Karatsanos	Portland	Maine
6307	Elise	Richer	Portland	Maine
6308	Nicholas	Rosenblum	Portland	Maine
6309	Phaeng	Southisombath	Portland	Maine
6310	Elizabeth	Hays	Portland	Maine
6311	Baxter	Miatke	Portland	Maine
6312	Jeanne	Handy	Portland	Maine
6313	Austin	Shriner	Portland	Maine
6314	Donna	Ekart	Portland	Maine
6315	David	Parker	Portland	Maine
6316	David	Cobb	Portland	Maine
6317	Peter	Green	Portland	Maine
6318	Roy	Kring	Portland	Maine
6319	Andrew	Cadot	Portland	Maine
6320	Colin	Durrant	Portland	Maine
6321	James	Bowley	Portland	Maine
6322	Justine	Lasdin Springer	Portland	Maine
6323	Barbara	Lamont	Portland	Maine
6324	Paul	Leblond	Portland	Maine
6325	Frederic	Whiting	Portland	Maine
6326	Jenna	Howard	Portland	Maine
6327	Matthew	Doucette	Portland	Maine
6328	Susan	Pastore	Portland	Maine
6329	Diane	Russell	Portland	Maine
6330	Berry	Manter	Portland	Maine
6331	Nicholas	Lunn	Portland	Maine
6332	Sara	Miller	Portland	Maine
6333	Laurel	Munson	Portland	Maine
6334	Jason	Sandifer	Portland	Maine
6335	Phil	Hamilton	Portland	Maine
6336	Brett	Loffredo	Portland	Maine
6337	Adrienne	Lord-Daggett	Portland	Maine
6338	Ann	Wilmot	Portland	Maine
6339	Bryan	Rosa	Portland	Maine
6340	Heather	Leonas	Portland	Maine
6341	WL	Chapkis	Portland	Maine
6342	Susan	Swain	Portland	Maine
6343	Linda	Markee	Portland	Maine
6344	David	Blais	Portland	Maine

6345	John	Grigsby	Portland	Maine
6346	Steve	Sclar	Portland	Maine
6347	Will	Nichols	Portland	Maine
6348	William	Bronson	Portland	Maine
6349	Sara	Gilfenbaum	Portland	Maine
6350	Aaron	Burdeau	Portland	Maine
6351	Rita	Feeney	Portland	Maine
6352	Emily	Connelly	Portland	Maine
6353	Dmitriy	Brin	Portland	Maine
6354	Joni	Fox-Campbell	Portland	Maine
6355	Daniel	Bernard	Portland	Maine
6356	Andrea	Hawkes	Portland	Maine
6357	Nick	Ciciretti	Portland	Maine
6358	Mary	Marsters	Portland	Maine
6359	Jesde	Mead	Portland	Maine
6360	Gunnar	Hubbard	Portland	Maine
6361	Peter	Dugas	Portland	Maine
6362	Ann	Hitzrot	Portland	Maine
6363	Carolyn	Treat	Portland	Maine
6364	Garrett	Sanborn	Portland	Maine
6365	Brendt	Corcoran	Portland	Maine
6366	Mikki	Jones-Little	Portland	Maine
6367	Myke	Johnson	Portland	Maine
6368	Rachel	Kane	Portland	Maine
6369	Sean	Seary	Portland	Maine
6370	Laurel	Burns	Portland	Maine
6371	Elizabeth	Pope	Portland	Maine
6372	Margaret	Dowzer	Portland	Maine
6373	Mary	Dunn	Portland	Maine
6374	Barbara	Fiore	Portland	Maine
6375	Danielle	Gerber	Portland	Maine
6376	Holly	Bruns	Portland	Maine
6377	Kathleen	Smith	Portland	Maine
6378	Kimara	Jebb	Portland	Maine
6379	Gwen	Tuttle	Portland	Maine
6380	Ray	Ruby	Portland	Maine
6381	Amanda	Lauritzen	Portland	Maine
6382	Nich	Biley	Portland	Maine
6383	Maggy	Wolf	Portland	Maine
6384	Catherine	Alexander	Portland	Maine
6385	Caitlin	Marshall	Portland	Maine
6386	Ron	Feintech	Portland	Maine
6387	Sarah	Drisko	Portland	Maine
6388	Deborah	Rand	Portland	Maine
6389	Ken	Swanberg	Portland	Maine
6390	Carly	Emond	Portland	Maine

6391	Jennifer	Bliss	Portland	Maine
6392	Jon	Hinck	Portland	Maine
6393	Jeremy	Davenport	Portland	Maine
6394	Tyler	Cohen	Portland	Maine
6395	Julie	Bishop	Portland	Maine
6396	Caitlin	Winn	Portland	Maine
6397	Conor	Hartford	Portland	Maine
6398	Alan	Liska	Portland	Maine
6399	Alex	Clarl	Portland	Maine
6400	Cheryl	Denis	Portland	Maine
6401	Jason	Wentworth	Portland	Maine
6402	Bill	Garcelon	Portland	Maine
6403	Lien	De Brouckere	Portland	Maine
6404	Donald	Malonson Sr	Portland	Maine
6405	Megan	Cohen	Portland	Maine
6406	Justin	Beth	Portland	Maine
6407	Kristal	Skrmetta	Portland	Maine
6408	Heather	Craig	Portland	Maine
6409	Susan	Carter	Portland	Maine
6410	Ashley	Rivers	Portland	Maine
6411	Megan	Masker	Portland	Maine
6412	George	St. Clair	Portland	Maine
6413	Lesley	Jones	Portland	Maine
6414	David	Tripp	Portland	Maine
6415	Ann	Albano	Portland	Maine
6416	Theo	Malonson	Portland	Maine
6417	James	Taylor	Portland	Maine
6418	Courtney	Griffin	Portland	Maine
6419	Amy	Holland	Portland	Maine
6420	Jennifer	Muehle	Portland	Maine
6421	Brian	Dietzel	Portland	Maine
6422	Terin	Damron	Portland	Maine
6423	Justin	Bessey	Portland	Maine
6424	Daniel	Powell	Portland	Maine
6425	James	Currier	Portland	Maine
6426	John	Steinhagen	Portland	Maine
6427	Kenyon	Shubert	Portland	Maine
6428	Barbara	Goodbody	Portland	Maine
6429	MIKE	ROYLOS	Portland	Maine
6430	Cecilia	Smith	Portland	Maine
6431	Stephanie	Hampton	Portland	Maine
6432	Jeffrey	Hotchkiss	Portland	Maine
6433	Pamela	Drivas-Mctigue	Portland	Maine
6434	Todd	Casper	Portland	Maine
6435	Catherine	Crute	Portland	Maine
6436	Sally	Trice	Portland	Maine

6437	Ginger	Raspiller	Portland	Maine
6438	David	Farmer	Portland	Maine
6439	Christine	Susca	Portland	Maine
6440	Betsi Jane	Taylor	Portland	Maine
6441	Kyle	Stetson	Portland	Maine
6442	Ana	Courtney	Portland	Maine
6443	Davian	Rawls	Portland	Maine
6444	Lisa	Hopper	Portland	Maine
6445	Mora	Katz	Portland	Maine
6446	Nicholas	Marcketta	Portland	Maine
6447	Julius	Ciembroniewicz	Portland	Maine
6448	Anastasia	Antonacos	Portland	Maine
6449	Sharon	Zelonish	Portland	Maine
6450	Jennifer	Murphy	Portland	Maine
6451	Christian	Loef	Portland	Maine
6452	Nicole	Pineau	Portland	Maine
6453	Jack	Phelan	Portland	Maine
6454	Judith	Wentzell	Portland	Maine
6455	Margo	Wood	Portland	Maine
6456	Sophie	VanDerburgh	Portland	Maine
6457	Stu	Shriner	Portland	Maine
6458	Richard	Rudolph	Portland	Maine
6459	Jennifer	Byron	Portland	Maine
6460	Jerome	Ansia	Portland	Maine
6461	Halorie	Thorne	Portland	Maine
6462	Jessica	Antonez	Portland	Maine
6463	Mary	Marsters	Portland	Maine
6464	Robert	Pantel	Portland	Maine
6465	Donald	Malonson Jr.	Portland	Maine
6466	Ian	Hayward	Portland	Maine
6467	Eleanor	Mann	Portland	Maine
6468	Erica	Robbins	Portland	Maine
6469	Brian	Frost	Portland	Maine
6470	Alice	Gouge	Portland	Maine
6471	Catherine	Griset	Portland	Maine
6472	Mira	D'Amato	Portland	Maine
6473	Cheryl	Nissen	Portland	Maine
6474	Lenora	Leibowitz	Portland	Maine
6475	Todd	Forsyth	Portland	Maine
6476	Susan	Scott	Portland	Maine
6477	David	Howe	Portland	Maine
6478	Greg	Greenman	Portland	Maine
6479	Anita	Jones	Portland	Maine
6480	James	Bruni	Portland	Maine
6481	Eugenia	O'Brien	Portland	Maine
6482	Alexander	Lehnen	Portland	Maine

6483	Sara	Devoy	Portland	Maine
6484	John	Knight	Portland	Maine
6485	Lin	Parsons	Portland	Maine
6486	Karl	Greenwald	Portland	Maine
6487	Sallie	Rich	Portland	Maine
6488	Francesca	Galluccio-Steele	Portland	Maine
6489	Jacqui	Chait	Portland	Maine
6490	Bennett	Morris	Portland	Maine
6491	Jacqui	Deveneau	Portland	Maine
6492	Kristin	Jackson	Portland	Maine
6493	Ebony	Wells	Portland	Maine
6494	Janet	Robinson	Portland	Maine
6495	Reaha	Goyetche	Portland	Maine
6496	Janet	Antich	Portland	Maine
6497	Zach	Lipman	Portland	Maine
6498	Sam	Lawrence	Portland	Maine
6499	Cynthia	Handlen	Portland	Maine
6500	Jamie	Phillips	Portland	Maine
6501	Douglas	Sanborn	Portland	Maine
6502	Jackie	Moreau	Portland	Maine
6503	Amanda	Macleod	Portland	Maine
6504	Melinda	Irving	Portland	Maine
6505	Laura	Burden	Portland	Maine
6506	Allen	Ewing-Merrill	Portland	Maine
6507	Julia	Finkle	Portland	Maine
6508	Martha	Burke	Portland	Maine
6509	Richard	Stevens	Portland	Maine
6510	Cristina	Malcolmson	Portland	Maine
6511	Sandra	Wood	Portland	Maine
6512	Scott	Fortin	Portland	Maine
6513	Dan	Murphy	Portland	Maine
6514	Mallory	Zwerdling	Portland	Maine
6515	Kenneth	Mitchell	Portland	Maine
6516	Ethan	Lavendier	Portland	Maine
6517	Heather	Denkmire	Portland	Maine
6518	Jason	Rubinoff	Portland	Maine
6519	prudence	barry	Portland	Maine
6520	Lily	Proom	Portland	Maine
6521	Joseph	Smith	Portland	Maine
6522	Saisie	Moore	Portland	Maine
6523	Evan	Lebrun	Portland	Maine
6524	Priscilla	Skerry	Portland	Maine
6525	Karen	Bakshoian	Portland	Maine
6526	Erica	Lovejoy	Portland	Maine
6527	Lois	Winter	Portland	Maine
6528	Sarah	Harvey	Portland	Maine

6529	John	Mason	Portland	Maine
6530	Allie	Paradis	Portland	Maine
6531	Zachary	Nichols	Portland	Maine
6532	Greg	Bostater	Portland	Maine
6533	Deborah	Roberts	Portland	Maine
6534	Tyler	Robinson	Portland	Maine
6535	Robin	Folger	Portland	Maine
6536	Martica	Douglas	Portland	Maine
6537	Jo	Sorrell	Portland	Maine
6538	Denise	Burdwood	Portland	Maine
6539	Mary	McGourty	Portland	Maine
6540	Elizabeth	Sullivan	Portland	Maine
6541	Richard P.	Schellens	Portland	Maine
6542	Jake	Richards	Portland	Maine
6543	Laurie	Davis	Portland	Maine
6544	Jared	Goulette	Portland	Maine
6545	Michael	Cornish	Portland	Maine
6546	Virginia	Moore	Portland	Maine
6547	Charlotte	Fullam	Portland	Maine
6548	Amanda	Head	Portland	Maine
6549	Muriel	Allen	Portland	Maine
6550	Lee	Nicoloff	Portland	Maine
6551	Michael	Angelone	Portland	Maine
6552	Susan	Davis	Portland	Maine
6553	Garth	Clark	Portland	Maine
6554	Morgan	Jones	Portland	Maine
6555	Beth	Guy	Portland	Maine
6556	Allison	Doody	Portland	Maine
6557	Lisa	Pierce	Portland	Maine
6558	David	Thibodeau	Portland	Maine
6559	Caleb	Violette	Portland	Maine
6560	Rita	Dennis	Portland	Maine
6561	Kate	Klibansky	Portland	Maine
6562	Craig	Sheil	Portland	Maine
6563	Phaeng	Southisombath	Portland	Maine
6564	Ruby	Dinh	Portland	Maine
6565	Katherine	Green	Portland	Maine
6566	Louise	Backer	Portland	Maine
6567	Travis	Vacchiano	Portland	Maine
6568	Gina	Kenny	Portland	Maine
6569	Michael	Fask	Portland	Maine
6570	J.	Valentine	Portland	Maine
6571	Erik	Hayes	Portland	Maine
6572	Edward	Zelonish	Portland	Maine
6573	Elizabeth	Trice	Portland	Maine
6574	Stacy	Aceto	Portland	Maine

6575	Michael	Orne	Portland	Maine
6576	Janet	Pemberton	Portland	Maine
6577	Lillian	Chaleff	Portland	Maine
6578	Craig	Mathieson	Portland	Maine
6579	David	Collins	Portland	Maine
6580	Sally	Oldham	Portland	Maine
6581	James	Patefield	Portland	Maine
6582	Joe	Kosnow	Portland	Maine
6583	Patricia	Perrier	Portland	Maine
6584	Angus	Briarheart	Portland	Maine
6585	David	Trafton	Portland	Maine
6586	Treva	Demaynadier	Portland	Maine
6587	Susan	Bosco	Portland	Maine
6588	Elaine	Akers	Portland	Maine
6589	Jean	Minervino	Portland	Maine
6590	Catherine	Field	Portland	Maine
6591	Abby	King	Portland	Maine
6592	Paula	Urbach	Portland	Maine
6593	Maureen	Pattee	Portland	Maine
6594	Andrea	Reising	Portland	Maine
6595	Zachary	Mullin	Portland	Maine
6596	Cathy	Conroy	Portland	Maine
6597	Tim	Mommers	Portland	Maine
6598	Ryan	Linn	Portland	Maine
6599	Trevor	Bean	Portland	Maine
6600	Carole	Jean	Portland	Maine
6601	Kurt	Hamilton	Portland	Maine
6602	Colby	Wieland	Portland	Maine
6603	John	Phelan	Portland	Maine
6604	Donna	Madison	Portland	Maine
6605	Jody	Plummer	Portland	Maine
6606	Annie	Wadleigh	Portland	Maine
6607	Kali	Isis	Portland	Maine
6608	George	Shaler	Porty	Maine
6609	Sandra	Spezzani	Pownal	Maine
6610	Clinton	Everett	Pownal	Maine
6611	Brandon	Allen	Pownal	Maine
6612	Kirk	Niese	Pownal	Maine
6613	Daniel	Horowitz	Pownal	Maine
6614	Angela	King-Horne	Pownal	Maine
6615	Christina	Harmon	Pownal	Maine
6616	Calvin	Ryder	Pownal	Maine
6617	Laura	Ely	Pownal	Maine
6618	Adam	Haynes	Pownal	Maine
6619	Nicholas	Cyr	Pownal	Maine
6620	George	Anderson	Pownal	Maine

6621	Forrest	Lizotte	Pownal	Maine
6622	Thomas	McEnaney	Pownal	Maine
6623	Judith	Hopkins	Pownal	Maine
6624	Zackery	Oliver	Pownal	Maine
6625	Trisha	Harmon	Pownal	Maine
6626	Jaime	Gardiner	Pownal	Maine
6627	Emilee	Billings	Pownal	Maine
6628	J	Libby	Pownal	Maine
6629	Matthew	Chipman	Pownal	Maine
6630	Wendy	Pollock	Pownal	Maine
6631	Lee	Gardiner	Pownal	Maine
6632	Alice	Kirkpatrick	Pownal	Maine
6633	Janet	Lynch	Pownal	Maine
6634	Leann	Morrison	Pownal	Maine
6635	Alfred	Fauver	Pownal	Maine
6636	Christine	Peary	Presque Isle	Maine
6637	Robert	Saucier	Presque Isle	Maine
6638	Sarah	LeClaire	Presque Isle	Maine
6639	Kendall	Howlett	Presque isle	Maine
6640	Ethan	Elliott	Presque Isle	Maine
6641	Randy	Lagasse	Presque Isle	Maine
6642	Michele	Sarkisian	Presque Isle	Maine
6643	Dawn	Currie	Presque Isle	Maine
6644	Loretta	Coty	Presque Isle	Maine
6645	Kara	Peters	Presque Isle	Maine
6646	Deion	Caudill	Presque Isle	Maine
6647	Stephanie	Bailey	Princeton	Maine
6648	Pete	Mercier	Princeton	Maine
6649	Cassandra	Socobasin	Princeton	Maine
6650	Cameron	Smallidge	Princeton	Maine
6651	Cameron	Grant	Princeton	Maine
6652	Viola	Francid	Princeton	Maine
6653	Bruce	York	Princeton	Maine
6654	Karen	Ferroni	Randolph	Maine
6655	John	Armstrong	Randolph	Maine
6656	Matthew	St Jarre	Randolph	Maine
6657	Troy	Elwell	Randolph	Maine
6658	Alicia	Koenig	Randolph	Maine
6659	Patricia	Higgins	Randolph	Maine
6660	Ryan	Boucher	Randolph	Maine
6661	Rebecca	Woodard	Randolph	Maine
6662	Donna	Wenckus	Randolph	Maine
6663	Nancy	Spailding	Randolph	Maine
6664	Deedee	Bailey	Randolph	Maine
6665	Amber	Libby	Randolph	Maine
6666	Ernest	Thurston	Randolph	Maine

6667	Roy	Wells	Randolph	Maine
6668	Margaret	Hinkley	Randolph	Maine
6669	Karen	Bartlett	Randolph	Maine
6670	Tom	Sullivan	Rangeley	Maine
6671	Peter	Roehrig	Rangeley	Maine
6672	John	Hooper	Rangeley	Maine
6673	Thomas	Regan	Rangeley	Maine
6674	Ann	Arthurs	Rangeley	Maine
6675	Natausha	Cogley	Rangeley	Maine
6676	Steven	Power	Rangeley	Maine
6677	Dale	Wilson	Rangeley	Maine
6678	Barbara	Jennings	Rangeley	Maine
6679	Jane	Wilson	Rangeley	Maine
6680	Natalie	Brooks	Rangeley	Maine
6681	Raymond	Sorianorr	Rangeley	Maine
6682	Joanne	Dunlap	Rangeley	Maine
6683	Jeannine	Dickey	Rangeley	Maine
6684	Carol	Sullivan	Rangeley	Maine
6685	Allen	Wicken	Rangeley	Maine
6686	Donna	Piotrowski	Rangeley	Maine
6687	Tracy	Doyon	Raymond	Maine
6688	Kimberly	Post	Raymond	Maine
6689	Archie	Tripp	Raymond	Maine
6690	Arlene	Briard	Raymond	Maine
6691	Heather	Peters	Raymond	Maine
6692	Brittney	Coleman	Raymond	Maine
6693	Diana	Altman	Raymond	Maine
6694	David	Gerding	Raymond	Maine
6695	Laurie	Flynn	Raymond	Maine
6696	Rebecca	Sayward	Raymond	Maine
6697	Jennifer	Smith	Raymond	Maine
6698	Carol	Tripp	Raymond	Maine
6699	Lori	TRUE	Raymond	Maine
6700	Todd	Richardson	Raymond	Maine
6701	Peter	Giannoumis	Raymond	Maine
6702	Garry	Stevens	Raymond	Maine
6703	Bruce	Peavey	Raymond	Maine
6704	Janet Berard	Doyle	Raymond	Maine
6705	Michael	Ryan	Raymond	Maine
6706	William	Burnham	Raymond	Maine
6707	Karen	Bartholomay	Raymond	Maine
6708	Britny	Chevarie	Raymond	Maine
6709	Julie	Sutherland	Raymond	Maine
6710	Jeanne	Thomas	Raymond	Maine
6711	Scott	Martin	Raymond	Maine
6712	Cheryl	Ryan	Raymond	Maine

6713	Samantha	Krause	Raymond	Maine
6714	Tammy	Swett	Raymond	Maine
6715	Greylin	Plummer	Raymond	Maine
6716	Michael	D'Arcangelo	Raymond	Maine
6717	Stephanie	Staples	Raymond	Maine
6718	Arthur	Beaudoin	Raymond	Maine
6719	Sharon	Plummer	Raymond	Maine
6720	Matt	Stone	Raymond	Maine
6721	Janette	Plummer	Raymond	Maine
6722	William	Haddock	Raymond	Maine
6723	Paul	tracy	Raymond	Maine
6724	Albert	Goslant	Raymond	Maine
6725	William	Yates	Raymond	Maine
6726	Justin	Vraux	Raymond	Maine
6727	Linda	Pankewicz	Raymond	Maine
6728	M Therese	Duffy	Raymond	Maine
6729	Samuel	Dodge	Raymond	Maine
6730	Rebecca	Tracy	Raymond	Maine
6731	Ashley	Pomelow	Raymond	Maine
6732	Jackie	Fearon	Raymond	Maine
6733	Scott	Powers	Raymond	Maine
6734	Patricia	Stpierre	Raymond	Maine
6735	Duncan	Allen	Readfield	Maine
6736	Ben	Fulmer	Readfield	Maine
6737	Keleine	Laflin	Readfield	Maine
6738	Linda	Nichols	Readfield	Maine
6739	Frank	Michaud	Readfield	Maine
6740	Kaitlyn	Collins	Readfield	Maine
6741	Nathan	Clark	Readfield	Maine
6742	Bruce	Bourgoine	Readfield	Maine
6743	Ryan	Wilford	Readfield	Maine
6744	Bryer	Carlson	Readfield	Maine
6745	Jason	Diamond	Readfield	Maine
6746	Richardyne	Chapman	Readfield	Maine
6747	Dominique	Taylor	Readfield	Maine
6748	Andrew	Sparda	Readfield	Maine
6749	Hunter	Farwell	Readfield	Maine
6750	Jason	White	Readfield	Maine
6751	Eli	Dumaine	Readfield	Maine
6752	Cynthia	Cushing	Readfield	Maine
6753	Melissa	Wight	Readfield	Maine
6754	Nancy	Lawrence	Readfield	Maine
6755	Andrea	Smith	Readfield	Maine
6756	Terry	Hill	Readfield	Maine
6757	Mary	Marino	Readfield	Maine
6758	Susan	Brochu	Readfield	Maine

6759	Gari	Smith-Bayreuther	Readfield	Maine
6760	Tori	Ladd	Readfield	Maine
6761	John	Cushing	Readfield	Maine
6762	Candid	Hill	Readfield	Maine
6763	Annette	Donaghy	Readfield	Maine
6764	Steve	Andrews	Readfield	Maine
6765	Rhea	Meadow	Reed Plt	Maine
6766	Kendra	Lambert	Richmond	Maine
6767	Laurie	Carver	Richmond	Maine
6768	Trevor	Korineck	Richmond	Maine
6769	Johnathan	Proctor	Richmond	Maine
6770	Olga	Pastuchiv	Richmond	Maine
6771	Stephanie	Donaldson	Richmond	Maine
6772	Brittany	Coyne	Richmond	Maine
6773	Jennifer	Small	Richmond	Maine
6774	Joseph	Stanley	Richmond	Maine
6775	Bruce	Carver	Richmond	Maine
6776	Alicia	Roberts	Richmond	Maine
6777	Eric	Humes	Richmond	Maine
6778	Angie	Meserve	Richmond	Maine
6779	Kristin	York	Richmond	Maine
6780	Scott	MacMaster	Richmond	Maine
6781	Chantal	Shields	Richmond	Maine
6782	Lana	Harper	Richmond	Maine
6783	Peter	Joyce	Richmond	Maine
6784	Stella	Trahan	Richmond	Maine
6785	Jaso	Patterson	Richmond	Maine
6786	Emily	Leavitt	Richmond	Maine
6787	Joyce	Gracie	Richmond	Maine
6788	Kimarie	Soule	Richmond	Maine
6789	Betty	Wallace	Richmond	Maine
6790	Ruth	Becker	Richmond	Maine
6791	Melissa	Hackett	Richmond	Maine
6792	Marc	Tabor	Richmond	Maine
6793	Peter	Dorey	Richmond	Maine
6794	Kristen	Salvatore	Richmond	Maine
6795	Valerie	Knight	Richmond	Maine
6796	James	Michaud	Richmond	Maine
6797	Sharon	Chesley	Richmond	Maine
6798	Beth	Comeau	Richmond	Maine
6799	Lois	Legendre	Richmond	Maine
6800	Jan	Wanggaard	Richmond	Maine
6801	Bruce	Carver	Richmond	Maine
6802	Leanndra	McCluskey	Richmond	Maine
6803	Laurie	Dunbar	Richmond	Maine

6804	Dawn	Leavitt	Richmond	Maine
6805	Samantha	Moore	Richmond	Maine
6806	Robert	Comeau	Richmond	Maine
6807	Josh	Snowden	Richmond	Maine
6808	Thomas	Dunbar	Richmond	Maine
6809	Lewis Charles	Loon	Richmond	Maine
6810	Kim	Plummer	Richmond	Maine
6811	Kari	Crosman	Richmond	Maine
6812	Randy	Gray	Richmond	Maine
6813	Cathy	Michaud	Richmond	Maine
6814	Heather	Brown	Richmond	Maine
6815	Samuel	Richmond	Richmond	Maine
6816	Jessie	Linneken	Richmond	Maine
6817	Heath	Austin	Richmond	Maine
6818	Frank	Harrison	Richmond	Maine
6819	Kirk	Alexander	Richmond	Maine
6820	Justin	Marr	Richmond	Maine
6821	Nancy	Massucco	Ripley	Maine
6822	Joseph	Kennedy	Ripley	Maine
6823	Tommy	Harris	Ripley	Maine
6824	Laura	Harris	Ripley	Maine
6825	Dora	Tellier	Ripley	Maine
6826	Julie	Steiner	River Road	Maine
6827	Elizabeth	Jackson	Robbinston	Maine
6828	Courtney-Jo	Curtis	Rockland	Maine
6829	Stacie	Bennett	Rockland	Maine
6830	Timothy	Given	Rockland	Maine
6831	Carolyn	Bobola	Rockland	Maine
6832	Amanda	Dibenedetti	Rockland	Maine
6833	Penelope	Padden	Rockland	Maine
6834	Cadden	Lavoie	Rockland	Maine
6835	Lisa	Vandegrift	Rockland	Maine
6836	Thomas	O'Donovan	Rockland	Maine
6837	Mike	Shunney	Rockland	Maine
6838	Gregory	Howard	Rockland	Maine
6839	Kristin	Lawson	Rockland	Maine
6840	Rebecca	Glaser	Rockland	Maine
6841	Chris	Hack	Rockland	Maine
6842	Leslie	Poole	Rockland	Maine
6843	George	Terrien	Rockland	Maine
6844	Joseph	Allen	Rockland	Maine
6845	Lois	Anne	Rockland	Maine
6846	Margaret	Junge	Rockland	Maine
6847	Nadine	Bangerter	Rockland	Maine
6848	Cassandra	Kenney	Rockland	Maine
6849	Amy	Files	Rockland	Maine

6850	Emily	Benner	Rockland	Maine
6851	Donald	Cole	Rockland	Maine
6852	Donald	Morang	Rockland	Maine
6853	Makayla	Niles	Rockland	Maine
6854	maureen	jennings	Rockland	Maine
6855	Steve	Macdonald	Rockland	Maine
6856	Springer	Lowell	Rockland	Maine
6857	Joshua	Tilton	Rockland	Maine
6858	Bret	Shepard	Rockland	Maine
6859	Melina	Dodd	Rockland	Maine
6860	Kris	Johnson	Rockland	Maine
6861	Beverly	Feldt	Rockland	Maine
6862	David	Lawson	Rockland	Maine
6863	Julieanna	Scott	Rockland	Maine
6864	Phoebe	Downer	Rockland	Maine
6865	David	Paffhausen	Rockland	Maine
6866	Mary Jane	Welch	Rockland	Maine
6867	Nicholas	Snowdeal	Rockland	Maine
6868	Brian	Trask	Rockland	Maine
6869	Jonathan	Frost	Rockland	Maine
6870	Whitney	Files	Rockland	Maine
6871	Cameron	Dennison	Rockland	Maine
6872	Marjorie	Strauss	Rockland	Maine
6873	Leslie	Piercy	Rockland	Maine
6874	Laurence	Coe	Rockland	Maine
6875	starlene	clark	Rockland	Maine
6876	Raymond	Brann	Rockland	Maine
6877	Ezra	Smith	Rockport	Maine
6878	Molly	Ungs Evans	Rockport	Maine
6879	John	Power	Rockport	Maine
6880	Tom	Murphy	Rockport	Maine
6881	John	Blodgett	Rockport	Maine
6882	Nicole	O'Brien Blake	Rockport	Maine
6883	Maggie	Timmermann	Rockport	Maine
6884	Harrah	Lord	Rockport	Maine
6885	Katrinka	Wilder	Rockport	Maine
6886	James	Chalfant	Rockport	Maine
6887	Andrea	Gray	Rockport	Maine
6888	Julie	Sells	Rockport	Maine
6889	Roger	Hollins	Rockport	Maine
6890	Margo	Murphy	Rockport	Maine
6891	Todd	Field	Rockport	Maine
6892	Lisa	Schleelein	Rockport	Maine
6893	Paul	Bickford	Rockport	Maine
6894	Kurt	Penney	Rockport	Maine
6895	Jen	Cooper	Rockport	Maine

6896	Katie	Urey	Rockport	Maine
6897	Angella	Hunt	Rockport	Maine
6898	Will	Trask	Rockport	Maine
6899	Joshua	Povec	Rockport	Maine
6900	Carter	Skemp	Rockport	Maine
6901	Janet	Hunt	Rockport	Maine
6902	Ryan	Gates	Rockport	Maine
6903	Robert	Iserbyt	Rockport	Maine
6904	George	Haselton	Rockport	Maine
6905	Karen	Colburn	Rockport	Maine
6906	Marcia	Dietrich	Rockport	Maine
6907	Nikos	Apollonio	Rockport	Maine
6908	Erica	Gates	Rockport	Maine
6909	Laurence	Miller	Rockport	Maine
6910	Jamie	Arute	Rockwood	Maine
6911	Heidi	Gurney	Rockwood	Maine
6912	Joyce	Welch	Rockwood	Maine
6913	Barbara	Carson	Rockwood	Maine
6914	Adelbert	Hume	Rockwood	Maine
6915	Nicole	Dipalma	Rockwood	Maine
6916	Doreen	Berry-Laskey	Rockwood	Maine
6917	Liza	Douglass	Rockwood	Maine
6918	Timothy	Cogswell	Rockwood	Maine
6919	Jill	Cogswell	Rockwood	Maine
6920	Andrea	Foss	Rome	Maine
6921	Roy	Bouchard	Rome	Maine
6922	Monica	McCarthy	Rome	Maine
6923	Dylan	Smith	Rome	Maine
6924	Chris	Delisle	Rome	Maine
6925	Steven	Mccarthy	Rome	Maine
6926	Charles	Christianson Ii	Rome	Maine
6927	Emily	Nightingale	Rome	Maine
6928	Laura	Pierce	Rome	Maine
6929	Steven	McCarthy	Rome	Maine
6930	Mary	Rackleff	Rome	Maine
6931	Jason	Toner	Rome	Maine
6932	Jody	Knight	Rome	Maine
6933	Daniel	Baty	Round Pond	Maine
6934	Rebecca	Bell	Round Pond	Maine
6935	Michael	Baty	Round Pond	Maine
6936	Jocelyn	Nadeau	Roxbury	Maine
6937	Toby	Wentzell	Roxbury	Maine
6938	Karen	Pierce	Roxbury	Maine
6939	Earle	Kasregis	Roxbury	Maine
6940	Melinda	Worthlley	Roxbury	Maine
6941	Kristina	Spring	Rumford	Maine

6942	Edward	Deroche	Rumford	Maine
6943	Brian	Carrier	Rumford	Maine
6944	Travis	Laughton	Rumford	Maine
6945	Travis	Perron	Rumford	Maine
6946	Michael	Ronan Sr.	Rumford	Maine
6947	Stephanie	Garci	Rumford	Maine
6948	Lisa	Drake	Rumford	Maine
6949	Pamela	Bevins	Rumford	Maine
6950	Todd	Glover	Rumford	Maine
6951	Maureen	Sheldon	Rumford	Maine
6952	Travis	Profit	Rumford	Maine
6953	Melissa	Harding	Rumford	Maine
6954	Izetta	Lee	Rumford	Maine
6955	Anthony	Magno	Rumford	Maine
6956	Travis	Pelletier	Rumford	Maine
6957	Bryce	Parent	Rumford	Maine
6958	Heather	Sorensen	Rumford	Maine
6959	Helen	Donahue	Rumford	Maine
6960	Donna	Cornish	Rumford	Maine
6961	Alisa	Belskis	Rumford	Maine
6962	Regina	Child	Rumford	Maine
6963	Bruce	Plante	Rumford	Maine
6964	Jennifer	Blodgett	Rumford	Maine
6965	Berha	Veilleux	Rumford	Maine
6966	Kathleen	Williams	Rumford	Maine
6967	Cindrie	Cormier	Rumford	Maine
6968	Nancy	Fickett	Rumford	Maine
6969	Rene	Parsons	Rumford	Maine
6970	Thomas	Fallon	Rumford	Maine
6971	Peggy	Hawley	Rumford	Maine
6972	Kimberly	Money	Rumford	Maine
6973	Francis	Allison	Rumford	Maine
6974	Brody	Hale	Rumford	Maine
6975	Paula	Gallant	Rumford	Maine
6976	Amy	Gilbert	Rumford	Maine
6977	Sadie	Standeven	Rumford	Maine
6978	Petef	Laplante	Rumford	Maine
6979	William	Murphy	Rumford	Maine
6980	James W	Boynton Jr	Rumford	Maine
6981	Julie	Allison	Rumford	Maine
6982	Ed	Perry	Rumford	Maine
6983	Jennifer	Kreckel	Rumford	Maine
6984	Carolyn	Bryant	Rumford	Maine
6985	Melissa	Harding	Rumford	Maine
6986	Michael	Parsons	Rumford	Maine
6987	Lani	Bisson	Rumford	Maine

6988	Trena	Magoon	Rumford	Maine
6989	Eric	Davis	Rumford	Maine
6990	Annette	Pratt	Rumford	Maine
6991	Robert	Hawley	Rumford	Maine
6992	Craig	Jacques	Rumford	Maine
6993	Kasey	Zadakis	Rumford	Maine
6994	Susan	Richard	Rumford	Maine
6995	Edward	Bulger	Rumford	Maine
6996	Lisa	Melone	s. berwick	Maine
6997	Cindy	Shumate	Sabattus	Maine
6998	George	Gagnon	Sabattus	Maine
6999	Patrick	Davis	Sabattus	Maine
7000	Amanda	Smith	Sabattus	Maine
7001	Debra A	Clarke	Sabattus	Maine
7002	Joann	Chekovsky	Sabattus	Maine
7003	Candy	Daniels	Sabattus	Maine
7004	Lucian	French	Sabattus	Maine
7005	Rachel	Emond	Sabattus	Maine
7006	John	Curtis	Sabattus	Maine
7007	Margaret Bubier	Bubier	Sabattus	Maine
7008	Mike	Cummings	Sabattus	Maine
7009	Naomi	Hall	Sabattus	Maine
7010	Erica	Staggs	Sabattus	Maine
7011	Ben	Wilson	Sabattus	Maine
7012	Garett	St.Pierre	Sabattus	Maine
7013	Landon	Goyette	Sabattus	Maine
7014	Brenda-Jo	Lane	Sabattus	Maine
7015	Ashley	Williams	Sabattus	Maine
7016	Todd	Cote	Sabattus	Maine
7017	Caleb	Pratt	Sabattus	Maine
7018	Jeanne	Gagnon	Sabattus	Maine
7019	Britta	Albert	Sabattus	Maine
7020	Taylor	Collins	Sabattus	Maine
7021	Kimberly	Campbell	Sabattus	Maine
7022	Erin	Walter	Sabattus	Maine
7023	Devon	Madden	Sabattus	Maine
7024	Melissa	Miller	Sabattus	Maine
7025	Kyle	Laberge	Sabattus	Maine
7026	Scott	Fyfe	Sabattus	Maine
7027	Diane	Doyon	Sabattus	Maine
7028	Michael	Saunders	Sabattus	Maine
7029	Emily	Lundberg	Sabattus	Maine
7030	Donna	Vatcher	Sabattus	Maine
7031	Erin	Austin	Sabattus	Maine
7032	Rick	Gonya	Sabattus	Maine

7033	Devin	Griffin	Sabattus	Maine
7034	Colby	Russell-Leo	Sabattus	Maine
7035	Sarah	Bade	Sabattus	Maine
7036	Anita	Maurice	Sabattus	Maine
7037	James	Albert	Sabattus	Maine
7038	Jeffrey	Dustin	Sabattus	Maine
7039	Richard	French	Sabattus	Maine
7040	Wayne	Burt	Sabattus	Maine
7041	Anthony	Fournier	Sabattus	Maine
7042	Carl	Chretien	Saco	Maine
7043	Nancy	Lacroix	Saco	Maine
7044	Edward	Gallagher	Saco	Maine
7045	Janet	Fernald	Saco	Maine
7046	Tracy	Albert	Saco	Maine
7047	P	Pierce	Saco	Maine
7048	Matt	Ouellette	Saco	Maine
7049	James	Cartier	Saco	Maine
7050	Sandra	Guay	Saco	Maine
7051	Jeffrey	Thibodeau	Saco	Maine
7052	Kathleen	McCallum	Saco	Maine
7053	Tressa	Brown	Saco	Maine
7054	Erik	Smith	Saco	Maine
7055	Christopher	Ward	Saco	Maine
7056	Chris	Martin	Saco	Maine
7057	Scott	Murray	Saco	Maine
7058	Sophie	Joseph	Saco	Maine
7059	C	Lumbert	Saco	Maine
7060	Kate	Collins	Saco	Maine
7061	Peter	Mooney	Saco	Maine
7062	Jamaica	Gilliam	Saco	Maine
7063	Adam	Montgomery	Saco	Maine
7064	Brenda	Hunter	Saco	Maine
7065	Lawrence	Marshall	Saco	Maine
7066	Michael	Desjardins	Saco	Maine
7067	Hope	Lambert	Saco	Maine
7068	Catherine	Bradford	Saco	Maine
7069	Holly	Dudash	Saco	Maine
7070	Tom	Rutka	Saco	Maine
7071	Tod	Alexander	Saco	Maine
7072	Katherine	Brancely	Saco	Maine
7073	Michele	Noyes	Saco	Maine
7074	Theresa	Ruel	Saco	Maine
7075	Heidi	Guimond	Saco	Maine
7076	Laurie	Townsend	Saco	Maine
7077	Eleni	Gourdouros	Saco	Maine
7078	Lance	Archambault	Saco	Maine

7079	Ethan	Ricker	Saco	Maine
7080	Angela	Coffin	Saco	Maine
7081	Darrell	Bridges	Saco	Maine
7082	Chris	Allen	Saco	Maine
7083	Rae	Henckel	Saco	Maine
7084	Alyssa	Renzi	Saco	Maine
7085	Katarina	Monk	Saco	Maine
7086	Ryan	Gorman	Saco	Maine
7087	Jacob	Ellis	Saco	Maine
7088	Matthew	Wiggins	Saco	Maine
7089	Audrey	Northway	Saco	Maine
7090	Crystal	Tinker	Saco	Maine
7091	Lexes	White	Saco	Maine
7092	Ashley	Smiley	Saco	Maine
7093	Lynne	Calero	Saco	Maine
7094	Jake	Smiley	Saco	Maine
7095	Ghislain	Cote	Saco	Maine
7096	Courtney	Bowen	Saco	Maine
7097	Aaron	Mailhiot	Saco	Maine
7098	Nathan	Parenteau	Saco	Maine
7099	Laurent And June	Hourcle	Saco	Maine
7100	Linnea	MarAvell	Saco	Maine
7101	Kevin	Martel	Saco	Maine
7102	Harry	Townsend	Saco	Maine
7103	Casey	Taylor	Saco	Maine
7104	Tom	Pelletier	Saco	Maine
7105	Danielle	Maragus	Saco	Maine
7106	Annie	Levine	Saco	Maine
7107	Shaun	Lewis	Saco	Maine
7108	Alyssa	Carignan	Saco	Maine
7109	Ryan	Campbell	Saco	Maine
7110	Eric	Howard	Saco	Maine
7111	Laura	Knittweis	Saco	Maine
7112	Denise	Benedict	Saco	Maine
7113	Joy	Keirstead	Saco	Maine
7114	Costa	Moreshead	Saco	Maine
7115	Shannon	Johnston	Saco	Maine
7116	Brenda	Sawyer	Saco	Maine
7117	Patrick	Pierce	Saco	Maine
7118	Michael	Leavitt	Saco	Maine
7119	Jessica	Stackpole	Saco	Maine
7120	James	Brooker Jr	Saco	Maine
7121	JOHN	MCENANEY	Saco	Maine
7122	Joanne	Fournier	Saco	Maine
7123	Kim	Esancy	Saint Agatha	Maine

7124	Kim	King	Saint Albans	Maine
7125	Sarah	King	Saint Albans	Maine
7126	Jacob	Richards	Saint Albans	Maine
7127	Sandy	Bussell	Saint Albans	Maine
7128	Anita	Morse	Saint Albans	Maine
7129	Sandy	Bussell	Saint Albans	Maine
7130	Harlow	Post	Saint Albans	Maine
7131	Jan	Post	Saint Albans	Maine
7132	Sherry	Callahan	Salem Twp	Maine
7133	Wayne	Perkins	Salem Twp	Maine
7134	Kirsten	Kelley	Salem Twp	Maine
7135	Mary	Opdyke	Salisbury Cove	Maine
7136	Benjamin	Emory	Salsbury Cove	Maine
7137	Trevor	Philips	Sandy Bay Twp	Maine
7138	Sharon	Dingfelder	Sandy River Plantation	Maine
7139	John	Gove	Sanford	Maine
7140	Allen	Martineau	Sanford	Maine
7141	Susan	Coveney	Sanford	Maine
7142	Michelle	Sheppard	Sanford	Maine
7143	Claude	McGinley	Sanford	Maine
7144	Lisa	Lavalley	Sanford	Maine
7145	Timothy	Morin	Sanford	Maine
7146	Eric	Matheson	Sanford	Maine
7147	Dawn	Luis	Sanford	Maine
7148	Zoe	Ross	Sanford	Maine
7149	Jennifer	Kimball	Sanford	Maine
7150	Nathan	Trufant	Sanford	Maine
7151	Christopher	Landry	Sanford	Maine
7152	Jennifer	Levesque	Sanford	Maine
7153	Jenna	Lawrence	Sanford	Maine
7154	Haley	Murano	Sanford	Maine
7155	Christine	Carpenter	Sanford	Maine
7156	John	Roy	Sanford	Maine
7157	Barbara	Herrgesell	Sanford	Maine
7158	Steve	Libby	Sanford	Maine
7159	Nathan	Roberge	Sanford	Maine
7160	Jacob	Bergeron	Sanford	Maine
7161	Christopher	Anderson	Sanford	Maine
7162	Pamela	Nelsen	Sanford	Maine
7163	Warren	Cheney	Sanford	Maine
7164	Bruce	Roberts	Sanford	Maine
7165	Catherine	Shaw	Sanford	Maine
7166	Amanda	Davis	Sanford	Maine
7167	Kayla	Moulton	Sanford	Maine
7168	Adam	Duckworth	Sanford	Maine
7169	Peter	Pierce	Sanford	Maine

7170	Greg	Holden	Sanford	Maine
7171	Corey	Spulick	Sanford	Maine
7172	Jessica	Woodward	Sanford	Maine
7173	Tom	Joyce	Sanford	Maine
7174	Dennis	Swan	Sanford	Maine
7175	Bambi	Doyon	Sanford	Maine
7176	Deborah	Kreis	Sanford	Maine
7177	Margaret	Weeks	Sanford	Maine
7178	Chad	Guillemette	Sanford	Maine
7179	Kevin	Levesque	Sanford	Maine
7180	Angela	Vulner	Sanford	Maine
7181	Jordan	Johnson	Sanford	Maine
7182	Daniel	Hawkins	Sanford	Maine
7183	Krista	Pelletier	Sanford	Maine
7184	Justin	Paradis	Sanford	Maine
7185	Charlene	Couture	Sanford	Maine
7186	Melanie	Coombs	Sanford	Maine
7187	Sharon	Rivas	Sanford	Maine
7188	Estela	Phillips	Sanford	Maine
7189	Patrick	Howard	Sanford	Maine
7190	Ben	Rideout	Sanford	Maine
7191	Jay	Woodhead	Sanford	Maine
7192	Jaime	McIntosh	Sanford	Maine
7193	Josh	Newton	Sanford	Maine
7194	Matthew	Dayton	Sanford	Maine
7195	Alan	Perry	Sanford	Maine
7196	Lindsey	Nunan	Sanford	Maine
7197	Paul	Stevens	Sanford	Maine
7198	Nicholas	Chambers	Sangerville	Maine
7199	Courtney	Williams	Sangerville	Maine
7200	Meredith	Perkins	Sangerville	Maine
7201	Maureen	Dowd	Sargentville	Maine
7202	Sandra	MacMahon	Scarborough	Maine
7203	Jim	Minott	Scarborough	Maine
7204	Patricia	Fox	Scarborough	Maine
7205	Janis	Quimby	Scarborough	Maine
7206	Jordan	Gilman	Scarborough	Maine
7207	Christina	Painter	Scarborough	Maine
7208	Evie	Perreault	Scarborough	Maine
7209	Valerie	Wylie	Scarborough	Maine
7210	Zack	Yates	Scarborough	Maine
7211	Carolyn	Gawron	Scarborough	Maine
7212	Amy	Wohltjen	Scarborough	Maine
7213	Leah	Brown	Scarborough	Maine
7214	Linda	Stevens	Scarborough	Maine
7215	Jennifer	Adams	Scarborough	Maine

7216	Andrew	Fraser	Scarborough	Maine
7217	Fred	Phillips	Scarborough	Maine
7218	Debbie	Dembski	Scarborough	Maine
7219	Val	Philbrick	Scarborough	Maine
7220	Margot	Pelletier	Scarborough	Maine
7221	Christine	Cellucci	Scarborough	Maine
7222	Sherri	Fabre	Scarborough	Maine
7223	Brian	Violette	Scarborough	Maine
7224	Rachel	Spinner	Scarborough	Maine
7225	Christopher	Smith	Scarborough	Maine
7226	Steven	Delage	Scarborough	Maine
7227	Lisa	Sands	Scarborough	Maine
7228	Rose	Bloom	Scarborough	Maine
7229	Donna	Gordon	Scarborough	Maine
7230	Eric	Callahan	Scarborough	Maine
7231	Holland	Reid	Scarborough	Maine
7232	Deborah	Gilmour	Scarborough	Maine
7233	Mark	Pokras	Scarborough	Maine
7234	Kelly	Hutchinson	Scarborough	Maine
7235	Stan	Gawron	Scarborough	Maine
7236	Leslie	Fitzpatrick	Scarborough	Maine
7237	Zachary	Stover	Scarborough	Maine
7238	William	Stauffer	Scarborough	Maine
7239	Chris	Perry	Scarborough	Maine
7240	Alexandria	Baltovski	Scarborough	Maine
7241	Jerry	Genesio	Scarborough	Maine
7242	Richard	Fox	Scarborough	Maine
7243	Jill	Goroux	Scarborough	Maine
7244	Dwight	Ely	Scarborough	Maine
7245	Ann	Carman	Scarborough	Maine
7246	Andrew	Skillings	Scarborough	Maine
7247	Megan	Thompson	Scarborough	Maine
7248	Beau	King	Scarborough	Maine
7249	Duncan	Perry	Scarborough	Maine
7250	Danielle	Baratta	Scarborough	Maine
7251	Tracey	Allen	Scarborough	Maine
7252	Julie	Carter	Scarborough	Maine
7253	Jane	Palmer	Scarborough	Maine
7254	Craig	Lindsay	Scarborough	Maine
7255	Luann	Farley	Scarborough	Maine
7256	Ryan	McDermott	Scarborough	Maine
7257	Mark	Follansbee	Scarborough	Maine
7258	Linda	Huntley	Scarborough	Maine
7259	Michael	Swords	Scarborough	Maine
7260	Deirdre	Pio	Scarborough	Maine
7261	nick	morales	Scarborough	Maine

7262	Ben	Griffith	Scarborough	Maine
7263	Louis	Pomerleau	Scarborough	Maine
7264	Linda	Hogan	Scarborough	Maine
7265	Blake	Miner	Scarborough	Maine
7266	Jonathan	Carr	Scarborough	Maine
7267	Anthony	Cofone	Scarborough	Maine
7268	Emily	Way	Scarborough	Maine
7269	Nick	Mazuroski	Scarborough	Maine
7270	Anna	Hewitt	Scarborough	Maine
7271	Magili	Quinn	Scarborough	Maine
7272	Lary	Davis	Scarborough	Maine
7273	Mark	Jones	Scarborough	Maine
7274	Lisbeth	Wierda	Scarborough	Maine
7275	Patricia	Campbell	scarborough	Maine
7276	Reggie	Wyman	Scarborough	Maine
7277	Mary	Hawko	Scarborough	Maine
7278	Pauline	Levin	Scarborough	Maine
7279	Jason	Davis	Scarborough	Maine
7280	Laura	Galt	Scarborough	Maine
7281	Mary	Nolette	Scarborough	Maine
7282	Tracey	Allen	Scarborough	Maine
7283	David	May	Scarborough	Maine
7284	Linda	Cannell	Scarborough	Maine
7285	Karen	D'Andrea	Scarborough	Maine
7286	Brian	Ackley	Scarborough	Maine
7287	Ryan	Hughes	Scarborough	Maine
7288	Michelle	Brown	Scarborough	Maine
7289	Noah	Perlut	Scarborough	Maine
7290	Michael	Haskell	Scarborough	Maine
7291	Amber	St. Hilaire	Scarborough	Maine
7292	Bert	Follansbee	Scarborough	Maine
7293	Kevin	Smith	Scarborough	Maine
7294	Sophia	Wentworth	Scarborough	Maine
7295	Diane	Neal	Scarborough	Maine
7296	Sami	Quirion	Scarborough	Maine
7297	Timothy	Leach	Scarborough	Maine
7298	Meredith	Plaud	Scarborough	Maine
7299	Kelly	Santillo	Scarborough	Maine
7300	Ann	Hancock	Scarborough	Maine
7301	Leah	Whitten	Scarborough	Maine
7302	Thomas	Hale	Scarborough	Maine
7303	Taylor	Nichols	Scarborough	Maine
7304	James	Baldwin	Scarborough	Maine
7305	Christina	Davis	Scarborough	Maine
7306	Val	Philbrick	Scarborough	Maine
7307	Emily	Beck	Seal Cove	Maine

7308	Dorcas	Corrow	Seal Cove	Maine
7309	Gabrielle	Graham	Seal Cove	Maine
7310	Sarah	Ebel	Seal Harbor	Maine
7311	Jean	Wakem	Searsmont	Maine
7312	Diane	Sturgeon	Searsmont	Maine
7313	Martin	Bartlett	Searsmont	Maine
7314	Patricia	Fuller	Searsmont	Maine
7315	Avary	Lamont	Searsmont	Maine
7316	Autumn	Jackson	Searsmont	Maine
7317	Linnea	Hoenshell	Searsmont	Maine
7318	Susan	Totman	Searsmont	Maine
7319	Amber	Fuller	Searsmont	Maine
7320	Jordan	Hill	Searsmont	Maine
7321	Vicky	Johnson	Searsmont	Maine
7322	Jensem	Sheafe	Searsmont	Maine
7323	Sadie	Samuels	Searsmont	Maine
7324	Beverly	Settle	Searsmont	Maine
7325	Liv	Detrick	Searsmont	Maine
7326	Randall	Bryant	Searsmont	Maine
7327	Rodney	Lesan	Searsmont	Maine
7328	Donna	Whitney	Searsport	Maine
7329	MARC	GOLDBERG	Searsport	Maine
7330	Dennis	Pike	Searsport	Maine
7331	Janet	Williams	Searsport	Maine
7332	Mike	Lloyd	Searsport	Maine
7333	Kinley	Friend	Searsport	Maine
7334	Troy	Wiseman	Searsport	Maine
7335	Ryan	Soucy	Searsport	Maine
7336	Phyllis	Sommer	Searsport	Maine
7337	Piper	Stiles	Searsport	Maine
7338	Carla	Sanders	Searsport	Maine
7339	Rebecca	Tripp	Searsport	Maine
7340	Jerod	Kronholm	Searsport	Maine
7341	Natasha	Kendall	Searsport	Maine
7342	Joyce	Curtis	Searsport	Maine
7343	James	Economy	Searsport	Maine
7344	Michael	Ford	Sebago	Maine
7345	Glen	Pierce	Sebago	Maine
7346	Nicholas	Moore	Sebago	Maine
7347	Kayla	Legere	Sebago	Maine
7348	Cathleen	Griffin	Sebago	Maine
7349	Kimberly	Berry	Sebago	Maine
7350	Roberta	Stilphen	Sebago	Maine
7351	Nicole	Chamberlain	Sebago	Maine
7352	Frank	Merritt	Sebago	Maine
7353	William	Skelton	Sebago	Maine

7354	Pamela	Boule	Sebago	Maine
7355	Tessica	Merrill	Sebago	Maine
7356	Elysse	Porta	Sebasco Estates	Maine
7357	Katharine	Waitt	Sebec	Maine
7358	Melanie	Baird	Sebec	Maine
7359	Sandra	Heal	Sebec	Maine
7360	jayne	lello	Sebec	Maine
7361	Ann	Flewelling	Sedgwick	Maine
7362	Justin	Gray	Sedgwick	Maine
7363	Mia	Strong	Sedgwick	Maine
7364	Pat	Horton	Sedgwick	Maine
7365	Lorinda	Toscas	Sedgwick	Maine
7366	Charles	Read	Sedgwick	Maine
7367	Peter	Robbins	Sedgwick	Maine
7368	Kobutsu	Malone	Sedgwick	Maine
7369	Peter	Neill	Sedgwick	Maine
7370	Cynthia	Curtis	Sedgwick	Maine
7371	Danielle	Oleary	Shapleigh	Maine
7372	Andrea	Spencer	Shapleigh	Maine
7373	Madge	Baker	Shapleigh	Maine
7374	Nicolas	Neveux	Shapleigh	Maine
7375	Mark	Jacobs	Shapleigh	Maine
7376	James	Rankin	Shapleigh	Maine
7377	Valerie	Johnson	Shapleigh	Maine
7378	Michael	Barrett	Shapleigh	Maine
7379	Jeremie	Winchell	Shapleigh	Maine
7380	Kevin	Smith	Shapleigh	Maine
7381	Justin	Green	Shapleigh	Maine
7382	Lisa	Bedell	Shapleigh	Maine
7383	Emily	Phillips	Shapleigh	Maine
7384	Rita	Geoerge	Shapleigh	Maine
7385	Nathan	Goodwin	Shapleigh	Maine
7386	Donna	Martel	Shapleigh	Maine
7387	Steve	Furbish	Shapleigh	Maine
7388	Aaron	Doens	Shapleigh	Maine
7389	Gerald	Gagnon	Shapleigh	Maine
7390	Brian	Bowens	Shapleigh	Maine
7391	Abby	Chessie	Shapleigh	Maine
7392	Chantal	Margolis	Shapleigh	Maine
7393	Luke	Witham	Shawmut	Maine
7394	Lorraine	Duffy	Sherman	Maine
7395	Brenda	Carrigan	Sherman	Maine
7396	Tori	Arey	Shirley	Maine
7397	John	Wood	Shirley Mills	Maine
7398	Mark	Jennison	Shirley Mills	Maine
7399	Vera	Davis	Shirley Mills	Maine

7400	Ryan	Edmondson	Shirley Mills	Maine
7401	Keith	Cassody	Shirley Mills	Maine
7402	Megan	Jennison	Shirley Mills	Maine
7403	Margaret	Phillips	Shirley Mills	Maine
7404	Jeremy	Hargreaves	Shirley Mills	Maine
7405	Elaina	George	Sidney	Maine
7406	Angela	Dube	Sidney	Maine
7407	Brandon	Levesque	Sidney	Maine
7408	Hallie	Bennett	Sidney	Maine
7409	Beth	Bell	Sidney	Maine
7410	Lyndsey	Shaw	Sidney	Maine
7411	Rita	Skidgel	Sidney	Maine
7412	Jeremy	Beeney	Sidney	Maine
7413	Debra	Poulin	Sidney	Maine
7414	Casey	Cummings	Sidney	Maine
7415	Shaun	Farnsworth	Sidney	Maine
7416	Tayla	Maschino	Sidney	Maine
7417	Joe	Hague	Sidney	Maine
7418	Dakota	Allard	Sidney	Maine
7419	Nick	Cummings	Sidney	Maine
7420	Shellue	Harding	Sidney	Maine
7421	Ethelyn	Christianson	Sidney	Maine
7422	Allison	Steinmeyer	Sidney	Maine
7423	Nate	Gromek	Sidney	Maine
7424	Scott	Routhier	Sidney	Maine
7425	Vanessa	Laliberte	Sidney	Maine
7426	Ethel	Southard	Sidney	Maine
7427	Adam	Bacon	Sidney	Maine
7428	Michelle	Fleury-True	Sidney	Maine
7429	Lonny	Keller	Sidney	Maine
7430	Katie	Beaulieu	Sidney	Maine
7431	Patricia	Beaudoin	Sidney	Maine
7432	Aaron	Gagne	Sidney	Maine
7433	Sandra	Neptune	Sidney	Maine
7434	Walter	Travis	Sidney	Maine
7435	Alexis	Lane	Sidney	Maine
7436	Edward	Muzeroll	Sidney	Maine
7437	Jake	Dube	Sidney	Maine
7438	Chad	Cummings	Sidney	Maine
7439	Mary	Richards	Sidney	Maine
7440	Amanda	Simpson	Sidney	Maine
7441	Susan	Parker	Sidney	Maine
7442	Robert	Collins	Sidney	Maine
7443	Deborah	Beaulieu	Sidney	Maine
7444	Jennifer	Lastella	Sidney	Maine
7445	Kristi	Fredette	Sidney	Maine

7446	Bethanie	Vogt	Sidney	Maine
7447	Cathy	Simmons	Sidney	Maine
7448	Wally	Buschmann	Sidney	Maine
7449	Perry	Sanborn	Sidney	Maine
7450	Robert	Kittredge	Sidney	Maine
7451	Christina	Cummings	Sidney	Maine
7452	Caitlin	Bacon	Sidney	Maine
7453	Tylen	Pooler	Sidney	Maine
7454	Jeremy	Bessey	Sidney	Maine
7455	Brenda	Webber	Sidney	Maine
7456	Brittany	Hernandez	Sidney	Maine
7457	Summer	Sinclair	Sidney	Maine
7458	Elizabeth	Bailey	Sidney	Maine
7459	Donald	Lemieux	Sidney	Maine
7460	Jessica	Towle	Sidney	Maine
7461	Kelsey	Poirier	Sidney	Maine
7462	Heidi	Tibbetts	Sidney	Maine
7463	Tim	Williams	Sidney	Maine
7464	Bryan	Bacon	Sidney	Maine
7465	Beverly	Wescott	Sidney	Maine
7466	Kelly	Fraser	Sidney	Maine
7467	Sarah	St Pierre	Sidney	Maine
7468	Dylan	Gagne	Sidney	Maine
7469	Jacob	Boucher	Sinclair	Maine
7470	John	Swett	Skowhegan	Maine
7471	Tanya	Folsom	Skowhegan	Maine
7472	Tina	Cyr	Skowhegan	Maine
7473	Rob	Booth	Skowhegan	Maine
7474	Kathy	Lebrun	Skowhegan	Maine
7475	Jennifer	Poirier	Skowhegan	Maine
7476	Roger	Poulin	Skowhegan	Maine
7477	Jacob	Richards	Skowhegan	Maine
7478	Patricia	Horine	Skowhegan	Maine
7479	Erin	Sevey	Skowhegan	Maine
7480	Michelle	Johnson	Skowhegan	Maine
7481	Cecil	Gray	Skowhegan	Maine
7482	Bob	Dorko	Skowhegan	Maine
7483	Andrea	Quirion	Skowhegan	Maine
7484	Lee	Taylor	Skowhegan	Maine
7485	Ryan	Moody	Skowhegan	Maine
7486	Cassidy	Bussell	Skowhegan	Maine
7487	Janice	Stringos	Skowhegan	Maine
7488	Hope	Savage	Skowhegan	Maine
7489	Ronald	Mudie	Skowhegan	Maine
7490	Patrick	Flynn	Skowhegan	Maine
7491	Kali	Richards	Skowhegan	Maine

7492	Tucker	Watson	Skowhegan	Maine
7493	Linda	Hoyt	Skowhegan	Maine
7494	Casey	Nadeau	Skowhegan	Maine
7495	Derek	McCarty	Skowhegan	Maine
7496	Lee	Couturier	Skowhegan	Maine
7497	Braden	McCarty	Skowhegan	Maine
7498	Susan	Surabian	Skowhegan	Maine
7499	Eric	Dore	Skowhegan	Maine
7500	Shannon	Thaller	Skowhegan	Maine
7501	Mike	Turcotte	Skowhegan	Maine
7502	Sean	Frost	Skowhegan	Maine
7503	David	Tozier	Skowhegan	Maine
7504	Kane	Grondin	Skowhegan	Maine
7505	Kris	Folsom	Skowhegan	Maine
7506	Barbara	Whitkop	Skowhegan	Maine
7507	Emily	Lightbody	Skowhegan	Maine
7508	Rylee	Jackson	Skowhegan	Maine
7509	Mary	Allmendinger	Skowhegan	Maine
7510	Gust	Stringos	Skowhegan	Maine
7511	Jennifer	Day	Skowhegan	Maine
7512	Donna	Conkling	Skowhegan	Maine
7513	Sam	Horine	Skowhegan	Maine
7514	Cathryn	Peters	Skowhegan	Maine
7515	Andrew	Hall	Skowhegan	Maine
7516	Lucad	York	Skowhegan	Maine
7517	Clifton	Bigoney	Skowhegan	Maine
7518	Cody	Jacques	Skowhegan	Maine
7519	Caleb	Morin	Skowhegan	Maine
7520	Donna	Finley	Skowhegan	Maine
7521	Kolby	Tozier	Skowhegan	Maine
7522	Stephanie	Dickinson	Skowhegan	Maine
7523	Page	Cary	Skowhegan	Maine
7524	Richard	Roderick	Skowhegan	Maine
7525	Tayler	Murray	Skowhegan	Maine
7526	Tavi	Norton	Skowhegan	Maine
7527	Amy	Sanborn	Skowhegan	Maine
7528	Patricia	Van Horne	Skowhegan	Maine
7529	Merle	Stubbs	Skowhegan	Maine
7530	Aaron	Hughes	Skowhegan	Maine
7531	Justin	Boulette	Skowhegan	Maine
7532	Desire	Potter	Skowhegan	Maine
7533	Carroll	Ware	Skowhegan	Maine
7534	Tyler	Judkins	Skowhegan	Maine
7535	Robert	Cook	Skowhegan	Maine
7536	Sherainah	Swett	Skowhegan	Maine
7537	Karla	Sevey-Dugas	Skowhegan	Maine

7538	Shawn	Washburn	Skowhegan	Maine
7539	Jennifer	C	Skowhegan	Maine
7540	Roger	Renfrew	Skowhegan	Maine
7541	Nancy	Bussiere	Skowhegan	Maine
7542	Janel	Blakely	Skowhegan	Maine
7543	Jami	Young	Skowhegan	Maine
7544	Forrest	Noke	Skowhegan	Maine
7545	Dwight	Violette	Skowhegan	Maine
7546	Robert	Russell	Skowhegan	Maine
7547	Will	Luther	Skowhegan	Maine
7548	Debra	Burnham	Skowhegan	Maine
7549	Stephen	Tyks	Skowhegan	Maine
7550	Dorothy	James	Skowhegan	Maine
7551	Erek	Bickford	Skowhegan	Maine
7552	Bryan	York	Skowhegan	Maine
7553	Russell	Peters	Skowhegan	Maine
7554	Alexa	Byler	Skowhegan	Maine
7555	Gwynne	Berry	Skowhegan	Maine
7556	Cheryl	Staples	Skowhegan	Maine
7557	Tonia	Prasch	Skowhegan	Maine
7558	Jennifer	York	Skowhegan	Maine
7559	Joshua	Lewis	Skowhegan	Maine
7560	Mackenzie	Clement	Skowhegan	Maine
7561	Summer	McCollough	Skowhegan	Maine
7562	Mattea	Powers	Skowhegan	Maine
7563	Darryll	White	Skowhegan	Maine
7564	Randi	Wyman	Skowhegan	Maine
7565	Heather	Hall	Skowhegan	Maine
7566	Elizabeth	Berry	Skowhegan	Maine
7567	Alexis	Lane	Skowhegan	Maine
7568	Stephen	Provencal	Skowhegan	Maine
7569	Donald	Carr	Skowhegan	Maine
7570	Derek	Chretien	Skowhegan	Maine
7571	Cheryl	Works	Skowhegan	Maine
7572	Barbara	Cook	Skowhegan	Maine
7573	James	Sylvester	Skowhegan	Maine
7574	David	James	Skowhegan	Maine
7575	William	Finley	Skowhegan	Maine
7576	Issac	Brown	Smithfield	Maine
7577	Jeff	Higgins	Smithfield	Maine
7578	Ciera	Labbe	Smithfield	Maine
7579	Molly	Chapman	Smithfield	Maine
7580	Jenna	Labbe	Smithfield	Maine
7581	Matthew	Kamm	Smithfield	Maine
7582	Alaine	Roselle	Smithfield	Maine
7583	Emily	Trial	Smithfield	Maine

7584	Ryan	Keniston	Smithfield	Maine
7585	Linda	Rice	Smithfield	Maine
7586	Tammie	Richard	Smithfield	Maine
7587	George	Cail	Smithfield	Maine
7588	Bert	Corrigan	Smithfield	Maine
7589	Terry	Dellarma	Smithfield	Maine
7590	Zachary	Trial	Smithfield	Maine
7591	Nancy	Labbe	Smithfield	Maine
7592	Evelyn	Worth	Smithfield	Maine
7593	Zachary	Benner	Smithfield	Maine
7594	Christine	Keller	Smithfield	Maine
7595	Jeff	Pelletier	Smithfield	Maine
7596	Peter	Pelletier	Smithfield	Maine
7597	Cayla	Nadeau	Smithfield	Maine
7598	Rick	Labbe	Smithfield	Maine
7599	Coalton	Whitney	Smyrna Mills	Maine
7600	Kate	Stevens	Solon	Maine
7601	Benjamin	White	Solon	Maine
7602	Charles	Gibson	Solon	Maine
7603	Amanda	Farrar	Solon	Maine
7604	Jeremy	Gibson	Solon	Maine
7605	Robert	Lindblom	Solon	Maine
7606	Shawna	Albert	Solon	Maine
7607	Kaylee	Gilson	Solon	Maine
7608	Joyce	Flanagan	Solon	Maine
7609	Barry	Dana	Solon	Maine
7610	Philip	Dubois Ii	Solon	Maine
7611	Gloria	Lehay	Solon	Maine
7612	Deanna	Reynolds	Solon	Maine
7613	Emily	Stevens	Solon	Maine
7614	Brian	Coombs	Solon	Maine
7615	Annie	Gray	Solon	Maine
7616	Craig	Gerry	Solon	Maine
7617	Frank	Zimbardi	Solon	Maine
7618	Tiana	Thompson	Solon	Maine
7619	Kevin	Flanagan	Solon	Maine
7620	Isaac	Davis	Solon	Maine
7621	Michelle	Stevens	Solon	Maine
7622	Frank	Ridley	Solon	Maine
7623	Brandon	Dixon	Solon	Maine
7624	Isaac	Davis	Solon	Maine
7625	Carrie	Erskine	Solon	Maine
7626	Dylan	Stetson	Solon	Maine
7627	Nancy	Martineau	Solon	Maine
7628	Lisa	Savage	Solon	Maine
7629	Sarah	Carpenter	Solon	Maine

7630	Erin	Scarpa	Solon	Maine
7631	Nancy	Martineau	Solon	Maine
7632	Kelly	Nichols	Somerville	Maine
7633	Deborah	Myers	Somerville	Maine
7634	Randy	Brann	Somerville	Maine
7635	Ashley	Sabins	Somerville	Maine
7636	James	Grenier	Somerville	Maine
7637	Douglas	Shartzer	Somerville	Maine
7638	Nathan	Lambshead	Somerville	Maine
7639	Mary	Throckmorton	Somerville	Maine
7640	Dixie	Dahmen	Sorrento	Maine
7641	Mary Lou	Bagley	South Berwick	Maine
7642	Laura	Eaton	South Berwick	Maine
7643	Jane	Ahlfeld	South Berwick	Maine
7644	Theresa	Korish	South Berwick	Maine
7645	edward	olson	South Berwick	Maine
7646	Susan	White	South Berwick	Maine
7647	Robert	Battersby	South Berwick	Maine
7648	Gail	Sawyer	South Berwick	Maine
7649	Kelly	Allen	South Berwick	Maine
7650	Kathleen	Jones	South Berwick	Maine
7651	John	Demos	South Berwick	Maine
7652	Jeff	St. Pierre	South Berwick	Maine
7653	Rachel	Schumacher	South Berwick	Maine
7654	Carly	Festervan	South Berwick	Maine
7655	Corey	Wright	South Berwick	Maine
7656	John	Mettam	South Berwick	Maine
7657	Abigail	Rovnak	South Berwick	Maine
7658	Lisa	Melone	South Berwick	Maine
7659	Daniel	Jepson	South Berwick	Maine
7660	Eric	Mundell	South Berwick	Maine
7661	Susan	McLean	South Berwick	Maine
7662	Karen	McPhedan	South Berwick	Maine
7663	Tinuviel	Sampson	South Berwick	Maine
7664	Joan	Newton	South Berwick	Maine
7665	Kim	Michel	South Bristol	Maine
7666	Cynthia	Dï¿½Ascanio	South Casco	Maine
7667	Connie	Cross	South Casco	Maine
7668	Ac	Davidson	South China	Maine
7669	Tyler	Barnes	South China	Maine
7670	Andrew	Graham	South China	Maine
7671	November	Burgess	South China	Maine
7672	Joey	Johnson	South China	Maine
7673	Carla	Gade	South China	Maine
7674	Herbert	Ashby	South China	Maine
7675	Dawson	Julia	South China	Maine

7676	Bradford	Swift	South China	Maine
7677	Raigan	Messier	South China	Maine
7678	Timothy	Dunlap Ii	South China	Maine
7679	Robert	Cote	South China	Maine
7680	Sharron	Carey	South China	Maine
7681	Jacob	Houghton	South China	Maine
7682	Alfred	Homan	South China	Maine
7683	Mitch	Donar	South China	Maine
7684	Leo	Pando	South China	Maine
7685	Marjorie	Childs	South China	Maine
7686	Dawn	Levo	South China	Maine
7687	Catherine	McCormac	South China	Maine
7688	Anson	Biller	South China	Maine
7689	Scott	Casey	South China	Maine
7690	Shawn	Houghton	South China	Maine
7691	Tyker	Reynolds	South China	Maine
7692	Ginny	Pelletier	South China	Maine
7693	Robert	Peavey	South China	Maine
7694	Susan	Morry	South China	Maine
7695	Karen	Morin	South China	Maine
7696	Katie	Smith	South China	Maine
7697	Johnathan	French	South China	Maine
7698	Nanette	Bennett	South China	Maine
7699	Hal & Jayne	Winters	South China	Maine
7700	Nanette	Bennett	South China	Maine
7701	Judy	Stone	South China	Maine
7702	Adam	Hamel	South China	Maine
7703	Gene	Kinnaly	South China	Maine
7704	Scott	McCormac	South China	Maine
7705	Ronald	Rochette	South China	Maine
7706	Matt	Bodine	South China	Maine
7707	Tara-Lynn	Hanes	South China	Maine
7708	Christopher	Williams	South China	Maine
7709	Michele	Green	South China	Maine
7710	Randall	Downer	South China	Maine
7711	Maria	Cruz	South China	Maine
7712	Bob	Bennett	South China	Maine
7713	Diana	Bowen	South China	Maine
7714	Timothy	Sanborn	South China	Maine
7715	Jason	Perkins	South China	Maine
7716	Peter	Ainsworth	South Freeport	Maine
7717	Tina	Labreck	South Gardiner	Maine
7718	Wendy	Flanders	South Paris	Maine
7719	Heather	Brown	South Paris	Maine
7720	Zoltan	Matocsy	South Paris	Maine
7721	Brittany	Collette	South Paris	Maine

7722	Raymond	Straiton	South Paris	Maine
7723	Jacob	Skaff	South Paris	Maine
7724	Miranda	Ward	South Paris	Maine
7725	Jason	Cloutier	South Paris	Maine
7726	Bruce	Ceccarossi	South Paris	Maine
7727	Kerry	Read	South Paris	Maine
7728	Linsey	Record	South Paris	Maine
7729	Nicole	Brule	South Paris	Maine
7730	Katherine	Branch	South Paris	Maine
7731	Rachel	Thibodeau	South Paris	Maine
7732	Gary	Vaughn	South Paris	Maine
7733	Corey	Britton	South Paris	Maine
7734	Kacie	Tripp	South Paris	Maine
7735	Sarah	Hayes	South Paris	Maine
7736	Sophia	Maamouri	South Paris	Maine
7737	Leah	Libby Menezes	South Paris	Maine
7738	Allen	Larson	South Paris	Maine
7739	Troy	Rowell	South Paris	Maine
7740	James	Kennedy	South Paris	Maine
7741	Wendy	Flanders	South Paris	Maine
7742	Kimberly	Mullins	South Paris	Maine
7743	Stacy	Coombs	South Paris	Maine
7744	Mara	Robertshaw	South Paris	Maine
7745	Sara	Estes	South Paris	Maine
7746	James	Bailey	South Paris	Maine
7747	Ryan	Smith	South Paris	Maine
7748	Gladys	Foster	South Paris	Maine
7749	Nicholas	Page	South Paris	Maine
7750	Frank	Danforth Iii	South Paris	Maine
7751	Katrina	Waite	South Paris	Maine
7752	Alex	Snow	South Paris	Maine
7753	Stanley	Larson	South Paris	Maine
7754	Sasha	Petrovick	South Paris	Maine
7755	Kelly	McPherson	South Portland	Maine
7756	Richard	McGinley	South Portland	Maine
7757	Susan	White	South Portland	Maine
7758	Chris	Walsh	South Portland	Maine
7759	Maria	Reuillard	South Portland	Maine
7760	Paula	Mallory	South Portland	Maine
7761	Ashley	Jacaruso	South Portland	Maine
7762	Faith	Thomas	South Portland	Maine
7763	Carl	Ekholm	South Portland	Maine
7764	Jean	Sideris	South Portland	Maine
7765	Jeremy	Doxsee	South Portland	Maine
7766	Debra	Davis	South Portland	Maine
7767	Philip	Hilt	South Portland	Maine

7768	Kailey	Hannigan	South Portland	Maine
7769	Donald	Young	South Portland	Maine
7770	Karen	Kimball	South Portland	Maine
7771	Hannah	Gato	South Portland	Maine
7772	Patricia	Mew	South Portland	Maine
7773	Jeffrey	Stone	South Portland	Maine
7774	Thomas	Keller	South Portland	Maine
7775	Keith	Gaudet	South Portland	Maine
7776	Charles	Hall	South Portland	Maine
7777	Barbara	Kriger	South Portland	Maine
7778	Bevin	McNulty	South Portland	Maine
7779	Denise	Michaud	South Portland	Maine
7780	Ginny	Schneider	South Portland	Maine
7781	Richard	Baker	South Portland	Maine
7782	Lisa	Munderback	South Portland	Maine
7783	Bruce	Cole	South Portland	Maine
7784	Kristine	Corey	South Portland	Maine
7785	Jolynn	Nye	South Portland	Maine
7786	Louisa	Beckett	South Portland	Maine
7787	D	Thomas	South Portland	Maine
7788	Denise	Larue	South Portland	Maine
7789	Allison	Reid	South Portland	Maine
7790	Carol	Ross	South Portland	Maine
7791	Nicholas	Pottle	South Portland	Maine
7792	Shania	Gray	South Portland	Maine
7793	Scott	Hamann	South Portland	Maine
7794	Carole	Orem	South Portland	Maine
7795	Gloriia	Twomey	South Portland	Maine
7796	Rachel	Burger	South Portland	Maine
7797	Abby	Huntoon	South Portland	Maine
7798	Priscilla	Mahoney	South Portland	Maine
7799	Tammy	Prop	South Portland	Maine
7800	Deborah	Fields-Graham	South Portland	Maine
7801	Peter	Conley	South Portland	Maine
7802	Erica	Shubin	South Portland	Maine
7803	Kari	Lugiano	South Portland	Maine
7804	Garry	Bracken	South Portland	Maine
7805	Lindsay	Cannon	South Portland	Maine
7806	John	Bernard	South Portland	Maine
7807	Tyson	O'Keefe	South Portland	Maine
7808	Lynn	McGovern	South Portland	Maine
7809	Lisa	Fabricius	South Portland	Maine
7810	Jennifer	Joaquin	South Portland	Maine
7811	Ann	Morrill	South Portland	Maine
7812	Marc	Sirois	South Portland	Maine
7813	Eben	Rose	South Portland	Maine

7814	Nathan	Hicks	South Portland	Maine
7815	Christian	Farnsworth	South Portland	Maine
7816	William	Nadeau	South Portland	Maine
7817	Vickie	Goushaw	South Portland	Maine
7818	Philip	Lee	South Portland	Maine
7819	Gregg	Raymond	South Portland	Maine
7820	Susan	McClure	South Portland	Maine
7821	Devin	Young	South Portland	Maine
7822	Hayden	Hunt	South Portland	Maine
7823	Collin	Gebhardt	South Portland	Maine
7824	Patty	Renaud	South Portland	Maine
7825	Michael	Jones	South Portland	Maine
7826	Thomas	Cormier	South Portland	Maine
7827	Mary-Jane	Ferrier	South Portland	Maine
7828	Gwen	Keighley	South Portland	Maine
7829	Joan	Stanton	South Portland	Maine
7830	Deborah	Fields-Graham	South Portland	Maine
7831	Peter	Googins	South Portland	Maine
7832	John	Cyr	South Portland	Maine
7833	Joe	Hemes	South Portland	Maine
7834	April	Caricchio	South Portland	Maine
7835	Emily	S.	South Portland	Maine
7836	Cynthia	Krum	South Portland	Maine
7837	Jake	Kulaw	South Portland	Maine
7838	Philip	Lee	South Portland	Maine
7839	Kerri	Szolusha	South Portland	Maine
7840	Bethany	Woodworth	South Portland	Maine
7841	Ian	Farm	South Portland	Maine
7842	Adam	Enman	South Portland	Maine
7843	Kelly	Corbin	South Portland	Maine
7844	Jesse	Shaw	South Portland	Maine
7845	Celeste	Roberge	South Portland	Maine
7846	Dennis	Voter	South Portland	Maine
7847	James	Melloh	South Portland	Maine
7848	Muriel K	Kruppa	South Portland	Maine
7849	Helen	Meyer	South Portland	Maine
7850	John	Ford	South Portland	Maine
7851	Marie	Pineo	South Portland	Maine
7852	Catherine	Chapman	South Portland	Maine
7853	Robert	Nixon	South Portland	Maine
7854	Lindsay	Stevens	South Portland	Maine
7855	Ellen	Zimmerman	South Portland	Maine
7856	Dorothy	Carr	South Portland	Maine
7857	Barry	Woods	South Portland	Maine
7858	Elizabeth	Perry	South Portland	Maine
7859	Drew	Kinney	South Portland	Maine

7860	Pat	Haertel	South Portland	Maine
7861	Shannon	Whitmore	South Portland	Maine
7862	Lucie	Springman	South Portland	Maine
7863	Stephen	Beckett	South Portland	Maine
7864	Catherine	Merrow	South Portland	Maine
7865	Nikos	Ley-Simmons	South Portland	Maine
7866	Andrew	Pulk	South Portland	Maine
7867	Robert	Morrill	South Portland	Maine
7868	Nicholas	McKenney	South Portland	Maine
7869	Robert	Craft	South Portland	Maine
7870	Jeremy	Haskell	South Portland	Maine
7871	Kristin	Jerome	South Portland	Maine
7872	Christian	Townsend	South Portland	Maine
7873	Peter	Robbins	South Portland	Maine
7874	Margaret	Esten	South Portland	Maine
7875	Joseph	Greeley	South Portland	Maine
7876	Mary	Derose	South Portland	Maine
7877	Donald	Sargent	South Portland	Maine
7878	Alexander	Green	South Portland	Maine
7879	Bob	Foster	South Portland	Maine
7880	Mark	Ustach	South Portland	Maine
7881	Jean	Smith	South Portland	Maine
7882	Kristen	Smith	South Portland	Maine
7883	Pamela	Bosco	South Portland	Maine
7884	Mary	Stone	South Portland	Maine
7885	Joanne	Fedorocko	South Portland	Maine
7886	Christina	Hafner	South Portland	Maine
7887	Tanay	Soucie-Porter	South Portland	Maine
7888	Brooks	Cannon	South Portland	Maine
7889	Kelly	Thebarge	South Portland	Maine
7890	Betty	Hickey	South Portland	Maine
7891	Braf	Young	South Rd	Maine
7892	Polly	Armstrong	South Thomaston	Maine
7893	Matthew	Bosica	South Thomaston	Maine
7894	Molly	Harvey	South Thomaston	Maine
7895	kathleen	florance	South Thomaston	Maine
7896	Virginia	Shepler-Sarai	South Thomaston	Maine
7897	Sally	Howlett	South Thomaston	Maine
7898	Jaime	Gregory	South Thomaston	Maine
7899	Shana	Howard	South Thomaston	Maine
7900	Anna	Frost	South Thomaston	Maine
7901	Kevin	McAllister	South Thomaston	Maine
7902	William	Garske	South Thomaston	Maine
7903	Carolyn	Garske	South Thomaston	Maine
7904	Carla	White	South Thomaston	Maine
7905	Arthur	Karker	South Thomaston	Maine

7906	Breeze	Kidder	Southport	Maine
7907	Marjorie	Monteleon	Southwest Harbor	Maine
7908	Bonnie	Lewis	Southwest Harbor	Maine
7909	Tim	Billings	Southwest Harbor	Maine
7910	Emma	Strong	Southwest Harbor	Maine
7911	Timothy	Clough	Southwest Harbor	Maine
7912	Beth	Pfeiffer	Southwest Harbor	Maine
7913	Dean	Henry	Southwest Harbor	Maine
7914	Janice	Church	Southwest Harbor	Maine
7915	Anny	Seavey	Southwest Harbor	Maine
7916	Stephen	Homer	Southwest Harbor	Maine
7917	Belinda	Toby	Springfield	Maine
7918	Danielle	Watson	Springvale	Maine
7919	Jean	Noon	Springvale	Maine
7920	Tatiana	Rodriguez	Springvale	Maine
7921	Sherwin	Start	Springvale	Maine
7922	Lindsey	Kiesman	Springvale	Maine
7923	Rebecca	Lafond	Springvale	Maine
7924	Sydney	Hall	Springvale	Maine
7925	Amanda	Johnson	Springvale	Maine
7926	Russell	Coughlin	Springvale	Maine
7927	Ken	Hall	Springvale	Maine
7928	Stephanie	Hupe	Springvale	Maine
7929	Kimberly	Cushman	Springvale	Maine
7930	Justin	Johnson	Springvale	Maine
7931	Randi	Fife	Springvale	Maine
7932	Travis	Naylor	Springvale	Maine
7933	Joe	Keef	Springvale	Maine
7934	I L	Wanco	Springvale	Maine
7935	Melissa	Valley	Springvale	Maine
7936	Lillian	Rodden	Springvale	Maine
7937	Sherwin	Start	Springvale	Maine
7938	Thomas	Hudson	Springvale	Maine
7939	Michael	Tuttle	Springvale	Maine
7940	Rita Kay	Bergeron	Springvale	Maine
7941	Elijah	Tremblay	Springvale	Maine
7942	Sally	Merchant	Spruce Head	Maine
7943	James	Zoller	Spruce Head	Maine
7944	Susan	Ellis	Spruce Head	Maine
7945	Susan	Drolet	Spruce Head	Maine
7946	Kim	Borges-Therien	St John Plt	Maine
7947	Patricia	Cullins	Stacyville	Maine
7948	Michael	Eckstein	Standish	Maine
7949	Holly	Bragdon	Standish	Maine
7950	Audrey	Lovering	Standish	Maine
7951	Robert	Zuidema	Standish	Maine

7952	Brenda	Macdowell	Standish	Maine
7953	Eleanor	Peterson	Standish	Maine
7954	Gary	Keene	Standish	Maine
7955	Sandra	Dumbrocyo	Standish	Maine
7956	Lee-Ann	Vanatta	Standish	Maine
7957	Ronald	Richards	Standish	Maine
7958	Brooke	Place	Standish	Maine
7959	Darrin	Russ	Standish	Maine
7960	Kate-Lyn	Wilcox	Standish	Maine
7961	Sarah	Smith	Standish	Maine
7962	Nyssa	Parmenter	Standish	Maine
7963	Heather	Craig	Standish	Maine
7964	Louis	Tucci	Standish	Maine
7965	Ashley	Lanoie	Standish	Maine
7966	Charles	Currier	Standish	Maine
7967	Joseph	Washuk	Standish	Maine
7968	Steve	Hannigan	Standish	Maine
7969	Sarah	Hodgkin	Standish	Maine
7970	Ashlee	Johnson	Standish	Maine
7971	Kristina	Zuidema	Standish	Maine
7972	Lauren	Carpenter	Standish	Maine
7973	Jason	Lanoie	Standish	Maine
7974	Deidre	Weymouth	Standish	Maine
7975	Carol	Currier	Standish	Maine
7976	Cory	Lunt	Standish	Maine
7977	Sharon	Cunningham	Standish	Maine
7978	Craig	Demers	Standish	Maine
7979	Dan	Wheeler	Standish	Maine
7980	Melissa	Dubois	Standish	Maine
7981	Shane	Drake	Standish	Maine
7982	Caitlin	Gamache	Standish	Maine
7983	Arthur	Cunningham	Standish	Maine
7984	Robert	Morowski	Standish	Maine
7985	Kayla	Harris	Standish	Maine
7986	Josh	Dunlap	Standish	Maine
7987	Michael	Smith	Standish	Maine
7988	Scott	Vining	Starks	Maine
7989	Tina	Oliver	Starks	Maine
7990	Sherene	Roberts	Starks	Maine
7991	Gabriella	Elfahel	Starks	Maine
7992	John	Robinson	Starks	Maine
7993	Barbara	Huettner	Starks	Maine
7994	Marie	Deluca	Starks	Maine
7995	Kimberly	Hendershot	Starks	Maine
7996	Courtney	Ashland	Starks	Maine
7997	Daniel	Bucciano	Starks	Maine

7998	Elizabeth	Smedberg	Starks	Maine
7999	Jessica	Waite	Starks	Maine
8000	Nicholas	Waite	Starks	Maine
8001	Melissa	Couture	Starks	Maine
8002	Jennifer	Orlowsky	Steep Falls	Maine
8003	Brian	Marles	Steep Falls	Maine
8004	peter	christensen	Steep Falls	Maine
8005	Patrick	Gillespie	Steep Falls	Maine
8006	Luwana	Dyer	Steep Falls	Maine
8007	Joshua	Fogg	Steep Falls	Maine
8008	Matthew	Gibbons	Steep Falls	Maine
8009	John	Hutchins	Steep Falls	Maine
8010	Wayne	Krauth	Steep Falls	Maine
8011	Georgianna	Kosciusko	Stetson	Maine
8012	Elaine	Gustafson	Stetson	Maine
8013	Zachary	Emerson	Stetson	Maine
8014	Suzanne	Hachey	Stetson	Maine
8015	Jarod	Burnett	Stetson	Maine
8016	Scott	Bruns	Stetson	Maine
8017	Maryann	Smale	Steuben	Maine
8018	Brent	West	Steuben	Maine
8019	Margit	Andersson	Steuben	Maine
8020	Greg	Simkiss	Steuben	Maine
8021	Peggy	Drake	Steuben	Maine
8022	Shemaya	Laurel	Steuben	Maine
8023	Sheila	Unvala	Steuben	Maine
8024	Mary Ann	Goodrich	Stockton Springs	Maine
8025	Serena	Cole	Stockton Springs	Maine
8026	Karen	Veilleux	Stockton Springs	Maine
8027	Donna	Sanborn	Stockton Springs	Maine
8028	Ken	Oberholtzer	Stockton Springs	Maine
8029	Lorna	Russell	Stockton Springs	Maine
8030	Renee	Capouya	Stockton Springs	Maine
8031	Mike	Marino	Stockton Springs	Maine
8032	William	Carpenter	Stockton Springs	Maine
8033	Paul	Buckley	Stockton Springs	Maine
8034	John	Noomyenooneam	Stocktonspring	Maine
8035	Gail	Langer	Stoneham	Maine
8036	Nancy	Hammond	Stoneham	Maine
8037	Thomas	Hawthorne	Stonington	Maine
8038	Diane	Walker	Stonington	Maine
8039	Ryan	Albert	Stow	Maine
8040	Michelle	Luongo	Stow	Maine
8041	Micheal	Butters	Stow	Maine
8042	Louise	Tesseo	Stratton	Maine
8043	Alex	Tuttle	Stratton	Maine

8044	Colombe	Loef	Stratton	Maine
8045	Tammy	Pinkham	Stratton	Maine
8046	Leonard	Hobbs	Stratton	Maine
8047	Kevin	Leblanc	Stratton	Maine
8048	Lisa	Brynildsen	Stratton	Maine
8049	Brenna	Herridge	Stratton	Maine
8050	Andrew	Cyr	Stratton	Maine
8051	Conor	Doherty	Stratton	Maine
8052	Eileen	Drummond	Stratton	Maine
8053	Todd	Voter	Strong	Maine
8054	Anita	Plog	Strong	Maine
8055	Joe	Bishop	Strong	Maine
8056	David	Curtis	Strong	Maine
8057	Mikayla	Luce	Strong	Maine
8058	Ashley	Miller	Strong	Maine
8059	Mary	Lynch	Strong	Maine
8060	Carla	Roy	Strong	Maine
8061	Tom	McLaughlin	Strong	Maine
8062	June	Flagg	Strong	Maine
8063	Nathan	Reid	Strong	Maine
8064	Machaon	Henderson	Strong	Maine
8065	Laurie-Anne	Brown	Strong	Maine
8066	Dawn	Abbott	Strong	Maine
8067	Sheila	Gravelle	Strong	Maine
8068	Rusty	Rusty	Strong	Maine
8069	Christopher	Gavin	Strong	Maine
8070	Barbara	Mispilkin	Strong	Maine
8071	Cheryl	Luce	Strong	Maine
8072	Summer	Ross	Strong	Maine
8073	Shannon	Monahan	Strong	Maine
8074	Amanda	Cote	Strong	Maine
8075	Brent	Deming	Strong	Maine
8076	Mariah	Cote	Strong	Maine
8077	Mike	Parker	Strong	Maine
8078	Taylor	Bopp	Strong	Maine
8079	Amanda	Coolong	Strong	Maine
8080	Kelly	Dexter	Strong	Maine
8081	Aiden	Shankland	Strong	Maine
8082	Noah	White	Strong	Maine
8083	Diane	Brown	Sullivan	Maine
8084	Ann	Breeden	Sullivan	Maine
8085	Mari e Louise Morandi Long	Zwicker	Sullivan	Maine
8086	Robert	Eaton	Sullivan	Maine
8087	Mark	Nyborg	Sullivan	Maine
8088	Galen	Plummer	Sullivan	Maine

8089	Paul	Breeden	Sullivan	Maine
8090	Mary Ann	Haxton	Sumner	Maine
8091	sharon	files	Sumner	Maine
8092	Beth	McInnis	Sumner	Maine
8093	Dannyel	Genthner	Sumner	Maine
8094	Cynthia	Stevens	Sumner	Maine
8095	Janet	Hampton	Sumner	Maine
8096	Crystal	Dacosta	Sunset	Maine
8097	Paula	Mrozicki	Surry	Maine
8098	Maureen	Giffin	Surry	Maine
8099	Rebecca	Pease	Surry	Maine
8100	Trudi	Thomas	Surry	Maine
8101	Nancy	Hathaway	Surry	Maine
8102	Nathan	Tracy	Surry	Maine
8103	Jason	York	Surry	Maine
8104	Betsy	Armstrong	Surry	Maine
8105	Shri	Verrill	Surry	Maine
8106	Josh	Moody	Surry	Maine
8107	Steve	Paley	Swans Island	Maine
8108	Pamela	Colby	Swanville	Maine
8109	Heather	Frey	Swanville	Maine
8110	Anna	Hickey-Smith	Swanville	Maine
8111	Janice	Kasper	Swanville	Maine
8112	Sheila	Costello	Swanville	Maine
8113	Jeffrey	Smith	Swanville	Maine
8114	Benjamin	Pratt	Swanville	Maine
8115	Kyle	Tripp	Swanville	Maine
8116	Dakota	Coleman	Swanville	Maine
8117	Douglas	Wood	Swanville	Maine
8118	Linda	Frey	Swanville	Maine
8119	Mary	Sohl	Sweden	Maine
8120	Linda	Bradley	Sweden	Maine
8121	Bruce	Taylor	Sweden	Maine
8122	Caitlin	Richard	T4 Indian Purchase Township	Maine
8123	Barbara	Collins	Temple	Maine
8124	Ruth	Nye	Temple	Maine
8125	Russell	Dubois	Temple	Maine
8126	Angela	Mason	Temple	Maine
8127	douglas	randall	Temple	Maine
8128	Greg	Kimber	Temple	Maine
8129	Betsy	Graves	Temple	Maine
8130	Douglas	Randall	Temple	Maine
8131	Michael	Dennison	Temple	Maine
8132	Kelsey	Jordan	Temple	Maine
8133	Kevin	White	Temple	Maine

8134	Vanessa	Mosher	Temple	Maine
8135	Michael	Chapman	Temple	Maine
8136	Colby	Weymouth	Temple	Maine
8137	Susie	Dennison	Temple	Maine
8138	Valerie	Blodgett	Temple	Maine
8139	Daniel	Bachelder	Temple	Maine
8140	Gracie	Foss	Temple	Maine
8141	Amber	Gardiner	Temple	Maine
8142	Jane	Hall	Tenants Harbor	Maine
8143	Amy	ODonnell	Tenants Harbor	Maine
8144	Victor	Cole	Tenants Harbor	Maine
8145	Anne	Webber	Tenants Harbor	Maine
8146	Steve	Cartwright	Tenants Harbor	Maine
8147	Paul	LaPorte	Tenants Harbor	Maine
8148	David	Cocke	Tenants Harbor	Maine
8149	Ernie	Johnson	Tenants Harbor	Maine
8150	Nancy	Krusell	Tenants Harbor	Maine
8151	Eric	Schweikardt	Tenants Harbor	Maine
8152	Nancy	Frederick	Tenants Harbor	Maine
8153	Ashby	Bartke	Tenants Harbor	Maine
8154	Mary	Hoodack	Tenants Harbor	Maine
8155	Lee	Polky	Tenants Harbor	Maine
8156	Roger	Paquette	The Forks	Maine
8157	Shari	Paquette	The Forks	Maine
8158	David	rancourt	The Forks Plt	Maine
8159	Roxanne	Predmore	The Forks Plt	Maine
8160	Edward	Beauchamp	The Forks Plt	Maine
8161	Daniel	Herrick	The Forks Plt	Maine
8162	Brian N	Clayton	The Forks Plt	Maine
8163	Melissa	Herrick	The Forks Plt	Maine
8164	Denise	Rancourt	The Forks Plt	Maine
8165	Clifford	Stevens	The Forks Plt	Maine
8166	Malena	Gatti	The Forks Plt	Maine
8167	Heather	Sylvester	The Forks Plt	Maine
8168	Walter	Glynn	The Forks Plt	Maine
8169	Melissa	Herrick	The Forks Plt	Maine
8170	Mimi	Moore	Thomaston	Maine
8171	Cindy	Lang	Thomaston	Maine
8172	Wilber E	Roman Sr	Thomaston	Maine
8173	Kenneth	Kijewski	Thomaston	Maine
8174	Zel	Bowman-Laberge	Thomaston	Maine
8175	Daniel	Keltonic	Thomaston	Maine
8176	James	Castonguay	Thomaston	Maine
8177	Steven	Powell	Thomaston	Maine
8178	Patti	Emery	Thomaston	Maine

8179	Tegan	Simmons	Thomaston	Maine
8180	Jeanne	Short	Thomaston	Maine
8181	Will	Quackenbush	Thomaston	Maine
8182	Stacy	Burch	Thomaston	Maine
8183	Diana	Beach	Thomaston	Maine
8184	Rosemary	Stuart-Libbey	Thomaston	Maine
8185	James	Murdock	Thomaston	Maine
8186	Cynthia	McGuirl	Thomaston	Maine
8187	Jeremiah	Gray	Thomaston	Maine
8188	Patti	Spaulding	Thomaston	Maine
8189	Margery	M	Thomaston	Maine
8190	Chuck	Kruger	Thomaston	Maine
8191	Sarah	Vigue	Thorndike	Maine
8192	John	Levers	Thorndike	Maine
8193	Matthew	Heintz	Thorndike	Maine
8194	Andrew	Hoglund	Thorndike	Maine
8195	Alicia	Natchie	Thorndike	Maine
8196	Cedric	Berry	Thorndike	Maine
8197	Kenneth	Copp	Thorndike	Maine
8198	Barbara	Walch	Thorndike	Maine
8199	Shawn	Bristol	Thorndike	Maine
8200	Wayne	Pitre	Thorndike	Maine
8201	Barbara	Walch	Thorndike	Maine
8202	Charles	Noyes	Topsfield	Maine
8203	Jeff	Pinette	Topsham	Maine
8204	Tracy	Gregoire	Topsham	Maine
8205	Tammy	Thompson	Topsham	Maine
8206	Lester	Borodinsky	Topsham	Maine
8207	Tom	Gilbert	Topsham	Maine
8208	Christopher	Corey	Topsham	Maine
8209	Brandyn	Thompson	Topsham	Maine
8210	Jake	Cox	Topsham	Maine
8211	Eleanor	Leo	Topsham	Maine
8212	Jeff	Dupuis	Topsham	Maine
8213	Hannah	Flanagan	Topsham	Maine
8214	Michael	Labonte	Topsham	Maine
8215	Nathan	McDonald	Topsham	Maine
8216	Susan	Fides	Topsham	Maine
8217	Gabby	Mason	Topsham	Maine
8218	Sherman	Lyons	Topsham	Maine
8219	Anna	Riendeau	Topsham	Maine
8220	Cameron	Estrella	Topsham	Maine
8221	Alice	Elliott	Topsham	Maine
8222	Nachelle	Seed	Topsham	Maine
8223	David	Mosley	Topsham	Maine
8224	Stephen	Munier	Topsham	Maine

8225	Kelly	Brooks	Topsham	Maine
8226	Melissa	Jones	Topsham	Maine
8227	Mike	Hill	Topsham	Maine
8228	Betsy	Eaton	Topsham	Maine
8229	Eric	Clark	Topsham	Maine
8230	Jeremy	Meadows	Topsham	Maine
8231	Holden	Weathers	Topsham	Maine
	Governor	James Phinney		
8232	Baxter, Llc	Baxter White	Topsham	Maine
8233	Mark	Menard	Topsham	Maine
8234	Melanie	Craig	Topsham	Maine
8235	Keith	Biedrzycki	Topsham	Maine
8236	Michelle	Borodinsky	Topsham	Maine
8237	Bettina	Bellefleur	Topsham	Maine
8238	Howard	Palmer	Topsham	Maine
8239	Jaime	Wallace	Topsham	Maine
8240	Natasha	Russell	Topsham	Maine
8241	Susan	Hedgpeth-More	Topsham	Maine
8242	Jamie	Giles	Topsham	Maine
8243	Manako	Epling	Topsham	Maine
8244	Jacqueline	Painchaud	Topsham	Maine
8245	Nicole	Napples	Topsham	Maine
8246	Kaylee	Treadwell	Topsham	Maine
8247	Rick	Diamond	Topsham	Maine
8248	Madelyn	Breerwood	Topsham	Maine
8249	M. Elaine	Kurtz	Topsham	Maine
8250	Sierra	White	Topsham	Maine
8251	Ryan	Towle	Topsham	Maine
8252	Andrew	Tufts	Topsham	Maine
8253	Dale	Thompson	Topsham	Maine
8254	Susan	Rae-Reeves	Topsham	Maine
8255	Gregory	Emerson	Topsham	Maine
8256	Amanda	Blood	Topsham	Maine
8257	Ronnie	Dumont	Topsham	Maine
8258	Kenneth	Boyington	Topsham	Maine
8259	Lindsey	Weir	Topsham	Maine
8260	Victor	Langelo	Topsham	Maine
8261	Arthur	Mary	Topsham	Maine
8262	Shane	Minchin	Topsham	Maine
8263	Greg	Korbet	Topsham	Maine
8264	Amber	Allisot	Topsham	Maine
8265	Nachelle	Jelenovic	Topsham	Maine
8266	Jessica	Dickey	Topsham	Maine
8267	David	Allen	Topsham	Maine
8268	Jeffrey	Burns	Topsham	Maine
8269	Diane	Schetky	Topsham	Maine

8270	Cathleen	Reed	Topsham	Maine
8271	Mark	Estrella	Topsham	Maine
8272	Jake	Webber	Topsham	Maine
8273	Craig	Watson	Topsham	Maine
8274	Sidney	Santerre	Topsham	Maine
8275	Michelle and Stanley	Moody	Topsham	Maine
8276	Joseph	Mendez	Topsham	Maine
8277	Luke	Vashon	Topsham	Maine
8278	Lynn	Sirois	Topsham	Maine
8279	Jordan	Boudway	Topsham	Maine
8280	Donna	Linkel	Topsham	Maine
8281	Nachelle	Seed	Topsham	Maine
8282	Michael	Laurence	Topsham	Maine
8283	Justin	Coffin	Topsham	Maine
8284	Derek	Field	Topsham	Maine
8285	Emma	Hagan	Topsham	Maine
8286	Jeremy	Rinebolt	Topsham	Maine
8287	Donald	Herbert	Topsham	Maine
8288	Jerry	Hardy	Topsham	Maine
8289	David	White	Topsham	Maine
8290	Rosa	Landeen	Topsham	Maine
8291	Cynthia	Winder	Topsham	Maine
8292	Yvette	Meunier	Topsham	Maine
8293	Thomas	Gilbert	Topsham	Maine
8294	Lacey	Sinclair	Trenton	Maine
8295	Darrell	White	Trenton	Maine
8296	Michael	Gilmartin	Trenton	Maine
8297	Karen	Davis	Trenton	Maine
8298	Mark	Norwood	Trenton	Maine
8299	Starr	Gilmartin	Trenton	Maine
8300	Henry	Muise	Trenton	Maine
8301	Marcia	Chaffee	Trescott Twp	Maine
8302	Eliza	Jones	Trevett	Maine
8303	Bridget	Read	Trevett	Maine
8304	Jared	Spofford	Trevett	Maine
8305	Robert	Kerr	Trevett	Maine
8306	Lori	Bailey	Trevett	Maine
8307	Robin	Jordan	Trevett	Maine
8308	Bill	Hammond	Trevett	Maine
8309	Trish	Stevens	Troy	Maine
8310	Cyrena	Giles	Troy	Maine
8311	Howard	Whitaker	Troy	Maine
8312	Kent	Thurston	Troy	Maine
8313	Regina	Panczyk	Troy	Maine
8314	Miranda	Carpentier	Troy	Maine

8315	Laurie	Whitmore	Turner	Maine
8316	Tia	Wadsworth	Turner	Maine
8317	Janet	Cutter	Turner	Maine
8318	Michelle	Gibbert	Turner	Maine
8319	Shawn	Thibodeau	Turner	Maine
8320	Kim	Lebel	Turner	Maine
8321	Sheila D.	Richardson	Turner	Maine
8322	Jody	Baine	Turner	Maine
8323	Madie	McCormick	Turner	Maine
8324	Cheyenne	Ruane	Turner	Maine
8325	Joyce	Morrison	Turner	Maine
8326	Sasha	Fournier	Turner	Maine
8327	Tracey	Terreri	Turner	Maine
8328	Kimberley	Eells	Turner	Maine
8329	Darren	Wilbur	Turner	Maine
8330	Doris	Green	Turner	Maine
8331	Lisa	Robitaille	Turner	Maine
8332	Stacey	Grondin	Turner	Maine
8333	Thomas	Langelier	Turner	Maine
8334	Anne	Brown	Turner	Maine
8335	Mark	Albert	Turner	Maine
8336	Daniel	Dill	Turner	Maine
8337	Dwight	Jordan	Turner	Maine
8338	Ryan	Day	Turner	Maine
8339	Kristie	Howe	Turner	Maine
8340	Mike	Soucy	Turner	Maine
8341	Judy	Keenan-Bower	Turner	Maine
8342	Glenda	Lilley	Turner	Maine
8343	Kyle	Chabe	Turner	Maine
8344	Joshua	Countryman	Turner	Maine
8345	Richard	Quimby	Turner	Maine
8346	Jennifer	Duchetye	Turner	Maine
8347	Miranda	Wadsworth	Turner	Maine
8348	Deana	Pierce	Turner	Maine
8349	Cody	Libby	Turner	Maine
8350	Pauline	Blouin	Turner	Maine
8351	Pauline	Blouin	Turner	Maine
8352	David	McLaughlin	Turner	Maine
8353	Michalee	Collins	Turner	Maine
8354	Danielle	Stevens	Turner	Maine
8355	Megan	Libby	Turner	Maine
8356	Kendra	Gilbert	Turner	Maine
8357	Martin	Goodell	Turner	Maine
8358	Suzanne	Huntington	Turner	Maine
8359	Melinda	Nelson	Turner	Maine
8360	Wayne	Berry	Turner	Maine

8361	Rachel	Pack	Turner	Maine
8362	Richie	Lake Jr	Turner	Maine
8363	Heidi	Trenoweth	Turner	Maine
8364	Carter	Jordan	Turner	Maine
8365	Valerie	Terenzoni	Turner	Maine
8366	Pamela	Dow	Turner	Maine
8367	Katie	Langley	Turner	Maine
8368	Jeff	Gondeck	Turner	Maine
8369	Craig	Labrecque	Turner	Maine
8370	Jesse	Twitchell	Turner	Maine
8371	Melissa	Stephenson	Turner	Maine
8372	Abby	Webster	Turner	Maine
8373	Michael	Mayo	Turner	Maine
8374	Sandra	Macpeek	Turner	Maine
8375	Sharon	Martin	Turner	Maine
8376	Rolande	Wing	Turner	Maine
8377	Cathy	Townsend	Turner	Maine
8378	Leah	Alexander	Turner	Maine
8379	Sage	Landry	Turner	Maine
8380	Heidi	Lavoie	Turner	Maine
8381	Melissa	Patrie	Turner	Maine
8382	Wanda	St. Germain	Turner	Maine
8383	Patricia	Varney	Turner	Maine
8384	Evan	Travers	Turner	Maine
8385	Tyler	Chicoine	Turner	Maine
8386	Heidi	Lavoie	Turner	Maine
8387	Tyler	Barnies	Turner	Maine
8388	Tessa	Wadsworth	Turner	Maine
8389	Ruth Ann	Robbins	Turner	Maine
8390	Gene	Quimby	Turner	Maine
8391	Heather	Lagueux	Turner	Maine
8392	Janet	Cutter	Turner	Maine
8393	Wendy	Jacques	Union	Maine
8394	Jacqueline	Merrick	Union	Maine
8395	Keri	Kaczor	Union	Maine
8396	Carmine	Greenrose	Union	Maine
8397	Ann	Breyfogle	Union	Maine
8398	Jonathan	Burns	Union	Maine
8399	Joseph	Skalecki	Union	Maine
8400	Michael	Ervin	Union	Maine
8401	Nancy	Johnson	Union	Maine
8402	Wendy	Ward	Union	Maine
8403	Peter	Thompson	Union	Maine
8404	Charlotte	Hollenberg	Union	Maine
8405	M	King	Union	Maine
8406	Debra	Hilt	Union	Maine

8407	PATRICK	COSGROVE	Union	Maine
8408	Adam	Reed	Unity	Maine
8409	Joan	Cheetham	Unity	Maine
8410	Anne	Sheble	Unity	Maine
8411	Trevanna	Grenfell	Unity	Maine
8412	David	Belch	Unity	Maine
8413	Sarah	Oliver	Unity	Maine
8414	Hayden	Benson	Unity	Maine
8415	Diana	Hauser	Unity	Maine
8416	Lyn	Larrc	Unity	Maine
8417	Cynthia	McCoy	Unity	Maine
8418	Alvah	Maloney	Unity	Maine
8419	Holly	Ryan	Unity	Maine
8420	Ben	Holt	Unity	Maine
8421	Leighanne	Wilson	Unity	Maine
8422	Susan	Siens	Unity	Maine
8423	Mark	Donaghy	Unity	Maine
8424	Lindsay	Peter	Unity	Maine
8425	Emily	Bartolini	Unity	Maine
8426	William	Marnik	Unity	Maine
8427	Jean	Bourg	Unity	Maine
8428	Diana	Burgess	Upper Enchanted	Maine
8429	Denis	Pinard	Upper Enchanted Township	Maine
8430	Steven	Burgess	Upper Enchanted Twp	Maine
8431	adele	drake	upper oak point	Maine
8432	Michael	Parshall	Upton	Maine
8433	Christopher	Sullivan	Van Buren	Maine
8434	Gabe	Joseph	Vassalboro	Maine
8435	Rick	Mathiau	Vassalboro	Maine
8436	Paula	Kendall	Vassalboro	Maine
8437	nate	gray	Vassalboro	Maine
8438	Jim	Murton	Vassalboro	Maine
8439	Brenda	Cayouette	Vassalboro	Maine
8440	Kayla	McKenney	Vassalboro	Maine
8441	Art	Kingdon	Vassalboro	Maine
8442	Lisa	Wasilowski	Vassalboro	Maine
8443	Roger	Hallee	Vassalboro	Maine
8444	Lisa	Munster	Vassalboro	Maine
8445	David	Lockman	Vassalboro	Maine
8446	Ida	Noonan	Vassalboro	Maine
8447	Jennifer	Reed	Vassalboro	Maine
8448	Kim	Atkinson	Vassalboro	Maine
8449	Albert	Farland	Vassalboro	Maine
8450	Jeremy	Clement	Vassalboro	Maine
8451	Angelina	Cayouette	Vassalboro	Maine
8452	Lucille	Norstrand-	Vassalboro	Maine

		Murphy		
8453	Dean	McCausland	Vassalboro	Maine
8454	Helen	Viles	Vassalboro	Maine
8455	Justin	McCausland	Vassalboro	Maine
8456	Caitlin	Ruby	Vassalboro	Maine
8457	Carrie	Ellis	Vassalboro	Maine
8458	Mary	Presti	Vassalboro	Maine
8459	Linda	Kingdon	Vassalboro	Maine
8460	Joan	Atkinson	Vassalboro	Maine
8461	Elijah	Albee	Vassalboro	Maine
8462	Kyle	Sterling	Vassalboro	Maine
8463	Timmy	Kendall	Vassalboro	Maine
8464	Jennifer	Noll	Vassalboro	Maine
8465	Jamie	Wasilowski	Vassalboro	Maine
8466	Jeff	Nutt	Vassalboro	Maine
8467	Michelle	Richards	Vassalboro	Maine
8468	Christopher	French	Vassalboro	Maine
8469	Lisa	Lapointe	Vassalboro	Maine
8470	Isabel	Bragdon	Vassalboro	Maine
8471	Sandra	Hallee	Vassalboro	Maine
8472	peter	bragdon	Vassalboro	Maine
8473	Robin	Farrell	Vassalboro	Maine
8474	Kim	Ruby	Vassalboro	Maine
8475	Joshua	Buzzell	Vassalboro	Maine
8476	Josh	Wilde	Vassalboro	Maine
8477	Zachary	Sheafe	Veazie	Maine
8478	Jennalie	Lutes	Veazie	Maine
8479	Edward	Barrett	Veazie	Maine
8480	Teri	Attean	Veazie	Maine
8481	Mark	Janicki	Veazie	Maine
8482	Michael	Moore	Veazie	Maine
8483	Suzanne	Ambrose	Veazie	Maine
8484	Devon	Carter	Veazie	Maine
8485	Regilyn	Gunn	Verona Island	Maine
8486	Tom	Moriarty	Verona Island	Maine
8487	George	Stavros	Verona Island	Maine
8488	Andrea	Moran	Verona Island	Maine
8489	Jennifer	Riefler	Verona Island	Maine
8490	James	Floyd	Vienna	Maine
8491	Mick	Bransky	Vienna	Maine
8492	Ashley	Martin	Vienna	Maine
8493	Chuck	Yates	Vienna	Maine
8494	Julie	Wilkey	Vienna	Maine
8495	Josiah	Chapman	Vienna	Maine
8496	Tom	Ferrero	Vienna	Maine
8497	Kristen	Welch	Vienna	Maine

8498	Sandra	Wade	Vienna	Maine
8499	Laura	Shepherd	Vienna	Maine
8500	Ryan	Davis	Vienna	Maine
8501	William	Rackliff	Vienna	Maine
8502	Sheila	Nurse	Vienna	Maine
8503	Cl	Bergeron	Vienna	Maine
8504	Robert	Martin	Vienna	Maine
8505	Jamus	Drury	Vinalhaven	Maine
8506	Sharon	Mrozinski	Vinalhaven	Maine
8507	Linnell	Mather	Vinalhaven	Maine
8508	Kerry	McKee	Vinalhaven	Maine
8509	Brendan	Meagher	Vinalhaven	Maine
8510	Kathleen	Gallagher	Waldo	Maine
8511	Susan	Lauchlan	Waldo	Maine
8512	Karen	Doherty	Waldo	Maine
8513	Trisha	Rose	Waldo	Maine
8514	Amy	Doherty	Waldo	Maine
8515	Kathryn	McCormick	Waldo	Maine
8516	Sadie	Lloyd Mudge	Waldo	Maine
8517	Barbara	Butterworth	Waldo	Maine
8518	Carl	Solberg	Waldoboro	Maine
8519	Sandra	O'farrell	Waldoboro	Maine
8520	William	Gomez	Waldoboro	Maine
8521	Dustin	Day	Waldoboro	Maine
8522	Greg	Chriatianson	Waldoboro	Maine
8523	Hillary	Bittues	Waldoboro	Maine
8524	Tammi	Winchenbach	Waldoboro	Maine
8525	Vanessa	Johnson	Waldoboro	Maine
8526	Kelli	Burton	Waldoboro	Maine
8527	Dozier	Bell	Waldoboro	Maine
8528	Maegan	Monsees	Waldoboro	Maine
8529	Sarah	Gladu	Waldoboro	Maine
8530	victoria	peschock	Waldoboro	Maine
8531	Ryan	Moody	Waldoboro	Maine
8532	Lori	Bryant	Waldoboro	Maine
8533	Betsy	Wooster	Waldoboro	Maine
8534	Maxwell	Negley	Waldoboro	Maine
8535	Krisanne	Baker	Waldoboro	Maine
8536	Ashley	Hunt	Waldoboro	Maine
8537	Matthew	Bolster	Waldoboro	Maine
8538	Katie	Winchenbach	Waldoboro	Maine
8539	Jonathan	Boutilier	Waldoboro	Maine
8540	Jasmine	Kauffman	Waldoboro	Maine
8541	Jordan	Newbert	Waldoboro	Maine
8542	Linda	Veblen	Waldoboro	Maine
8543	Tom	Winkley	Waldoboro	Maine

8544	Sue	Thieme	Waldoboro	Maine
8545	Angela	Goff	Waldoboro	Maine
8546	Brandon	Klein	Waldoboro	Maine
8547	Kathe	Marion-Gallant	Waldoboro	Maine
8548	Trey	Knof	Waldoboro	Maine
8549	Sara	Hotchkiss	Waldoboro	Maine
8550	Katherine	Silva	Waldoboro	Maine
8551	Nate	Bryant	Waldoboro	Maine
8552	Kenneth	Ames	Waldoboro	Maine
8553	Valdemar	Skov	Waldoboro	Maine
8554	Keely	Walsh	Waldoboro	Maine
8555	Jennifer	Long	Waldoboro	Maine
8556	Racheal	Morris	Waldoboro	Maine
8557	Nicole	Lash	Waldoboro	Maine
8558	Gary	Demmons	Waldoboro	Maine
8559	Sabel	Pratt	Waldoboro	Maine
8560	Randy	Orff	Waldoboro	Maine
8561	Will	Perry	Waldoboro	Maine
8562	Carissa	Parkins	Waldoboro	Maine
8563	Deborah	Michaelsen	Waldoboro	Maine
8564	Victoria	Peschock	Waldoboro	Maine
8565	Matthew	Morse	Waldoboro	Maine
8566	Tatyana	Eckstrand	Waldoboro	Maine
8567	Sophie	Davis	Waldoboro	Maine
8568	Tyler	Cyr	Wales	Maine
8569	Matthew	Plante	Wales	Maine
8570	Hilary	Furrow	Wales	Maine
8571	Gerald	Crowley	Wales	Maine
8572	Dominic	Gordon	Wales	Maine
8573	Sean	Branagan	Wales	Maine
8574	Hannah	Dieterich	Wales	Maine
8575	Thomas	Auger	Wales	Maine
8576	Katelyn	Plummer	Wales	Maine
8577	Alden	Andrews	Wales	Maine
8578	Christel	Davis	Wales	Maine
8579	Zachary	Leeman	Wales	Maine
8580	Chantel	McLain	Wales	Maine
8581	Jared	Bubier	Wales	Maine
8582	Susan	English	Wales	Maine
8583	Rebecca	Bower Huber	Wales	Maine
8584	Kohl	Benziger	Wales	Maine
8585	Cheyenne	Gray	Wales	Maine
8586	Kyle	Lincoln	Walpole	Maine
8587	Arlene	Cass	Walpole	Maine
8588	Ben	Hoagland	Walpole	Maine
8589	Ryan	Jackson	Warren	Maine

8590	Richard	Burnett	Warren	Maine
8591	Michael	Lally	Warren	Maine
8592	Adam	Newell	Warren	Maine
8593	Caitlin	Mellin	Warren	Maine
8594	Amanda	Heal	Warren	Maine
8595	Jean	Ramsdell	Warren	Maine
8596	Owen	Bundy	Warren	Maine
8597	Elizabeth	Lally	Warren	Maine
8598	Lance	Bukoff	Warren	Maine
8599	KATHERINE	HOLLAND	Warren	Maine
8600	Amber	Parker	Warren	Maine
8601	Lisbeth	Whitney	Warren	Maine
8602	Alli	Winkelman	Warren	Maine
8603	Ellen	Wood	Warren	Maine
8604	Jean	Seekell	Warren	Maine
8605	Natasha	Carter	Warren	Maine
8606	Amanda	Shelmerdine	Warren	Maine
8607	Thomas	Watson	Warren	Maine
8608	Nicole	Demmons	Warren	Maine
8609	Cheryl	Evangelos	Warren	Maine
8610	Dawn	Pendleton	Warren	Maine
8611	Lynn	Higgins	Warren	Maine
8612	Brianna	Augusto	Warren	Maine
8613	Linda	Brouwer	Warren	Maine
8614	Gail	Pomerleau	Warren	Maine
8615	Heidi	Obuchon	Warren	Maine
8616	Julianne	Hyatt	Warren	Maine
8617	Laura	Martz	Warren	Maine
8618	Rocky	Gorbey	Warren	Maine
8619	Sydney	Plum	Warren	Maine
8620	Elizabeth	Stanley	Warren	Maine
8621	Sandra Hall	Bourrie	Washington	Maine
8622	Karen	Jelenfy	Washington	Maine
8623	Yvonne	Taylor	Washington	Maine
8624	Kevin	Hix	Washington	Maine
8625	Krista	Rideout	Washington	Maine
8626	Linda	Andrei	Washington	Maine
8627	Anne	Cristiani	Washington	Maine
8628	Neil	Gross	Washington	Maine
8629	Kenneth	Doak	Washington	Maine
8630	Justin	Bowman	Washington	Maine
8631	Vincent	Mecca	Washington	Maine
8632	David	Savoie	Waterboro	Maine
8633	Jared	Dion	Waterboro	Maine
8634	Matt	Garland	Waterboro	Maine
8635	John	Harmon	Waterboro	Maine

8636	Jacob	Guillemette	Waterboro	Maine
8637	Jonathan	Lessard	Waterboro	Maine
8638	David	Anderson	Waterboro	Maine
8639	Justin	O'Neill	Waterboro	Maine
8640	Bob	Leclair	Waterboro	Maine
8641	Craig	Richardson	Waterboro	Maine
8642	Gavin	Grant	Waterboro	Maine
8643	Thomas	Guillemette	Waterboro	Maine
8644	Ronald	Jacobsen	Waterboro	Maine
8645	Kristy	Kendrick	Waterboro	Maine
8646	Don	Johnson	Waterboro	Maine
8647	Sam	Corriveau	Waterboro	Maine
8648	Zach	Gile	Waterboro	Maine
8649	Kari	Berube	Waterboro	Maine
8650	Ruth	Buck	Waterboro	Maine
8651	Lisa	Kinsey	Waterboro	Maine
8652	Mary Ann	Holme	Waterford	Maine
8653	Catherine	Macdonald	Waterford	Maine
8654	Lydia	Landesberg	Waterford	Maine
8655	Margaret	Nation	Waterford	Maine
8656	Carol	Waldeier	Waterford	Maine
8657	Bart	Hague	Waterford	Maine
8658	Josephine	Hatch	Waterford	Maine
8659	Erin	Joyce	Waterford	Maine
8660	Chelsea	Bedell	Waterford	Maine
8661	George	Kimmerly	Waterford	Maine
8662	Erin	Grover	Waterford	Maine
8663	Helen	Kimmerly	Waterford	Maine
8664	Christopher	Easton	Waterford	Maine
8665	Desireep	Campbell	Watervile	Maine
8666	Stephanie	Kierstead	Waterville	Maine
8667	Herbert	Wilson	Waterville	Maine
8668	Jazmine	Fowler	Waterville	Maine
8669	Stephen	Benner	Waterville	Maine
8670	Dan	LaRochelle	Waterville	Maine
8671	Stephanie	Buzzell	Waterville	Maine
8672	Douglas	Carmichael	Waterville	Maine
8673	Jerry	Fanjoy	Waterville	Maine
8674	Elizabeth	Jakofsky	Waterville	Maine
8675	Elizabeth	Schiller	Waterville	Maine
8676	Nina	Gimond	Waterville	Maine
8677	Nathaniel	Thomas	Waterville	Maine
8678	Porscha	Green	Waterville	Maine
8679	Bethany	Henry	Waterville	Maine
8680	Joshua	Young	Waterville	Maine
8681	Sharon	Saunders	Waterville	Maine

8682	Chasity Rae	Robichaud	Waterville	Maine
8683	Isaac	Veilleux	Waterville	Maine
8684	Tyler	Jones	Waterville	Maine
8685	Laurie	Howard	Waterville	Maine
8686	Christian	Ferguson	Waterville	Maine
8687	Christine	Kreider	Waterville	Maine
8688	Sylvia	Spear	Waterville	Maine
8689	Tatonka	Champagne	Waterville	Maine
8690	Janine	Moore	Waterville	Maine
8691	Alexis	Casey	Waterville	Maine
8692	Elizabeth	Rackliff	Waterville	Maine
8693	Ronnie	Dodge	Waterville	Maine
8694	Nicole	Vachon	Waterville	Maine
8695	Amy	Mason	Waterville	Maine
8696	Jasper	Champagne	Waterville	Maine
8697	Chris	Fillyaw	Waterville	Maine
8698	Madison	Lawrence	Waterville	Maine
8699	Debra	Berthiaume	Waterville	Maine
8700	Kaylie	Martin	Waterville	Maine
8701	Eric	Sales	Waterville	Maine
8702	Amber	Lord	Waterville	Maine
8703	Ryan	Chase	Waterville	Maine
8704	Gayle	Blydenstein	Waterville	Maine
8705	Linda	Woods	Waterville	Maine
8706	Brian	Jacques	Waterville	Maine
8707	Hillary	Baldinelli	Waterville	Maine
8708	Daphne	Isbister	Waterville	Maine
8709	Susan	MacKenzie	Waterville	Maine
8710	Justin	Gade	Waterville	Maine
8711	Eileen	McGinley	Waterville	Maine
8712	Cassidy	Rickard	Waterville	Maine
8713	Gerald	Cates	Waterville	Maine
8714	Nancy	Williams	Waterville	Maine
8715	Chez	Berube	Waterville	Maine
8716	Maggie	Lebrun	Waterville	Maine
8717	Jesse	Morris	Waterville	Maine
8718	Nicole	Vachon	Waterville	Maine
8719	Stephen	Eccher	Waterville	Maine
8720	Susanne	DeMott	Waterville	Maine
8721	David	Hedrick	Waterville	Maine
8722	Linda	Woods	Waterville	Maine
8723	Randall	Chamberlain	Waterville	Maine
8724	Alexandra	Kriegel	Waterville	Maine
8725	William	Potter Iv	Waterville	Maine
8726	Joshua	Dunn	Waterville	Maine
8727	Bernard	Huebner	Waterville	Maine

8728			Waterville	Maine
8729	Susan	Roy	Waterville	Maine
8730	Keith	Fischer	Waterville	Maine
8731	Arlene	Toulouse	Waterville	Maine
8732	Cynthia	Eccher	Waterville	Maine
8733	Ariana	Bissonnette	Waterville	Maine
8734	Carol	Godbout	Waterville	Maine
8735	Fiona	Greenwood	Waterville	Maine
8736	Lauren	Bossie	Waterville	Maine
8737	David	Twitchell	Wayne	Maine
8738	Tammy	Birtwell	Wayne	Maine
8739	Sarah	Emmons	Wayne	Maine
8740	Jason	Parrott	Wayne	Maine
8741	Tena	Deblois	Wayne	Maine
8742	Jeff	Ireland	Wayne	Maine
8743	Jareb	Dyer	Wayne	Maine
8744	Peter	Emery	Wayne	Maine
8745	Tori	Jackson	Wayne	Maine
8746	Colin	Barlow	Wayne	Maine
8747	Jennifer	Ross	Wayne	Maine
8748	Prudence	Andrews	Wayne	Maine
8749	Scott	Grimshaw	Wayne	Maine
8750	Bill	Elliott	Wayne	Maine
8751	David	Perry	Wayne	Maine
8752	Buddy	Seymour	Wayne	Maine
8753	Marion	Messenger	Wayne	Maine
8754	Leslie	Burhoe	Wayne	Maine
8755	Julia	Clark	Wayne	Maine
8756	Stuart S.	Smith	Wayne	Maine
8757	Carl	Mulligan	Webster Plt	Maine
8758	Bonita	Hardy	Weeks Mills Rd.	Maine
8759	Evan	McIntire	Weld	Maine
8760	Diane	Haley	Weld	Maine
8761	Linda	Adams	Weld	Maine
8762	Ted	Simanek	Weld	Maine
8763	Debbie	Storer	Weld	Maine
8764	Cynthia	Proctor	Weld	Maine
8765	Brianna	Testa	Weld	Maine
8766	Angela	DeRosa	Wellington	Maine
8767	Katie	Fournier	Wellington	Maine
8768	Jenna	Sevigney	Wells	Maine
8769	Matthew	Leon	Wells	Maine
8770	Joseph	Pelletier	Wells	Maine
8771	Wayne	Smith	Wells	Maine
8772	Michelle	Tardif	Wells	Maine
8773	Patrick	Purcell	Wells	Maine

8774	Linda	Grenfell	Wells	Maine
8775	Carole	Gabree	Wells	Maine
8776	Joseph	Hardy	Wells	Maine
8777	Steven	Cutter	Wells	Maine
8778	Katrina	Zarrella Smith	Wells	Maine
8779	Brigitte	Boston	Wells	Maine
8780	Alex	Staples	Wells	Maine
8781	Scott	Chase	Wells	Maine
8782	Robert	Jenkins	Wells	Maine
8783	Kelley	Sevigney	Wells	Maine
8784	David	Gerard	Wells	Maine
8785	Danielle	Bullard	Wells	Maine
8786	Philip	Richmond	Wells	Maine
8787	Emily	Currier	Wells	Maine
8788	Steven	Jellison	Wells	Maine
8789	Tod	Callioras	Wells	Maine
8790	Naomi	Smith	Wells	Maine
8791	Susan	Christinziano	Wells	Maine
8792	Katie	Thurlow	Wells	Maine
8793	Catheryn	Barry	Wells	Maine
8794	Christopher	Chase	Wells	Maine
8795	Samuel	Johnson	Wells	Maine
8796	Pamela Jorgensen	Higgins	Wells	Maine
8797	Jacqueline	Cullen	Wells	Maine
8798	Craig	Brown	Wells	Maine
8799	Denise	Penttila	Wells	Maine
8800	Nancy	Caton	Wells	Maine
8801	Dawn	Syminis	Wells	Maine
8802	Hope	Titcomb	Wells	Maine
8803	Charles	Robinson	Wells	Maine
8804	Kaitlyn	Bennett	Wells	Maine
8805	Adam	Williams	Wells	Maine
8806	Shea	Harrington	Wells	Maine
8807	Peter	Petrella	Wells	Maine
8808	Paul	Smith	Wells	Maine
8809	Gregg	Martinez	Wells	Maine
8810	Veronika	Barra	Wells	Maine
8811	Jesse	Mitchell	Wells	Maine
8812	David	Cullen	Wells	Maine
8813	Mike	Cote	Wells	Maine
8814	Ashley	Cunningham	Wells	Maine
8815	Carole	Maccollum	Wells	Maine
8816	Diane	Williams	Wells	Maine
8817	Chris	Cote	Wells	Maine
8818	Janice and	Davis	Wells	Maine

	Michael			
8819	Charles	Fitzpatrick	Wells	Maine
8820	Cheryl	Mills	Wells	Maine
8821	Collette	Hamilton	Wells	Maine
8822	Deborah	Shipp	Wells	Maine
8823	Tim	Wheeler	Wells	Maine
8824	William	Caton	Wells	Maine
8825	Julia	L	Wells	Maine
8826	Kris	Bridges	West Baldwin	Maine
8827	David	Knight	West Baldwin	Maine
8828	Vinnedge	Lawrence	West Baldwin	Maine
8829	Cynthea	Bridges	West Baldwin	Maine
8830	Rachel	Anderson	West Baldwin	Maine
8831	Thomas	Caron	West Baldwin	Maine
8832	Stephen	Moriarty	West Bath	Maine
8833	Jocelyn	Sinclair	West Bath	Maine
8834	Michael	Moroney	West Bath	Maine
8835	Steve	Bonine	West Bath	Maine
8836	Julie	Hamilton	West Bath	Maine
8837	Rebecca	Black	West Bath	Maine
8838	Jessica	Raspbury	West Bath	Maine
8839	Carl	Nygaard	West Bath	Maine
8840	Gerald	Dauphin	West Bath	Maine
8841	Rebecca	Goldfine	West Bath	Maine
8842	Daniel	Wallace	West Bath	Maine
8843	Melissa	Whittaker	West Bath	Maine
8844	Amber	Herzog	West Bath	Maine
8845	Andrew	Holbrook	West Bath	Maine
8846	Elizabeth	Renaud	West Bath	Maine
8847	Gina	Emerson	West Bath	Maine
8848	Nathaniel	Hyde	West Bath	Maine
8849	Tiffany	Russell	West Bath	Maine
8850	Mary Ellen	Wilson	West Bath	Maine
8851	Aidan	Coffin	West Bath	Maine
8852	Bobby	Sloan	West Bath	Maine
8853	Gage	Ritenour	West Bath	Maine
8854	Matt	Harris	West Bath	Maine
8855	Diana	Sholtz	West Bath	Maine
8856	Brianne	York	West Bath	Maine
8857	Andrea	Farrington	West Bethel	Maine
8858	Sue Ellen	James	West Boothbay Harbor	Maine
8859	Betty J	Dobson	West Boothbay Harbor	Maine
8860	Scott	Atkinson	West Boothbay Harbor	Maine
8861	Lee	Corbin	West Boothbay Harbor	Maine
8862	Alex	Kerney	West Boothbay Harbor	Maine
8863	Susan	Witt	West Boothbay Harbor	Maine

8864	Alex	Kerney	West Boothbay Harbor	Maine
8865	Tina	Heald	West Enfield	Maine
8866	Bryce	Knights	West Enfield	Maine
8867	Elizabeth	Bickford	West Enfield	Maine
8868	Alexis	Wyman-Labelle	West Farmington	Maine
8869	Martha	Bessey	West Farmington	Maine
8870	Shane	Nicely-Luker	West Farmington	Maine
8871	Patricia	Gordon	West Farmington	Maine
8872	Harold	Hobart	West Forks	Maine
8873	Jillian	Berry	West Forks	Maine
8874	Kimberly	Webb	West Forks	Maine
8875	Robert	Cryan	West Forks	Maine
8876	Andrew	Webb	West Forks	Maine
8877	Sharon	Harrison	West Forks	Maine
8878	Emily	Wolf	West Forks	Maine
8879	Iris	Duval	West Forks	Maine
8880	Jim	Stlaurent	West Forks	Maine
8881	Leon	Duval	West Forks	Maine
8882	Susan H	Melcher-Clayton	West Forks	Maine
8883	Andrew	Webb	West Forks	Maine
8884	Ernie	Shulett	West Forks	Maine
8885	Kenneth	Harrison	West Forks	Maine
8886	Sarah	Dostie	West Forks	Maine
8887	Rita	Marquis	West Gardiner	Maine
8888	Wanda	Wyman	West Gardiner	Maine
8889	Tyler	Baker	West Gardiner	Maine
8890	Henry	Piersing	West Gardiner	Maine
8891	Phoebe	Boyland	West Gardiner	Maine
8892	Gabe	Caron	West Gardiner	Maine
8893	Jasmine	Cotton	West Gardiner	Maine
8894	Nathan	Macdonald	West Gardiner	Maine
8895	Lillian	Baker	West Gardiner	Maine
8896	Rusty	Wonsey	West Gardiner	Maine
8897	Nathan	Devault	West Gardiner	Maine
8898	Karen	Rybka	West Gardiner	Maine
8899	Susan	Bolduc	West Gardiner	Maine
8900	Bonnie	Colfer	West Gardiner	Maine
8901	Brenda	Cadwallader	West Gardiner	Maine
8902	Brad	Kalloch	West Gardiner	Maine
8903	Dorothy	Cote	West Gardiner	Maine
8904	Nichole	Pelletier	West Gardiner	Maine
8905	Karlton	Peckham	West Gardiner	Maine
8906	Sheila	Pierce	West Gardiner	Maine

8907	Betsy	Laney	West Gardiner	Maine
8908	Dan	Gysi	West Gardiner	Maine
8909	Greg	Ponte	West Gardiner	Maine
8910	Gary	Emery	West Gardiner	Maine
8911	Alex	Beaulieu	West Gardiner	Maine
8912	Lauren	Swindells	West Gardiner	Maine
8913	Melissa	Caron	West Gardiner	Maine
8914	Haley	Carmichael	West Gardiner	Maine
8915	Jennifer	Zack	West Gardiner	Maine
8916	Richard	Nadeau	West Kennebunk	Maine
8917	Hilary	Wallis	West Newfield	Maine
8918	Wanda	Neville	West Newfield	Maine
	Northern York County Rod			
8919	Gun Club	President	West Newfield	Maine
8920	Ed	Stubbs	West Newfield	Maine
8921	Jacqueline	Thibeault	West Newfield	Maine
8922	Stacy	Jette	West Newfield	Maine
8923	Daniel	Winn	West Newfield	Maine
8924	Alexis	Rumney	West Newfield	Maine
8925	Virginia	Woodwell	West Newfield	Maine
8926	Michelle	Rumney	West Newfield	Maine
8927	Tayt	Dame	West Newfield	Maine
8928	Cody	Wilson	West Paris	Maine
8929	Marianne	Walton	West Paris	Maine
8930	Sharon	Dolleman	West Paris	Maine
8931	Earlene	Sprague	West Paris	Maine
8932	Kevin	Daley	West Paris	Maine
8933	Dannie	Abbott	West Paris	Maine
8934	Colby	Brett	West Paris	Maine
8935	Randall	Sappington	West Paris	Maine
8936	Adam	Herrick	West Paris	Maine
8937	Hanna	Ney	West Paris	Maine
8938	Kristy	Basso	West Paris	Maine
8939	Donna	Diconzo	West Paris	Maine
8940	Hunter	Rowell	West Paris	Maine
8941	Jennie-Mae	Nisbet	West Paris	Maine
8942	Dennis	Huber	West Paris	Maine
8943	Dale	Gregory	West Poland	Maine
8944	Megan	Brown	West Poland	Maine
8945	Shirley	Remsen	West Rockport	Maine
8946	Amanda	Brown	Westbrook	Maine
8947	Hunter	Fuller	Westbrook	Maine
8948	Anthony	Bessey	Westbrook	Maine
8949	Michelle	Gouzie	Westbrook	Maine
8950	Christie	Macelhiney	Westbrook	Maine

8951	Deanna	Mitchell	Westbrook	Maine
8952	Emily	Michaud	Westbrook	Maine
8953	Scott	Shibles	Westbrook	Maine
8954	Kim	Matthews	Westbrook	Maine
8955	Dana	Peterson	Westbrook	Maine
8956	Ryan	Pugh	Westbrook	Maine
8957	Nancy	Renton	Westbrook	Maine
8958	Ian	Ryan	Westbrook	Maine
8959	Kyle	Coniglio	Westbrook	Maine
8960	Beth	Schultz	Westbrook	Maine
8961	Barbara	Peaslee	Westbrook	Maine
8962	Dale	Leroux	Westbrook	Maine
8963	Michael	Walp	Westbrook	Maine
8964	Anthony	Ferrante	Westbrook	Maine
8965	david	brezack	Westbrook	Maine
8966	Emilia	McLellan	Westbrook	Maine
8967	Andrew	Clement	Westbrook	Maine
8968	Clifford	Hoover	Westbrook	Maine
8969	Chris	Sweet	Westbrook	Maine
8970	John	Hilton	Westbrook	Maine
8971	Deb	Diluiso	Westbrook	Maine
8972	Tracy	Phillips	Westbrook	Maine
8973	Tiffany	Greco	Westbrook	Maine
8974	Laine	Kuehn	Westbrook	Maine
8975	Matthew	Otis	Westbrook	Maine
8976	Mark	Levasseur	Westbrook	Maine
8977	Bradford	Martin	Westbrook	Maine
8978	Daniel	Cofone	Westbrook	Maine
8979	John	Hilton	Westbrook	Maine
8980	Martha	Goodale	Westbrook	Maine
8981	Kaylee	Daly	Westbrook	Maine
8982	Julie	Moulton	Westbrook	Maine
8983	Desiree	Leadbetter	Westbrook	Maine
8984	McKenzie	Parker	Westbrook	Maine
8985	Kimberly	White	Westbrook	Maine
8986	John	Olsson	Westbrook	Maine
8987	Benjamin	Ely	Westbrook	Maine
8988	Dorothy	Barnes	Westbrook	Maine
8989	Katrina	Sawyer	Westbrook	Maine
8990	Zachery	Disilvestro	Westbrook	Maine
8991	James	Varney	Westbrook	Maine
8992	Cadence	Atchinson	Westbrook	Maine
8993	Michael	Mitchell	Westbrook	Maine
8994	Sadie	Cross	Westbrook	Maine
8995	Carrie	Lambert	Westbrook	Maine
8996	Gloria	Caricchio	Westbrook	Maine

8997	Joanna	Leary	Westbrook	Maine
8998	Zachary	Sheltra	Westbrook	Maine
8999	Cadence	Atchinson	Westbrook	Maine
9000	Tanor	Bourgoin	Westbrook	Maine
9001	Alyssa	McIntyre	Westbrook	Maine
9002	Patrick	Fitzgerald	Westbrook	Maine
9003	Timothy	Haskell	Westbrook	Maine
9004	Cory	Broniarczyk	Westbrook	Maine
9005	Patrick	Smart	Westbrook	Maine
9006	Zachary	Quatrano	Westbrook	Maine
9007	Hannah	Blackburn	Westbrook	Maine
9008	Trevor	Saremi	Westbrook	Maine
9009	Stephen	Poirier	Westbrook	Maine
9010	David	Sawyer	Westbrook	Maine
9011	Rebeccca	Dillon	Westbrook	Maine
9012	Joan	Yates	Westbrook	Maine
9013	Bethany	Winslow	Westbrook	Maine
9014	Robert	Girard	Westbrook	Maine
9015	Benjamin	Ely	Westbrook	Maine
9016	Toby	Kilgore	Westbrook	Maine
9017	Courtney	Sabasteanski	Westbrook	Maine
9018	Peter	Lemay	Westbrook	Maine
9019	Maria	Woodbury	Westbrook	Maine
9020	Ann	Laliberte	Westbrook	Maine
9021	Adam	Webber	Westport Island	Maine
9022	Adam	Webber	Westport Island	Maine
9023	Richard	Barker	Westport Island	Maine
9024	Jacob	Risch	Westport Island	Maine
9025	Paul	Swidrak	Westport Island	Maine
9026	Eric	Albee Ii	Whitefield	Maine
9027	Bertie	Koller	Whitefield	Maine
9028	Jake	Mathews	Whitefield	Maine
9029	Virginia	Campbell	Whitefield	Maine
9030	Eric	Paetow	Whitefield	Maine
9031	Melissa	Boynton	Whitefield	Maine
9032	Rebecca	Koller	Whitefield	Maine
9033	Michael	McMorrow	Whitefield	Maine
9034	Kit	Pfeiffer	Whitefield	Maine
9035	Amy	Lincoln	Whitefield	Maine
9036	Greg	Doughty	Whitefield	Maine
9037	Bertie	Koller	Whitefield	Maine
9038	Katherine	Morse	Whitefield	Maine
9039	Stephen	Spencer	Whitefield	Maine
9040	Nathan	Tower	Whitefield	Maine
9041	Roger	Baston	Whitefield	Maine
9042	Jessica	Dowling	Whitefield	Maine

9043	Katrina	Jackson	Whitefield	Maine
9044	Lana	Paetow	Whitefield	Maine
9045	Marlene	Sullivan	Whitefield	Maine
9046	Daniel	Townsend	Whitefield	Maine
9047	Grace	Macomber	Whitefield	Maine
9048	Alice	Kopp	Whitefield	Maine
9049	Erik	Ekholm	Whitefield	Maine
9050	Erin	Trundy	Whitefield	Maine
9051	Gary	McCrimmon	Whitefield	Maine
9052	Judith	Martin	Whitefield	Maine
9053	Frank and Kim	McLaughlin	Whitefield	Maine
9054	Elizabeth	Mackenney	Whitefield	Maine
9055	Alicia	Landry	Whitefield	Maine
9056	Shannon	Baron	Whitefield	Maine
9057	scott	mackenney	Whitefield	Maine
9058	Loreal	Flannery	Whitefield	Maine
9059	Stephen	Pellecchia	Whitefield	Maine
9060	Michael	Sullivan	Whitefield	Maine
9061	Judith	Ekholm	Whitefield	Maine
9062	Aaron	Bond	Whitefield	Maine
9063	Benjamin	Giguere	Whitefield	Maine
9064	Susanne	Meidel	Whitefield	Maine
9065	Natasha	mayers	Whitefield	Maine
9066	Howard	Hatch	Whiting	Maine
9067	Adam	Hall	Whiting	Maine
9068	Rosemarie	Hill	Willimantic	Maine
9069	Laura	Feaga	Willimantic	Maine
9070	Kaitlin	Kelly	Wilton	Maine
9071	Issac	Cousins	Wilton	Maine
9072	Bette Jo	Tracy	Wilton	Maine
9073	Michael	Burke	Wilton	Maine
9074	Jennifer	Gardiner	Wilton	Maine
9075	Barbara	O'Reilly	Wilton	Maine
9076	Thomas	Greaton	Wilton	Maine
9077	Hannah	Cousins	Wilton	Maine
9078	Sarah	Cardinale	Wilton	Maine
9079	Austin	Pepin	Wilton	Maine
9080	Nancy	Prince	Wilton	Maine
9081	Megan	Crandall	Wilton	Maine
9082	Kelsey	Ellis	Wilton	Maine
9083	Ralph	Black	Wilton	Maine
9084	Tracy	Walker	Wilton	Maine
9085	Nancy	Walters	Wilton	Maine
9086	Judith	Fischer	Wilton	Maine
9087	Ben	Flagg	Wilton	Maine
9088	Kelly	Hewett	Wilton	Maine

9089	Lorien	Batt	Wilton	Maine
9090	Nick	Ellis	Wilton	Maine
9091	Sophia	Bunnell	Wilton	Maine
9092	Dell	Nichols	Wilton	Maine
9093	Jean	Linehan-Silva	Wilton	Maine
9094	Katherine	Nile	Wilton	Maine
9095	Benjamin	Cunningham	Wilton	Maine
9096	Gerran	Dyke	Wilton	Maine
9097	William	Andrews	Wilton	Maine
9098	Robert	Blake	Wilton	Maine
9099	Cole	Yates	Wilton	Maine
9100	Rebecca	Morin	Wilton	Maine
9101	Leslie	Richardson	Wilton	Maine
9102	Gwen	Doak	Wilton	Maine
9103	Patti	Collins	Wilton	Maine
9104	Sarah	Williams	Wilton	Maine
9105	Kym	Arian	Wilton	Maine
9106	Katleen	Masterman	Wilton	Maine
9107	Elaine	Fitch	Wilton	Maine
9108	Tamra	Albright	Wilton	Maine
9109	Tamra	Albright	Wilton	Maine
9110	Ashlee	McCormick	Wilton	Maine
9111	Crystal	Crockett	Wilton	Maine
9112	Marisa	Kennedy	Wilton	Maine
9113	Adam	Cote	Wilton	Maine
9114	Joan	Quinn	Wilton	Maine
9115	Michael	Arian	Wilton	Maine
9116	Patricia	O'Donnell	Wilton	Maine
9117	Brooklynn	Winters	Wilton	Maine
9118	Nancy	Merrow	Wilton	Maine
9119	Wanda	Kobischen	Wilton	Maine
9120	Susan	Embleton	Wilton	Maine
9121	Vern	Marden	Wilton	Maine
9122	Ellen	Nadeau	Wilton	Maine
9123	Laura	Chicn	Wilton	Maine
9124	Andrew	Simoneau	Wilton	Maine
9125	Krista	Ryder	Wilton	Maine
9126	Dalene	Tyler	Wilton	Maine
9127	April	Golden	Wilton	Maine
9128	Dyan	Macomber	Wilton	Maine
9129	Rebecca	Kelleher	Wilton	Maine
9130	Alec	McBean	Wilton	Maine
9131	peter	campion	Wilton	Maine
9132	Robert	O'Reilly	Wilton	Maine
9133	Caroline	Bergendahl	Wilton	Maine
9134	Nicole	Camfferman	Wilton	Maine

9135	Eileen	Adams	Wilton	Maine
9136	Meghan	Carroll	Wilton	Maine
9137	Shantel	Moody	Wilton	Maine
9138	Jordan	Shaw	Wilton	Maine
9139	Dennis	Maxwell	Wilton	Maine
9140	Jodi	Spiller	Wilton	Maine
9141	Kylea	Melbourne	Wilton	Maine
9142	Sandi	Escarfullery	Wilton	Maine
9143	Michael	Leblanc	Wilton	Maine
9144	Shannon	Oï¿½Clair	Windham	Maine
9145	David	Peterson	Windham	Maine
9146	Janet	Snow	Windham	Maine
9147	Carol	Priebe	Windham	Maine
9148	Joyce A	Bailey	Windham	Maine
9149	Benjamin	Skvorak	Windham	Maine
9150	Keaton	Harmon	Windham	Maine
9151	Patty	Plummer	Windham	Maine
9152	Thad	Millett	Windham	Maine
9153	Everett And Carole	Millett	Windham	Maine
9154	Trey	Thomes	Windham	Maine
9155	Steven	Ellis	Windham	Maine
9156	Richard	Graves	Windham	Maine
9157	Matt	Jannarone	Windham	Maine
9158	Mary	Haibon	Windham	Maine
9159	Jennifer	Harmon	Windham	Maine
9160	Anthony	Diblasi	Windham	Maine
9161	Nathan	Bowie	Windham	Maine
9162	Brian	Skillings	Windham	Maine
9163	Joe	Blo	Windham	Maine
9164	Craig	Lowell	Windham	Maine
9165	Barbara	Maurais	Windham	Maine
9166	Jason	Libby	Windham	Maine
9167	Nathalie	Mitchell	Windham	Maine
9168	Ronald	Cooper	Windham	Maine
9169	Jean	Skinner	Windham	Maine
9170	Shannon	Jones	Windham	Maine
9171	April	Pattershall	Windham	Maine
9172	Brock	Norberg	Windham	Maine
9173	Lee Ann	Black	Windham	Maine
9174	Brandon	Bryant	Windham	Maine
9175	Kyle	Harmon	Windham	Maine
9176	Michael	Waters	Windham	Maine
9177	Ross	Salovitch	Windham	Maine
9178	Lucas	Bernacki	Windham	Maine
9179	Ashley	Rice-Welch	Windham	Maine

9180	Daniel	Svenson	Windham	Maine
9181	Jennifer	Moulton	Windham	Maine
9182	Thomas	Peterson	Windham	Maine
9183	Peter	Gerard	Windham	Maine
9184	Beth	Gilman	Windham	Maine
9185	Rebecca	Lockridge	Windham	Maine
9186	Tyler	Lockwood	Windham	Maine
9187	Priscilla	Payne	Windham	Maine
9188	Corey	Poitras	Windham	Maine
9189	Frank	Chepke	Windham	Maine
9190	Lisa	Leighton	Windham	Maine
9191	Merideth	Millett	Windham	Maine
9192	Helen	Hurgin	Windham	Maine
9193	Valerie	Page	Windham	Maine
9194	Jessica	Alexander	Windham	Maine
9195	Daniel	Hayden	Windham	Maine
9196	Stephen	Curit	Windham	Maine
9197	Cheryl	Carlson	Windham	Maine
9198	Clay	Hoyt	Windham	Maine
9199	Richard	York	Windham	Maine
9200	Cassandra	Stewart	Windham	Maine
9201	Amanda	Fogg	Windham	Maine
9202	Timothy	Emery	Windham	Maine
9203	Cynthia	Obrien	Windham	Maine
9204	Kelly	McMann	Windham	Maine
9205	Ann	Sparling	Windham	Maine
9206	Sherry	Booth	Windham	Maine
9207	Elizabeth	Oatley	Windham	Maine
9208	Roger	Varney	Windham	Maine
9209	James	Dyer	Windham	Maine
9210	Simone	Emmons	Windham	Maine
9211	Amy	Hayden	Windham	Maine
9212	Stephen	Weeks	Windham	Maine
9213	Jeremy	Trainor	Windham	Maine
9214	Igor	Rakuz	Windham	Maine
9215	Richard	Benish	Windham	Maine
9216	Rosanne	Dombek	Windham	Maine
9217	Scott	Harnden	Windham	Maine
9218	Sean	Favreau	Windham	Maine
9219	Stephen	Marean	Windham	Maine
9220	Michael	Milliken	Windham	Maine
9221	Aaron	Cieslak	Windham	Maine
9222	Brandi	Dmytruk	Windham	Maine
9223	Chris	Martin	Windham	Maine
9224	William	Briggs	Windham	Maine
9225	Tracy	Vance	Windham	Maine

9226	Wendy	Haskell	Windham	Maine
9227	Troy	Peterson	Windham	Maine
9228	Cassandra	Nichols	Windham	Maine
9229	Austin	Harmon	Windham	Maine
9230	Phil	Salway	Windham	Maine
9231	John	Reny Iii	Windham	Maine
9232	Megan	Lowell	Windham	Maine
9233	Micaela	Van Valkenburgh	Windham	Maine
9234	Amanda	Salovitch	Windham	Maine
9235	Greg	Barr	Windham	Maine
9236	Martha	Briggs	Windham	Maine
9237	Sarah	Martin	Windham	Maine
9238	Brenda	Slvinsky	Windham	Maine
9239	Steve	Newcomb	Windham	Maine
9240	Katherine	DiBlasi	Windham	Maine
9241	Jeff	Dunlop	Windham	Maine
9242	Janes	Cummings	Windham	Maine
9243	Victor	Detroy	Windham	Maine
9244	Katherine	Stetson-Reed	Windham	Maine
9245	Brady	Southerland	Windham	Maine
9246	Joshua	Dugas	Windham	Maine
9247	Brian	Morin	Windham	Maine
9248	Theodore	Obrien	Windham	Maine
9249	David	Butler	Windham	Maine
9250	Katelyn	Salvato	Windham	Maine
9251	Thomas	Bennett	Windham	Maine
9252	Debbe	Kelley	Windham	Maine
9253	Courtney	Post Van Der Burg	Windham	Maine
9254	Katherine	Diblasi	Windham	Maine
9255	Donald	Harmon	Windham	Maine
9256	Jessica	Preble	Windham	Maine
9257	Nathan	Strout	Windham	Maine
9258	Charlotte	Emery	Windham	Maine
9259	Tony	Vance	Windham	Maine
9260	Rachel	Cooper	Windham	Maine
9261	Elizabeth	Choate	Windsor	Maine
9262	Nick	Roberge	Windsor	Maine
9263	Airyn	Jewett	Windsor	Maine
9264	Jessica	Hisler	Windsor	Maine
9265	Norris	Bowie	Windsor	Maine
9266	Tyler	Curtis	Windsor	Maine
9267	Jon	Bonner	Windsor	Maine
9268	Robert	Hatch	Windsor	Maine
9269	Michelle	Bonner	Windsor	Maine

9270	Abigail	Lee	Windsor	Maine
9271	Kassandra	Ross	Windsor	Maine
9272	Colton	Labelle	Windsor	Maine
9273	Clifton	Sirois	Windsor	Maine
9274	Ian	Ferguson	Windsor	Maine
9275	Robert	Rice	Windsor	Maine
9276	Wanda	Rose	Windsor	Maine
9277	Linda	Pepin	Windsor	Maine
9278	Donald	Jones	Windsor	Maine
9279	JoAnne	LaFear	Windsor	Maine
9280	Matthew	Moody	Windsor	Maine
9281	Peter	Vashon	Windsor	Maine
9282	Susan	Dodge	Windsor	Maine
9283	Jacie	Cain	Windsor	Maine
9284	Daniel	Vashon	Winslow	Maine
9285	David	Perry	Winslow	Maine
9286	Zachary	Guptill	Winslow	Maine
9287	Jameson	White	Winslow	Maine
9288	Christopher	Hopkins	Winslow	Maine
9289	Chelsea	Robbins	Winslow	Maine
9290	Brian	Gleason	Winslow	Maine
9291	Troy	Reny	Winslow	Maine
9292	Lee	Trahan	Winslow	Maine
9293	Jim	Nadeau	Winslow	Maine
9294	Sonya	Cole	Winslow	Maine
9295	Morgan	Anonymous	Winslow	Maine
9296	Katherine	Coombs	Winslow	Maine
9297	Elery	Keene	Winslow	Maine
9298	Ryan	Millett	Winslow	Maine
9299	Alyssa	Veilleux	Winslow	Maine
9300	Dominic	Pare	Winslow	Maine
9301	Jessica	Crouse	Winslow	Maine
9302	Tina	Eames	Winslow	Maine
9303	Harry	Morrison	Winslow	Maine
9304	Melisa	Nye	Winslow	Maine
9305	Zackery	Buckmore	Winslow	Maine
9306	Raymond	Phinney	Winslow	Maine
9307	Raeann	Deraps	Winslow	Maine
9308	Amy	Greenwald	Winslow	Maine
9309	Peter	Garrett	Winslow	Maine
9310	Alison	Quick	Winslow	Maine
9311	Christina	Rusnov	Winslow	Maine
9312	Jordan	Pelletier	Winslow	Maine
9313	Mitchell	Morrison	Winslow	Maine
9314	Ryan	Bolduc	Winslow	Maine
9315	Earlina	Brown	Winslow	Maine

9316	Walter	Keene	Winslow	Maine
9317	Robert	Goodrich	Winslow	Maine
9318	Tracy	Welch	Winslow	Maine
9319	Lawrence W	Fleury Jr	Winslow	Maine
9320	Gail	Young	Winslow	Maine
9321	Dan	Camann	Winslow	Maine
9322	Brian	Allen	Winslow	Maine
9323	Karen	Woodworth	Winslow	Maine
9324	Josh	Stetson	Winslow	Maine
9325	Ross	Desjardins	Winslow	Maine
9326	Joel	Dorr	Winslow	Maine
9327	Sally	Harwood	Winslow	Maine
9328	Dianne	Fleury	Winslow	Maine
9329	Riley	Linton	Winslow	Maine
9330	Jared	Hodgins	Winslow	Maine
9331	Hillary	Libby	Winslow	Maine
9332	Samuel	Gath	Winslow	Maine
9333	Benjamin	Bryant	Winslow	Maine
9334	Richard	Cate	Winter Harbor	Maine
9335	David	Ackley Sr,	Winter Harbor	Maine
9336	Suellen	Jagels	Winterport	Maine
9337	Brenda	Moot	Winterport	Maine
9338	Cynthia	Belyea	Winterport	Maine
9339	Lawrence	White	Winterport	Maine
9340	Philip	Belyea	Winterport	Maine
9341	Robert	Palmer	Winterport	Maine
9342	Robert	Sabins	Winterport	Maine
9343	Christine	Clark-Mello	Winterport	Maine
9344	Roger	Doyon	Winterport	Maine
9345	Hannah	Holmes	Winterport	Maine
9346	Kaylee	Stpierre	Winterport	Maine
9347	Cassandra	McCannell	Winterport	Maine
9348	Rebecca	Richards	Winterport	Maine
9349	Lloyd	Tracy	Winterport	Maine
9350	Brandon	Brasslett	Winterport	Maine
9351	Keltie	Beaudoin	Winthrop	Maine
9352	Christa	Casey	Winthrop	Maine
9353	Justine	Woodman	Winthrop	Maine
9354	Ahren	Groleau	Winthrop	Maine
9355	Adrian	Beaudoin	Winthrop	Maine
9356	Sarah	Linneken	Winthrop	Maine
9357	Anna	Carll	Winthrop	Maine
9358	Michael	Harvey	Winthrop	Maine
9359	Dawn	Costello	Winthrop	Maine
9360	Carol	Ellingwood	Winthrop	Maine
9361	Kirtland	Belz	Winthrop	Maine

9362	Jason	Linneken	Winthrop	Maine
9363	Suzanne	Larochelle	Winthrop	Maine
9364	Gayle	Roy	Winthrop	Maine
9365	Jennifer	Cunningham	Winthrop	Maine
9366	Christian	Weymouth	Winthrop	Maine
9367	Mark	Hopkins	Winthrop	Maine
9368	Jeff	Dunn	Winthrop	Maine
9369	Frank	Oberg	Winthrop	Maine
9370	Barbara	Bixby	Winthrop	Maine
9371	Ellen	Jones-Hignett	Winthrop	Maine
9372	Mary	Richards	Winthrop	Maine
9373	Ashley	Mason	Winthrop	Maine
9374	John	Nicholas	Winthrop	Maine
9375	Keegan	Choate	Winthrop	Maine
9376	Alexis	Harriman	Winthrop	Maine
9377	Tucker	Rowland	Winthrop	Maine
9378	Jeffrey	Toothaker	Winthrop	Maine
9379	Ashley	Ward	Winthrop	Maine
9380	Barbara	Snowadzky	Winthrop	Maine
9381	Stephanie	Gravel	Winthrop	Maine
9382	Stephen	Norton	Winthrop	Maine
9383	Mary	Dumais	Winthrop	Maine
9384	Jeanette	Ouellette	Winthrop	Maine
9385	Nancy	Nicholas	Winthrop	Maine
9386	Susan	Gallo	Winthrop	Maine
9387	Cory	Ridlon	Winthrop	Maine
9388	Kayla	Vivenzio	Winthrop	Maine
9389	Melanie	Beauchesne	Winthrop	Maine
9390	Barbara	Lamoreau	Winthrop	Maine
9391	Candida	Shelton	Winthrop	Maine
9392	Dale	Peaslee Jr	Winthrop	Maine
9393	Gary	Varnam	Winthrop	Maine
9394	Joseph	Powell	Winthrop	Maine
9395	Natasha	Brassley	Winthrop	Maine
9396	Megan	Hubert	Winthrop	Maine
9397	Emmanouil	Karamousadakis	Winthrop	Maine
9398	Mary	Dumais	Winthrop	Maine
9399	Heather	Burnham	Winthrop	Maine
9400	Eben	Ballard	Winthrop	Maine
9401	Jessica	Dubois	Winthrop	Maine
9402	Scott	Gravel	Winthrop	Maine
9403	Steven	Maxim	Winthrop	Maine
9404	David	Van Twistern	Winthrop	Maine
9405	Chad	Perreault	Winthrop	Maine
9406	Rebecca	Wilson	Winthrop	Maine
9407	Thomas	Ames	Winthrop	Maine

9408	Stephanie	Gravel	Winthrop	Maine
9409	Amanda	Bryant	Winthrop	Maine
9410	Sue	Neal	Winthrop	Maine
9411	Jenn	St.Hilaire	Winthrop	Maine
9412	Caleb	Dale	Winthrop	Maine
9413	Faith	McLaughlin	Winthrop	Maine
9414	Tracy	Urbaitis	Winthrop	Maine
9415	Arnold	Stebbins	Winthrop	Maine
9416	Eben	Thomas	Winthrop	Maine
9417	Jeanette	Ouellette	Winthrop	Maine
9418	Lawrence	Cook	Winthrop	Maine
9419	Laura	Urbaitis	Winthrop	Maine
9420	Cheryl	Thompson	Winthrop	Maine
9421	Priscilla	Jenkins	Winthrop	Maine
9422	Louise	Hinkley	Winthrop	Maine
9423	Norman	Fox	Wiscasset	Maine
9424	Belinda	Haggett	Wiscasset	Maine
9425	Kevin	Hardwick	Wiscasset	Maine
9426	Taylor	Delano	Wiscasset	Maine
9427	Kirsten	Briggs	Wiscasset	Maine
9428	Steven	Hamlin	Wiscasset	Maine
9429	Tony	Barnes	Wiscasset	Maine
9430	Susan	van Alsenoy	Wiscasset	Maine
9431	Margo	Soule	Wiscasset	Maine
9432	Diane	Hammond	Wiscasset	Maine
9433	Narissa	Goodwin	Wiscasset	Maine
9434	Raymond	Cray	Wiscasset	Maine
9435	Ashley	Ring	Wiscasset	Maine
9436	Ryan	Hanson	Wiscasset	Maine
9437	Thomas	Seigars	Wiscasset	Maine
9438	Douglas	Henderson	Wiscasset	Maine
9439	Joey	Brown	Wiscasset	Maine
9440	Terry	Ashton	Wiscasset	Maine
9441	John	Reinhardt	Wiscasset	Maine
9442	Jeff	Clark	Wiscasset	Maine
9443	Kyle	McCaskill	Wiscasset	Maine
9444	Margaret	Miles	Wiscasset	Maine
9445	Samantha	Morang	Wiscasset	Maine
9446	Sophie	Harrigan	Wiscasset	Maine
9447	Meghan	Gillespie	Wiscasset	Maine
9448	Destinee	Poole	Wiscasset	Maine
9449	Hannah	Maloy	Wiscasset	Maine
9450	Nate	Woodman	Wiscasset	Maine
9451	Kathrynne	Willhoite	Wiscasset	Maine
9452	Ann	Schneider	Wiscasset	Maine
9453	Greg	Dalton	Wiscasset	Maine

9454	Whitney	Travis	Wiscasset	Maine
9455	Nicholas	Oppedisano	Wiscasset	Maine
9456	Daniel	Ezzell	Wiscasset	Maine
9457	Tori	Dyke	Wiscasset	Maine
9458	Maria	McGuiggan	Wiscasset	Maine
9459	Nicole	Graffam	Wiscasset	Maine
9460	Sam	Selby	Wiscasset	Maine
9461	Jacque	Simmons	Wiscasset	Maine
9462	Marty	Fox	Wiscasset	Maine
9463	Bob	Soule	Wiscasset	Maine
9464	Nicholas	Tilas	Wiscasset	Maine
9465	Brooke	Callahan	Wiscasset	Maine
9466	Nicholas	Hinkley	Wiscasset	Maine
9467	John	Rines	Wiscasset	Maine
9468	Dakota	Willhoite	Wiscasset	Maine
9469	Teagan	Wright	Wiscasset	Maine
9470	Elizabeth	Clinton	Wiscasset	Maine
9471	Wesley	Gagne	Wiscasset	Maine
9472	Kendra	Chancellor	Wiscasset	Maine
9473	Sabrina	Maamouri-Cortez	Wiscasset	Maine
9474	Elizabeth	Atwater	Wiscasset	Maine
9475	Megan	McCandless	Wiscasset	Maine
9476	Alysha	Brooks	Wiscasset	Maine
9477	Melissa	Mackusick	Wiscasset	Maine
9478	Nicole	Walsh	Wiscasset	Maine
9479	Nicholas	Dalton	Wiscasset	Maine
9480	Michael	Gillespie	Wiscasset	Maine
9481	Kathleen	Reinhardt	Wiscasset	Maine
9482	Valery	Curtis	Wiscasset	Maine
9483	Linda	Ewen	Wiscasset	Maine
9484	Jessica	Mullins	Wiscasset	Maine
9485	Jaime	Hussey	Wiscasset	Maine
9486	Devin	Fisk	Wiscasset	Maine
9487	Angela	Quirion	Wiscasset	Maine
9488	Jenny	Gray	Wiscasset	Maine
9489	Karyn	Thornton	Woodland	Maine
9490	Levi	Swan	Woodland	Maine
9491	Judy	Huber	Woodstock	Maine
9492	Jillian	Vaillancourt	Woolwich	Maine
9493	Juliet	Shaw	Woolwich	Maine
9494	Amanda	Bowling	Woolwich	Maine
9495	Shannon	Fraser	Woolwich	Maine
9496	Linda	Gilbert	Woolwich	Maine
9497	Erik	Missal	Woolwich	Maine
9498	Beth	Harcek	Woolwich	Maine

9499	Brey	Miller	Woolwich	Maine
9500	Janine	Lipfert	Woolwich	Maine
9501	Maggie	Lachance	Woolwich	Maine
9502	Zachary	Holbrook	Woolwich	Maine
9503	Diane	Gilman	Woolwich	Maine
9504	Kaitlin	Lavallee	Woolwich	Maine
9505	Jacob	Coffin	Woolwich	Maine
9506	Natalie	Burch	Woolwich	Maine
9507	Pamela	Wright	Woolwich	Maine
9508	Taylor	Callan	Woolwich	Maine
9509	Sarah	Harvey	Woolwich	Maine
9510	Korallei	Fifield	Woolwich	Maine
9511	Alexandra	McGuiggan	Woolwich	Maine
9512	Paula	Harvard	Woolwich	Maine
9513	Stephanie	Wilhelm	Woolwich	Maine
9514	Amy	Leonard	Woolwich	Maine
9515	Richard	Bisson	Woolwich	Maine
9516	Cory	Fitzgerald	Woolwich	Maine
9517	Carol	Grose	Woolwich	Maine
9518	Michael	Harcek	Woolwich	Maine
9519	Kevin	Overmiller	Woolwich	Maine
9520	Janice	Brooker	Woolwich	Maine
9521	Mary Ellen	Morin	Woolwich	Maine
9522	Lauri	Bailey	Woolwich	Maine
9523	Arielle	Bickmore	Woolwich	Maine
9524	Billy Joe	Jackson	Woolwich	Maine
9525	Roger	Foster	Woolwich	Maine
9526	Katie	Goodenow	Woolwich	Maine
9527	Dylan	Quimby	Woolwich	Maine
9528	Lauren	Puff	Woolwich	Maine
9529	Kathleen	Hanning	Woolwich	Maine
9530	Ryan	Wyman	Woolwich	Maine
9531	David	Arsenault	Woolwich	Maine
9532	Michael	Scanlon	Woolwich	Maine
9533	Greg	Goodenow	Woolwich	Maine
9534	Joan	Weaver	Woolwich	Maine
9535	Trey	Milam	Woolwich	Maine
9536	Chandler	Field	Woolwich	Maine
9537	Danielle	Friend	Woolwich	Maine
9538	Victoria	Grover	Woolwich	Maine
9539	Nicholas	Wilhelm	Woolwich	Maine
9540	Marion	Fear	Woolwich	Maine
9541	John	Hobson	Woolwich	Maine
9542	William	Chesties	Woolwich	Maine
9543	Crystal	Thibeault	Woolwich	Maine
9544	Guy	Marsden	Woolwich	Maine

9545	Taylor	Walker	Wyman	Maine
9546	Karen	Seile	Wyman	Maine
9547	Richard	McWilliams	Yarmouth	Maine
9548	Benjamin	Donahue	Yarmouth	Maine
9549	Jaime	Stowell	Yarmouth	Maine
9550	Julie	Crofts	Yarmouth	Maine
9551	Debra	Bluth	Yarmouth	Maine
9552	Phillip	Lowe	Yarmouth	Maine
9553	Doug	Thorp	Yarmouth	Maine
9554	Andrew	Mazer	Yarmouth	Maine
9555	Erica	St Laurent	Yarmouth	Maine
9556	Pat	Chanterelle	Yarmouth	Maine
9557	Donald	Lennon	Yarmouth	Maine
9558	Max	Grimm	Yarmouth	Maine
9559	Steve	Barker	Yarmouth	Maine
9560	Erin	Abbott	Yarmouth	Maine
9561	Nick	Gillert	Yarmouth	Maine
9562	Curwin	Martin	Yarmouth	Maine
9563	Chris	Peterson	Yarmouth	Maine
9564	Sean	Rendall	Yarmouth	Maine
9565	William	Mackinnon	Yarmouth	Maine
9566	Carl	Germann	Yarmouth	Maine
9567	Laura	Smith-Petersen	Yarmouth	Maine
9568	Donna S	Walls	Yarmouth	Maine
9569	Christine	Oberink	Yarmouth	Maine
9570	Kyaira	Grondin	Yarmouth	Maine
9571	Elizabeth	Small	Yarmouth	Maine
9572	Margaret	Donahue	Yarmouth	Maine
9573	Daniel	Goodwin	Yarmouth	Maine
9574	Virginia	Thorp	Yarmouth	Maine
9575	Kristen	Singer	Yarmouth	Maine
9576	Kymberly	Dakin	Yarmouth	Maine
9577	Colles	Stowell	Yarmouth	Maine
9578	Bill	Carter	Yarmouth	Maine
9579	Brenda	Laverdiere	Yarmouth	Maine
9580	Isaac	Grondin	Yarmouth	Maine
9581	stephen	geneseo	Yarmouth	Maine
9582	Todd	Meier	Yarmouth	Maine
9583	Frank	Grondin	Yarmouth	Maine
9584	Peter	Titcomb	Yarmouth	Maine
9585	Karen	Johnson	Yarmouth	Maine
9586	Debbie	Robichaud	Yarmouth	Maine
9587	Bruce	Soule	Yarmouth	Maine
9588	Jay	Binnion	Yarmouth	Maine
9589	April	Humphrey	Yarmouth	Maine
9590	Michael	Darling	Yarmouth	Maine

9591	Scott	Hanson	Yarmouth	Maine
9592	Eric	Salvesen	Yarmouth	Maine
9593	Trevor	Putnoky	Yarmouth	Maine
9594	Tayla	Regalado	Yarmouth	Maine
9595	Brian	Peters	Yarmouth	Maine
9596	David	Ertz	Yarmouth	Maine
9597	Noah	Grondin	Yarmouth	Maine
9598	Elizabeth	Abbott	Yarmouth	Maine
9599	Kathleen	Darling	Yarmouth	Maine
9600	Mariana	Tupper	Yarmouth	Maine
9601	Elle	Grondin	Yarmouth	Maine
9602	Jennifer	Peters	Yarmouth	Maine
9603	Elle	Grondin	Yarmouth	Maine
9604	Skip	Schnable	York	Maine
9605	Kayla	Boone	York	Maine
9606	Glen	MacWilliams	York	Maine
9607	Germain	Cloutier	York	Maine
9608	Janet	Drew	York	Maine
9609	Edward	Leskowsky	York	Maine
9610	Steven	Rowley	York	Maine
9611	Dennis and Susan	Kepner	York	Maine
9612	F.	Garole	York	Maine
9613	Timothy	Beauchamp	York	Maine
9614	Conor	Obrien	York	Maine
9615	Linda	Hourihan	York	Maine
9616	Wanda	Leblanc	York	Maine
9617	David	Patton	York	Maine
9618	Brody	Lee	York	Maine
9619	Hilary	Clark	York	Maine
9620	Douglas	Frazier	York	Maine
9621	Lindsay	Turnquist	York	Maine
9622	Gail	Borkowski	York	Maine
9623	Alan	McDonald	York	Maine
9624	Diane	Kleist	York	Maine
9625	Sue	Ross	York	Maine
9626	Lynn	Friar	York	Maine
9627	Paul	Turnquist	York	Maine
9628	Edward	McAbee	York	Maine
9629	Nichole	Yeaton	York	Maine
9630	Crawford	Zetterberg	York	Maine
9631	M.	Turner	York	Maine
9632	Brandon	Lyon	York Beach	Maine
9633	Ingrid	Towle	York Beach	Maine
9634	Rodney W	Byam	York Beach	Maine
9635	Maud	Aldrich	York Beach	Maine

9636	Jim	Bernstein	York Harbor	Maine
9637	Bonnie	Raindrop	Baltimore	Maryland
9638	Miranda	Betts	Baltimore	Maryland
9639	Catherine	Swartz	Bowie	Maryland
9640	Richard	Weber	Conowingo	Maryland
9641	Faith	Howarth	Easton	Maryland
9642	Matt	Spong	Ellicott City	Maryland
9643	Mike	Baird	Girdletree	Maryland
9644	Richard	Weber	North East	Maryland
9645	Orman	Morton	Nottingham	Maryland
9646	Diane	Lewis	Severna Park	Maryland
9647	Liz	Stevens	Silver Spring	Maryland
9648	Melia	Gayaldo	Silver Spring	Maryland
9649	Vicki	Carter	Silver Spring	Maryland
9650	Elizabeth	Tanner	Towson	Maryland
9651	Claudia	Kohl	Worton	Maryland
9652	Jane	Moosbruker	Acton	Massachusetts
9653	Peter	Kaminski	Acton	Massachusetts
9654	Catherine	Schlich	Amesbury	Massachusetts
9655	Bob	Ingalls	Amesbury	Massachusetts
9656	Justin	Perry	Amesbury	Massachusetts
9657	Catherine	Farrell	Arlington	Massachusetts
9658	Catherine	Lehmann	Athol	Massachusetts
9659	Michael	Amancio	Attleboro	Massachusetts
9660	Lori	Diebling	Attleboro	Massachusetts
9661	Stephen	Fincher	Attleboro	Massachusetts
9662	Maryann	Decell	Auburn	Massachusetts
9663	Daniel	Perez	Belchertown	Massachusetts
9664	Allison	Zuchman	Belmont	Massachusetts
9665	Peter	Orne	Belmont	Massachusetts
9666	Brian	Lowe	Berlin	Massachusetts
9667	Chet	Dube	Bernardston	Massachusetts
9668	Patricia E	Peverada	Beverly	Massachusetts
9669	Christopher	Stanford	Beverly	Massachusetts
9670	Loring	Merrow	Beverly	Massachusetts
9671	Colin	Hawkes	Beverly	Massachusetts
9672	Cheryl	Sydorko	Beverly	Massachusetts
9673	David	McMillan	Billerica	Massachusetts
9674	Carrie	Stevens	Billerica	Massachusetts
9675	Kevin	Shapleigh	Billerica	Massachusetts
9676	Dave	Ryan	Boston	Massachusetts
9677	Emily	Franchett	Boston	Massachusetts
9678	Nick	Petrovic	Boston	Massachusetts
9679	Bernard	Borman	Boston	Massachusetts
9680	Ling	Wang	Boston	Massachusetts
9681	Cal	Spinelli	Boxford	Massachusetts

9682	William	Andrews	Braintree	Massachusetts
9683	Kristina	Cullen	Braintree	Massachusetts
9684	Jennifer	Curry	Braintree	Massachusetts
9685	Lisa	Mavilia	Braintree	Massachusetts
9686	Michaela	Bowen	Braintree	Massachusetts
9687	Brendan	Curry	Braintree	Massachusetts
9688	Brian	Gingras	Braintree	Massachusetts
9689	Judy	North	Brewster	Massachusetts
9690	William	Lyons	Bridgewater	Massachusetts
9691	Alexis	Ambeliotis	Brighton	Massachusetts
9692	Benjamin	White	Brockton	Massachusetts
9693	Matthew	Rhode	Brookline	Massachusetts
9694	William	Kelley	Brookline	Massachusetts
9695	Nancy	Maynes	Brookline	Massachusetts
9696	Laura	Troll	Buzzards Bay	Massachusetts
9697	Sam	Waterbury	Cambridge	Massachusetts
9698	Kshitij	Mittal	Cambridge	Massachusetts
9699	Aryt	Alasti	Cambridge	Massachusetts
9700	Randy	Stein	Cambridge	Massachusetts
9701	Jane	Hilburt-Davis	Cambridge	Massachusetts
9702	Dwight	Quayle	Cambridge	Massachusetts
9703	Walter	Silver	Cambridge	Massachusetts
9704	Brian	Campbell	Cambridge	Massachusetts
9705	Ann	Stewart	Cambridge	Massachusetts
9706	Sophia	Karasavas	Canton	Massachusetts
9707	John	schaechter	Canton	Massachusetts
9708	Robert	West	Carlisle	Massachusetts
9709	Sean	Fidler	Carlisle	Massachusetts
9710	Alison	Brown	Carver	Massachusetts
9711	Donna	Perry	Charlton	Massachusetts
9712	Jonathan	Roberts	Charlton	Massachusetts
9713	Stuart	Moore	Chatham	Massachusetts
9714	Susan	Brooks	Chelmsford	Massachusetts
9715	Andrea	Price	Chelmsford	Massachusetts
9716	Gina	Henrichon	Chester	Massachusetts
9717	Kathleen	Vadnais	Chicopee	Massachusetts
9718	Mackenzie	Connor	Cotuit	Massachusetts
9719	Emily	Swindell	Danvers	Massachusetts
9720	Valeria	Kenny	Danvers	Massachusetts
9721	Catherine	Cutler	Danvers	Massachusetts
9722	Tyler	Gaudet	Danvers	Massachusetts
9723	Melissa	Smith	Dedham	Massachusetts
9724	Liam	Michel	Dedham	Massachusetts
9725	Roger	Reeves	Dorchester Center	Massachusetts
9726	Nicholas	Fantini	Dracut	Massachusetts
9727	Annie	Laurie	Dracut	Massachusetts

9728	Bob	McArdle	Dracut	Massachusetts
9729	Kathleen	Donovan	Dracut	Massachusetts
9730	John	McKiernan	Dudley	Massachusetts
9731	Wayne	Evans	Duxbury	Massachusetts
9732	Lisa	Gerrish	East Boston	Massachusetts
9733	Amanda	Sparda	East Weymouth	Massachusetts
9734	Lisa	Amaral	Fairhaven	Massachusetts
9735	Kevin	Mullen	Fairhaven	Massachusetts
9736	Lisa	Amaral	Fairhaven	Massachusetts
9737	Jaime	Sudnick	Feeding Hills	Massachusetts
9738	Erik	Sudnick	Feeding Hills	Massachusetts
9739	Jenna	Boucher	Fiskdale	Massachusetts
9740	Jordan	Boivin	Fitchburg	Massachusetts
9741	Ben	Amburgey	Fitchburg	Massachusetts
9742	James	Wolford	Foxboro	Massachusetts
9743	Russell	Donnelly	Framingham	Massachusetts
9744	Leonard	Ezbicki	Framingham	Massachusetts
9745	Gabrielle	Fellman	Framingham	Massachusetts
9746	Matthew	Vendetti	Franklin	Massachusetts
9747	Laura	Hutt	Franklin	Massachusetts
9748	Richard	Knowlton	Gardner	Massachusetts
9749	Max	Gorgone	Georgetown	Massachusetts
9750	Judy	Desreuisseau	Gill	Massachusetts
9751	Michael	Moffett	Gloucester	Massachusetts
9752	Kristy	Poulliot	Grafton	Massachusetts
9753	Deb	Graham	Granby	Massachusetts
9754	D	Friedman	Hadley	Massachusetts
9755	Joan	Doucette	Halifax	Massachusetts
9756	Joshua	Reed	Halifax	Massachusetts
9757	Judy	Brewer	Hampden	Massachusetts
9758	Hailey	Johnson	Hanson	Massachusetts
9759	Katharine	Toll	Harvard	Massachusetts
9760	Francoise	McDougall	Harwich	Massachusetts
9761	James	Smith Iii	Harwich	Massachusetts
9762	Constance	Graham	Hingham	Massachusetts
9763	Robert	Bossange	Holliston	Massachusetts
9764	Caroll	Damigella	Holliston	Massachusetts
9765	Chelsea	Brown	Holyoke	Massachusetts
9766	Lori	McCarthy	Holyoke	Massachusetts
9767	Autumn	Reynolds	Hubbardston	Massachusetts
9768	Jason	Blais	Hubbardston	Massachusetts
9769	Dennis	Rogers	Hubbardston	Massachusetts
9770	Vivian	Hood	Hudson	Massachusetts
9771	Barbara	Dunn	Hudson	Massachusetts
9772	Lorna	Hennebury	Hull	Massachusetts
9773	Robert	Bowes	Hull	Massachusetts

9774	Bob	Bayer	Hull	Massachusetts
9775	Jodi	Simmons	Huntington	Massachusetts
9776	Benjamin	Lane	Ipswich	Massachusetts
9777	Debra	Wheeler	Ipswich	Massachusetts
9778	Roger	Wheeler	Ipswich	Massachusetts
9779	Tracy	Brown	Jamaica Plain	Massachusetts
9780	William	Burgess	Jamaica Plain	Massachusetts
9781	Anne	Wheelock	Jamaica Plain	Massachusetts
9782	Sinead	Keogh	Jamaica Plain	Massachusetts
9783	Jennifer	Trescot	Kingston	Massachusetts
9784	Thomas	Christopher	Lancaster	Massachusetts
9785	Dann	Prentiss	Lancaster	Massachusetts
9786	Charles	Hopkins	Leicester	Massachusetts
9787	Kathleen	Lafferty	Leverett	Massachusetts
9788	Fran	Ludwig	Lexington	Massachusetts
9789	Robert	Mason	Lexington	Massachusetts
9790	Anthony	Sudnick	Lincoln	Massachusetts
9791	Michael	Scuderi	Longmeadow	Massachusetts
9792	Brian	Nichols	Lowell	Massachusetts
9793	Tansey	Helmke	Lowell	Massachusetts
9794	John	Daly	Lowell	Massachusetts
9795	Brad	Adie	Lowell	Massachusetts
9796	Meghan	Adie	Lowell	Massachusetts
9797	Heather	Antolik	Lowell	Massachusetts
9798	Paul	Comtois	Ludlow	Massachusetts
9799	Ed	Hyde	Lynn	Massachusetts
9800	Michael	Hanley	Malden	Massachusetts
9801	Christine	Wight	Manchester	Massachusetts
9802	Laurence	Guild	Marlborough	Massachusetts
9803	Austin	Hart	Marshfield	Massachusetts
9804	Joleen	Corcoran-Theran	Marshfield	Massachusetts
9805	Ronald	Macinnis	Mashpee	Massachusetts
9806	Katherine	Whitney	Maynard	Massachusetts
9807	Lois	Grossman	Medford	Massachusetts
9808	Kendra	Peart	Medford	Massachusetts
9809	Matt	Farren	Merrimac	Massachusetts
9810	Allin	Frawley	Middleboro	Massachusetts
9811	Shawn	Shaw	Middleboro	Massachusetts
9812	Nicole	Plante	Middleboro	Massachusetts
9813	Kimberly	Plante	Middleboro	Massachusetts
9814	Michael	Maddigan	Middleboro	Massachusetts
9815	Paul	Tavano	Milford	Massachusetts
9816	Jeffrey	Kimball	Milford	Massachusetts
9817	Khylie	Provencher	Millbury	Massachusetts
9818	Steven	Frasca	Millis	Massachusetts
9819	Barbara	Volz	Millis	Massachusetts

9820	Richard	Kenworthy	Milton	Massachusetts
9821	Zachary	Cooperstein	Milton	Massachusetts
9822	Jonathan	Bosse	Milton	Massachusetts
9823	Lianna	Harrington	Nantucket	Massachusetts
9824	Peter	Bradley	Natick	Massachusetts
9825	Joseph	Laite	Nbpt	Massachusetts
9826	Nan	Mayo	Needham Heights	Massachusetts
9827	Gillian	Sampson	New Bedford	Massachusetts
9828	Claudia	Sampson	New Bedford	Massachusetts
9829	Ianthe	Sampson	New Bedford	Massachusetts
9830	Karen	Leighton	New Bedford	Massachusetts
9831	Lisa	Andrews	New Bedford	Massachusetts
9832	Will	Riley	Newtonville	Massachusetts
9833	Susan	Peristere	Norfolk	Massachusetts
9834	Erin	Kelley	North Andover	Massachusetts
9835	Ryan	Kelley	North Andover	Massachusetts
9836	Sarah	Keith	North Andover	Massachusetts
9837	Ronald	Wybranowski	North Andover	Massachusetts
9838	Brandyn	Armstrong	North Carver	Massachusetts
9839	Nathaniel	Burke	North Chelmsford	Massachusetts
9840	Michelle	Tozer	North Dartmouth	Massachusetts
9841	Kathy	Poor	North Eastham	Massachusetts
9842	Erica	Cordatos	North Easton	Massachusetts
9843	Chrid	Guenard	North Reading	Massachusetts
9844	Dorothy	Anderson	North Weymouth	Massachusetts
9845	Dorothy	Anderson	North Weymouth	Massachusetts
9846	Erika	Hoddinott	North Weymouth	Massachusetts
9847	Rebecca	Moldover	Northampton	Massachusetts
9848	Zach	Dubowik	Northboro	Massachusetts
9849	Brendan	Buckley	Norwood	Massachusetts
9850	Robert	Webster	Oxford	Massachusetts
9851	Elizabeth	Gregory	Paxton	Massachusetts
9852	Ross	Johnson	Peabody	Massachusetts
9853	Jolene	Harrington	Peabody	Massachusetts
9854	Nora	Okeefe	Pittsfield	Massachusetts
9855	Daniel	Zunitch	Pittsfield	Massachusetts
9856	Susan	Hardenbrook	Princeton	Massachusetts
9857	Debra	Pelletier	Provincetown	Massachusetts
9858	Chao	Xie	Quincy	Massachusetts
9859	Patrick	Levesque	Quincy	Massachusetts
9860	Richard	Holmes	Raynham	Massachusetts
9861	Eileen	Barrett	Reading	Massachusetts
9862	Kelly	Estano	Rehoboth	Massachusetts
9863	James	Vasquez	Revere	Massachusetts
9864	Ann	Goldberg	Revere	Massachusetts
9865	Taylor	Jesse	Rochester	Massachusetts

9866	Marc	Slabodnick	Rochester	Massachusetts
9867	David	Davis	Rockland	Massachusetts
9868	Dawn Michelle	Tesorero	Roslindale	Massachusetts
9869	Mare	Courtney	Roslindale	Massachusetts
9870	Kelsey	Klibansky	Rowley	Massachusetts
9871	Scott	Stone	Rowley	Massachusetts
9872	Dana	Clancy	Salem	Massachusetts
9873	Sharon	Macdonald	Sheffield	Massachusetts
9874	Emilia	Deimezis	Somerville	Massachusetts
9875	Keiko	Tanaka	Somerville	Massachusetts
9876	Jesse	Waites	Somerville	Massachusetts
9877	Elizabeth	Trehu	South Boston	Massachusetts
9878	Katherine	Hesler	South Boston	Massachusetts
9879	Bill	Larned	South Chatham	Massachusetts
9880	Jennifer	Mead	South Dartmouth	Massachusetts
9881	Cara	Joly	South Dennis	Massachusetts
9882	Gabrielle	Clermont	South Easton	Massachusetts
9883	Joshua	Cretinon	South Easton	Massachusetts
9884	Craig	Woodard	South Hadley	Massachusetts
9885	Constance	McCrane	South Hamilton	Massachusetts
9886	David	Schylling	South Hamilton	Massachusetts
9887	Craig	Ovitt	Southampton	Massachusetts
9888	Christine	Ovitt	Southampton	Massachusetts
9889	Karen	Essa	Southampton	Massachusetts
9890	Melanie	Ledoux	Southborough	Massachusetts
9891	Caroline	Doherty	Southborough	Massachusetts
9892	Haley	Wrobel	Springfield	Massachusetts
9893	Nikki	Lussier	Springfield	Massachusetts
9894	Laura	Giard	Sterling	Massachusetts
9895	Peter	Proestakis	Stoughton	Massachusetts
9896	Ryan	Hagerty	Stow	Massachusetts
9897	Nathan	Michel	Stow	Massachusetts
9898	Kenneth	Walker	Sudbury	Massachusetts
9899	Martha	Agnew	Swampscott	Massachusetts
9900	Kathleen	Sampson	Swansea	Massachusetts
9901	David Winslow	Keyes	Swansea	Massachusetts
9902	Susan	Crites	Taunton	Massachusetts
9903	Lynda	Soule	Taunton	Massachusetts
9904	Cullen	Elwell	Tewksbury	Massachusetts
9905	Tanya	Shiner	Tewksbury	Massachusetts
9906	Scott	Holt	Topsfield	Massachusetts
9907	Jarod	Beal	Townsend	Massachusetts
9908	Mike	Tisdale	Townsend	Massachusetts
9909	Patricia	McCann	Tyngsboro	Massachusetts
9910	Jennifer	Mellen	Uxbridge	Massachusetts
9911	Heather	Bell	Vineyard Haven	Massachusetts

9912	Generoso	Cresta	Wakefield	Massachusetts
9913	Nancy	Addonizio	Wakefield	Massachusetts
9914	Francis	Le	Walpole	Massachusetts
9915	Thomas	Iannetti	Waltham	Massachusetts
9916	Paulajean	Oï¿½Neill	Wareham	Massachusetts
9917	Denise	Rizzo	Warren	Massachusetts
9918	H. Paul	Santmire	Watertown	Massachusetts
9919	Bruce	Cunneen	Wayland	Massachusetts
9920	Michele	Cunneen	Wayland	Massachusetts
9921	Susan	Westmoreland	Wellesley	Massachusetts
9922	Rebecca	Dalmas	Wellfleet	Massachusetts
9923	Robert	Devoe	West Newton	Massachusetts
9924	Dietrich	Schlobohm	West Springfield	Massachusetts
9925	Jon	Breard	West Springfield	Massachusetts
9926	Louise	Hetzler	Westborough	Massachusetts
9927	Douglas	Sudnick	Westfield	Massachusetts
9928	Michael	Kinney	Westford	Massachusetts
9929	Rev Mary F	Bettencourt	Westford	Massachusetts
9930	Paul	Viola	Westminster	Massachusetts
9931	Lauren	Viola	Westminster	Massachusetts
9932	Kristin	Barbieri	Weston	Massachusetts
9933	Marilyn	Simons	Westport	Massachusetts
9934	Taylor	Galvin	Weymouth	Massachusetts
9935	William	Rohan	Williamsburg	Massachusetts
9936	Richard	Barry	Wilmington	Massachusetts
9937	Patrick	Barry	Wilmington	Massachusetts
9938	Russell	Macdonald	Wilmington	Massachusetts
9939	Marietta	Delehant	Winchester	Massachusetts
9940	Beverly	Alba	Winthrop	Massachusetts
9941	Suzanne	Kuffler	Woods Hole	Massachusetts
9942	Elizabeth	Devereaux	Worcester	Massachusetts
9943	Brian	Potvin	Wyman	Massachusetts
9944	Ken	Ross	Ann Arbor	Michigan
9945	Jeremy	Arndt	Flushing	Michigan
9946	Kim	Taylor	Gaylord	Michigan
9947	Cameron	Dodgson	Grand Rapids	Michigan
9948	Cidney	Pratt	Harmony	Michigan
9949	Mandy	Minervino	Hudsonville	Michigan
9950	Mandy	Minervino	Hudsonville	Michigan
9951	Thomas	Kane	Farmington	Minnesota
9952	Joseph B.	Cassidy III,	Minneapolis	Minnesota
9953	Melissa	Downey	Columbus	Mississippi
9954	Laura	Dehart	Mount Vernon	Missouri
9955	Katherine	Knight	Bozeman	Montana
9956	Mary	Carlson	Bozeman	Montana
9957	Naomi	Morrison	Columbia Falls	Montana

9958	Laura	Kalian	Missoula	Montana
9959	Heather	Hunter	Omaha	Nebraska
9960	Sharon	Behrends	Roca	Nebraska
9961	Kelli	Mitchell	St. Andrews	New Brunswick
9962	Merryl	Goldman	Alexandria	New Hampshire
9963	Jim	Kraly	Alstead	New Hampshire
9964	Karen	Seaver	Alstead	New Hampshire
9965	Charlene	Sheldon	Atkinson	New Hampshire
9966	Jakob	Grover	Barrington	New Hampshire
9967	Alyssa	Milligan	Belmont	New Hampshire
9968	Jeff	Abbe	Boscawen	New Hampshire
9969	Janice	Banks	Center Barnstead	New Hampshire
9970	Christine	Anderson	Chichester	New Hampshire
9971	Matthew	Higgins	Concord	New Hampshire
9972	Stephanie	Tardiff	Concord	New Hampshire
9973	Kenneth	Beaulieu	Danville	New Hampshire
9974	Robin	Tyner	Exeter	New Hampshire
9975	Seth	Hahn	Gilford	New Hampshire
9976	Carole	Hiward	Gilford	New Hampshire
9977	Erin	Zaffini	Goffstown	New Hampshire
9978	Erin	Zaffini	Goffstown	New Hampshire
9979	Alexandra	Horne	Gorham	New Hampshire
9980	Denise	Sullivan	Grantham	New Hampshire
9981	Shannon	Gagnon	Hampton Falls	New Hampshire
9982	Alison	Mackey	Hancock	New Hampshire

9983	Thomas	Gloudemans	Hancock	New Hampshire
9984	James	Dillon	Hebron	New Hampshire
9985	Emma	Nelson	Henniker	New Hampshire
9986	Sarah	Martin	Hinsdale	New Hampshire
9987	Robert	Berliner	Hopkinton	New Hampshire
9988	Katrina	Feraco	Keene	New Hampshire
9989	Heather	Gilligan	Keene	New Hampshire
9990	Jane	Brickett	Lancaster	New Hampshire
9991	James	Goudreault	Littleton	New Hampshire
9992	Melissa	Petersen	Londonderry	New Hampshire
9993	Keith	Kantack	Lyme	New Hampshire
9994	Margaret	Sheehan	Lyme	New Hampshire
9995	Melissa	Charron	Lyndeborough	New Hampshire
9996	Suzanne	Corby	Manchester	New Hampshire
9997	Jayne	Chase	Marlborough	New Hampshire
9998	Kayla	Adie	Nashua	New Hampshire
9999	Kathryn	Curtis	Nashua	New Hampshire
10000	Mimi	Iannillo	Nashua	New Hampshire
10001	Joanna	Cardinale	Nashua	New Hampshire
10002	Kaleb	Jacob	New Boston	New Hampshire
10003	Julie	Richelson	New Hampton	New Hampshire
10004	Jane Abbott	Sweatt	New London	New Hampshire
10005	Mitchell	Breton	Newmarket	New Hampshire
10006	William	Paige	Newmarket	New

				Hampshire
10007	Susan	Lathrop	North Conway	New Hampshire
10008	Robert	Robichaud	North Conway	New Hampshire
10009	Matt	Thornton	North Conway	New Hampshire
10010	Charles	Knox	North Hampton	New Hampshire
10011	Albert	Nickerson	Pelham	New Hampshire
10012	Sharon	Gordon	Pembroke	New Hampshire
10013	Esther	Rhoades	Peterborough	New Hampshire
10014	John	Barto	Pittsfield	New Hampshire
10015	Aaron	Gomo	Plainfield	New Hampshire
10016	Andrew	Menard	Portsmouth	New Hampshire
10017	Cynthia	Antaya	Raymond	New Hampshire
10018	Ryan	Waterhouse	Rochester	New Hampshire
10019	Kelly	Schumann	Rumney	New Hampshire
10020	Paul	Gaudet	Seabrook	New Hampshire
10021	Paul	Gaudet	Seabrook	New Hampshire
10022	Christy	Lowe	Stratham	New Hampshire
10023	Stacey	Fortin	West Swanzey	New Hampshire
10024	Louis	Sarcone	Atco	New Jersey
10025	Daniel	McLaughlin	Audubon	New Jersey
10026	Joseph	Forrest	Brick	New Jersey
10027	Michael	Kraus	Cherry Hill	New Jersey
10028	Michael	Keller	Cherry Hill	New Jersey
10029	Terrie	Bruce	Clarksboro	New Jersey
10030	Sarah	Dehart	Egg Harbor Township	New Jersey
10031	Kevin	Halter	Estell Manor	New Jersey
10032	William	Halter	Estell Manor	New Jersey
10033	Jenn	Cimino	Estell Manor	New Jersey
10034	Justin	Oneill	Grenloch	New Jersey
10035	Michael	Guida	Hackettstown	New Jersey

10036	Michelle	Guida	Hackettstown	New Jersey
10037	Rachael	Lebo	Hamilton Square	New Jersey
10038	Marie	Miceli	Jackson	New Jersey
10039	Pasquale	Miceli	Jackson	New Jersey
10040	Michael	Miceli	Jackson	New Jersey
10041	Patrick	Baker	Manahawkin	New Jersey
10042	Victoria	Emm	Manalapan	New Jersey
10043	Kim	Ross	Mickleton	New Jersey
10044	Alfred	Driscoll	Moorestown	New Jersey
10045	Chase	Dehart	Mount Royal	New Jersey
10046	Iliya	Rezvine	Mt Laurel	New Jersey
10047	Joy	Hibbs	National Park	New Jersey
10048	James	Angley	Oakhurst	New Jersey
10049	Jason	Williams	Pitman	New Jersey
10050	Clara	Rodriguez	Rutherford	New Jersey
10051	Malcolm	Dawson	Sewell	New Jersey
10052	Harvey	Van Sciver	Somers Point	New Jersey
10053	Jake	DeHart	Thorofare	New Jersey
10054	Sue Ellen	Dehart	West Deptford	New Jersey
10055	Mark	Davis	West Deptford	New Jersey
10056	Dan	Riley	West Deptford	New Jersey
10057	Cole	Dehart	West Deptford	New Jersey
10058	Jake	McHale	West Deptford	New Jersey
10059	Madison	Battle	West Deptford	New Jersey
10060	Janene	Ryan	West Deptford	New Jersey
10061	William	Dehart	West Deptford	New Jersey
10062	Gabbie	Battle	West Deptford	New Jersey
10063	Jenn	Mancuso	West Deptford	New Jersey
10064	Luke	Dehart	West Deptford	New Jersey
10065	Cole	DeHart	West Deptford	New Jersey
10066	Brandon	Jackmuff	West Deptford	New Jersey
10067	Douglas	Dehart, Sr.	West Deptford	New Jersey
10068	Lyndsay	McKinney	West Deptford	New Jersey
10069	Kathy	Robles	Winfield Park	New Jersey
10070	Frank	Salvato	Winfield Park	New Jersey
10071	Donna	Parsons	Woodbine	New Jersey
10072	Dan	Parsons	Woodbine	New Jersey
10073	Douglas	Dehart	Woodbury	New Jersey
10074	Douglas	DeHart	Woodbury	New Jersey
10075	B	Smyth	La Mesa	New Mexico
10076	Thomas	Wagner	Bellport	New York
10077	Jean	Hopkins	Bronx	New York
10078	Edward	Hopkins	Bronx	New York
10079	Matthew	Fritze	Brooklyn	New York
10080	Karen	Stein	Brooklyn	New York
10081	Pawel	Biedo	Brooklyn	New York

10082	William	Sabath	Brooklyn	New York
10083	Clement	McIntosh	Brooklyn	New York
10084	Richard	Miterko	Brooklyn	New York
10085	Christinia	Eldridge	Buffalo	New York
10086	Kevin	Healy	Canandaigua	New York
10087	Nancy	Kane	Chatham	New York
10088	Susan	Lowry	Delanson	New York
10089	Weiheng	Sun	Forest Hills	New York
10090	Barbara	Evans	Hartsdale	New York
10091	Daniel	Mongno	Lake Placid	New York
10092	Nicholas	Archer	Lancaster	New York
10093	Gerry	Thornberg	Middletown	New York
10094	Bob	Healy	Naples	New York
10095	George	Whitridge	New York	New York
10096	Madeleine	Kirchberger	New York	New York
10097	Amy	Branch	New York	New York
10098	Philippe	Chaurize	New York	New York
10099	Andy	Wanning	New York	New York
10100	S.	Nam	New York	New York
10101	Diane	Johnston	New York	New York
10102	Frankie	Johnson	Oswego	New York
10103	Becky	Albitz	Pleasant Valley	New York
10104	Alice	Nicklas	Port Jefferson Station	New York
10105	Andrew	Morgan	Pound Ridge	New York
10106	Robert	French	Rochester	New York
10107	Jerry	Rivers	Roosevelt	New York
10108	Ralph	Marallo	Saugerties	New York
10109	Thomas	McNally	Staten Island	New York
10110	Lisa	Mowery	Washingtonville	New York
10111	Stuart	Perks	Wellsville	New York
10112	Matt	Levenson	Wilmington	New York
10113	G.E.W.	Rupprecht	Yonkers	New York
10114	Hallie	Sikes	Albemarle	North Carolina
10115	Bryan	Durost	Carolina Shores	North Carolina
10116	Lorna	Chafe	Chapel Hill	North Carolina
10117	Aaron	Libby	Charlotte	North Carolina
10118	Courtney	McDougall-Chu	Fayetteville	North Carolina
10119	Jordan	Smith	Havelock	North Carolina
10120	Benjamin	Halliwell	Havelock	North Carolina

10121	Brenda	Crawford	Lowgap	North Carolina
10122	Bradley	Thurlow	Mocksville	North Carolina
10123	Michael	Cormier	Richlands	North Carolina
10124	Daniel	Hunter	Vale	North Carolina
10125	Meghann	Hunter	Vale	North Carolina
10126	Laurie	Fenwood	Wilmington	North Carolina
10127	Donna	Toole	North River	Nova Scotia
10128	Mary	Burch	Akron	Ohio
10129	Bruce	Cratty	Akron	Ohio
10130	Penelope	Bove	Canton	Ohio
10131	Laurence	Bove	Canton	Ohio
10132	Frank	Phillips	Columbus	Ohio
10133	Kyle	Bilancini	Oxford	Ohio
10134	Robyn	Durlin	Ravenna	Ohio
10135	Sharon	Gunning	Oklahoma City	Oklahoma
10136	Nicole	Mielke	Ottawa	Ontario
10137	Matt	Deacon	Bend	Oregon
10138	Rich	Pierce	Lake Oswego	Oregon
10139	Rich	Pierce	Newberg	Oregon
10140	Marti	Guest	Portland	Oregon
10141	Stephanie	Canora	Portland	Oregon
10142	Jonathan	Rogers	Portland	Oregon
10143	James	Merrill	Salem	Oregon
10144	Dolores	Krick	Airville	Pennsylvania
10145	Heidi	Beebe	Altoona	Pennsylvania
10146	Brad	Wilson	Bethlehem	Pennsylvania
10147	Jerry	Steward	Bethlehem	Pennsylvania
10148	Caroline	Constable	Bryn Mawr	Pennsylvania
10149	Russell	Scott	Bryn Mawr	Pennsylvania
10150	Richard	Corkran	Coatesville	Pennsylvania
10151	Barbara	Lowe	Coatesville	Pennsylvania
10152	Tim	Miller	Conshohocken	Pennsylvania
10153	Josh	Cox	Downingtown	Pennsylvania
10154	Madlyn	Cox	Downingtown	Pennsylvania
10155	Larry	Tamanini	Doylestown	Pennsylvania
10156	Patti	Seiger	Emmaus	Pennsylvania
10157	James	Ziegler	Equinunk	Pennsylvania
10158	Sandra	Harrington	Fairview	Pennsylvania
10159	Kelli	Gormley	Folsom	Pennsylvania
10160	Deb	Seymour	Harleysville	Pennsylvania

10161	Rachel	Dubois	Huntingdon	Pennsylvania
10162	Judith	O'Rourke	Lafayette Hill	Pennsylvania
10163	Catherine	Galinus	Lansdale	Pennsylvania
10164	Paul	Bunn	Media	Pennsylvania
10165	Kimberly	Carrick	New Freedom	Pennsylvania
10166	Debra	Bruni	New Kensington	Pennsylvania
10167	Marilyn	Smith	Newtown Square	Pennsylvania
10168	Patrick	Odonnell	Philadelphia	Pennsylvania
10169	Patrick	McCunney	Philadelphia	Pennsylvania
10170	Robert	Caucci	Philadelphia	Pennsylvania
10171	Bryan	Yeso	Pittsburgh	Pennsylvania
10172	Ann	Mazur	Reading	Pennsylvania
10173	Beth	Magie	Smithfield	Pennsylvania
10174	Jean	Seaver	Stroudsburg	Pennsylvania
10175	Suzanne	Proctor	West Chester	Pennsylvania
10176	Joanne	Fritz	West Chester	Pennsylvania
10177	Michael	Thornton	West Chester	Pennsylvania
10178	David	Conoran	Worthington	Pennsylvania
10179	Garrett	Brightman	Ashaway	Rhode Island
10180	Pauline	Belal	Cranston	Rhode Island
10181	Terry	Anzaldi	Cranston	Rhode Island
10182	Trinity	Briceno	Cranston	Rhode Island
10183	Martine	Dodd	Cranston	Rhode Island
10184	Beverlee	Groff	Foster	Rhode Island
10185	Samantha	McCue	Johnston	Rhode Island
10186	Brian	McMahon	Lincoln	Rhode Island
10187	Staci	Nunes	Lincoln	Rhode Island
10188	Bradley	Smith	North Providence	Rhode Island
10189	Nick	Boisclair	North Smithfield	Rhode Island
10190	Jennifer	Kelly	North Smithfield	Rhode Island
10191	Carla	Bernard	Pawtucket	Rhode Island
10192	Albert	Frawley	Providence	Rhode Island
10193	Albert	Frawley	Providence	Rhode Island
10194	Teresa	Arey	Riverside	Rhode Island
10195	Jason	Demaggio	Wakefield	Rhode Island
10196	Daniel	Tate	Warwick	Rhode Island
10197	Melissa	Desomma	Warwick	Rhode Island
10198	Thomas	Harrower	Warwick	Rhode Island
10199	Dennis	Constantine	Warwick	Rhode Island
10200	Cathy	Cheek	Anderson	South Carolina
10201	Samara	King	Beaufort	South Carolina
10202	Karen	Burnett	Central	South Carolina
10203	Heather	Henderson	Fountain Inn	South

				Carolina
10204	Elizabeth	Lockyer	Fountain Inn	South Carolina
10205	Jared	Henderson	Fountain Inn	South Carolina
10206	Jim	Smoragiewicz	Rapid City	South Dakota
10207	Katina	Williams	Clarksville	Tennessee
10208	Stanley	Lemelin	Cookeville	Tennessee
10209	Ryan	Haines	Franklin	Tennessee
10210	Bryan	Chakoumakos	Knoxville	Tennessee
10211	Mariah	Cratty	Santa Fe	Tennessee
10212	Hannah	Troegle	Arlington	Texas
10213	Joshua	Troegle	Arlington	Texas
10214	Kathryn	Overlock	Austin	Texas
10215	Ryan	McMillan	Euless	Texas
10216	Ryan	Fussell	Fort Worth	Texas
10217	Lisa	Mounce	Roanoke	Texas
10218	Gabriella Amber	Morsett	Waxahachie	Texas
10219	Dawn	Hubert	Draper	Utah
10220	Joann	Goodell	Salt Lake City	Utah
10221	Kate	Riley	Brattleboro	Vermont
10222	Corey	Robinson	Brattleboro	Vermont
10223	Alex	Miller	Burlington	Vermont
10224	John	Van Hazinga	Burlington	Vermont
10225	Raeden	Zavis	Cambridge	Vermont
10226	Paul	Moore	Charlotte	Vermont
10227	Ian	Staples	Chester	Vermont
10228	Cathy	Kashanski	East Calais	Vermont
10229	Chris	Ingram	East Hardwick	Vermont
10230	Courtney	Lachaussie	Essex Junction	Vermont
10231	Lindsay	Knowlton	Glover	Vermont
10232	Dan	Abbott	Guilford	Vermont
10233	James	Desorda	Jeffersonville	Vermont
10234	Patrick	Abbott	Jeffersonville	Vermont
10235	Shawn	Bowman	Jeffersonville	Vermont
10236	Kevin	Penney	Jeffersonville	Vermont
10237	Sam	Guarnaccia	Middlebury	Vermont
10238	Whitney	Mathews	Montgomery Center	Vermont
10239	Rob	Perry	Montpelier	Vermont
10240	Stephen	Gorman	Norwich	Vermont
10241	Corbin	Bennett	Saint Albans	Vermont
10242	Obediah	Racicot	Shelburne	Vermont
10243	Laura	Macuga	South Burlington	Vermont
10244	Thomas	Prendergast	South Burlington	Vermont
10245	Alexis	Grisales	West Dover	Vermont

10246	Carlton	Mills	Alexandria	Virginia
10247	Claudia	Mills	Alexandria	Virginia
10248	Stephen	Engle	Chesapeake	Virginia
10249	John	Barry	Hardy	Virginia
10250	Ellen	Arthur	Lexington	Virginia
10251	W.	Clark	Lynchburg	Virginia
10252	Greg	Moser	Richmond	Virginia
10253	Steven	Carter-Lovejoy	Richmond	Virginia
10254	Molly	Washo	Bellingham	Washington
10255	James	Mulcare	Clarkston	Washington
10256	Alexander	Banbury	Mercer Island	Washington
10257	Joanne	Mayhew	Olympia	Washington
10258	Roger	Greene	Renton	Washington
10259	Terri	McLellan	Harpers Ferry	West Virginia
10260	Wil	Hershberger	Hedgesville	West Virginia
10261	Brian	Hazlett	Morgantown	West Virginia
10262	Danielle	Martin	Morgantown	West Virginia
10263	Marina	Miranda	Morgantown	West Virginia
10264	Keryn	Newman	Shepherdstown	West Virginia
10265	Jon	Lund	La Farge	Wisconsin
10266	Debbie	Schluter	Watertown	Wisconsin
10267	Craig	Hunkins	Waukesha	Wisconsin
10268	Tom	Ezquerro	Lander	Wyoming
10269	Matthew	Vashon	Florence	Alabama
10270	Suli	Gray	Pell City	Alabama
10271	Joseph	Kitts	Fort Wainwright	Alaska
10272	William	Easton	Homer	Alaska
10273	Tracy	Craig	Kodiak	Alaska
10274	Elizabeth	Proulx	Stratford, New Zealand	American Samoa
10275	Diane	Plunkett	Casa Grande	Arizona
10276	Dan	Davis	Oracle	Arizona
10277	George	Pauk	Phoenix	Arizona
10278	Keegan	Drouin	Phoenix	Arizona
10279	Barry	Kutzen	Scottsdale	Arizona
10280	Kenneth	Porter	Tucson	Arizona
10281	Mo	Padgett	Williams	Arizona
10282	Debbie	King	Little Rock	Arkansas
10283	Mary	Mercier	Little Rock	Arkansas
10284	Joseph	Schurman	Alameda	California
10285	Lauren	Wironen	Aliso Viejo	California
10286	Peter	Nichols	Arcata	California
10287	Lance	Wyeth	Bolinas	California
10288	Jeremy	Lambert	Coleville	California
10289	Laurel	Golden	Costa Mesa	California
10290	Matthew	Howard	Cotati	California

10291	William	Dorgan	El Granada	California
10292	Jeanne	Chapman	Folsom	California
10293	Shona	Quinn	La Canada Flintridge	California
10294	Soheyla	Azizi	Laguna Beach	California
10295	Keith	Richards	Long Beach	California
10296	Sam	Krabbe	Los Angeles	California
10297	Susan	Andres	Los Angeles	California
10298	Lisa	Thomas	Napa	California
10299	Aimee	La Joie	Poway	California
10300	Bill	Nye	Ridgecrest	California
10301	Wendy	Gorham	Rohnert Park	California
10302	Nora	Cummings	Sacramento	California
10303	Gail	Shingler	San Diego	California
10304	Ross	Fields	Tustin	California
10305	Sam	Toselli	Winnetka	California
10306	Andrew	Carroll	Denver	Colorado
10307	Karyn	Schiele	Denver	Colorado
10308	Bonnie	Reimer	Idaho Springs	Colorado
10309	Tiffany	Panzera	Lafayette	Colorado
10310	Anthony	Martelli	Lakewood	Colorado
10311	Shannon	Garfein	Lyons	Colorado
10312	Suzannah	Kunkle	Northglenn	Colorado
10313	Elizabeth	Noel	Ansonia	Connecticut
10314	Patty	Obie	Avon	Connecticut
10315	Leann	Longhi Eddy	Avon	Connecticut
10316	Julie	Spencer	Bloomfield	Connecticut
10317	Pierre	Castonguay	Brooklyn	Connecticut
10318	harold	burbank	Canton	Connecticut
10319	Austin	Rhodes	Colchester	Connecticut
10320	Carrington	Archambault	Colchester	Connecticut
10321	Kristen	Delzell	Colchester	Connecticut
10322	Kristi	Rhodes	Colchester	Connecticut
10323	Diane	McDougall	Colchester	Connecticut
10324	Lee	Delaney	Collinsville	Connecticut
10325	Stephen	Gifford	Columbia	Connecticut
10326	Walter	Waddell	Coventry	Connecticut
10327	Dan	Manzi	Coventry	Connecticut
10328	Sasha	Suto	Cromwell	Connecticut
10329	Mark	Rukowicz	Cromwell	Connecticut
10330	Douglas	Banks	Cromwell	Connecticut
10331	Jennifer	Wehner	Danbury	Connecticut
10332	Jennifer	Wehner	Danbury	Connecticut
10333	Anna	Stagnetta	Darien	Connecticut
10334	Tina	Tuccinardi	Darien	Connecticut
10335	Terry	Chesebrough	Deep River	Connecticut
10336	Kim	Clouser	East Hampton	Connecticut

10337	Eric	Drouin	Enfield	Connecticut
10338	Susan	Droney	Enfield	Connecticut
10339	Richard	Arcand, Jr.	Granby	Connecticut
10340	Rex	Brown	Greenwich	Connecticut
10341	Tyler	Laprade	Greenwich	Connecticut
10342	Kaylah	Witham	Hampden	Connecticut
10343	Randall	Schaen	Jewett City	Connecticut
10344	Sierra	Ecklid	Lebanon	Connecticut
10345	Samantha	Tweedie	Manchester	Connecticut
10346	Michael	Fuda	Meriden	Connecticut
10347	Adam	Meza	Middletown	Connecticut
10348	Cindy	Carpenter	Middletown	Connecticut
10349	Glen	Judkins	Middletown	Connecticut
10350	Darlene	Gosnell	Monroe	Connecticut
10351	Andrea	Scott	Moodus	Connecticut
10352	Calvin	Kilduff	New Britain	Connecticut
10353	John	Palin	New Britain	Connecticut
10354	Anita	Barden	New Hartford	Connecticut
10355	Charles	Blow	New Hartford	Connecticut
10356	David	Ganci	New Hartford	Connecticut
10357	Jonathan	Thomas	New Haven	Connecticut
10358	Diane	Fitzgerald	Norwalk	Connecticut
10359	Tyler	Sauciers	Norwich	Connecticut
10360	Donna	Karsmarski	Old Lyme	Connecticut
10361	Donna	Dahn	Oxford	Connecticut
10362	Craig	Savage	Plainfield	Connecticut
10363	Mellisa	Fortier	Pomfret Center	Connecticut
10364	John	Popielaski	Portland	Connecticut
10365	Yvonne	Rogers	Prospect	Connecticut
10366	Christopher	Hudzina	Shelton	Connecticut
10367	Jane	Carlin	Stamford	Connecticut
10368	Benjamin	Ragsdale	Stonington	Connecticut
10369	Fred	Purdue	Suffield	Connecticut
10370	Donnie	Stagnetta	Trumbull	Connecticut
10371	Melissa	Stagnetta	Trumbull	Connecticut
10372	Chrisma	Andriulaitis	Waterbury	Connecticut
10373	Bob	Groff	West Hartford	Connecticut
10374	Karla	Boutin	West Haven	Connecticut
10375	Alex	Tragakes	Westbrook	Connecticut
10376	Carol	Buffinton	Westport	Connecticut
10377	Elizabeth	Townsend	Wethersfield	Connecticut
10378	Tim	Watts	Wethersfield	Connecticut
10379	Kye	Paradise	Windham	Connecticut
10380	Christopher	Burton	Lewes	Delaware
10381	Shannon	Miller	Magnolia	Delaware
10382	Bailey	Singer	Millville	Delaware

10383	Josie	Cort	Newark	Delaware
10384	Charles	McShane	Wilmington	Delaware
10385	Charles	Verrill	Washington	District of Columbia
10386	Hannah	Berman	Washington	District of Columbia
10387	Dennis	Bankowitz	Astatula	Florida
10388	Micheal	Stratton	Cape Coral	Florida
10389	Danielle	Cattani	Clearwater	Florida
10390	Jennifer	Thurlow	Clearwater	Florida
10391	Logan	Hudson	Daytona Beach	Florida
10392	David	Roberts	Englewood	Florida
10393	Dianne	Wilson	Fort Myers	Florida
10394	John	Morneault	Fort Myers	Florida
10395	Stephen	Lyons	Gainesville	Florida
10396	Pamela	Hargraves	Hudson	Florida
10397	Jamie	Webster	Jupiter	Florida
10398	Barry	Webster	Jupiter	Florida
10399	Kimberly	Boutte	Lake Butler	Florida
10400	Joan	Federman	Lake Worth	Florida
10401	Carlos	Cabanas	Lake Worth	Florida
10402	Claudia	Shover	Lakeland	Florida
10403	Claudia	Shover	Lakeland	Florida
10404	Lois	Dehart	Lakeland	Florida
10405	Martin	Cyr	Lithia	Florida
10406	Mark	Gorey	Live Oak	Florida
10407	Sally	Moreno	Miami	Florida
10408	William	Fuller	Naples	Florida
10409	Jason	Sabarese	New Smyrna Beach	Florida
10410	Paula	Holman	Nokomis	Florida
10411	David	Glatthorn	North Palm Beach	Florida
10412	Stephen	Burke	North Port	Florida
10413	Sarah	Bryant	Orlando	Florida
10414	Victoria	Burghdurf	Palmetto	Florida
10415	Bill	Stevens	Punta Gorda	Florida
10416	william	cook	Riverview	Florida
10417	Abigail	Sullivan	Saint James City	Florida
10418	Kathleen	Callaghan	Saint Petersburg	Florida
10419	Brian	Sherman	Saint Petersburg	Florida
10420	Brian	Sherman	Saint Petersburg	Florida
10421	Alix	Morin	Sarasota	Florida
10422	Donna	Smith	Sebastian	Florida
10423	Kim	Hooten	Seminole	Florida
10424	Kaitlin	Overlock	Shawmut	Florida
10425	John	Toombs	Stuart	Florida
10426	John	Tulp	Summerland Key	Florida

10427	Joseph	McColl	Tampa	Florida
10428	Patrick	Jacques	The Villages	Florida
10429	Sally	Reed	Venice	Florida
10430	Megan	Raasveldt	Vero Beach	Florida
10431	Samantha	Crisafulli	Vero beach	Florida
10432	Donna	Corson	Webster	Florida
10433	Lane	Ashcroft	Winter Park	Florida
10434	Lynette	Bryant	Winter Springs	Florida
10435	David	Dequasie	Winter Springs	Florida
10436	Michael	Smith	Zephyrhills	Florida
10437	Jack	Bailey	Zephyrhills	Florida
10438	Cynthia	Fanelli	Flowery Branch	Georgia
10439	Victoria	Snyder	Rome	Georgia
10440	Karen	Tripp	Statham	Georgia
10441	Colby	Cain	Wells	Guam
10442	Hector	Ordonez	Honolulu	Hawaii
10443	Lisa	Kelso	Kailua	Hawaii
10444	Rebecca	Kelso	Kailua	Hawaii
10445	Nicole	Holley	Kailua	Hawaii
10446	Michael	Kelso	Kailua	Hawaii
10447	Jarrett	Von Jess	Cambridge	Idaho
10448	Jaime	Campbell-Lavallee	Idaho Falls	Idaho
10449	Julie	Decoteau	Batavia	Illinois
10450	Deborah	Bennett	Cary	Illinois
10451	Linda	Corby	Chicago	Illinois
10452	Zhenya	Karelina	Chicago	Illinois
10453	Stephanie	Kopman	Evanston	Illinois
10454	Lea	Scruggs-Parker	Marissa	Illinois
10455	Michael	Speva	Plainfield	Illinois
10456	Paul	Gulezian	River Grove	Illinois
10457	Ervin	Hill	Springfield	Illinois
10458	Kristi	Harter	Chesterton	Indiana
10459	Peter	Stratton	Fort Wayne	Indiana
10460	Timothy	Kareckas	Greendale	Indiana
10461	Suzanne	Holden	Des Moines	Iowa
10462	Ann	Harris	Mount Vernon	Iowa
10463	Miranda	Moss	Sioux Center	Iowa
10464	Becky	Bloomfield	Frankfort	Kentucky
10465	Ann	Roberts	Horse Cave	Kentucky
10466	Jennifer	Walter	Villa Hills	Kentucky

Fifteen towns in the region have rescinded their prior support or come out in opposition to CMP's proposed transmission line:

- Alna (Select Board rescinded letter of support)
- Caratunk (Select Board rescinded letter of support)
- Dennistown (Board of Assessors voted to oppose)
- Durham (Select Board rescinded support)
- Embden (Select Board rescinded support)
- Farmington (town residents voted to rescind support and oppose the project)
- Industry (Select Board rescinded support and opposed the project)
- Jackman (town residents voted to oppose)
- Moose River (town residents voted to oppose)
- Pownal (Select Board rescinded support)
- Starks (town residents voted to not support line)
- The Forks (town residents voted to oppose)
- West Forks (town residents voted to oppose)
- Wilton (town residents voted to rescind support and oppose the project)
- Wiscasset (Select Board rescinded letter of support)

ALNA

SELECT BOARD RESCINDED LETTER OF SUPPORT

Wiscasset Newspaper

Alna selectmen pull support for town being CMP project 'Sherpa'

Carroll: Without Massachusetts deal, Maine gets '100 percent of nothing'

By SUSAN JOHNS
Posted: Friday, October 5, 2018 - 12:00pm

CMP's Massachusetts project spokesman John Carroll passes Alna Third Selectman Doug Baston a handout of his presentation. Also pictured are Second Selectman Ed Pentaleri and First Selectman Melissa Spinney. SUSAN JOHNS/Wiscasset Newspaper

Central Maine Power no longer has Alna's support to expand the transmission lines that run through it and some of its neighbor towns. After hearing from CMP's project spokesman, selectmen voted 3-0 Oct. 3 to retract a 2017 letter of support.

John Carroll wanted to meet with selectmen after learning last month they were considering retracting it. Resident Cathy Johnson asked them to. After the Oct. 3 vote, she thanked them.

Arguing minutes earlier for last year's letter to stick, Carroll said the project bringing Canadian hydropower to Massachusetts means a first 10-year benefit to Maine of $1 billion in jobs, property taxes, energy cost savings and a higher gross domestic product, and cleaner air for all of New England. The states' collective grid needs more and cleaner power to keep the supply reliable and cut greenhouse gases, he said.

Third Selectman Doug Baston said he wants the plan slowed down so Maine can get more out of it. He compared Massachusetts to a big game hunter; and Maine is being asked to issue the hunting license, he said. "We're kind of the Sherpas in the middle just carrying."

Carroll said one year of economic benefits to Maine "outstrips" the 40-year funding commitment to Massachusetts. He said the bidding is over and CMP cannot negotiate a different deal. If the project doesn't happen, Maine will get 100 percent of nothing, he told the board.

As for CMP's projected $386,600 in new taxes for Alna starting in 2023, Baston said the assessor the town uses for CMP has advised caution with the figure.

If the state doesn't push for a better bargain, the little towns need to, Baston said. "I want this to be real." Nothing in the plan gives Maine workers preference on the jobs, he said.

Carroll responded, if a large company comes in, it will hire locally.

Also Oct. 3, the board announced Linda Verney has been hired as a deputy town clerk. She replaces Janice Bradford, who resigned for personal reasons, First Selectman Melissa Spinney said.

Selectmen started an account to move historic buildings' reserve funds into each time the town decides to tap them. That brings the accounting in line with other reserves, selectmen said.

One of Alna's representatives to Sheepscot Valley Regional School Unit 12, Ralph Hilton, said the unit wants to know what news the member towns would like to be getting and how. Selectmen told him they would like the website improved. Hilton agreed. "It's virtually inpossible to find the information ... you'd really like to have," Hilton said. He said he will tell the RSU.

CARATUNK

SELECT BOARD RESCINDED LETTER OF SUPPORT

Town of Caratunk

Office of Selectmen
PO Box 180 Caratunk, Maine 04925
207.672.3030
caratunkselectmen@myfairpoint.net

Re: Comments on CMP's Application permit for the New England Clean Energy Connect ("NECEC") from Québec-Maine Border to Lewiston and Related Network Upgrades

To whom it may concern,

Please accept these comments regarding Central Maine Power Company's application for the New England Clean Energy Connect project. The Town of Caratunk is within the project boundaries and is, therefore, directly and indirectly affected.

On March 21, 2018, a CMP representative pitched a brief, overview presentation to the Caratunk Selectmen regarding this project. The representative was looking for a letter of support for their application. Later that week, Caratunk sent in a general letter of support. However, since that time, much information has been brought to light. The Selectmen share great concerns for the welfare of Caratunk residents as well as the State of Maine should this project be brought to fruition.

1. The Town of Caratunk has had no representation in this mitigation proceedings. The Town of Caratunk wants to participate and be represented in permitting decisions for this application because the Town is within project boundaries.
2. The Town of Caratunk has not been contacted or asked to be on the board of the LLC handling the mitigation funds. CMP's presentation stated that the Town and community would receive benefits, yet instead, a few CMP representatives privately negotiated only with a few isolated business owners.
3. Should this project go forth as stated, Maine energy would be locked up and prevented from engaging in any future renewable energy generation projects. Caratunk has already twice supported NextEra for a solar farm within its boundaries. This DC line blocks access to solar or other energy projects in Caratunk and Somerset County. One such solar project lost in direct competition to this NECEC. The valuation benefit from CMP's additional transmission lines does not even compare to a large solar project in Caratunk. Caratunk is against the NECEC project if it prevents future renewable energy opportunities that provide for a huge tax benefit to all landowners and significantly increase the Caratunk valuation. Therefore, Caratunk sees this project as reducing its tax revenue.
4. This project is forcing 1000' of transmission lines across a Scenic and Wild River, the Kennebec River, where Caratunk residents make their livelihoods in the whitewater rafting, fishing and hunting tourism industry. Tourists from all over the country travel to

the Kennebec for world class whitewater rafting and kayaking and remote fishing through the Kennebec gorge. Removing the Scenic and Wild and remote wilderness aspect of our area is a direct detriment to Caratunk residents and businesses.

5. Additionally, this corridor is negatively impacting native Maine nature and wildlife as many environmental groups and DIFW have attested.
6. This project is not benefiting the Maine ratepayer with lower rates or cleaner energy. In fact, it may increase greenhouse gas emissions. The Town of Caratunk and its citizens have an interest in lower energy costs and clean energy sources.
7. Evidence regarding Hydro-Quebec's hydro intentions and practices suggest that the profits HQ intends to make on the NECEC would greatly influence its energy production or lack thereof for the grid and negatively impact Maine ratepayers. Caratunk opposes a project within its boundaries that is bad for Maine taxpayers and ratepayers
8. This project is not financially beneficial to the Maine economy or its residents.
9. Independent PUC consultants have found that CMP's project application boasts inflated economic and financial benefits. Similarly, our assessor, an instructor for Maine Revenue Services, confirms that CMP overinflates the proposed valuations in their presentations and that the lines are never assessed that high for tax purposes. Therefore, the tax property increase for Maine towns/cities is far less that CMP's proposal advertised.
10. Green and environmental agencies, DIF&W as well as the Maine Legislature's Committee of Environmental and Natural Resources and the Maine Legislature's Committee on Energy, Utilities and Technology have stated valid and alarming concerns on this project.

We see this project as benefiting Hydro-Quebec and the Commonwealth of Massachusetts at the expense of Caratunk and the State of Maine. This should not be so. **We ask that the DEP, LUPC, PUC, and Massachusetts DPU not be pressured into allowing this project to go forth.** New Hampshire and Vermont protected their states from harmful and devious corporate overreaches. **The Town of Caratunk opposes this harmful project, retracts its prior letter of support sent to the 83D selection committee, and asks the DEP, LUPC, PUC, and DPU to stand up for the Maine ratepayers, business owners and citizens by rejecting this proposed transmission line.** Thank you for the opportunity to provide comments in these proceedings.

Sincerely,

Elizabeth M Caruso

Elizabeth Caruso
Select Board Chair
On behalf of Neil Katz, Garret Booth

BDN MAINE
bangordailynews.com

Small Maine town rescinds support for big CMP hydro project

By Lori Valigra, BDN Staff • September 7, 2018 1:00 am
Updated: September 7, 2018 12:22 pm

A town of 68 residents along the proposed hydropower corridor from Canada to Lewiston retracted its earlier letter of support for the Central Maine Power and Hydro-Quebec project, calling it harmful and saying it is not financially beneficial to the Maine economy or its residents.

In an Aug. 31 public comment letter to the Maine Public Utilities Commission, Elizabeth Caruso, chair of Caratunk's selectboard, asked commissioners, the Maine Department of Environmental Protection, the Maine Land Use Planning Commission and the Massachusetts Department of Public Utilities not to allow the New England Clean Energy Connect, or NECEC, project to go forward.

Caruso also is expected to participate Friday in the second consecutive day of technical discussions about the case this week. Additional discussions will take place Sept. 14.

Caratunk is one of the towns along the NECEC route that earlier signed letters supporting the project. New Sharon is the only one that did not sign a letter, according to CMP spokesman John Carroll.

Caruso said Caratunk residents had second thoughts after comparing the benefits touted by CMP, including property tax benefits, with what Caratunk might lose, including not being able to build a solar array Caruso said would bring in more property tax revenue than she expects from the NECEC infrastructure.

"We have grave concerns for the welfare of the citizens and ratepayers should this project be brought to fruition," Caruso told the Bangor Daily News.

A Maine Center for Business and Economic Research report prepared as part of CMP's project submission to the PUC lists scenarios for new taxes for the project. Caratunk, which has a current property tax rate of $7.20 per $1,000 valuation, would have an adjusted rate of $5.21 under the NECEC new valuation, giving it $100,487 in projected new tax revenue annually.

The total amount cited in the report for the $950 million NECEC project is $18.38 million in new property tax revenue for the towns, unorganized territory and townships along the route. Lewiston, which would have the most new infrastructure in the project, would get the most: $8.39 million.

Caruso cites 10 issues of concern in her letter, including the valuation benefit of a possible new solar farm.

“Caratunk has already twice supported NextEra for a solar farm within its boundaries,” she wrote. “This DC [hydropower] line blocks access to solar or other energy projects in Caratunk and Somerset County. One such solar project lost [is] in direct competition to this NECEC.

“The valuation benefit from CMP’s additional transmission lines does not even compare to a large solar project in Caratunk. … Therefore, Caratunk sees this project as reducing its tax revenue.”

She also began to question CMP’s tax revenue numbers after a discussion with town assessor Garnett Robinson.

Robinson was an assessor in Dixmont during an earlier large CMP project, the $1.4 billion Maine Power Reliability Program, an expansion program with construction starting in 2010 and ending in 2015.

He said when CMP applied for a permit to put lines through Dixmont in 2009, it estimated the value of the project at $24 million. But once the project was completed, CMP valued it at $8 million. The result, he said, is less tax money flowing into the town.

“I told Liz [Caruso] to be very skeptical during the permitting process if [CMP] is promising numbers,” he said. “And she should be involved in the permitting process.”

Caruso asked in her PUC letter to be represented in permitting decisions.

“As this case progresses, more information becomes known,” said Tanya Bodell, executive director of Energyzt, a Boston consultancy. She is an economist testifying as an intervenor at the PUC on Friday.

She said while nothing is set in stone yet regarding property taxes, “CMP has all the incentive in the world to decrease the numbers once it gets the appraisals. This should be a wake-up call that towns may not be getting that much. The property tax value could be less than originally assumed.”

Figuring taxes is tricky

CMP’s Carroll said he is disappointed that Caratunk withdrew its support. He has requested a meeting with the town to clarify what he said are misunderstandings in the letter submitted to the PUC. Nothing has been set up yet.

He also said the small plantation of West Forks plans to hold a meeting of townspeople next week to vote about whether or not they support the project. A West Forks selectman was not immediately available for comment.

Carroll said the NECEC project is not blocking Caratunk from building a solar array.

“The solar farm was included in one of our proposals to Massachusetts,” he said. “But Massachusetts didn’t pick that proposal because it didn’t suit their needs to have a line with wind and solar to Massachusetts.”

He said Caratunk still can build the solar array. It will have to find a different customer for the energy from it.

Carroll said it still could be a few years until the Maine Revenue Service, CMP and the towns agree upon exactly how the tax benefit of the NECEC project would be distributed.

The Maine Power Reliability Program was paid for mostly by CMP and in turn, by ratepayers. Carroll said the tax benefits from the project were socialized, or spread across all the ratepayer areas that benefited from it.

“It was built for CMP ratepayers who shared equally in its value,” he said of the difference between the permit value and the finished project value.

Since Massachusetts taxpayers are footing the bill for the transmission project, the distribution of tax benefits still has to be decided in Maine, he said. The Maine Center for Business and Economic Research report’s new property figures were estimates.

The proposed project still needs to be approved by the Massachusetts Department of Public Utilities and the PUC.

The PUC will hold a series of meetings about the project through the fall. There will be a series of hearings Sept. 18-21. An important document that summarizes the case and gives PUC examiners’ recommendations is due out Nov. 9. Responses to that will be heard Nov. 16. The PUC commissioners are scheduled to deliberate the case Nov. 27.

The controversial project has drawn 285 filings, 74 data requests and 300 public comments to the PUC’s website.

DENNISTOWN

BOARD OF ASSESSORS VOTED TO OPPOSE

DENNISTOWN PLANTATION
P.O. BOX 277
JACKMAN, ME 04945

October 26, 2018

To whom it may concern,

The citizens and Assessors of Dennistown Plantation have voted to oppose the CMP NECEC project due to our grave concerns about the projects impacts.

If approved, the New England Clean Energy Connect (NECEC) corridor will forever impact our region, our environment, our tourist industry, our forest products industry, our economy, our families' future, our seasonal residents' future, and our very way of life. This region continues to attract generations of visitor because they want to experience the natural beauty of the upper Kennebec and Moose River Waterways, and the surrounding wilderness of western Maine. This region offers a unique respite from the challenges and stress of life in the city, and we want it to stay that way for future generations of residents and visitors.

Some local sightlines will be spared, but the proposed transmission towers and lines will be visible from nearly every summit of nearly every peak in the Moose River Valley. They will cross some of the region's most pristine wilderness numerous times, hang over brooks, streams, rivers, and seasonal waterways crucial to all species of wildlife. The herbicides used to maintain the corridor will leach into the region's waterways, aquifers, and water tables. Our water is drawn from Big Wood Pond and it is fed by the Moose River. We do not need any more Herbicides than we already have polluting our drinking water. The environmental impact of the permanent deforestation component alone should alarm you as leaders of our town. Loss of oxygen to the valley, loss of shade to the fish, loss of canopy for birds and wildlife, loss of habitat for birds and mammals including deer yards and the loss of the unscarred views that make our area so special.

The NECEC project will have potential impacts on the safety and security of The
United States of America. The project will leave a wide open 150-300 foot hole in the northern border of our country requiring additional resources to guard to prevent illegal activities. The project will also make us less energy independent and more reliant on a foreign country for our energy needs. Giving foreign countries control of our power supply is not responsible nor in the best interest of our country.

This project will inevitably lead to more powerlines, an unknown number of wind turbines and other future developments that are industrial in nature and detrimental to our area and its' wild untamed charm that keeps us here and brings in tourists and future residents.

Our area is not logistically equipped to handle the scope of the proposed project. The short term economic gains will be outweighed by the long term losses to our economy. The limited lodging, gathering places, eateries, and fuel pumps will be inundated by out of area workers, leaving little to no room for our longtime residents and tourists will look for alternative places to ride, boat, fish, hike, hunt, snowmobile, ATV, and get away from it all. Many of them will not come back once they find new places to recreate.

Another major issue is the current level of healthcare available to the workers during this multi-year project. The remote region of the corridor presents its own unique rescue challenges, and the level of medical treatment available may prove quite inadequate in the event of simultaneous traumatic injuries to multiple workers and residents. This would be an additional financial burden on our taxpayers. The remote locations could lead to a potential loss of life or property if the Fire Department and Ambulance are unable to respond to multiple calls simultaneously. There are no licensed nurses to support the one physician and one physician's assistant covering the clinic.

These impacts along with many others show how this project will be an economic burden on us that will have no lasting benefits to our citizens, only benefits for out of state and foreign companies while we are negatively impacted.

Respectfully submitted,

The residents and Board of Assessors of Dennistown

EMBDEN

SELECT BOARD RESCINDED SUPPORT

Town of Embden
Office of the Select Board
809 Embden Pond Road
Embden, Maine 04958
(207) 566-5551
Incorporated June 22, 1804

January 5, 2019

Central Maine Power Company/Avangrid
83 Edison Drive
Augusta, ME 04660

Re: New England Clean Energy Connect Project, Embden, ME.

Dear Sir/Madam,

This letter is to advise your company that Embden's Select Board has recently been presented with information by a group of concerned citizens including neighbors from the Forks/Caratunk region, abutting corridor property owners in town, and other Embden residents attempting to educate themselves with the pros/cons of this major expansion project. The list of concerns with the NECEC project being voiced and disseminated includes but is not limited to: Environmental degradation, wildlife harm, human health impairment, view shed deterioration, property value loss, potentially overstated property valuation estimates, and seemingly non-transparent future plans for the corridor.

Consequently, this has led our Board of Selectpersons to take a ***neutral*** stance on the project going forward. Therefore, this communication is intended to supersede the letter of support submitted by the Town of Embden during Avangrid's initial "bid" phase. Thank you for understanding our position in response to what we feel to be very serious concerns.

Sincerely,

Charles E. Taylor
Select Board Chairman
Town of Embden

FARMINGTON

TOWN RESIDENTS VOTED TO RESCIND SUPPORT AND OPPOSE THE PROJECT

Farmington residents vote to oppose CMP power line, despite pitch by Mills

Voters hear from Gov. Janet Mills, whose hometown is Farmington, on why she supports the controversial project.

BY RACHEL OHMMORNING SENTINEL
March 25, 2019

FARMINGTON — Residents Monday voted overwhelmingly to oppose a proposed 145-mile transmission line through western Maine following a debate that included comments from Gov. Janet Mills on her support of the project.

The vote was 262- 102 to oppose the New England Clean Energy Connect project in a secret ballot vote at the annual Town Meeting at the Farmington Community Center.

During about 45 minutes of debate, Mills, whose hometown is Farmington, said she supports the project because it will provide $346 million in electricity market benefits in Maine in the first 15 years and will reduce CO2 emissions by about 360 metric tons per year.

She also cited the local benefits, including an estimated $436,000 in new annual tax revenue from the project in Farmington, $5 million from Central Maine Power to economic development in Franklin County and $5 million in scholarships for local students.

In addition, Mills cited the support of groups such as the Acadia Foundation and Conservation Law Center who have signed on to supporting the project.

“Are there trade offs?” Mills said. “Sure. There always are. But the fundamental question to me is, ‘Do we want to be pouring money down the drain fattening the pockets of big oil and big gas companies the rest of our lives?’ The answer is no.”

Ultimately, she said residents should make their own decisions on how they wanted to vote, but asked them to “consider certain irrefutable facts.”

She said hydropower is one of the cleanest forms of energy; that the power would be coming from Canada, a country that is still a part of the Paris Agreement on climate change and has an interest in reducing emissions; and that the hyropower line will help bring down electricity prices throughout the region, including in Farmington.

Mills also talked about what the line, which is proposed to run from northern Somerset County, through Franklin County and on to Lewiston, will look like.

“It’s not the New Jersey Turnpike now and it won’t be the New Jersey Turnpike,” Mills said. “It’s widest parts from what I’ve read in the record is less than half the width of the New Jersey Turnpike.”

Prior to her speaking, some residents said they were against the line because of its impact to the environment in Franklin County.

“I have spent 30 years plus going to a log cabin between The Forks and Jackman nine miles in on dirt lumber roads,” said resident Wendy Huish. “You’re in the wilderness there… do you realize the corridor they are going to make is going to be as wide as the Jersey Turnpike? The towers are going to be huge.”

“I was born here and lived here all my life,” said resident Jon Bubier. “I know lots of people on both sides put thought into this but I don’t think Farmington should be neutral. I think (we should oppose it.) It not only strips us of who we

are in western Maine, it puts us in a situation where it's like a knife cutting through all of Franklin County."

Resident Dennis O'Neil said he supports the CMP line because it's a step towards less reliance on fossil fuels.

"It's not a perfect solution, but I applaud the governor for her efforts," O'Neil said.

The vote rescinds a letter of support the Board of Selectmen previously wrote in support of the project and authorizes them to submit to the Maine Public Utilities Commission, one of the permitting agencies for the project, a letter opposing it.

In other news Monday, residents also voted to approve an ordinance putting in place regulations for marijuana related businesses and approved an overall $6.1 million municipal budget.

A statement encouraging Franklin County commissioners to reverse their policy aimed at eliminating county funding for nonprofit social services was also approved, as was $17,998 in funding for such services, including groups like Western Maine Community Action and Western Maine Transportation.

Several residents said they support paying for such services, including Paula Widmer, who said she relies on Western Maine Transportation to get her to doctor's appointments.

Lately, she said the group has had to cut back on their bus routes due to budgetary constraints.

"We hear a lot about these cuts in the national news and it's really sad to sit here in this town and hear the same thing," Widmer said.

In elections, Selectman Josh Bell, who currently serves as the chair of the board, was re-elected with 130 votes. Selectman Michael Fogg was also re-elected with 170 votes. Both are three-year terms.

Douglas Dunlap, a member of the Regional School Unit 9 board of directors, was re-elected to a three-year term with 138 votes.

Isaac Raymond was elected to a three-year term with 92 votes.

Dennis O’Neil was elected to a two-year term on the RSU 9 board of directors with 149 votes.

All races were uncontested.

INDUSTRY

SELECT BOARD RESCINDED SUPPORT AND OPPOSED THE PROJECT

Town of Industry
1033 Industry Road
Industry, Maine
04938
Tel. (207)-778-5050

COPY

May 7, 2019

Maine Public Utilities Commission
18 State House Station
Augusta, Maine 04333

Dear Commission Members:

In fall of 2018, the Town of Industry Board of Selectpersons sent a Letter of Support to the Massachusetts 83D concerning Central Maine Power's application for the New England Clean Energy Connect Project. At the time, the Industry Board of Selectperson's had limited information, as Central Maine Power was only in the initial application phase.

With Massachusetts' acceptance of Central Maine Power's proposal, pending permit approvals, and increased knowledge of the detrimental effects of the project to the Town of Industry and to the Western Maine Region, the Industry Board of Selectpersons revoke the Town support for the project. This notification to rescind the board's letter of fall of 2018, and to confirm the Town's new position formally opposing the Project.

The Town of Industry Board of Selectpersons and the Citizens of Industry goes on record as opposing Central Maine Power's New England Clean Energy Connect Project.

Sincerely yours,

Board of Selectmen
Town of Industry

JACKMAN

TOWN RESIDENTS VOTED TO OPPOSE

Jackman joins resistance against CMP power line project

BY **MEG ROBBINS, MORNING SENTINEL**

November 29, 2018

JACKMAN — This Somerset County town has joined a number of towns and organizations throughout the state in opposing Central Maine Power Co.'s proposed transmission line that would bring hydropower from Quebec to Massachusetts via western Maine.

Residents voted 78-11 against the project Wednesday night in a special town meeting at the Forest Hills Consolidated School gymnasium.

The move comes as state agencies prepare to vote on whether to issue permits for the project, a process that was supposed to be underway by now but has been delayed multiple times after CMP submitted incomplete applications or failed to provide information in a timely manner.

The transmission line, called New England Clean Energy Connect, would provide 1,200 megawatts to power to roughly 1 million homes in Massachusetts. While its $950 million budget would be funded by Massachusetts electricity customers, the 145-mile-long infrastructure — plus updates to an existing 50-mile line — would run through 38 communities in Somerset, Franklin and Androscoggin counties. CMP owns the land where the new line would be installed.

Jackman borders two of the communities on the corridor, Bradstreet Township and Parlin Pond Township, but the proposed power line would not pass directly through the town.

Voters in Jackman said they thought the project would "damage Maine's environment, wildlife habitat, water quality, scenic views, and tourism economy; and permanently harm their way of life," according to a news release from the Natural Resources Council of Maine, a conservation group that has taken a prominent stance against the project.

Jackman Town Manager Victoria Forkus declined to comment immediately on stances taken at the town meeting or to provide a list of voters in attendance. She said the Jackman Select Board will issue a news release on the topic on or before Dec. 13 after voting on its wording.

As of May, CMP had received letters of support that it solicited from 37 communities that the power line passes through. Since then, Alna and Caratunk have rescinded their letters of support. New Sharon did not sign a letter in the first place. West Forks Plantation and The Forks Plantation voted to oppose the project.

“More and more towns are retracting their support and voicing opposition to the transmission line,” said Sue Ely, a clean energy attorney for the Natural Resources Council of Maine, in a news release. “As each new town, business or political leader announces their opposition, it becomes clearer that Maine does not want this project.”

John Carroll, a spokesman for CMP’s parent company Avangrid, said the mounting resistance from towns in or near the corridor is not a pressing concern for the organization at this point.

“Our focus is with the (state agencies),” he said. “We need to address their concerns, so that’s where our focus is right now.”

Carroll attended the special town meeting in Jackman on Wednesday and said that people expressed concern that the project would “somehow hurt some of their businesses.”

“We hope the public understands the benefits that this project brings to Maine,” Carroll said. “There will always be people who reject change, but in the long run, we believe that this is the right thing for Maine and New England and we will continue to work with the communities.”

Those in favor of the project, including a group of business and labor leaders called Mainers for Clean Energy Jobs, cited the potential for job creation and tax revenue as perks. The project is expected to generate $18 million annually for Maine communities through property taxes, according to CMP. The company also has stated that its transmission line would create roughly 1,700 temporary construction jobs, most of which would go to Mainers.

Some people opposed to the plan noted that proposals for routing the line through Vermont and New Hampshire offered better benefits to those states. Those proposals included upward of $200 million in mitigation to offset the disruptions the power line would have caused those states.

John Carroll, NECEC project manager, addressed this point in May.

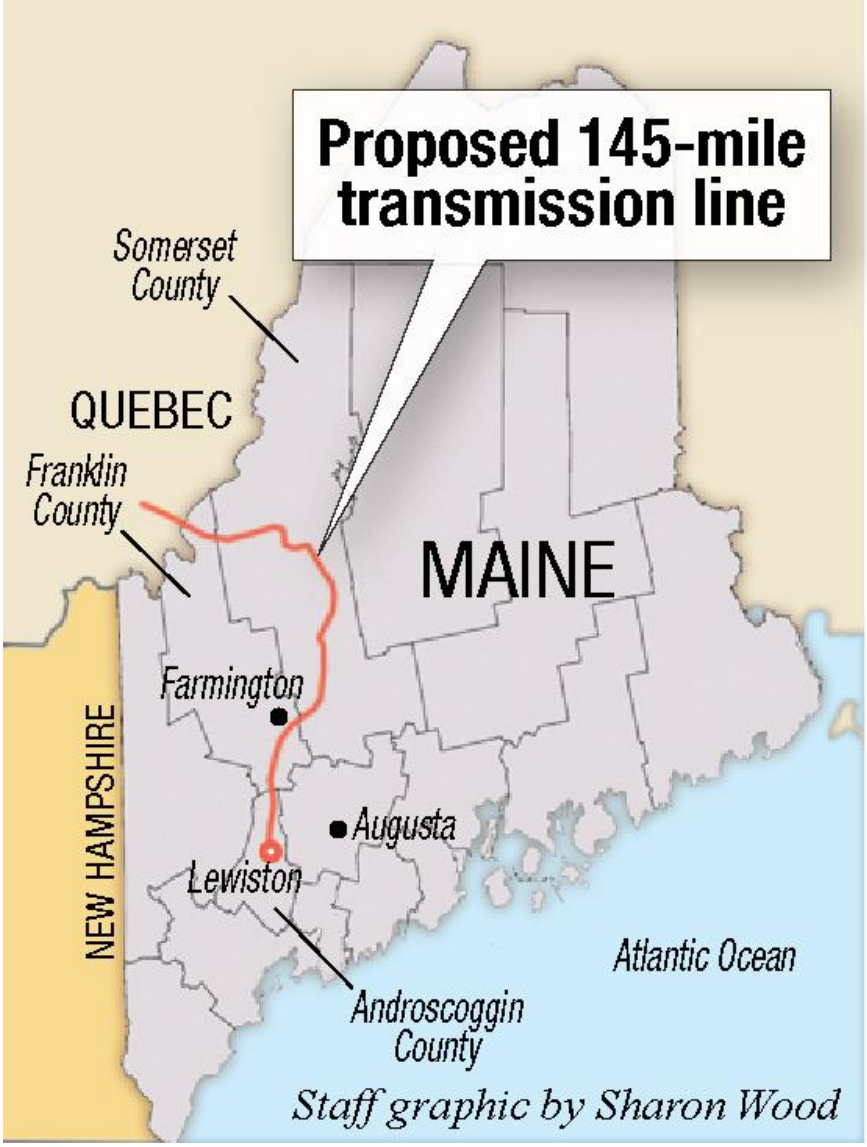
“The difference in cost is entirely based on how thoughtful the three projects were,” he said. “Our project was carefully cited to maximize the existing infrastructure and minimize community impact. That’s reflected in the cost.”

The project has received pushback over its anticipated effects on the environment and potential to mar the natural beauty that powers much of Maine’s tourism industry. The location where the line would cross the Kennebec River Gorge became a particular point of contention. Initially, CMP planned to build the wires 200 feet above the stretch of water, popular for whitewater rafting. In October, the company conceded to critics by agreeing to drill under the river instead and bury that section of the line. This would increase the project budget by $37 million — and reduce mitigation funds CMP offered to Somerset County by upward of $12 million. It had formerly offered the county $22 million for conservation projects and economic development.

At a rally in Augusta in September, protesters voiced concern over what the project actually would contribute to Mainers and whether the project would thwart the state’s ability to develop renewable energy. According to a letter from the Caratunk Select Board, one of the town’s concerns was that the CMP line already has prevented the town from being able to build a solar farm that would bring in more tax revenue.

“Caratunk has already twice supported NextEra for a solar farm within its boundaries,” the letter states. “One such solar project lost in direct competition to this NECEC. … Caratunk is against the NECEC project if it prevents future renewable energy opportunities that provide for a huge tax benefit to all landowners and significantly increase the Caratunk valuation.”

The plan needs approval from Maine's Public Utilities Commission, the Department of Environmental Protection and the Land Use Planning Commission, all of which will make decisions in the coming months about whether it can go forward.



MOOSE RIVER

TOWN RESIDENTS VOTED TO OPPOSE

TOWN OF MOOSE RIVER
P.O. BOX 267
JACKMAN, ME 04945

October 14, 2018

To whom it may concern,

The citizens of the Town of Moose River and Board of Selectman have voted to oppose the CMP NECEC project due to our grave concerns about the projects impacts.

If approved, the New England Clean Energy Connect (NECEC) corridor will forever impact our region, our environment, our tourist industry, our forest products industry, our economy, our families' future, our seasonal residents' future, and our very way of life. This region continues to attract generations of visitor because they want to experience the natural beauty of the upper Kennebec and Moose River Waterways, and the surrounding wilderness of western Maine. This region offers a unique respite from the challenges and stress of life in the city, and we want it to stay that way for future generations of residents and visitors.

Some local sightlines will be spared, but the proposed transmission towers and lines will be visible from nearly every summit of nearly every peak in the Moose River Valley. They will cross some of the region's most pristine wilderness numerous times, hang over brooks, streams, rivers, and seasonal waterways crucial to all species of wildlife. The herbicides used to maintain the corridor will leach into the region's waterways, aquifers, and water tables. Our water is drawn from Big Wood Pond and it is fed by the Moose River. We do not need any more Herbicides than we already have polluting our drinking water. The environmental impact of the permanent deforestation component alone should alarm you as leaders of our town. Loss of oxygen to the valley, loss of shade to the fish, loss of canopy for birds and wildlife, loss of habitat for birds and mammals including deer yards and the loss of the unscarred views that make our area so special.

The NECEC project will have potential impacts on the safety and security of The United States of America. The project will leave a wide open 150-300 foot hole in the northern border of our country requiring additional resources to guard to prevent illegal activities. The project will also make us less energy independent and more reliant on a foreign country for our energy needs. Giving foreign countries control of our power supply is not responsible nor in the best interest of our country.

This project will inevitably lead to more powerlines, an unknown number of wind turbines and other future developments that are industrial in nature and detrimental to our area and its' wild untamed charm that keeps us here and brings in tourists and future residents.

Our area is not logistically equipped to handle the scope of the proposed project. The short term economic gains will be outweighed by the long term losses to our economy. The limited lodging, gathering places, eateries, and fuel pumps will be inundated by out of area workers, leaving little to no room for our longtime residents and tourists will look for alternative places to ride, boat, fish, hike, hunt, snowmobile, ATV, and get away from it all. Many of them will not come back once they find new places to recreate.

Another major issue is the current level of healthcare available to the workers during this multi-year project. The remote region of the corridor presents its own unique rescue challenges, and the level of medical treatment available may prove quite inadequate in the event of simultaneous traumatic injuries to multiple workers and residents. This would be an additional financial burden on our taxpayers. The remote locations could lead to a potential loss of life or property if the Fire Department and Ambulance are unable to respond to multiple calls simultaneously. There are no licensed nurses to support the one physician and one physician's assistant covering the clinic.

These impacts along with many others show how this project will be an economic burden on us that will have no lasting benefits to our citizens, only benefits for out of state and foreign companies while we are negatively impacted.

Respectfully submitted,

The residents and Selectmen of Moose River

WARRANT

To: Karen Moore, Citizen of the Town of Moose River, in the County of Somerset, Maine:

In the name of the State of Maine, you are hereby required to notify and warn the Residents of the Town of Moose River, qualified to vote on town affairs, to meet at the Moose River Town Office on the 12th of October, 2018 at seven o'clock in the evening then and there to act on the following articles, to wit:

ARTICLE 1 To choose a moderator to preside at said meeting.
***Wayne Lumbert nominates Harald Moore.
James Smyth seconded. Motion for nominations ceased 1. Wayne Lumbert 2. James Smyth. Harald Moore is sworn in as moderator.

ARTICLE 2 To see if the town will vote to support or oppose the CMP corridor project.
*** Travis Oliver made a motion to oppose the CMP corridor project. This motion was seconded by Cathy Reed. The voters voted 25 yay 0 nay. All in favor of opposing the CMP corridor project.

The Board of Selectmen give notice that the Registrar of Voters will be in session at the above named place on October 12, 2018 at 6:30 until the meeting starts for the purpose of correcting the voting lists and registering new voters.

Given unto our hands this 2nd day of October, 2018.

Harald K. Moore First Selectman	James A. Smyth Second Selectman	Wayne T. Lumbert Third Selectman

Attest: Karen Moore, Resident, Moose River

***Rhonda McNally made a motion to adjourn the meeting. Seconded by Karen Moore. Meeting adjourned at 7:40pm.

***Meeting notes recorded by Lindsay Keiper Town Clerk.

POWNAL

SELECT BOARD RESCINDED SUPPORT

April 11, 2019

At the last Selectmen's meeting (4/8), a group of citizens came forward objecting to the CMP powerline proposal and to their perceived notion that the Pownal Selectmen were in support of the project based on a letter that was on the project's NECEC website that was signed by the Selectmen. As one of the letter's co-signers, I have to register my surprise that CMP would misguidedly use a letter that CMP drafted themselves to gain support for their bid against other projects. Without asking permission to publish the letter, or to transform the intent of the letter to fit the purposes of CMP, I find the process disappointing to say the least. Below is Pownal's response to CMP publishing that letter without permission. The Selectmen of Pownal have not endorsed the NECEC project. CMP representatives will be at the next Selectmen's meeting on 4-22 at 7:00 pm.

Town of Pownal

Independent Unto Itself

April 9, 2019

RE: Letter of Support

Dear New England Clean Energy Connect & Central Maine Power Company:

It has come to the attention of the Board that the letter of support that was written dated November 9th 2017 on behalf of the Board of Selectmen is being publicized and misconstrued as support for the entirety of the project being proposed. The intent the Board had in signing this letter was only to lend the municipalities support to Central Maine Power & New England Clean Energy Connect being awarded the project as it was at the time being bid on by other companies from out of state. It was not the Board's intention to lend support for the entirety of the project as at that time there was not enough information available about the scope of the project.

We ask that the letter be taken down from the New England Clean Energy Connects website. This is misleading to the public in the support that the Town provided for this proposed project. We would further like to clarify that any decisions that are made on the project will need to go before the legislative body of the Town of Pownal.

Respectfully submitted,

Jonathan Morris George Anderson Shawn Bennett

Board of Selectmen
Pownal, Maine

429 Hallowell Road Pownal, Maine 04069
Tel. 207-688-4611 Fax 207-688-4978 www.pownalmaine.org

STARKS

TOWN RESIDENTS VOTED TO NOT SUPPORT LINE

Another Maine Town Comes Out In Opposition To CMP's Proposed Transmission Line

By FRED BEVER · APR 12, 2019

A twelfth municipality that could host a new power line proposed by Central Maine Power has voted to oppose the plan. At town meeting Thursday night, Starks residents rejected a motion to support the project, 42-to-14.

Other towns along the corridor to either oppose the project or rescind previous support include Farmington, Wilton, West Forks and Wiscasset. The Franklin County Commission has rescinded its support as well.

But on the same day as the Starks vote, the state Public Utilities Commission approved CMP's application for a Certificate of Public Convenience and Necessity. That's one of three state permits the project needs to move forward. The Commission found that the project's benefits, including suppressing electricity prices, would outweigh its harms.

In the Maine Legislature, meanwhile, project opponents are trying to muster support for a measure that would require that "high-impact" transmission projects win affirmative votes from host communities.

Another bill would require a new study of whether the CMP project would reduce emissions of greenhouse gases, as supporters claim.

The 145-mile, billion-dollar power line would bring hydro-electricity from Canada into the regional grid, to serve Massachusetts customers.

https://www.mainepublic.org/post/another-maine-town-comes-out-opposition-cmps-proposed-transmission-line

WEST FORKS

TOWN RESIDENTS VOTED TO OPPOSE

BDN MAINE
bangordailynews.com

Second small Maine town votes against CMP's hydropower project

By Lori Valigra, BDN Staff • September 14, 2018 12:45 pm

West Forks plantation, a town of 56 residents, voted Thursday night by a majority not to support Central Maine Power's project to transmit electricity from Canada to Massachusetts via Maine.

In a 45-7 vote, townspeople objected to the New England Clean Energy Connect project being pushed by CMP and its partner, Hydro-Quebec.

Last week, the town of Caratunk retracted its earlier letter to CMP supporting the project. In a filing with the Public Utilities Commission, the town of 68 residents cited environmental concerns and worries about not getting enough financial benefit from the project.

West Forks had not sent a similar letter of support, said third assessor Ashli Coleman, and until Thursday night's vote, had kept a neutral status. However, a Somerset County commissioner did individually send a letter of support that is posted on CMP's website for the project, she said.

"West Forks will be drafting and submitting a letter of opposition to the Department of Environmental Protection, Land Use Planning Commission and the Public Utilities Commission by early next week," she said. "We will also ensure that CMP removes the letter of support [from the county commissioner] from the West Forks link on their NECEC website and replace it with the letter of opposition from the town of West Forks."

The town already has filed for intervenor status to participate in hearings on the project. The project still needs to be approved by Massachusetts and Maine regulators.

Coleman said West Forks is the only organized town along the new route CMP plans to build starting at the Canadian border that will be directly affected by the lines. The new lines will then connect to existing CMP lines and run through Lewiston. Hydropower from Hydro-Quebec will run through the Maine lines to Massachusetts customers.

"It will change the view shed and affect the national scenic byway," Coleman said about concerns expressed by townspeople. She also cited groundwater issues and an overtaxing of the town's infrastructure as workers flow into the town to build the new line.

She added that she questions the accuracy of financial estimates CMP has presented for tax benefits and mitigation for altering the landscape and wildlife habitat.

WILTON

TOWN RESIDENTS VOTED TO RESCIND SUPPORT AND OPPOSE THE PROJECT

Town of Wilton
158 Weld Road
Wilton, ME 04294
Tel. (207)-645-4961
Fax. (207) 645-2001

March 6, 2019

Maine Public Utilities Commission
18 State House Station
Augusta, Maine 04333

Dear Commission Members:

On November 21, 2017, the Town of Wilton Board of Selectpersons sent a Letter of Support to the Massachusetts 83D concerning Central Maine Power's application for the New England Clean Energy Connect Project. At the time, the Wilton Board of Selectperson's had limited information, as Central Maine Power was only in the initial application phase.

With Massachusetts' acceptance of Central Maine Power's proposal, pending permit approvals, and increased knowledge of the detrimental effects of the project to the Town of Wilton and to the Western Maine Region, the Wilton Board of Selectpersons held a Special Town Meeting with a warrant article concerning Central Maine Power's proposed New England Clean Energy Connect Project. One hundred seventy-three voters overwhelmingly voted to direct the Board of Selectpersons to rescind the board's letter of November 21, 2017, and to confirm the Town's new position formally opposing the Project. The single voter who did not support the warrant article articulated a preference to remain neutral.

The Town of Wilton Board of Selectpersons and the Citizens of Wilton go on record as opposing Central Maine Power's New England Clean Energy Connect Project.

Sincerely yours,

Tiffany Maiuri

Chairperson, Board of Selectpersons
Town of Wilton

WISCASSET

SELECT BOARD RESCINDED LETTER OF SUPPORT

3a

WISCASSET BOARD OF SELECTMEN,
TAX ASSESSORS AND OVERSEERS OF THE POOR
MARCH 19, 2019

Preliminary Minutes

Present: Kim Andersson, Bob Blagden, Chair Judy Colby, Kathy Martin-Savage, Vice Chair Ben Rines, Jr. and Interim Town Manager John O'Connell

Chair Judy Colby called the meeting to order at 6:02 p.m.

1. Pledge of Allegiance

2. Approval of Treasurer's Warrants

Ben Rines, Jr., moved to approve the payroll warrant of March 15, 2019. Vote 5-0-0.

Kathy Martin-Savage moved to approve the accounts payable warrant of March 19, 2019. Vote 5-0-0.

3. Approval of Minutes

Kathy Martin-Savage moved to approve the minutes of February 19, 2019 as amended. Vote 5-0-0.

Ben Rines, Jr., moved to approve the minutes of March 12, 2019. Vote 5-0-0.

4. Special Presentations or Awards

Chair Judy Colby presented the Maine Municipal Association's Essay Contest Winner Award to Grace Greene together with a gift certificate for $250.00

5. Committee Appointments

Ben Rines, Jr., moved to appoint Donald James to the Shellfish Committee. Vote 5-0-0.

Kim Andersson moved to appoint Sue Robson to the Waterfront Committee. Vote 3-2-0 (Rines and Blagden opposed).

6. Public Hearings – none

7. Public Comment

Marty Fox who opposes the New England Connect Energy Corridor read a letter written September 21, 2017 from Marian Anderson, then Town Manager, to CMP indicating that the board voted to support the NECEC. Judy Colby said she did not remember the board voting to support the NECEC and she would need to verify through a search of minutes that the board had voted to approve the corridor. Subsequently, a review of the minutes indicated there was no vote on 9/19/17. Fox said Anderson's letter was on the corridor's website and asked the board to reconsider. Jim Kochan said the DOT was soliciting a letter of support at that meeting in 2017. The matter will be on the agenda in two weeks and discussed further under Other Board Business.

Kim Dolce asked, if legally possible, to have a statement on the warrant indicating whether the budget number is an increase or decrease from the previous year's budget. Also, could it indicate that property taxes would increase or decrease depending upon what percent the budget was increased or decreased. Judy Colby said it would depend on State regulations and she would check if it would be possible.

8. Department Head or Committee Chair

a. Department Head February Monthly reports – Kim Andersson noted that the Wastewater Treatment Plant report was very thorough and was useful in budgeting for next year.

9. Unfinished Business

a. Clean Up Grant RFP: John O'Connell said that minor revisions had been made. **Kathy Martin-Savage moved to direct the Town Manager to submit the RFP as presented. Vote 5-0-0.**

b. Budget Calendar: March 20, 2019 – no budget meeting; Meetings on March 25 and 27, April 1 and 3 at 5 p.m.; Budget process should be complete by April 1.

c. Policy on Tax Lien and Sewer Lien Acquired Policy Revision: **Ben Rines, Jr., moved to adopt the Policy on Tax Lien and Lien Acquired Property. Vote 5-0-0. Ben Rines, Jr., moved to rescind the vote on the Policy on Tax Lien and Lien Acquired Property. Vote 5-0-0. Ben Rines, Jr., moved to approve the Policy on Tax Lien and Sewer Lien Acquired Property. Vote 5-0-0.**

d. Tax Acquired Property Occupancy and Re-Purchase Agreement: **Judy Colby moved to adopt the Tax Acquired Property Occupancy and Re-purchase Agreement form. Vote 5-0-0**

e. Update on Pier Vendor Fees: O'Connell said Lincoln County Regional Planning Commission had submitted information on pier vendor fees in seaside communities. Many do not have kiosks on the municipal piers and those that do have kiosks have varying fees for varying sizes or duration of agreement. The average for the four communities that responded (Camden, Eastport, Lubec and Mt. Desert Island) is $5,635/season, $900/month, $225/week and $32/day. John O'Connell will ask the Waterfront Committee for recommendations. Jim Kochan said there had been no rate increase of any note for 20 years. He said he had submitted a recommendation for a graduated fee increase several weeks ago. He also said that because two of the current vendors are members of the Waterfront Committee, a quorum to vote on a recommendation from the Waterfront Committee would not be possible. He said the town should not have to underwrite other people's businesses on the pier. He added that almost all the money made on vendor fees this year went for maintenance. Judy Colby said the Waterfront Committee will be asked for its recommendation and the board will also review Jim Kochan's recommendation. It was suggested that vendor fees at farmers' markets be investigated.

10. New Business

a. February Monthly Financials

- Department year to date expense report: In response to Kim Andersson's question regarding Municipal Building Electric and other accounts, Vernice Boyce said she would get further information on the accounts before the next meeting.
- H.M.Payson Statement of Accounts

b. Quit Claim Deed

•. Gary and Debbie Joslyn, Map R04: **Judy Colby moved to grant the quit claim deed for Gary and Debbie Joslyn. Vote 5-0-0.**

c. Watercraft Storage Rack Rental Policy Proposal – Peter Wells: Wells submitted a proposal for three rental waterfront storage racks which would be attached to the building at the pier and would have four shelves each for kayaks, canoes, or watercraft. The storage racks would be convenient for residents and would be an economic benefit for the Town. Phase I would be for one rental storage rack. The Waterfront Committee is in support. Each rack would cost $760 which would include four I-bolts, not installation. He also submitted a draft rental agreement which would specify that the town had no responsibility- use of the racks would be at the renter's risk. Other towns have rented spaces for $30 to $50 per season. There is a donor for Phase I of the project who would pay for the racks and I- bolts if the town would install them. The donor would also want rental space at no cost for their kayaks (at $50 per year rent and $760 donated for rack, the donor would get free rent for approximately five years). Jim Kochan said he supported the idea, but he said it would benefit a limited number of people. He said cheaper and more durable models could be constructed with donated time and materials. There was discussion on free-standing versus racks attached to the building, whether the racks attached to the building or free-standing year-round racks would require approval of the Historic Preservation Commission, alternate location for stand-alone racks, possibility of building racks in-house, testing the demand for one year, using a lottery system for spaces if the demand exceeds the supply, the return on investment would take approximately four years, and utilizing vacant space at the dock for stand-alone racks. The board will take a road trip to the waterfront to see if stand-alone racks would be an option. Wells will meet with the Historic Preservation Commission regarding any necessary approval.

d. Sunken Garden Discussion – Steve Christiansen: In 1958 the parcel of land known today as the Sunken Garden was given to the Town provided that no buildings be put on the property. If that condition was not met, the land would revert to the donors. In 1990 there was a request for funds for the Sunken Garden which Christiansen assumes was used for the shed. He concluded that the shed must be removed, or the property would revert to the heirs of the owners. The shed is used by the Garden Club and the Beautification Committee for gardening tools and supplies. Bob Blagden said the board should honor the conditions of the gift. **Kathy Martin-Savage moved to remove shed before Memorial Day.** A member of the Garden Club spoke about the need for a storage shed for their efforts in the Sunken Garden. It was mentioned that before the shed was erected, tools were kept in the barn of the Nichols-Sortwell House. O'Connell will contact Norma Gordon of the Beautification Committee regarding the tools in the garden shed. **Vote 5-0-0.**

e. Business License Approval – Edward Colburn, CBA Water Street Kitchen & Bar: **Ben Rines, Jr., moved to approve the Business License for Edward Colburn, DBA Water Street Kitchen and Bar. Vote 5-0-0.**

f. Town Clock Maintenance Agreement with Balzer Family Clock Works: O'Connell said the clock tower itself needs work and Jason Putnam, who worked on the tower last year, will be contacted by John O'Connell to inspect the tower to see what repairs are necessary.

g. Friends of Wiscasset Village – Peter Wells, Mary Ellen Barnes: Barnes said the Friends of Wiscasset Village is an ad hoc committee with approximately 45 members whose mission is to communicate positive energy, to strengthen the local economy and community, to celebrate our unique treasures, and to welcome new neighbors and businesses. She outlined the activities of the group during the

MDOT construction projects and other activities during the past fall and holiday shopping season. The group is now focusing on sidewalk amenities, and Peter Wells introduced several design concepts for streetscape improvements including benches and trash receptacles. He illustrated the brick sidewalks (from 22 feet to 30 feet wide) with three Japanese Lilac trees on each side, three lights on each side and bollards. A sitting wall is also planned on the north side of the street. He presented drawings showing several concepts with benches, trash receptacles, planters and tables and chairs. He said there was no water access so a water truck would be needed for plants and trees. He asked for support for the origin of funds for the improvements and developing some amenities and going back to MDOT to see if they would help support. He said it would be better to install the amenities before the sidewalks are finished. In response to Ben Rines question, the cost of 8 benches and 4 trash receptacles is $18,000 without installation. Installation would probably double that amount. Susan Blagden asked what the ongoing costs would be to maintain the amenities. Maryellen Barnes asked for the support of the town and asked to be authorized to communicate with the MDOT regarding the amenities and vendors.

In response to Judy Colby's question regarding funding, Barnes said the group was not asking for funding from the board, only the authorization to talk to the MDOT about its funding some of the amenities and then the balance would come from fundraising by the group. Kathy Martin-Savage said she had a problem with the committee speaking on behalf of the selectmen and the town and that John O'Connell could contact the MDOT to see if the amenities could be put back into the project. It was decided that O'Connell and Peter Wells would meet with the MDOT. Kim Andersson thanked the group for their work on the project. Jim Kochan said that at a May 2018 meeting, Ernie Martin had said that the MDOT was paying for all the amenities in the design, however, the PAC had agreed to give up the amenities that would have been free. In response to a question, Wells outlined the grades which were handicap accessible and those which did not require ramps. .

11. Town Manager's Report

a. John O'Connell announced the appointment of Theodore Snowdon as Director of Public Works
b. A memo was received from John Carroll, CMP, confirming that the Union of Concerned Scientists was in favor of the NECEC project as he had mentioned at the last meeting, and he had provided Marty Fox with a copy of the UCS statement.
c. A communication had been received from Lt. Murphy regarding costs of animal control and asking for a meeting to follow up on expenses.
d. O'Connell will meet with Jason Putnam to look at the building housing the town clock to determine what work needs to be done. He will discuss with the Balzer representative repairs to keep the clock on time. Bob Blagden said there is a book available giving instructions on adjusting the clock. The maintenance agreement must be signed by July 1.
e. O'Connell will meet with a representative of Wright Pierce on March 20 about possible grants for the wastewater treatment plant.

12. Assessors' Agent Recommended Abatements:
- Carroll M. Jones, Map R03, Lot 54-3-1, $347.99
- Dennis Gauthier, Map R04, Lot 11C, $152.49
- Scott Connors, Map R01, Lot 035-C02, $318.67
- Gilbert H. Rines, Map R05, Lot 51-A2. $95.80
- Sam Patterson, Map R07, Lot 039-19, $146.63

Ben Rines, Jr., moved to approve the recommended abatements. Vote 5-0-0. He thanked the Treasurer for her explanation.

13. Other Board Business

Judy Colby asked whether a vote on the CMP plan should be on the next agenda. Regarding the letter on the CMP website citing Wiscasset's approval of the NECEC plan, Ben Rines, Jr., said the CMP had a false statement (regarding the board's support). Kim Andersson said she thought the board was supportive of the RFP when it was presented in 2017, and that Marian Andersson's letter of September 2017 was not inaccurate at that time. Kathy Martin-Savage said the original proposal was the subject of the meeting in 2017 but since then a second proposal had been made which is now being discussed. Bob Blagden said since the board had not acted, there was no action to be rescinded as requested earlier in the meeting. He said he did not favor putting the issue on the warrant because it was difficult to understand. Judy Colby said the board was receptive of the information given to the board in 2017 but the board has not taken a position on the NECEC project. **Ben Rines, Jr., moved to direct the Town Manager to contact CMP to specifically remove any references that imply support of the ongoing project from the onset to the present by the Town of Wiscasset from its website. Vote 5-0-0.**

Regarding the Monkey C Monkey Do water bill, Richard Gaeth, Wastewater Treatment Plant Manager, said that there are four meters on the property and that the property owners didn't understand the consumption of water that would result from power-washing the building. Chris Cossette, Wiscasset Water District, advised that no abatement should be recognized. Bob Blagden said the business should have had a separate water meter for power-washing.

Gaeth apologized for the length of his monthly report, but said he thought the board should be aware of what the department was doing. He hoped to get to the point where the reports would be proactive instead of reactive. A new DEP flow meter will be installed and at the next meeting Gaeth would like to address septic fees, providing information of surrounding areas. He asked if the board would contemplate giving a loan to the department from the Payson Fund of about $25,000.

Gaeth said if there is $5,000 in budget at the end of March, he would like to hire Ted Berry to do wet well work. He was advised that the request would be on the next agenda. Bob Blagden said the work should go out to bid.

Judy Colby asked the reporters to note that nomination papers for Budget Committee, Select Board, School Board, etc. are due on April 11.

14. Adjournment

Kathy Martin-Savage moved to adjourn the meeting at 8:25 p.m. Vote 5-0-0.

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TRANSMISSION LINE LEASE

BETWEEN

DEPARTMENT OF AGRICULTURE, CONSERVATION AND FORESTRY
BUREAU OF PARKS AND LANDS
and CENTRAL MAINE POWER COMPANY

This Lease Agreement is made by and between the State of Maine, by the Bureau of Parks and Lands, Department of Agriculture, Conservation and Forestry (hereinafter called the "Lessor"), acting pursuant to the provisions of Title 12 M.R.S.A. §1852(4), and Central Maine Power Company, a Maine corporation with its principal place of business at 83 Edison Drive, Augusta, Maine (hereinafter called "Lessee"). For the considerations hereinafter set forth, the Lessor hereby leases to Lessee, and Lessee hereby takes from the Lessor, the non-exclusive use of that portion of the West Forks Plantation and Johnson Mountain Township (T2 R6 BKP WKR) Maine Public Reserved Lands in Somerset County, Maine described in Exhibit "A" and shown on Exhibit "B" attached hereto and incorporated herein, being a three hundred (300) foot wide by approximately one mile long transmission line corridor located on a portion of the aforementioned Maine Public Reserved Lands. The described transmission line corridor, together with the improvements now or hereafter to be placed thereon, is hereinafter referred to as the "Property" or "Premises," and is subject to the following terms and conditions:

1. Term:

a. This lease shall be in effect from the date of execution of this instrument for a term of twenty-five (25) years and, at no less than 5 year intervals, the term of this lease may be extended by mutual agreement for additional years as will grant Lessee a remaining lease term totaling no more than twenty-five (25) years, so long as Lessee is in compliance with the conditions of this lease. Lessee shall not request a lease term extension any more often than once every five years. Notice of any lease extension shall be given to Lessor at least six (6) months prior to the expiration of any initial term or renewal period.

b. Lessor reserves the right to terminate this Lease at any time during the term hereof to the extent permitted under the provisions contained in paragraph 13 Default.

c. Lessee has the right to terminate this Lease upon at least ninety (90) days prior written notice to Lessor, or such lesser notice period as agreed to by Lessor in writing.

d. Any notice required by this paragraph, whether by Lessee or Lessor, shall be sent postage pre-paid, registered or certified mail, return receipt requested, to the party at the address set forth in paragraph 24.

2. Rent. Lessee shall pay to the Lessor rental as follows:

An annual payment of $1,400.00. The first payment shall be due on the date of execution of this lease (the "Initial Payment") and subsequent annual payments shall be made on or before December first of each following year. Lessor or Lessee may, within the first twelve months of the lease and at either Lessor's or Lessee's sole discretion, commission an appraisal of the Premises. Both Lessor and Lessee shall agree on the Appraiser to be assigned the appraisal assignment. Lessee agrees to pay any additional value above the Initial Payment indicated by the appraisal and the cost of the appraisal. The annual payment shall be adjusted each year in an amount not to exceed the average increase in the Consumer Price Index as published by the Bureau of Labor Statistics, United States Department of Labor over the preceding one year period.

In addition, Lessee shall pay to Lessor the negotiated price of the timber present on the Premises based on mill scale and stumpage value at time the corridor is harvested for the construction of the utility corridor.

3. Use. The Property shall be used by the Lessee as follows: to erect, construct, reconstruct, replace, remove, maintain, operate, repair, upgrade, and use poles, towers, wires, switches, and other above-ground structures and apparatus used or useful for the above-ground transmission of electricity ("Facilities"), all as the Lessee, its successors and assigns, may from time to time require upon, along, and across said Property; to enter upon the Property at any time with personnel and conveyances and all necessary tools and machinery to maintain the Premises and facilities; the non-exclusive right of ingress to and egress from the Premises over and across the land of the Lessor; to transmit electricity and communication, as conditioned below, over said wires, cables, or apparatus installed on Lessee's facilities. Lessee shall own all communication facilities and such facilities shall be for Lessee's use in its business as a public utility. In the event Lessee desires to provide capacity to others on Lessee's communication facilities, Lessee shall first obtain Lessor's written approval, which shall not be unreasonably withheld. Lessor may adjust the rent at such time as Lessee provides communication capacity to others. The rent adjustment is to be determined by an appraisal paid for by Lessee. Both Lessor and Lessee shall agree on the Appraiser to be assigned the appraisal assignment. Lessee shall not sub-lease or contract the communication facilities for any other commercial use. The Lessor further grants to said Lessee the right to establish any and all safety and reliability regulations applicable to said transmission line corridor which said Lessee deems necessary and proper for the safe and reliable construction and maintenance of said structures, wires, and apparatus and for the transmission of electricity.

4. Quiet Enjoyment. So long as Lessee pays the rent, performs all of its non-monetary obligations, and otherwise complies with the provisions of this Lease, the Lessee's possession of the Premises for its intended use will not be disturbed by the Lessor, its successors and assigns except as otherwise provided under the terms of this Lease. Notwithstanding any provision to the contrary herein, Lessor reserves the right to enter onto the Premises at any time and from time to time to inspect the Premises.

5. Access:

a. It is agreed by the parties to this Lease that Lessor is under no obligation to construct or maintain access to the Premises, notwithstanding any provisions of any federal, state and local law to the contrary. However, the Lessee shall be allowed to cross Lessor's abutting land by using Lessor's Forest Management Roads for access to the Premises for construction, maintenance and repairs, subject to reasonable restrictions and regulations imposed by Lessor, and the rights of others using said roads. Upon reasonable advance notice to Lessee, Lessor reserves the right to close, lock or otherwise restrict access along or through the Forest Management Roads at any time it appears reasonably necessary to protect the safety of persons or property. Such situations include, but are not limited to, spring mud season or periods of high fire danger. Lessee shall immediately repair any damage to the road caused by Lessee. Lessor is under no obligation to provide maintenance to the road. If Lessee wishes to undertake performing repairs or upgrades to the Forest Management Roads, Lessee must acquire prior written approval from Lessor. Lessee shall acquire prior written approval for the construction or use of any other access location across Lessor's land abutting the Premises which approval shall not be unreasonably withheld, delayed, or conditioned.

b. The Lessor expressly reserves the right for itself or its guests, servants, or agents to pass and repass over the described Premises at any and all times with machinery and equipment necessary for the operation or conduct of Lessor's uses as such uses may from time to time exist, provided that: said uses will comply with the above referenced safety regulations and any applicable state law, and will not prohibit the Lessee from complying with the conditions or requirements imposed by permitting agencies; that the Lessor shall provide Lessee with at least three business days prior written notice if Lessor will be on the Premises with construction or logging equipment; and that such use will not unreasonably interfere with the rights of Lessee herein conveyed.

6. Lessee Covenants. The Lessee covenants as follows:

a. No buildings, either permanent or temporary, may be constructed or placed upon the described Premises, except temporary structures during construction of the Facilities, such as field trailers.

b. Crossing mats for stream or wetland crossings shall not be made of ash or hemlock, so as to avoid introduction of invasive pests associated with these species.

c. No hazardous or toxic waste substance or material, residual pesticides or fertilizers, other than organic compost, shall be used or kept upon the Premises or any portion thereof, nor shall any livestock or poultry be kept temporarily or permanently thereon. Pesticides, herbicides, and chemical defoliants registered for use in Maine may be applied to the Premises only after acquiring prior written approval from Lessor and only by trained applicators working under the supervision of applicators

licensed by the State of Maine in formulations and dosages approved by the Environmental Protection Agency and Lessor. One month prior to all pesticide applications, Lessee shall provide information to Lessor, including, but not limited to pesticides, herbicides, and chemical defoliants to be used, dates and methods of application, application locations and reasons for use.

d. There shall be no vegetation removal that would result in less than 50% aerial coverage of woody vegetation and stream shading within 25 feet of a stream.

e. There shall be no vegetation maintenance or disturbance within a 50-foot radius around the high water boundary of a significant vernal pool from March 15 – July 15; provided, however, that Lessee may take all appropriate actions with regards to vegetation management to ensure that Lessee is in compliance with all federal and state laws, rules and regulations imposed upon Lessee as the owner and operator of the Facilities.

f. Lessee shall not make any strip or waste of the Leased Premises or of any other lands of Lessor. Vegetation clearing within the Leased Premises for Lessee's Facilities shall be limited to standards approved by the Maine Public Utilities Commission and shall encourage a ground cover of woody species with a maximum mature height approaching but not exceeding15 feet. Lessee shall make every effort to minimize clearings and cutting of vegetation.

g. Lessee acknowledges that lease of the Premises by the Bureau of Parks and Lands, Department of Agriculture, Conservation and Forestry is unique, and that in authorizing the Lease under 12 M.R.S. § 1852(4)(A), Lessor requires that Lessee shall make every reasonable effort within the leased Premises to be in conformance with the Maine Department of Inland Fisheries and Wildlife "Recommended Performance Standards for Inland Waterfowl and Wadingbird Habitats in Overhead Utility ROW Projects", "Recommended Performance Standards for Maine's Significant Vernal Pools in Overhead Utility ROW Projects", and "Recommended Performance Standards for Riparian Buffers in Overhead Utility ROW Projects", all dated March 26, 2012, which copies are attached to this lease, or the publication's most current version.

h. Lessee shall not kindle any outside fires on the Premises or any other land of the Lessor, except in accordance with applicable federal, state and local regulations, and hereby agrees to assist with any means at Lessee's disposal in putting out fires occurring on the Premises or adjacent areas, and to report promptly such fires to Lessor or its representative and to the appropriate authorities.

i. Lessee agrees to maintain the Premises in a neat and sanitary manner and to provide for proper disposal of all garbage, trash, septic (for purposes of this Lease, "septic" shall mean, but is not limited to, sewage, wash water, black water, gray water and slop water), and other waste in compliance with all applicable federal, state and local laws and in a manner so as not to be objectionable or detract from the aesthetic values of the general area. Lessee shall not discharge any untreated or partially treated sewage or other waste materials directly or indirectly into any body of water including but not limited to, any wetland, stream, river, lake, pond, or

groundwater. In addition, Lessee covenants that it bears the responsibility for any noncompliance with all federal, state and local laws and regulations governing septic and other waste disposal resulting from Lessee's activities and Lessee shall indemnify and hold harmless Lessor from and against any and all actions, suits, damages and claims by any party by reason of noncompliance by Lessee with such laws and regulations. Such indemnification shall include all Lessor's costs, including, but not limited to reasonable attorney fees.

j. No non-forest waste including, but not limited to, broken equipment, spilt fuels, fluids and lubricants, fluid and lubricant containers, equipment parts, tires, debris, garbage, or trash shall be deposited, discharged, dumped or buried upon the Premises. Forest woody waste (e.g., wood chips and stumps) may be disposed of on the premises, but may not be disposed of in piles. Stumps shall be buried in "stump dump" holes, except that small numbers of stumps (four or less) may be left aboveground. All non-forest waste shall be disposed of legally and not on property of Lessor.

k. Lessee shall not build permanent roads on the Premises without obtaining prior specific written permission from the Lessor; provided, however, that Lessee may construct a minimal number of temporary roads and trails to facilitate the construction of the transmission line (tree clearing, pole setting, wiring). At the time construction is completed, all temporary roads and trails shall be dismantled and put to bed or converted to permanent access trails. All access trails shall be built to Best Management Practices (BMP) standards as shown in the "Maine Motorized Trail Construction and Maintenance Manual" written by the Bureau of Parks and Lands Off-Road Vehicle Division, dated May 2011 and all roads shall be built pursuant to those Best Management Practices (BMPs) standards pertaining to forest management and road construction practices set forth in the publication entitled, "Best Management Practices for Forestry: Protecting Maine's Water Quality," prepared by the Maine Department of Agriculture, Conservation and Forestry, Maine Forest Service, in such publication's most current version at the time of the grant of this lease, and as the same may be further amended, supplemented or replaced after the date of the execution of this lease.

   Prior to start of construction, Lessee shall provide an Access and Maintenance Plan to Lessor for review and approval. This plan shall provide details and maps on proposed roads, permanent and temporary, access points, temporary trails, inspection, and maintenance access, and descriptions of any proposed bridges, temporary or permanent.

l. Natural Plant Community, wetland and Significant Vernal Pool field surveys of the Premises must be conducted by Lessee or Lessee's designee prior to any construction on the Premises. Lessee shall send to Lessor and to the Maine Department of Inland Fisheries and Wildlife a copy of all completed surveys before commencing any construction on the Premises.

m. Lessee shall be in compliance with all Federal, State and local statutes, ordinances, rules, and regulations, now or hereinafter enacted which may be applicable to Lessee in connection to its use of the Premises. Lessee further shall

not construct, alter or operate the described Premises in any way until all necessary permits and licenses have been obtained for such construction, alteration or operation. Lessee shall provide written confirmation that Lessee has obtained all material permits and licenses to construct and operate the Facilities. Lessee shall furnish Lessor with copies of all such permits and licenses, together with renewals thereof to Lessor upon the written request of Lessor. This lease shall terminate at the discretion of the Lessor for failure of Lessee to obtain all such required permits. Prior to such termination, however, Lessor shall provide written notice to Lessee of such failure and Lessee shall have 30 days in which to cure such failure.

n. In the event of the following:

a) Lessee constructs an electric transmission line on the Premises; and
b) Lessee has determined, in its sole discretion, to rebuild the existing transmission line (the "Jackman Tie Line") located on that part of the existing 100-foot wide utility corridor described in a lease dated July 9, 1963 and recorded in the Somerset County Registry of Deeds, Book 679, Page 37 (the "Jackman Tie Line Lease") that is located westerly of the Premises and easterly of Route 201; and
c) Lessee receives all permits and regulatory approvals necessary to rebuild the line in such new location including, but not limited to, approvals of the Maine Public Utilities Commission and the Maine Department of Environmental Protection; then

Lessee agrees to relocate said Jackman Tie Line from the above described portion of the Jackman Tie Line Lease to a location on the Premises and such other corridor as acquired by the Lessee from others. Upon completion of any such relocation of the Jackman Tie Line or its functional replacement pursuant to this section and removal of Lessee's facilities from that portion of the Jackman Tie Line Lease lying westerly of the Premises, Lessor and Lessee agree to amend the Jackman Tie Line Lease to delete from the lease area that portion of the Jackman Tie Line Lease lying westerly of the Premises. All other terms and conditions of the Jackman Tie Line Lease shall remain in full force and effect. The term "rebuild" as used in this paragraph, shall not include routine repair or replacement of poles, crossarms, insulators, braces or conductor.

7. Liability and Insurance.

a. Lessee shall without unreasonable delay inform Lessor of all risks, hazards and dangerous conditions caused by Lessee which are outside of the normal scope of constructing and operating the Facilities of which Lessee becomes aware of with regards to the Premises. Lessee assumes full control of the Premises, except as is reserved by Lessor herein, and is responsible for all risks, hazards and conditions on the Premises caused by Lessee.

b. Except for the conduct of Lessor and Lessor's guests and agents, Lessor shall not be liable to Lessee for any injury or harm to any person, including Lessee, occurring in or on the Premises or for any injury or damage to the Premises, to any property of the Lessee, or to any property of any third person or entity. Lessee shall indemnify and defend and hold and save Lessor harmless, including, but not limited

to costs and attorney fees, from: (a) any and all suits, claims and demands of any kind or nature, by and on behalf of any person or entity, arising out of or based upon any incident, occurrence, injury, or damage which shall or may happen in or on the Premises that is caused by the Lessee or its Agents; and (b) any matter or thing arising out of the condition, maintenance, repair, alteration, use, occupation or operation of the Premises, the installation of any property thereon or the removal of any property therefrom that is done by the Lessee or its Agents. Lessee shall further indemnify Lessor against all actions, suits, damages, and claims by whoever brought or made by reason of the nonobservance or nonperformance of Lessee or its Agents of: (a) any obligation under this Lease; or (b) any federal, state, local law or regulation pertaining to Lessee's use of the Premises.

c. The Lessee shall obtain and keep in force, for the duration of this lease, a liability policy issued by a company fully licensed or designated as an eligible surplus line insurer to do business in this State by the Maine Department of Professional & Financial Regulation, Bureau of Insurance, which policy includes the activity to be covered by this Lease with adequate liability coverage over at least one million dollars for each occurrence and two million dollars in annual aggregate in general commercial liability coverage to protect the Lessee and the Lessor from suits for bodily injury and damage to property. Nothing in this provision, however, is intended to waive the immunity of the Lessor. Upon execution of this Lease, the Lessee shall furnish the Lessor with a certificate of insurance as verification of the existence of such liability insurance policy.

8. Lessee's Liability for Damages. Lessee shall be responsible to Lessor for any damages caused directly or indirectly by Lessee or its guests, servants or agents, including, but not limited to, interference or meddling with any tools, machinery, equipment, gates, buildings, furniture, provisions or other property of the Lessor on the Premises, its agents, employees or guests.

9. Tax Proration. Lessee shall pay when due all taxes levied on the personal property and improvements constructed by Lessee and located on the Premises. Lessor shall be responsible for any real property taxes levied on the Premises based on unimproved land. Lessor shall have no ownership or other interest in any of the Facilities on the Property and Lessee may remove any or all of the Facilities at any time.

10. Lease Assignment, Sublease and Colocation: Lessee shall not assign or sublease in whole or part without prior written consent of Lessor, which consent shall not be unreasonably withheld. Lessor may lease the Premises for other compatible uses and colocation of other utilities so long as such rights do not extend to access to the Facilities, said uses will not prohibit the Lessee from complying with the conditions or requirements imposed by permitting agencies, and such use will not interfere with the rights herein conveyed, including the right to build such additional Facilities as may be accommodated on the Premises using transmission line spacing standards approved by the Maine Public Utilities Commission.

11. Lessee's Removal of Structures: Lessee must obtain Lessor's advance written consent, which consent shall not be unreasonably withheld, delayed, or conditioned, to the method of removal before any structures or improvements are removed from the Premises.

12. Surrender. Upon termination of this Lease for any reason, Lessee shall deliver the Premises to Lessor peaceably, without demand, and in reasonably good condition clear of all trash and debris, unusable equipment, unregistered vehicles and abandoned equipment and structures, located on the Premises by Lessee or its Agents. If such trash and debris and other unusable equipment, unregistered vehicles, and abandoned equipment and structures are not removed within one hundred eighty days (180) days of the termination of this Lease, the Lessor shall thereafter have the right to remove it and Lessee shall reimburse Lessor for the costs of such removal and disposal. Any other personal property, fixture, or structure on the Premises belonging to Lessee shall be removed by Lessee, unless Lessor requests in writing, that the other personal property, fixture, or structure may remain and Lessee agrees in writing not to remove it. If the Lessee fails to remove such other personal property, fixture, or structure such items shall be deemed the property of the Lessor two hundred and ten days (210) days after termination of the Lease and the Lessor shall thereafter have the right to remove it and charge the Lessee with the costs of such removal and disposal. In the event that any of this other personal property, fixtures, or structures on the Premises are incapable of being removed within one hundred eighty days (180) days, Lessee may be allotted up to one year to remove the items, with prior written approval from Lessor, which approval shall not be unreasonably, delayed, or conditioned. Any holding over by Lessee without Lessor's prior written consent shall be considered a tenancy at sufferance.

13. Default.

a. The following constitutes a default under this Lease: (1) Lessee's failure to perform any of its monetary or nonmonetary obligations under this Lease; (2) the filing of any bankruptcy or insolvency petition by or against Lessee or if Lessee makes a general assignment for the benefit of creditors which is not resolved or withdrawn within 30 days of such petition being filed; (3) an execution, lien, or attachment issued against the Lease, the Premises, or Lessee's property on the Premises, unless Lessee provides Lessor with satisfactory assurances and evidence that such execution, lien, or attachment will be released within a reasonable time not to exceed ninety (90) days, unless a shorter period of time is provided for by any applicable law or proceeding for the removal thereof, in which case the more restrictive time limitation applies; (4) the assignment or sublease of this lease to any third party without Lessor's prior written consent; or (5) the violation of any state, federal or local law, rule, regulation, or ordinance; or (6) Lessee's abandonment of the leased premises.

b. Upon the occurrence of any such event of default and subject to any applicable cure period as defined in paragraph 6(m), above, Lessor may, in addition to (and not instead of) any other remedies available at law or in equity, terminate this lease with notice or demand to Lessee and enter and take possession of the leased premises. Lessee shall be liable to Lessor for loss and expense, including reasonable attorney fees, incurred by reason of such default or termination hereof Lessor will provide Lessee with written notice of an event or occurrence of default under paragraph 13(a)(1) and Lessee shall have a reasonable period of time, as determined by Lessor, to cure said default which period shall not exceed thirty (30) days; provided, however, that if Lessee satisfies to Lessor that Lessee has

undertaken the appropriate actions to cure said default and such default has not been cured within the said time permitted, the Lessor may exercise its sole discretion to extend the cure period.

14. Statutory Authority Over Public Lands. Lessor shall have the right to request that this Lease be amended from time to time and throughout the term of this lease in the event that any Lease term is found not to comply with Maine state law regarding the lease of property under 12 M.R.S. § 1852(4). Lessor shall send notice to Lessee of the proposed revision. Upon receipt of such notice, Lessee shall have the option to either terminate the Lease by notifying Lessor in writing within thirty (30) days of receipt of notice or negotiate an amendment to the Lease in order to bring such term in compliance with said state law. Except as provided in this Lease, neither Party shall have the right to terminate this lease unless the resulting non-compliance constitutes a default under Section 13 hereof, in which case Section 13 shall govern.

15. Mechanics Lien. If any notice is filed at the county registry of deeds of a builder's, supplier's or mechanic's lien on the Premises, arising out of any work performed by or on behalf of Lessee, Lessee shall cause such lien to be discharged or released immediately and shall indemnify Lessor against any such claim or lien, including all costs and attorney fees that Lessor may incur in connection with the same.

16. Succession; No Partnership. This Lease shall be binding upon and inure to the benefit of the heirs, executors, administrators, successors in interest and assigns of the parties hereto. Nothing in this agreement shall be construed to create an association, joint venture, trust or partnership covenant, obligation, or liability on or with regards to any of the parties to this agreement.

17. Waiver. Any consent, express or implied, by Lessor to any breach by Lessee of any covenant or condition of this Lease shall not constitute a waiver by the Lessor of any prior or succeeding breach by Lessee of the same or any other covenant or condition of this Lease. Acceptance by Lessor of rent or other payment with knowledge of a breach or default by Lessee under any term on this Lease shall not constitute a waiver by Lessor of such breach or default.

18. Force Majeure. Except as expressly provided herein, there shall be no abatement, diminution, or reduction of the rent or other charges payable by Lessee hereunder, based upon any act of God, any act of the enemy, governmental action, or other casualty, cause or happening beyond the control of the parties hereto.

19. Eminent Domain. In the event that the Premises or any portion thereof shall be lawfully condemned or taken by any public authority, Lessor may, in its discretion, elect either: (a) to terminate the Lease; or (b) to allow this Lease to continue in effect in accordance with its terms, provided, however, that a portion of the rent shall abate equal to the proportion of the Premises so condemned or taken. All condemnation proceeds shall be Lessor's sole property without any offset for Lessee's interests hereunder.

20. Holding Over. If Lessee holds over after the termination of this Lease, said hold over shall be deemed to be a trespass.

21. Lessor Protection. Lessor expressly retains and nothing contained herein shall be construed as a release or limitation by Lessor of any and all applicable liability protections under Maine law. Lessor specifically retains any and all protections provided under Maine law to owners of land, including but not limited to those provided under the Maine Tort Claims Act, 14 M.R.S.A. §§ 8101-8118.

22. Cumulative Remedies. The remedies provided Lessor by this Lease are not exclusive of other remedies available by current or later existing laws.

23. Entire Agreement. This Lease sets forth all of the covenants, promises, agreements, conditions and understandings between Lessor and Lessee governing the Premises. There are no covenants, promises, agreements, conditions, and understandings, either oral or written, between them other than those herein set forth. Except as herein provided, no subsequent alterations, amendments, changes, or additions to this Lease shall be binding upon the Lessor or Lessee unless and until reduced to writing and signed by both parties.

24. Notices. All notice, demands, and other **communications** required hereunder shall be in writing and shall be given by first class mail, postage prepaid, registered or certified mail, return receipt requested; if addressed to Lessor, to:

State of Maine, Department of Agriculture, Conservation and Forestry, Division of Parks and Lands,
22 State House Station, Augusta, ME 04333-0022, Attn: Director;

and if to Lessee, to;

Central Maine Power Company, Real Estate Services
83 Edison Drive, Augusta, Maine 04364, Attn. Supervisor, Real Estate

25. General Provisions:

a. Governing Law. This Lease shall be construed and interpreted in accordance with the laws of the State of Maine.

b. Savings Clause. The invalidity or unenforceability of any provision of this Lease shall not affect or impair the validity of any other provision. To the extent any provision herein is inconsistent with applicable state statute, the statute is deemed to govern.

c. Paragraph Headings. The paragraph titles herein are for convenience only and do not define, limit, or construe the contents of such paragraph.

IN WITNESS WHEREOF, the parties have hereunto set their hands the day and year first above written. For purposes of this Lease, a facsimile signature shall be deemed an original.

Lessor:

STATE OF MAINE
Department of Agriculture, Conservation, and Forestry
Bureau of Parks and Lands

By: Thomas Morrison
Thomas Morrison Acting Director

Dated: Dec 15, 2014

David Bodrigues
Witness

Lessee:

CENTRAL MAINE POWER COMPANY

BY: Mary R. Smith
Mary R. Smith, Authorized Representative

Dated: 12-8-14

Roberta B. Holahan
Witness

ROBERTA B. HOLAHAN
Notary Public, State of New York
No. 01HO6040322
Qualified in Monroe County
Commission Expires April 17, 2018

EXHIBIT A

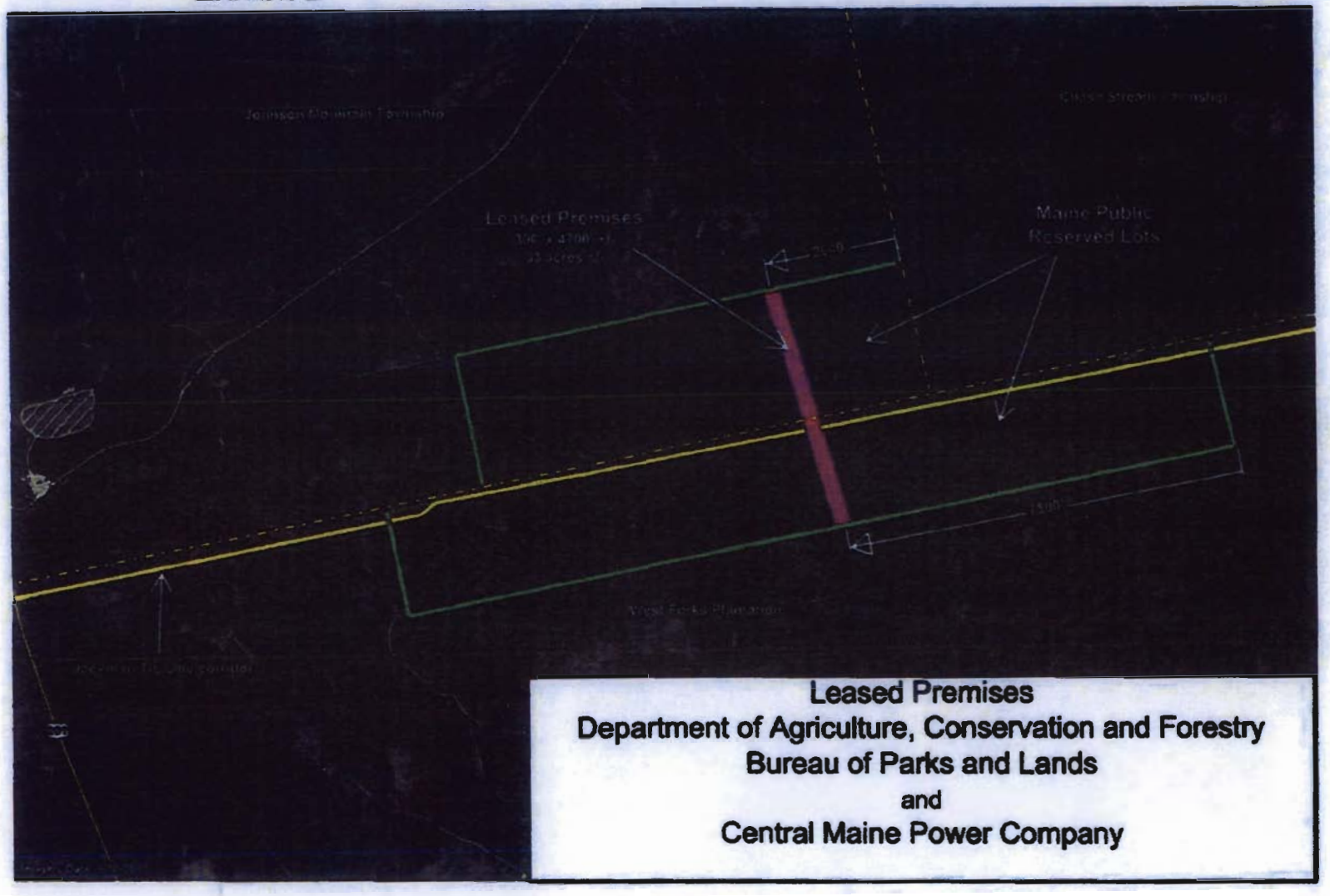
Leased Premises
Department of Agriculture, Conservation and Forestry
Bureau of Parks and Lands
and
Central Maine Power Company

A non-exclusive lease over a portion of the Lessor's land located in Johnson Mountain Township (T2 R6 BKP WKR), and West Forks Plantation, Somerset County, Maine, more particularly described as follows:

A strip of land 300 feet in width beginning at the southerly line of the Maine Public Reserved Lot located on the northerly line of West Forks Plantation and extending northerly a distance of 4700 feet, more or less, to the northerly line of the Maine Public Reserved Lot located on the common line between West Forks Plantation and Johnson Mountain Township (T2 R6 BKP WKR). The centerline of said strip beginning at a point on the southerly line of the Lessor's land at a point that is 7,500 feet westerly of the southeasterly corner of said Lot in West Forks Plantation; thence on a bearing of 342.2 degrees a distance of 4,700 feet, more or less, to a point on the northerly line of said Lot in Johnson Mountain Township, said point being 2640 feet, more or less, westerly of the northeast corner of said Lot and the east line of Johnson Mountain Township; said leased area containing 33 acres, more or less (the "Leased Premises").

The description of the Leased Premises is based on a current conceptual design of the Lessee's proposed transmission line corridor and may be subject to modification by Lessee to minimize impacts on environmentally sensitive areas. Lessor and Lessee agree that upon completion of environmental assessments, final engineering, and if applicable, any survey prepared by Lessee, Lessee will prepare a final description of the Leased Premises to be incorporated into this Lease. Lessor and Lessee further agree that the final alignment of the transmission line corridor will be substantially as described herein and any significant deviation from the above described line will be agreed to in writing by Lessor and Lessee.

Exhibit B



Leased Premises
Department of Agriculture, Conservation and Forestry
Bureau of Parks and Lands
and
Central Maine Power Company

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6.0 VISUAL QUALITY AND SCENIC CHARACTER

6.1 INTRODUCTION

The New England Clean Energy Connect Project (NECEC) is a High Voltage Direct Current ("HVDC") transmission line and related facilities project with the capacity to deliver up to 1,200 MW of electric generation starting at the Canadian Border in Beattie Township (Twp) and connecting to the New England Control Area through the new Merrill Road Converter Station and existing Larrabee Road Substation in Lewiston, Maine.

The project is composed of five segments. Segment 1 includes 53.5 miles of new HVDC transmission line corridor within a 150' wide cleared corridor within a 300' right-of-way supported by single pole self-weathering steel structures with an average height of 100'. The new HVDC transmission line corridor will be located in Beattie TWP, Lowelltown Twp, Skinner Twp, Appleton Twp, T5 R7 BKP WKR, Bradstreet TWP, Parlin Pond Twp, Johnson Mountain Twp, West Forks Twp, Moxie Gore, and The Forks
Plantation (Plt).

Segment 2 includes the northern portion (22+/- miles) of HVDC transmission line to be co-located within an existing 115kV transmission line corridor between the southern end of Segment 1 near the north end of Moxie Pond in The Forks Plt, through the towns of Caratunk and Bald Mountain TWP T2 R3, to the Wyman Hydroelectric Facility located in Moscow. The co-located section will require the existing 150' wide corridor clearing to be widened by 75' on the western side with the exception of a small section near the former Moscow Radar Station which will be widened by 75' on the east side. The northern portion of the co-located HVDC transmission line along Moxie Pond and in the vicinity of the Appalachian Trail crossing, will be supported by single pole self-weathering steel structures ranging from 75' to 105 in height. The structures on the southern portion of Segment 2 will be single pole self-weathering steel structures with an average height of 100'.

Segment 3 will include 70+/- miles of the co-located HVDC transmission line from the Wyman Hydroelectric Facility in Moscow, through the towns of Concord Plt, Embden, Anson, Starks, Industry, New Sharon, Farmington, Wilton, Chesterville, Jay, Livermore Falls, Leeds, Greene, to

the new 345kV AC to +/-320kV HVDC 1200 MW Merrill Road Converter Station, just north of Larrabee Road Substation in Lewiston. The existing corridor clearing ranges between 150' and 225' in width for the majority of Segment 3, except for a 400' wide 1.1 mile long section ending at the Livermore Falls Substation. The co-located section will require the existing cleared corridor to be widened by 75' on the western side. The Converter Station and Larrabee Road Substation will be connected by a new 1.2-mile 345kV AC Transmission Line (Section 3007). In proximity to the Larrabee Road Substation there will be a partial rebuild of 0.8 miles of 34.5kV transmission line (Section 72) to accommodate the connecting segment of 345kV transmission line and the installation of a new 345kV transmission line terminal. The structures in Segment 3 will be single pole self-weathering steel structures with an average height of 100'.

Segment 4 will include a new 345kV STATCOM Substation off Fickett Road in Pownal and a 0.3 mile 345kV AC Transmission Line (Section 3005)connection from this facility to the Surowiec Substation. In addition, two 115kV transmission lines will be rebuilt: the 9.3 mile Section 62 between Crowley's Substation in Lewiston and Surowiec Substation in Pownal, and the 16.1 mile Section 64 between Larrabee Road Substation and Surowiec Substation. The typical 45' wooden H-frame structures will be replaced with 75' wooden single pole structures. Both rebuilt sections are located in the towns of Lewiston, Auburn, Durham and Pownal.

Segment 5 will include a new 26.5-mile 345kV AC Transmission Line (Section 3027) from the existing Coopers Mills Substation in Windsor to the existing Maine Yankee Substation in Wiscasset; partial rebuild of a 0.3 mile segment of the 345kV (Section 3025) transmission line between Larrabee Road Substation and Coopers Mills Substation; partial rebuild a 0.8 mile segment of 345kV (Section 392) transmission line between Maine Yankee Substation and Coopers Mills Substation; approximately 3 miles of re-conductor work on existing double circuit lattice steel towers outside of Maine Yankee; and a partial rebuild of a 0.8 mile segment 115kV transmission line (Section 60/88) outside of Coopers Mills Substation. Segment 5 is located in the towns of Windsor, Whitefield, Alna, Woolwich, and Wiscasset.

Several substations constructed or upgraded as part of the Maine Power Reliability Program (MPRP) will also require additional equipment installation as part of the NECEC Project including the Larrabee Road and Crowley's Substations in Lewiston, the Surowiec Substation in

Pownal, the Coopers Mills Substation in Windsor, the Maine Yankee Substation in Wiscasset and the Raven Farm Substation in Cumberland.

A Visual Impact Assessment (VIA) has been prepared by Terrence J. DeWan & Associates (TJD&A) for each segment and substation where visible changes will occur using standard visual impact assessment methodologies. Each VIA follows the methodology and standards described in the Maine Department of Environmental Protection's (MDEP) Natural Resources Protection Act (NRPA) Chapter 315 regulations as well as addressing the standards in the Site Location of Development Law Chapter 375.14 (Scenic Character). This is generally the same format that was used for Central Maine Power's MPRP.

The NRPA and Chapter 315 require an applicant to demonstrate that a proposed activity will not unreasonably interfere with existing scenic and aesthetic uses of a scenic resource and only apply to activities in, on, over, or adjacent to a protected natural resource.[1] More broadly, the Site Law and Chapter 375.14 require an applicant to demonstrate that the development will not have an unreasonable adverse effect on the scenic character of the surrounding area.[2] Potential impacts to identified scenic resources, and other points of local sensitivity, have been assessed within each segment. A summary of scenic resources within the APE are included as **Tables** in each Section.

Updates to the assessment methodology since the completion of MPRP include expanding the project Study Area viewshed or "Area of Potential Effect" (APE) from <u>one</u> mile on all sides beyond the new or upgraded transmission lines and substations to <u>three</u> miles on all sides beyond the new or upgraded transmission lines and substations and up to five miles beyond the Project for elevated viewpoints within the viewshed. A viewshed analysis was also completed for the entire five mile APE. This APE was reviewed by MDEP staff on July 19, 2017 prior to developing the VIA.

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[1] A Scenic Resource is a public natural resource or public land visited by the general public, in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities. The attributes, characteristics, and features of the landscape of a scenic resource provide varying responses from and varying degrees of benefits to, humans. *Chapter 315, Maine Department of Environmental Protection*.

[2] Applicants are required to provide evidence that 1) the design of the proposed development takes into account the scenic character of the surrounding area; 2) development which is not in keeping with the surrounding scenic character will be located, designed and landscaped to minimize its visual impact to the fullest extent possible, and 3) structures will be designed and landscaped to minimize their visual impact on the surrounding area. *Chapter 375.14.*

Throughout this assessment, all references to rebuilding transmission lines are limited to the NRPA application. Rebuilt lines are exempt from review under the Site Law, 38 M.R.S. § 488.

6.1.1 Data Collection

TJD&A conducted field evaluations, photographed existing conditions, prepared viewshed analyses and prepared the visual impact assessments for each of the transmission line segments and substations. TJD&A staff collected field data by driving, walking, hiking, boating, flying (float plane) and photographing the Study Area in order to assess visibility from public roads, trails, conservation lands, waterbodies and viewpoints. Specific field evaluation dates are noted in each segment report.

Photographic documentation was completed by TJD&A for all locations except the Kennebec River Gorge (referred to hereafter as the "Kennebec Gorge"), which was documented by POWER Engineers.

Other data sources include the United States Geological Survey (USGS) maps; substation grading plans, 3D PLS CADD models , and cross-sections and elevations provided by POWER Engineers; Maine Office of GIS website; maps and documentation from the comprehensive plans from individual towns; Land for Maine's Future website; Maine Department of Agriculture, Conservation and Forestry (MDACF) websites for State Parks, Wildlife Refuges, Maine Department of Inland Fisheries & Wildlife (MDIFW) Lake Survey Maps, Interconnected Trail Systems (ITS); Maine Land Use Planning Commission; National Park Services' National Natural Landmark website; The Nature Conservancy; The Trust for Public Land; The Forest Society of Maine; local/regional land trusts; sites listed on the National or State Register of Historic Places; Maine Lakes Study; Maine Wildlands Lake Assessment; Maine Rivers Study; DeLorme Atlas and Gazetteer; Google Earth, Maine Trail Finder; and other secondary data sources.

6.1.2 Project Study Area

Site Context

For each segment VIA, the physical context is described in terms of the land use, vegetation patterns, land form, and water bodies adjacent to the transmission line corridor or substation site.

The narrative evaluates existing vegetative buffers where present and their effectiveness in screening the facilities within the corridor from nearby land uses and scenic resources. Representative photographs are included for each segment to supplement the narrative and provide context within the viewshed. See Appendix B. In keeping with MEDEP policies, the VIAs have concentrated on views from publicly accessible viewpoints, primarily roads, trails, public lands, and water bodies.

Distance Zones

The concept of distance zones is based upon the United States Department of Agriculture (USDA) Forest Service's visual analysis criteria for forested landscapes and on the amount of detail that an observer can differentiate at varying distances. The distance zones used for the study of the NECEC Project are defined as:

Foreground (0 to 1/2 mile in distance): Within this distance zone, observers are able to detect surface textures, details, and a full spectrum of color. The majority of public views described in the VIA are in the foreground where transmission lines cross public roads, streams, rivers or where substations are adjacent to public roads, or other scenic resources.

Midground (1/2 mile to 3 miles in distance): In the midground, the details found in the foreground become subordinate to the patterns observed in the larger landscape as a whole. In panoramic views, the midground landscape is the most important element in the composition in determining visual impact. Transmission lines are part of the midground landscape in several situations, such as when approaching a road crossing adjacent to open fields, when seen from an elevated viewpoint, or when seen crossing hillsides above the viewer's location.

Background (greater than 3 miles): Changes to the landscape seen at this distance are highly visible only if they present a noticeable contrast in form or line. There are elevated viewpoints where the new and existing transmission line corridor clearings will be visible in the background. The effects of atmospheric haze can also significantly reduce visibility of clearings and structures.

6.1.3 Inventories of Scenic Resources within the Viewshed

A MDEP Visual Evaluation Field Survey Checklist for Scenic Resources has been completed for each transmission line segment and substation (**Figures 6-1 through 6-5**). Background information has been added to the checklist for any scenic resources or other visually sensitive areas within the viewshed of the transmission line corridors and substations.

6.1.4 Viewshed Analysis Methodology

A viewshed analysis was prepared to identify locations within the Project Study Area where potential visibility of any portion of one or more proposed transmission structures could occur. The analysis was used to guide fieldwork to areas of potential visibility of the Project from scenic resources and other visually sensitive areas within the viewshed. Two types of viewshed analysis were created. A topographic viewshed analysis was prepared using Digital Elevation Model (DEM) from the USGS National Elevation Data (NED) website. This data was used to develop a DTM (Digital Terrain Model) ground surface model for the entire five mile Study Area. Transmission structures were provided by POWER Engineers with an elevation and structure height and configuration. The visibility command found in Spatial Analysis Extension for ArcMAP was then used to determine areas where the structures could be visible from within the Study Area. The topographic viewshed analysis does not account for the screening effects of vegetation but it does provide a baseline understanding of where there is no possible Project visibility due to the screening effects of topography.

To gain a more realistic understanding of potential project visibility, an additional viewshed analysis was prepared to show the effect of tree cover on Project visibility. The DTM surface was converted to a DSM (Digital Surface Model) using Maine Land Cover Data Classifications from the Maine Office of GIS. A landcover height raster was developed using specific heights for land covers in the Study Area. (See note on Viewshed Maps for actual landcover heights.) This raster file was overlaid on the base map to indicate where it is not likely to have Project visibility due to the screening effects of 40’ tall vegetation.

All work was performed using ESRI ArcMap Software, Version 10.5, Basic Edition with 3D and Spatial Analyst extensions. See Appendix C: Viewshed Maps.

Fieldwork and additional 3D Modeling was used to confirm the potential for Project visibility. See Appendix B for Study Area photographs.

6.1.5 Study Area Photographs

Representative photographs of each Study Area are provided in Appendix B. The location of the photographs are indicated on the Study Area Maps found in Appendix A. The Study Area photos are organized by Maps 1 – 12. Photos for Segment 1 are found on Maps 1-3; Segment 2 photos on Maps 3 and 4; Segment 3 photos on Maps 5-9; Segment 4 photos on Maps 9 and 10; and Segment 5 photos on Maps 11 and 12. The photographs are provided to document the field study, supplement the narrative, and provide additional context images for the photosimulation locations.

6.1.6 Photosimulations

Photosimulations (computer-altered photographs) have been prepared to illustrate the anticipated changes to the new and co-located transmission line corridors and the surrounding landscape. The simulations concentrate on scenic resources that may be affected by the Project. A total of 32 key observation points (KOPs) from scenic resources and locally sensitive resources were selected for the development of photosimulations to illustrate the 'worst case' visibility and potential visual impact of the proposed Project. A summary of selected KOPS for Photosimulations are included in **Table 6-1.** The Photosimulations are found in Appendix D.

Photographs used in the photosimulations were taken during field work with either a Nikon D7100 or Nikon D5500 digital camera, set to shoot at a focal length equivalent to a 50 mm ('normal') lens. Photographs from the Kennebec Gorge were taken by POWER Engineers using a Canon EOS 5D Mark III. The locations of all photographs were recorded with a GPS unit which allowed the image to be registered in the computer model.

The photosimulations of the proposed Project were prepared by 1) creating a three dimensional DTM model base of the study area landscape using National Elevation Data from USGS; 2) inserting three dimensional models of the structures generated in PLS CADD provided by Power Engineers into the base model; 3) aligning the computer model of the Project with GPS located photographs in 3D Studio Max; 4) rendering a simulated perspective of the Project using 3D

Table 6-1. Summary of Photosimulations

#	PHOTOSIMULATION	VIEWPOINT LOCATION
Segment 1		
1	Beattie Pond, Lowelltown Twp	From northern end of pond looking south
2	Wing Pond, Lowelltown Twp	From northern end of pond looking south
3	Rock Pond, T5 R6 BKP WKR	From southeast side of pond looking north,
4	No 5 Mountain,T5 R7 BKP WKR	Summit of mountain within Leuthold Preserve
5	Fish Pond, Hobbstown Twp	From southern end of the pond looking northwest
6	Attean View Rest Area, Jackman	Route 201, looking southwest
7	Parlin Pond, Parlin Pond Twp	Looking southwest from the north east end of pond
8	Coburn Mtn, Upper Enchanted Twp.	From summit looking southeast
9	Route 201, Johnson Mountain Twp	From intersection of Judd Road at Route 201
10	Kennebec Gorge, Moxie Gore	On Kennebec River looking southwest from picnic area
11	Kennebec Gorge, Moxie Gore	On Kennebec River looking north from picnic area
12	Moxie Stream, Moxie Gore	From the north side of the stream, looking west
Segment 2		
13	Moxie Pond north, East Moxie Twp	Looking southwest from northern end of Moxie Pond
14	Moxie Pond north, East Moxie Twp	Continued pan from northern end of Moxie Pond
15	Moxie Pond south, Bald Mtn Twp T2 R3	Looking west from southern end of Moxie Pond
16	Mosquito Mountain, The Forks Plt	Looking northeast from eastern overlook
17	Mosquito Mountain, The Forks Plt	Continued pan looking southeast from eastern overlook
18	Troutdale Road, The Forks Plt.	Looking southeast from road within existing corridor
A	Appalachian Trail – Pleasant Pond Mountain, The Forks, Plt	230’ southeast of surveyed from summit
B	Appalachian Trail - Troutdale Rd, Bald Mtn Twp	On trail within existing corridor looking towards Joe's Hole
C	Appalachian Trail - Bald Mountain, Bald Mountain Twp	From summit
Segment 3		
19	Route 201, Moscow	From existing transmission line crossing, near Wyman Hydro
20	Wyman Lake Recreation Area, in Pleasant Ridge Plt	Looking northeast from beach toward dam
21	Route 8, Anson	Looking north in existing transmission line crossing
22	Route 2, Farmington	Looking south in existing transmission line crossing
23	Androscoggin Riverlands State Park, Leeds	Looking south in existing transmission line crossing
24	Merrill Road, Lewiston	Looking north from existing transmission line crossing
Segment 4		
25	Riverside Drive, Auburn	Looking north across Androscoggin River
26	Fickett Road Substation, Pownal	Looking southwest from Fickett Road towards proposed substation
Segment 5		
27	Route 194, Whitefield	Looking south in existing transmission line crossing
28	Route 27, Wiscasset	Looking north in existing transmission line crossing
29	Route 1, Wiscasset	Looking south in existing transmission line crossing

Studio Max; and 5) exporting image into Photoshop and merging with 'normal' photographs to create a photorealistic representation of the Project. The alteration of vegetation to reflect new or widened corridor clearings was completed in Photoshop based on limit of clearing information provided by Power Engineers.

Existing and proposed conditions photosimulations were created for each viewpoint to accurately represent the proposed changes based on "normal" focal length. For the cameras used, a "normal" view includes a horizontal field of view of 37.26 degrees. In evaluating the photosimulations, the reviewer should view the 'normal' images approximately 19.5" from a screen set at viewing 100% or 11"x17" hard copy, to approximate the actual view.

Panoramic views were also created for each viewpoint by using several 'normal' photographs 'stitched' together in Photoshop. The panoramic images provide a more contextual view of the landscape and are included for reference as the title page for each location. Each title page includes an aerial image location map, a context map, a typical cross section and photosimulation information including location, viewing direction, angle of view, date and time of photograph, camera focal length, camera type, photo source, proposed number of structures visible, and approximate distance to the nearest visible structure (or corridor clearing).

6.1.7 Affected Population/ User Expectations/Continued Use and Enjoyment

Several groups of people may be affected by the proposed Project. Most already see or come into contact with transmission lines and substations at different times during the year. The level of sensitivity to the visual changes that may result from the NECEC Project is site specific and will depend on the type and use of the resource, duration of exposure, distance from the Project, and potential mitigation.

Residents

The primary viewing population for most of the Project is the year-round residents who live along the roads that intersect or run along the existing transmission line corridors or those who live within the viewshed of the substations. The majority of the homeowners that may see the transmission line corridors live in rural areas outside of established residential areas. For

substations, particular attention is paid to abutting residential properties. The VIAs describe the number, proximity, orientation, and existing buffers for those homes that may be affected by the upgrades. There are very few residents within the viewshed of Segment 1.

Motorists

This category of users includes local residents, commuting traffic, delivery personnel, and others who use local roads that cross the transmission line corridors as part of their daily routines.

Recreating Population

Several types of recreation occurs within the Project area including snowmobiling, all-terrain vehicle (ATV) riding, camping, boating, fishing, swimming, bird watching, cross-country skiing, snowshoeing, hiking, mountain biking and dog-walking. Several of these types of recreation are enjoyed by people who use existing transmission line corridors or the resources within their viewshed and/or lands surrounding the substations.

Working Population

The working population includes people who are employed throughout northern Maine in commercial timber harvesting, and in central and southern Maine in agriculture, construction, land management activities, trucking, and other occupations that put them in transmission line corridors and/or substation viewsheds more frequently.

6.1.8 Visual Impact Assessments

A VIA has been performed for each transmission line segment and substation of the NECEC. The potential impacts on scenic resources and existing public scenic and aesthetic uses were evaluated within the identified project viewshed. The evaluation is based upon knowledge of the Project gained from fieldwork, viewshed analysis, resource mapping, and a review of the photosimulations and other data sources.

The narrative for each segment and substation follows the MDEP Chapter 315 Regulations, as noted below. MDEP's Basic Visual Impact Assessment Form[3] (VIA Form) is used as a starting

[3] *The Basic Visual Impact Assessment Form is found in MDEP Guidance for Assessing Impacts to Existing Scenic and Aesthetic Uses under the Natural Resources Protection Act. July 20, 2003.*

point to determine the potential visual effect of the Project on resources, based upon an evaluation of the Project's visual elements (*i.e.*, landscape compatibility, scale contrast, and spatial dominance as described in 6.1.8.1). The narrative also includes a description of the scenic significance of scenic resources based on state or local designations in published documents and visual quality observed during field visits (landform, vegetation, water bodies, color, views, human development and character.)

Observations and researched data are provided, when available, to determine the Project's effects on user expectation of scenic quality; extent, nature, duration of public use, and continued use and enjoyment. The following two questions were asked for each identified resource: Will the Project affect the way the scenic resource is currently being used and will it have an effect on the public's enjoyment of the resource?

The sections *in italics* below are quotes from the Chapter 315 Regulations.

Landscape Compatibility

Landscape compatibility, which is a function of the sub-elements of color, form, line, and texture. Compatibility is determined by whether the proposed activity differs significantly from its existing surroundings and the context from which they are viewed such that it becomes an unreasonable adverse impact on the visual quality of a protected natural resource as viewed from a scenic resource. Each sub-element is evaluated for how compatible the change resulting from the NECEC activity will be with its surroundings and whether there will be no, minimal, moderate, strong, or severe contrast.

> This section describes anticipated color contrasts between existing conditions and proposed materials to be used for the Project. In the case of transmission structures, new wooden poles may initially be darker than the existing poles but the contrast will diminish with time as normal aging occurs. Color contrast for new transmission structures in existing transmission line corridors is generally rated as minimal. Moderate contrasts in color may occur in situations that use self-weathering steel transmission structures, which are typically darker in color than wooden poles that have weathered to a light gray color. Where no other structures exist, the self-weathering steel can be more similar in color to surrounding wooded landscape.

Most of the electrical equipment used in substations will be galvanized or painted a silver color, which should match the existing equipment and that of adjacent substations. In the case of Fickett Road Substation the color should be similar to the adjacent Surowiec Substation.

Form: The form (three-dimensional shape) of the transmission structures that are being proposed for the HVDC structures are similar to single pole structures currently found in transmission line corridors upgraded during the MPRP project. The proposed single pole 115kV structures and H-frame 345kV structures are commonly seen in areas where they are proposed for the Project. In most instances, the new transmission structures are expected to result in a minimal contrast in form with the surrounding trees and existing transmission structures. Moderate contrasts in form may result in situations when there is disparity between the existing and proposed transmission structures (*e.g.*, a new HVDC single pole self-weathering steel structure located adjacent to an existing wood H-frame structure).

Line: The VIA describes the projected changes to the transmission line corridor, the conductors, and the transmission structures, all of which are linear elements in the landscape. It also determines if any of the transmission structures (vertical lines) or conductors (horizontal lines) will be seen against the sky from prominent viewpoints or scenic resources. The degree of contrast in line is a function of the distance from the observer, the relative length of the structure that is visible above the horizon, or the magnitude of other new lines introduced into the landscape.

Substations are typically composed of very linear elements – vertical, horizontal, and angular components – in addition to the lines of the conductors entering the facility. In the existing substations where new equipment will be added, there should be minimal to moderate contrast in line, depending upon whether the new components will be visible above the horizon. New substations could have a moderate to strong contrast between the lines found in nature and the lines introduced by the substation.

Texture: The HVDC structures will be single pole self-weathering steel, which has a smoother (and darker) texture than the standard wooden poles. There may be moderate contrasts in texture in situations where the HVDC structures are viewed adjacent to

wooden structures. The standard wooden structures, have a texture similar to the existing H-frame poles and monopoles used throughout the corridors. There is generally no contrast in texture for new transmission structures made of the same material.

The texture of the improved substations should be similar to the existing facilities, so there should be virtually no contrast in texture. In the case of new substations, the electrical equipment could have a moderate to strong contrast in texture with the surrounding vegetation and abutting land uses.

Scale Contrast

Scale contrast is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource.

The VIAs describe the change in scale between the existing and proposed transmission lines, how the transmission structures fit into the maintained corridor, and how the transmission structures relate to the size of trees that line the corridor (where appropriate). The change in scale of the transmission line(s) and corridors resulting from the Project activity is evaluated for the degree of contrast within the surrounding landscape.

The VIA describes the relative size of the new or improved substations in comparison to their surroundings (transmission structures, existing trees, nearby homes or other adjacent land uses). This section also examines whether the components for both new and improved substations will be seen above the surrounding forest cover. In making a final determination of scale contrast for both new and improved substations, the VIA takes into consideration the presence of existing trees, topography, or other natural or man-made features that block the view of the facility. The VIA also recognizes the potential of visual buffer plantings and earthen berms in certain locations to minimize the visual impact of the substations by reducing its visible mass and introducing naturalistic forms in the immediate foreground.

Spatial Dominance

Spatial dominance is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

The VIAs describe whether the proposed transmission line(s) or new or improved substations dominate or are prominent in the whole landscape composition, or are prominently situated within the landscape, or dominates the surrounding landforms, nearby water bodies, or the sky. This section considers the presence or absence of screening vegetation between the viewpoint and the transmission structures or substations, the type and character of viewpoints (both roadside and from scenic resources), and the number of viewers and their respective sensitivity. The dominance of the transmission lines or substations is evaluated for their relative prominence in the landscape: insignificant; subordinate to the surrounding natural and cultural elements in the landscape; co-dominate the landscape; or dominate the landscape, the immediate setting, or the backdrop.

The severity of potential visual impact is determined by professional judgment on the part of TJD&A landscape architects who consider Landscape Compatibility (color, form, line, and texture), Scale Contrast, and Spatial Dominance to determine whether the visual impact will be negligible, moderate, strong, or severe. The evaluation is based upon first-hand knowledge of the specific site; a review of site photography and aerial photographs; Project design parameters for the individual transmission lines (cross-sections, areas of tree clearing) and substations; and photosimulations of the transmission lines. See Appendix B: Study Area Photographs and Appendix D: Photosimulations.

Transmission lines and substations are usually visible from multiple viewpoints and at different viewing distances. To account for this variability, a range of potential visual impacts is often provided (*e.g.*, moderate to strong) in recognition of both the viewer location and site conditions.

6.1.9 Mitigation Strategies

Mitigation is defined as any action taken or not taken to avoid, minimize, rectify, reduce, eliminate, or compensate for actual or potential adverse environmental impact.[4]

Transmission Lines

The primary mitigation measure being employed for Segment 1 is to use self-weathering single poles to minimize visual contrast, especially when viewed from elevated viewpoints and where

[4] *Maine Department of Environmental Protection. Chapter 315: Assessing and Mitigating Impacts to Existing Scenic and Aesthetic Uses. 5.F. Definitions.*

the structure is seen against a wooded backdrop. The new HVDC transmission line corridor is also primarily located in areas of commercial timber production which have been, and continue to be, periodically harvested.

In Segments 2 and 3, the primary mitigation measure being employed is to co-locate the HVDC transmission line adjacent to an existing corridor, rather than acquiring and developing an entirely separate transmission line corridor. This co-location strategy significantly reduces potential visual impacts.

Segment 4 and 5 have been designed to minimize additional clearing and the need for land acquisition by making the most effective use of existing corridors, existing structures, and rebuilding existing transmission lines. New structures will be set back as far from streams, rivers, and other areas of visual/habitat sensitivity as practicable.

There are many areas where favorable growing conditions and CMP's maintenance procedures have resulted in effective stands of non-capable species near the roadside which act as visual buffers. Wherever practicable, existing vegetation will be preserved within the transmission line corridor by careful layout of access roads and monitoring of construction practices during the installation process. No additional roadside buffers are proposed at this time.

Substations

Two main mitigation strategies have been employed in the development of the site plans for the new and improved substations to reduce their potential visual impact and achieve a harmonious balance between the facilities and the surrounding landscape. These include upgrading existing substations (several of which were constructed for MPRP) within the existing facility footprint which minimizes the need for additional clearing. Also, a Buffer Planting Plan will be developed for the areas north and east of the Fickett Road Substation in Pownal to minimize views of the substation. A detailed planting plan will be prepared by the Project landscape architect. The plan will consider specific site conditions to determine the optimum plant species mix. The Merrill Road Converter Station has been sited to avoid visibility from public roads. The preserved vegetation around the station will screen it from view from Merrill Road.

6.1.10 Conclusion

The VIA for each segment demonstrates that the proposed activity meets the standards for visual quality established under Chapter 315 and the Site Law's Chapter 375.14 (*i.e.*, that the proposed activity will not unreasonably interfere with existing scenic and aesthetic uses, that the developer has made adequate provision for fitting the development harmoniously into the existing natural environment, and that the development will not adversely affect scenic character in the surrounding area).

6.2 TRANSMISSION LINES

6.2.1 SEGMENT 1. New HVDC Transmission Line

The project is composed of five segments. Segments 1 includes 53.5 miles of new HVDC transmission line corridor within a 150' wide cleared corridor supported by single pole self-weathering steel structures with an average height of 100'. The new HVDC transmission line corridor will be located in Beattie TWP, Lowelltown Twp, Skinner Twp, Appleton Twp, T5 R7 BKP WKR, Bradstreet TWP, Parlin Pond Twp, Johnson Mountain Twp, West Forks Twp, Moxie Gore, and The Forks Plt.

6.2.1.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 8, 13, 14, 15, 21, and July 25, 26, 2017. Representative views from each road crossing within the Study Area are included in **Appendix B**.

Other data sources include the location, cross sections and structure details provided by Burns & McDonnell (B&McD)and POWER Engineers for the Project; project descriptions and maps from The Nature Conservancy, Maine Bureau of Parks and Lands website, Land for Maine's Future website; LUPC comprehensive plans and zoning ordinances; Northern Forest Canoe Trail website; Holeb Unit Management Plan (DOC 1989); Concept Plan for Attean Township and Dennistown Plantation (1993), National Park Service/National Natural Landmarks website; The Trust for Public Land (Cold Stream Forest); Maine Trail Finder; and Google Earth.

6.2.1.2 Study Area

The Study Area of Segment 1 is mostly located within the Western Mountains Biophysical Region.[5] . This region is characterized as a mountainous landscape with elevations ranging between 2,100' and 3,700'.

The Study Area includes 27 elevated viewpoints (hills and mountains) within 5 miles of Segment 1 as shown in Table 6-2 below.

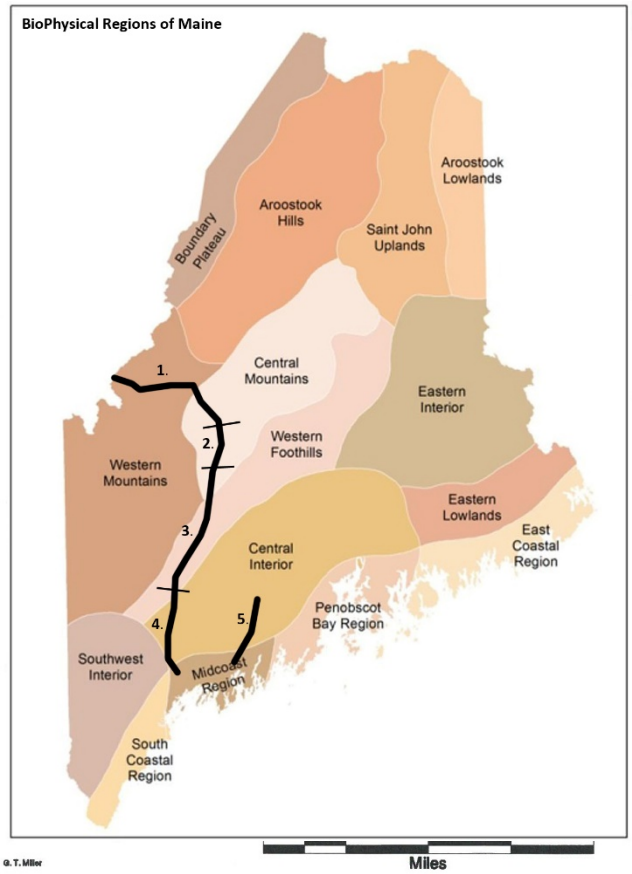


Illustration 6-1

Table 6-2 Elevated Viewpoint within 5 miles – Segment 1

MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT*	SIGNIFICANCE	VISIBILITY**
Lowell Hill	Beattie TWP	2.3 mi	2,923'	None	-	No - wooded
Dome Mtn	Beattie TWP	4.2 mi	2,353'	None	-	No - wooded
Van Dyke Mtn	Beattie Twp	0.5 mi	3,190'	None	-	No - wooded
Merrill Mtn	Merrill Strip Twp	1.8 mi	2,132	None	-	No - wooded
Caswell Mtn	Lowelltown Twp	1.4 mi	2,321'	None	-	No - wooded
Moose Mtn	Skinner Twp	0.7 mi	3,041'	None	-	No - wooded
Caribou Mtn	Skinner Twp	2.4 mi	3,650'	None	-	No - wooded
King Mtn	Skinner Twp	1.4 mi	2,530'	None	-	No - wooded
Peaked Mtn	Skinner Twp	0.5 mi	3,037'	None	-	No - wooded
Kibby Mtn	Skinner Twp	2.2mi	3,654'	Fire Tower – structure only, 4 structures at summit., Kibby wind project to the south	Accessible trail to fire tower	Possible
Tumbledown Mtn	T5 R6 BKP WKR	1.1 mi	3,588'	Fire Tower- Standing structure only, no cab, 3 structures at summit	access trail to fire tower – doesn't appear to be a documented hiking trail	Yes, 1 mile
MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT*	SIGNIFICANCE	VISIBILITY**

[5] *The Biophysical Regions of Maine: Patterns in the Landscape and Vegetation*. Janet McMahon. 1990.

MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT*	SIGNIFICANCE	VISIBILITY**
Spencer Bale Mtn	Skinner Twp	3.3 mi	3,301’	None	-	No - wooded
Leroy Peak	Skinner Twp	1.0 mi	3,030’	None	-	No - wooded
No. 6 Mtn	T5 R7 BKP WKR	1.9 mi	3,315’	None	within Leuthold Preserve – no trail	No - wooded
No 5 Mtn	T5 R7 BKP WKR	2.3 mi	3,186’	Fire tower – 47’ steel structure – no cab.	within Leuthold Preserve with trail access	Yes
Hardwood Mtn	Hobbstown Twp	2.2 mi	2,410’	None	-	No - wooded
Hardscrabble Mtn	Hobbstown Twp	2.7mi	2,354’	None	-	No - wooded
Spencer Mtn	Hobbstown Twp	3.9 mi	2,210’	None	-	No - wooded
Catheart Mtn	Bradstreet Twp	2.3 mi	2,395’	None	-	No - old logging roads
Bean Brook Mtn	Parlin Pond Twp	1.7 mi	2,690’	None	-	No - harvested
Parlin Mtn	Parlin Pond Twp	3.2 mi	2,450’	None	-	No - harvested
Coburn Mtn	Upper Enchanted Twp	0.8 mi	3,730	Abandoned ski area, snowmobile & ATV trails, fire tower –- observation, 3 structures on summit	All viewpoints in the Upper Enchanted Township are Designated Scenic Viewpoints of State or National Significance	Yes
Shutdown Mtn	Upper Enchanted Twp	4.8 mi	2,539’	None	-	No - harvested
Granny Cap	Lower Enchanted Twp	4.3 mi	2,705’	None	-	No - wooded
Cold Stream Mtn	Johnson Mountain Twp	2.5 mi	2,254’	None	-	No - harvested
Wilson Hill	West Forks Plt	1.5 mi	1,570’	None	-	No - harvested
Attean Scenic View	Route 201 Jackman	7.0 mi	2,070’	Rest Area with parking, interpretive panels, rest room	on Old Canada Road National Scenic Byway	Yes, distant views of corridor

* Description of development at summits is documented from fieldwork and/or research on fire towers from Maine Fire Lookouts-State Listing Page.
** Project visibility is documented through field work, viewshed analysis, and review of google earth aerials.

The watershed of this mountainous area drains through small streams towards the East and West Branches of the Moose River, into the South Branch of the Moose River, the Moose River, and the Kennebec River. The northern portion of the Segment 1 Study Area including Moose River and No. 5 Bog drains northward towards Attean Pond towards Moosehead Lake to the Kennebec

River. The area within 3 miles of Segment 1 includes numerous small to medium sized waterbodies, typically surrounded by spruce fir vegetation in heights ranging from 40' to 60'. See Table 6-3 for list of waterbodies within three miles of Segment 1.

Table 6-3 Waterbodies within 3 miles of Segment 1

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Beattie Pond	Beattie TWP	1,300'	27	AC[1]	DEV[1] (1 camp)	2/6	-	Yes – 1 structure
Mud Pond	Beattie TWP	1.2 mi	12	INAC	UNDEV	3/7	-	No
Sipun Pond	Lowelltown TWP	2.2 mi	5.6	INAC	UNDEV	-/7	-	No
Wing Pond	Lowelltown Twp, Skinner Twp	1.4 mi	10	INAC	UNDEV	3/6	-	Yes
Rock Pond	T5 R6 BKP WKR	1,010'	124	AC	DEV	1B/7	S	Yes
Iron Pond	T5 R6 BKP WKR Hobbstown Twp	2,700'	32	AC	UNDEV [2]	2/7	-	Yes, top of 1 structure
Tobey Pond #2	T5 R7 BKP WKR	2.8 mi	32	INAC	UNDEV	2/6	S	No
Tobey Pond #3	T5 R7 BKP WKR	2.5 mi	14	INAC	UNDEV	2/6	S	No
Boulder Pond	T5 R7 BKP WKR	2.3 mi	30	INAC	UNDEV	3/6	-	No
Hall Pond	T5 R7 BKP WKR	1.1 mi	42	INAC	UNDEV	3/6	-	No
Whipple Pond	T5 R7 BKP WKR	1,760'	112	AC	UNDEV	2/7	S	No
Toby Pond	Hobbstown Twp	850'	28	INAC	UNDEV	2/7	-	No
Chub Pond	Hobbstown Twp	1.0 mi	24	AC	DEV	2/7	-	No
Fish Pond	Hobbstown Twp	1.9 mi	219	AC	DEV	2/7	S	Yes – tips of up to 2 structures
Moore Pond	Bradstreet Twp	1,400'	47	AC[3]	UNDEV	1B/7	-	No
Egg Pond	Bradstreet Twp	332'	4	INAC	UNDEV	-/7	-	Yes, 1 structure
Moose River (Bow River Trip)	Bradstreet Twp	0.9 mi	7.2 mi within study area	AC	UNDEV	-	-	No
Grace Pond	Upper Enchanted Twp	1.5 mi	150	AC	DEV[4]	1B/7	-	No
Parlin Pond	Parlin Pond Twp	1.7 mi	543	AC	DEV	1B/7	S	Yes- 4 structures, corridor
Mountain Ponds	Johnson Mountain Twp	0.7 mi	2/1.5	INAC	UNDEV	-/7	-	No

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Markham Pond	Johnson Mountain Twp	1.5 mi	4	INAC	UNDEV	-/7	-	No
Tobey Pond	Johnson Mountain Twp	1,400'	20	AC	UNDEV	1B/7	-	No
Little Wilson Hill Pond	Johnson Mountain Twp	1,300'	20	INAC	UNDEV	3/7	-	Yes
Round Pond	Chase Stream Twp	2.8 mi	30	AC	UNDEV	1B/7	-	No
Long Pond	Chase Stream Twp	2.0 mi	17	AC	UNDEV	2/7	-	No
Flatiron Pond	Chase Stream Twp	1.4 mi	5	INAC	UNDEV	-/7	-	No
Ellis Pond	Chase Stream Twp	2.0 mi	85	AC	DEV	1B/7	-	No
Dead Stream Pond	West Forks Plt	2.9 mi	67	AC	DEV	3/7	-	No
Wilson Hill Pond	West Forks Plt	0.8 mi	21	INAC	UNDEV	3/7	-	No
Upper Kennebec River	West Forks Plt Moxie Gore (crossing)	0	9.0 mi Within study area	INAC at crossing	UNDEV at crossing	LUPC Recreation Protection Sub-district	S	Yes at Crossing
Black Brook Pond	Moxie Gore	2.2 mi	333	AC[5]	DEV	2/7	-	No
Baker Pond	Moxie Gore	1.9 mi	93	AC	UNDEV	3/7	-	No
Prescott Pond	Moxie Gore	0.7 mi	22	INAC?	UNDEV	2/7	-	No
Fish Pond	Moxie Gore	0.5 mi	15	AC[6]	UNDEV	2/7	-	No
Mud Pond	Moxie Gore	1.1 mi	18	INAC	UNDEV	3/7	-	No
Moxie Stream	Moxie Gore	0	5.1 in study area	AC	UNDEV		S	Yes at Crossing

	REMOTE POND
	SCENIC RESOURCE OF STATE OR NATIONAL SIGNIFICANCE
DIST:	Distance to the Project. AC: Accessible. INAC: Inaccessible. DEV: Developed. UNDEV: Undeveloped.
RES. CLASS:	Resource Class from Maine Wildlands Lake Assessment (MWLA) 1A: Lakes of Statewide significance with multiple outstanding natural values. 1B: Lakes of Statewide significance with a single outstanding natural value. 2: Lakes of regional significance (no outstanding values but at least one significant resource value). 3: Lakes of local or unknown significance. Note that lakes and ponds smaller than 10 acres do not have a resource assessment. (-)
MAN. CLASS	LUPC Management Class Designation: 6: Remote Pond, 7: Lakes not otherwise designated
SCENIC RATING	S: Significant O: Outstanding ratings from the Maine Wildlands Lake Assessment (-) No scenic resource rating
VISIBILTY:	Project visibility based on viewshed mapping, fieldwork and 3D modeling/ cross sectional analysis.
NOTES	[1]. Beattie Pond is listed as INAC in MWLA but there is now a gravel access road within 400' of the Pond. The Pond is listed as DEV (Developed) in MWLA. There is one camp with associated out buildings. [2]. Iron Pond is listed as AC/DEV in MWLA but there is no development, logging roads are within 250' of Pond. [3]. Moore Pond is listed as "INAC?", there is now a boat launch to the Pond so it is now accessible [4] .Grace Pond is listed as UNDEV in MWLA but there are at least 10 camps now , considered developed [5]. Black Brook Pond is listed as INAC? And UNDEV. There are now 20+/- camps on the Pond. [6]. Fish Pond is listed as INAC in MWLA but there is now a 2WD access road to a boat put in

Segment 1 is primarily located within a commercial forest with several significant areas of conservation land within the Study Area. The vegetation on the land immediately surrounding the Project is mixed deciduous and coniferous second growth with areas of active harvesting. Vegetation ranges in height from 0' (existing laydown areas) to 60'. Land use in the immediate vicinity of the transmission line is predominantly commercial forest with sparse seasonal camps on adjacent ponds. The largest population centers within Segment 1 are the villages of West Forks and The Forks Plt, both located approximately 5 miles from the Project. Jackman is over 8 miles to the north of the Project Study Area.

Table 6-4. Conservation Lands within 3 miles of Segment 1

CONSERVATION LAND	HOLDER	LOCATION	DIST +/-	SIZE (ac)	ACCESS	PROJECT VISIBILITY
Holeb Public Reserved Land/Moose River, No 5 Bog	BPL FSM	Holeb Twp	1.0 mi	26,095, 3,200 +/- within 3 miles	Public	Possible, not likely
Leuthold Preserve	TNC	Appleton Twp, T5 R7 BKP WKR, Bradstreet Twp	Abuts on south	16,934 13,200 +/- within 3 miles	Public	Yes, from No.5 Mountain
Grace Pond Upper Enchanted	BPL	Upper Enchanted Twp	1.2 mi	2,201, 1,550+/- within 3 miles	Public	No
Bradstreet Twp S Parcel	BPL	Bradstreet Twp	780 ft	177	Public	No
Upper Enchanted Twp Parcel	BPL	Upper Enchanted Twp	0.3 mi	300	Public	Yes, from Coburn Mountain
Cold Stream Forest	BPL	Johnson Mountain Twp	190 ft	8,139, 5,370 +/- within 3 miles	Public	Possible, not likely
West Forks Parcels	BPL	West Forks Plt	crosses	3 parcels, 695	Public	Yes
Johnson Mountain Parcel	BPL	Johnson Mountain Twp	crosses	513	Public	Yes
Plum Creek / Moosehead Region	BPL	Chase Stream Twp	0.5 mi	71,630, 5,370+/- within 3 miles	Public	No
Moxie Falls	BPL	Moxie Gore	0.3 mi	237	Public	No
Moxie Gore Parcel	BPL	Moxie Gore	0.9 mi	448	Public	No
Draper, NEFF	NEFF	Moxie Gore	crosses	3,477	Private, possible access	Yes
The Forks Plt N Parcel	BPL	The Forks Plt	0.9 mi	717	Public	No

Scenic Resources[6] with potential views of the Project that were evaluated include: Beattie Pond in Beattie TWP; Wing Pond in Lowelltown Twp, Skinner Twp; Rock Pond inT5 R6 BKP WKR; Fish Pond in Hobbstown Twp; Parlin Pond in Parlin Pond Twp; Upper Kennebec River in West

[6] *Throughout this section, the term "Scenic Resources" is used as defined by Chapter 315.10, Maine Department of Environmental Protection.*

Forks Plt/Moxie Gore (crossing); and Moxie Stream in Moxie Gore. Elevated viewpoints assessed include No. 5 Mountain in T5 R7 BKP WKR within the Leuthold Preserve, Coburn Mountain in Upper Enchanted Twp, and the Attean View Rest Area on Route 201 in Jackman.

6.2.1.3 Distance Zones

Foreground (0 to 1/2 mile in distance): Foreground views of the HVDC transmission line corridor are found at road crossings (primarily within the commercial timber harvesting areas), river and stream crossings, and from adjacent waterbodies listed below:

- Beattie Twp: Lowelltown Road, Beattie Pond, Mill Brook, unnamed haul roads
- Lowelltown Twp: Beattie Pond (eastern portion), Wing Pond (northern portion), unnamed haul roads
- Skinner Twp: Wing Pond, Lowelltown Road, West Branch Road, South Branch Moose River, Goldbrook Road, Pine Tree Road, unnamed haul roads
- Appleton Twp: Spencer Bale Road
- T5 R6 BKP WKR: Rock Pond, Iron Pond
- Hobbstown Twp: Spencer Bale Road
- T5 R7 BKP WKR: Spencer Rips Road
- Bradstreet TWP: Mining Road, several unnamed logging roads
- Parlin Pond Twp: Hardscrabble Road
- Johnson Mountain Twp: Coburn Mountain access road/Enchanted Mountain Road, Judd Road, Route 201, Capital Road, Wilson Hill Road,
- West Forks Twp: Wilson Hill Road, Upper Kennebec River
- Moxie Gore: Fish Pond Road, Moxie Stream
- The Forks Plt: Lake Moxie Road

Midground (1/2 mile to 3 miles in distance):

- T5 R7 BKP WKR: Iron Pond
- Hobbstown TWP: Fish Pond
- Johnson Mountain Twp: Coburn Mountain – (1.2 miles to closest visible portion of corridor.
- Parlin Pond Twp: Parlin Pond- 1.6 miles from Pond to Project, view from northern end of Pond is 2.9 from Project.

Background (greater than 3 miles):

- T5 R7 BKP WKR: No 5 Mountain – 5 and 7 miles to visible portion of Project from summit
- Jackman: Route 201 – Attean View Rest Area – 7.1 miles to visible portion of Project
- Appalachian Trail –6.25 miles from Pleasant Mountain, 7.9 from Bald Mountain to the new HVDC Corridor

6.2.1.4 Inventory of Scenic Resources within the Viewshed of Segment 1

Figure 6-1 - SEGMENT 1
MDEP Visual Evaluation Field Survey Checklist
(Natural Resources Protection Act, 38 M.R.S. §§ 480 A - Z)

Name of applicant: Central Maine Power
Application Type: Site Law/NRPA
Activity Type: Segment 1, installation of a HVDC transmission line
Activity Location: Beattie TWP, Lowelltown Twp, Skinner Twp, Appleton Twp, T5 R7 BKP WKR, Bradstreet TWP, Parlin Pond Twp, Johnson Mountain Twp, West Forks Twp, Moxie Gore, and The Forks Plt.
County: Franklin and Somerset
GIS Coordinates, if known: See project location maps and photosimulations
Date of Survey: June 8, 13, 14, 15, 21, and July 25, 26, 2017.
Observer: Amy Segal, Steve Thompson
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? The No. 5 Bog and Jack Pine Stand is a large peatland containing boreal vegetation and glacial features surrounded by a stand of Jack and Red Pine. It is the "only large, intermontane peatland in the northeastern US."[7]. The Bureau of Parks and Lands designated the No.5 Bog as an ecological reserve to protect five exemplary natural communities, within the bog and the largest inland stand of Jack Pine in the state. The edge of the Bog is located approximately 2 to 2.5 miles north of the Project in Attean Twp, TR R7 BKP WKR, Bradstreet Twp. The open water of No.5 Bog is approximately 3.2 miles north of the Project. Public access to the No. 5 Bog is limited to private roads off Spencer Road to the south which connect to the Moose River. Viewshed analysis indicates the Project may be visible from the Bog. Fieldwork on the southernmost portions of the Moose River indicate Project visibility should be extremely limited from within the Bog due to the shoreline vegetation, water levels, and viewing distance. There are two waterfalls within three miles of the Project: Cold Stream Falls in Johnson Mountain Twp and Moxie Falls in Moxie Gore. The primary viewing platforms within the Moxie Falls Scenic Area are 0.5 miles to the south of the closest point of the Project and 1.6 miles downstream of the proposed crossing of Moxie Stream. Cold Stream Falls, within the Cold Stream Forest lands, is approximately 1.7 miles north of the Project The Project will not be visible from either waterfall due to intervening topography and vegetation.	□	□	■
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? The **Leuthold Preserve**, is a 16,934 acre forested preserve located north of the Project in Appleton Twp, T5 R7 BKP WKR and Bradstreet Twp. The preserve is managed collaboratively by The Nature Conservancy, Forest Society of Maine and the Maine Bureau of Parks and Lands as an ecological reserve. The southern boundary of the Preserve appears to follow Spencer Road and abuts the Project boundary in Appleton Twp and T5 R7 BKP WKR. The Project will not be visible from any of the waterbodies located within the 3 mile Study Area (Whipple Pond, Hall Pond, Boulder Pond, Tobey Ponds #2, and #3 and an Unnamed Pond) within the Preserve due to intervening shoreline vegetation.	□	□	■

[7] *https://www.nps.gov/subjects/nnlandmarks/site.htm?Site=NOFI-ME*

The Project will be visible from **No. 5 Mountain** (T5 R7 BKP WKR) at a distance of 3.9 miles; at this distance the structures will be difficult to see but the corridor may be noticeable as it crosses the commercial forest land. No. 5 Mountain is the only accessible elevated viewpoint within the Preserve located within 5 miles of the Project. The summit is fairly open with several large areas of exposed ledge with 360 degree views of the surrounding area. There is a 47' old fire tower on the summit of No. 5 Mountain that allows hikers to gain a view above the treeline, but there is no observation deck on the tower so the views are from the tower stairs. The view of the Project from the summit of No. 5 Mountain is partially screened by No. 6 Mountain which is located approximately 1 mile to the southwest. See Appendix B: Study Area Photographs, Map 1 and Photosimulation in Appendix D.

The **No. 5 Bog/Moose River Reserve**, approximately 4,700 acres, is a designated ecoreserve encompassing the southern portion of the No. 5 Bog, surrounding uplands areas and adjacent parts of the Moose River. The Reserve is located adjacent to the east and north of the Leuthold Preserve. See description above.

C. A state or federal trail?

The **Old Canada Road National Scenic Byway (Route 201)** is designated as both a Maine State Scenic Byway and a National Scenic Byway.[8] This 78.2 mile-long Byway follows the Kennebec River within Segments 1 and 2 of the Project Study Area. This section of road is also part of the Kennebec-Chaudiere Heritage Corridor, which links Fort Popham from the south with the City of Quebec to the north.

Segment 1 of the Project crosses the **Byway/ Route 201 in Johnson Mountain Twp** approximately 1,200' south of Judd Road and 2,000' north of Capital Road. This segment of Route 201 passes through a commercial forest area with mixed vegetation buffer strips along the sides of the road ranging in height from 20' to 40'. The most visible portion of the Project will be the conductors crossing over the road. A motorist traveling south on Route 201 will see the conductors as they approach the crossing for approximately 1,900'. A motorist traveling north may see the conductors and one of the structures for approximately one mile approaching the crossing. Posted speed for Route 201 in this area is 45 mph which translates into a motorist being exposed to the Project for 29 seconds traveling south and about one minute traveling north. The closest rest stops or designated scenic overlooks on Route 201 is located 5.3 miles north of the crossing on the west side of Parlin Pond. (The Project will not be visible from the Parlin Pond rest area.) There will be minimal visual impact to the Byway due to the minimal duration of view and limited Project visibility.

The Project will also be visible in the background from the **Attean View Rest Area** on the Byway/Route 201 in Jackman. This scenic overlook encompasses an approximately 100 degree view towards Merrill Mountain, Attean Mountain, and Sally Mountain and Attean Pond, No. 5 Bog and the Moose River. Wind turbines located 14 miles to the north in Canada are also visible from the overlook. The corridor clearing for Segment 1 will be slightly visible at distances of 7 to 12 miles to the southwest and seen in context of the meandering Moose River and commercially harvested areas beyond the conservation land. At this distance individual structures will not be readily visible to the average observer and the corridor clearing will blend with the surrounding vegetation patterns on either side of the corridor. There will be minimal to no visual impact from the Attean View Rest Area.

Snowmobile trails are common throughout Segment 1. The new HVDC transmission line corridor will cross ITS 89 in Bradstreet Twp and Johnson Mountain Twp and ITS 87 in Johnson Mountain Twp. These ITS trails are part of The Forks Trail Network, a 150 mile network connecting Jackman, Eustis, Moosehead Lake, and Bingham. The majority of ITS routes are generally located in the valleys and logging roads and should have

[8] *The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The U.S. Secretary of Transportation recognizes certain roads as All-American Roads or National Scenic Byways based on one or more archeological, cultural, historic, natural, recreational and scenic qualities. http://www.byways.org/*

minimal visual contact with the Project. While snowmobile / ATV trails are not considered scenic resources of state or national significance, some of the local trails may cross Rock Pond, Fish Pond, and Parlin Pond, all of which are scenic resources of state or national significance. Local snowmobile trails are also located on Coburn Mountain in Upper Enchanted Twp and all viewpoints within Upper Enchanted Township are considered designated scenic viewpoints, and therefore are considered scenic resources. See description of Coburn Mountain below.

The Project will cross the **Northern Forest Canoe Trail** in a portage section between Spencer Rips on the Moose River, along Spencer Rips Road, past Whipple Pond to Spencer Road and Fish Pond. The Northern Forest Canoe Trail website describes the trail as, *"Completed in 2006, the 740-mile Northern Forest Canoe Trail (NFCT) connects waterways from the New York State's Adirondack Park to the Canadian border in northern Maine. Following traditional travel routes used by Native American, settlers and guides, the NFCT connects 22 rivers and streams, 58 lakes and ponds and 45 communities. It is the largest inland water trail in the nation."*[9] Because the trail crosses Fish Pond, paddlers may notice the tips of up to four structures visible to the northwest. Visual impact will be very minimal.

D. A public site or structure listed on the National Register of Historic Places? □ □ □

None.

E. A National or State Park? None □ □ □

The Appalachian National Scenic Trail (AT), a unit of the National Park System, extends 2,175 miles from Mount Katahdin in Maine to Springer Mountain in Georgia. Approximately 14.5 miles of the Trail are located within 5 miles of Segment 2. The closest point on the AT with visibility of Segment 1 is Pleasant Mountain at a distance of 6.25 miles. The Appalachian Trail is a scenic resource of state or national significance and is described in greater detail in Segment 2.

F. 1) A municipal park or public open space? □ □ □

There is no municipal land. Other publically accessible parcels with in the Project Study Area include the land managed by the Bureau of Parks and Lands around Moore Pond in Bradstreet Twp. A boat launch on Moore Pond is accessible off Spencer Road. The Project is approximately 1,300' from the northern edge of the Pond but will not be visible due to intervening vegetation.

Other conservation land in the area includes the Grace Pond Upper Enchanted parcel with limited public access. The Project will not be visible from the pond due to intervening topography and vegetation.

2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? □ □ ■

All viewpoints in the Upper Enchanted Twp Unit (also known as the Coburn Mountain parcel) were designated as Scenic Viewpoints of State or National Significance by the Maine Department of Conservation (now part of the Maine Department of Agriculture, Conservation and Forestry) in March 2010. Coburn Mountain, elevation 3,730', is the highest viewpoint within the unit. The trails on the mountain appear to be used mainly for snowmobile and ATVs. Some of the trails on the mountain follow portions of the abandoned ski area known as Enchanted Mountain which closed in the 1970's. There are no official trail signs other than signs prohibiting

[9] *https://www.northernforestcanoetrail.org/discover/trail-overview/*

ATVs on certain trails. There is a small communication tower powered by solar panels and a small wind turbine located on lower portions of the trail. The vegetation along the trail is generally 15-25' in height which generally blocks any foreground views except for eastern views toward Indian Pond and Moosehead Lake. There is a large clearing on the summit with a small building and communication infrastructure, a fairly large solar panel array, and an observation tower. (See Photographs in Appendix B, Map 2.) From the ground summit, there is an east to south vista with a filtered view of the northern portion of Moxie Pond. Recent clearing has increased the panoramic views from the summit. The old fire tower on the summit allows viewers to stand approximately 20' above the ground for a 360 degree view of the area.

The Project will first be visible near the trailhead in an area of active timber harvesting. From the summit, portions of the new 150' wide corridor clearing will be visible in the midground looking toward the west side of Johnson Mountain at distances of 1.2 to 3.0 miles and in the background (4+ miles) to the southeast. Up to 10 HVDC structures will be visible within 3 miles of the summit. Recreational users of trails on Coburn Mountain are aware of manmade structures along the trail and at the summit. While the view from Coburn Mountain is distinctive in the region because of its elevation, it also includes views of active commercial timber harvesting and hauling roads. The view is not of undisturbed wilderness but rather active working forest. The closest portions of the Project will be screened by foreground vegetation at the summit. The 150' wide cleared corridor is sited within recently harvested areas to reduce additional tree removal. The visual impact from Coburn will be minimal to moderate.

3) A public resource, such as the Atlantic Ocean ■ ■ ■
a great pond or a navigable river?

Beattie Pond, partially located in Beattie Twp and Lowelltown Twp, is classified by LUPC as a Management Class VI Lake, or remote pond. The first criteria to be designated Management Class 6 includes having no existing road access by two-wheel drive motor vehicles during summer months within 1/2 mile of the normal high-water mark of the water body. There is an existing gravel access road for two-wheel drive motor vehicles within 400 feet of the Pond. This road appears to provide access to a camp with outbuildings located on the southeast end of the Pond. The second criteria for the designation is having existing buildings within 1/2 mile of the normal high-water mark of the water body limited to no more than one non-commercial remote camp and its accessory structures. Signage at the gated entrance to the access road indicates use by a 'club' for hunting. It isn't completely clear, but based on the signage the camp could be a commercial camp. The access road within 400' and the potentially commercial camp are contrary to the criteria for classification as a remote pond. The Maine Wildlands Lake Assessment designated Beattie Pond as Resource Class 2: a lake of regional significance (with no outstanding values but at least one significant resource value). Fisheries were rated as 'Significant'. Scenic resources were not considered unique or significant (*i.e.*, they did not meet a minimum standard of significance).

Views of the Project from Beattie Pond are limited to one transmission line angle structure located approximately 1,300 feet south of the Pond. The majority of the structure will be buffered by existing vegetation such that only the top portion of the structure and conductors will be visible. The structure will be made of self-weathering steel which will blend into the wooded landscape, reducing the contrast in color when viewed from the Pond. Visual impact on the Pond should be minimal to moderate.

Wing Pond, partially located within Lowelltown Twp and Skinner Twp, is classified by LUPC as a Management Class VI Lake, or remote pond. There are no access roads within the P-RR buffer around the Pond or camps on the shoreline of the Pond. The Maine Wildlands Lake Assessment designated Wing Pond as Resource Class 3: a Lake of local or unknown significance. Scenic resources were not considered unique or significant (*i.e.*, they did not meet a minimum standard of significance).

Views of the Project from Wing Pond will include two structures and conductors visible from within 1.75 miles. The visible portion of the Project is located within a recently harvested area visible at the base of Smart Mountain. No additional corridor clearing will be required in the area visible from the pond. Because the structures will be made of self-weathering steel, the contrast in color with the surrounding vegetation will be minimal. At certain times of the day and season, the conductors may be the most visible component when they reflect sunlight. Visual impact on Wing Pond should be minimal to moderate depending on viewers' location on the Pond.

Rock Pond is a 124 acre pond in T5 R6 BKP WKR. The *Maine Wildlands Lake Assessment* designated Rock Pond as Resource Class 1B with 'Outstanding' Fisheries resource and 'Significant' Scenic and Shore Character resources. The Pond is considered a Scenic Resource of State or National Significance as a great pond with scenic resources rated as 'Significant'. *The Scenic Lakes Character Evaluation in Maine's Unorganized Towns* characterizes Rock Pond as having "low complexity" of Relief and Physical Features and no unique Shoreline Configuration or Vegetation Diversity. There is a boat launch, approximately 6 campsites (RV and tent sites) on the northwestern end of the Pond and one camp. The Pond appeared to be heavily used for boating and fisheries as evidenced by the number of boats stored at the boat launch.

At the closest point, The Project will be approximately 1,000' north of Rock Pond. The camp sites on the northern end of the Project will not have views of the Project due to intervening vegetation. Visitors to the Pond will cross under the Project as they drive along Spencer Road to access the boat launch. Up to six structures and the cleared corridor will be visible from the Pond to the northwest as the Project passes through the valley between the Three Slide and Greenlaw Mountains at a distance of 3,500'. Additionally, the top portions of up to six structures, conductors, and portions of the cleared corridor will be visible at distances of 0.6 to 0.8 mile looking to the north. The visual impact to Rock Pond will be moderate to strong depending on the location and orientation of the viewer due to the visibility of the cleared corridor and structures within the midground viewing distance. However, shoreline vegetation will partially screen the closest visible structures and the use of self-weathering steel structures and non-specular conductors will minimize the contrast with the wooded backdrop.

Fish Pond is a 219 acre pond in Hobbstown Twp. The *Maine Wildlands Lake Assessment* designated Fish Pond as Resource Class 2 with 'Significant' resource ratings for Scenic and Cultural resources. The Pond is considered to be a Scenic Resource of State or National Significance as a great pond with scenic resources rated as 'Significant'. *The Scenic Lakes Character Evaluation in Maine's Unorganized Towns* characterizes Fish Pond as having a 'low' rating for Relief and Shoreline Configuration, and a 'medium' rating for Physical Feature and Vegetation Diversity, no special features, and low/no levels of Inharmonious Development. There is a boat launch on the northwestern end of the Pond adjacent to a small campground. The shoreline appears undeveloped and the focal points on the Pond are No. 6 Mountain and No. 5 Mountain.

At the closest point, The Project will be approximately 2 miles northwest of Fish Pond. Visibility of the Project from Fish Pond will be very limited with the tips of up to 4 structures slightly visible above the treeline at distances of 3 to 4 miles. The corridor clearing will not be visible. The visual impact to Fish Pond will be minimal.

Parlin Pond is a 543 acre pond in Parlin Pond Twp. The Old Canada Road National Scenic Byway (Route 201) is located along the western boundary of the Pond and there is a rest area with interpretive panels on the southwest end of the Pond. A boat landing is located on the southwest corner of the Pond off the rest area on Route 201. There are approximately 50 camps on or near the shoreline of Parlin Pond. It is considered an accessible and developed pond and appears to be heavily used for boating and fishing as evidenced by the number of boats and docks along the shoreline and stored at the boat launch. The *Maine Wildlands Lake Assessment* designated Parlin Pond as Resource Class 1B with 'Significant' ratings for Fisheries, Scenic and Shore Character, and Botanical resources. The Pond is considered to be a Scenic Resource of State or National

Significance as a great pond with scenic resources rated as 'Significant'. *The Scenic Lakes Character Evaluation in Maine's Unorganized Towns* characterizes Parlin Pond as having a 'medium' rating for Relief, 'low' ratings for Physical Features, Shoreline Configuration, Vegetation Diversity, and no Special Features. The Pond also has a rating of 'medium' for inharmonious development.

Project visibility will be from the northern and eastern portions of the Pond looking southwest toward the shoulder of Coburn Mountain. Up to five structures, conductors and portions of the corridor clearing will be visible at distances of approximately 1.8 to 2.8 miles depending on your location on the Pond. At this distance and viewing angle, the self- weathering steel structures will be visible against the wooded backdrop of Coburn Mountain, with the exception of one structure that will be silhouetted on the ridgeline. The proposed corridor clearing will not be visible but a change in vegetation will be slightly noticeable. The visual impact to Parlin Pond will be minimal to moderate.

Segment 1 of the HVDC transmission line corridor crosses the **Upper Kennebec River** in West Forks Plt and Moxie Gore 3.7 miles upriver of the confluence with the Dead River and approximately 8.2 miles downriver of Harris Dam. The Maine Rivers Study identifies the Upper Kennebec River as an "A" river, with unique/significant resource values for undeveloped, scenic, and inland fisheries. This section of the River is also rated as having outstanding statewide geologic and whitewater boating resource values with high recreational importance. The River itself is zoned as a Protected Recreation Resource Subdistrict by LUPC.

The most visible portion of the Project will be the conductors crossing the river. The curves in the river, sloped topography, and riverside trees estimated to be 75' in height, will limit views of the Project to an area extending approximately 1,600' upstream and 2,200' downstream. From a picnic area located 1,200' +/- north of the crossing, vegetation will screen the closest structures on either side of the river (located 845' to the southwest and 1,080' to the west). Conductors over the river will be visible to recreational boaters for approximately 1,600' approaching the crossing. From within the crossing, two structures will be visible looking to the east at distances of 425' and 800' and two structures will be visible looking to the west at distances of 450' and 970'.
The preserved riparian vegetation (trees will not be cleared within approximately 200 feet from the east and west side of the river), minimizing views into the corridor from the river. From areas south of the river, the top of one structure and conductors will be visible for a distance of approximately 2,200'. The design includes structures on either side of the river of 95' and 105' tall. The duration of exposure to the corridor is minimized by the near perpendicular angle of the corridor as it crosses the river. Where topographic conditions allow, capable vegetation will be permitted to grow within and adjacent to protected natural resources or critical habitats where maximum growing height can be expected to remain below the conductor safety zone CMP will also use non-specular conductors in highly sensitive locations such as the Kennebec River crossing and Rock Pond. Non-specular conductors appear duller and less reflective which minimizes their visibility. Marker balls/bird diverters will be placed on the shield wires as required. These orange balls will be noticeable from within the foreground, or most of the area of visibility.

Moxie Stream is a tributary of the Upper Kennebec River from its headwaters at Moxie Pond. The Upper Kennebec River and its tributaries; Cold Stream and Moxie Stream, are rated as an "A" river in the Maine Rivers Study. Moxie Stream is rated for its Geologic/Hydrologic, Critical/Ecologic, Undeveloped, and Scenic Resource Values. The proposed HVDC transmission line corridor will cross Moxie Stream in Moxie Gore for approximately 2.3 miles +/- north of the confluence with the Kennebec River, 1.6 miles +/- north of Moxie Falls, and 2.7 miles south of Moxie Pond. Moxie Stream is crossed by the existing 115kV transmission line within a 150' wide cleared corridor as it connects to the north end of Moxie Pond. The proposed corridor will cross Moxie Stream 650' +/- south of the location where Fish Pond Road once crossed the stream. Large stone piles remain where the bridge abutments were once located.

The proposed 150' wide corridor clearing and conductors will be visible for approximately 760' on the upstream side approaching the crossing and approximately 1,000' on the downstream side of the Moxie Stream crossing. See Photosimulation in Appendix D. The line has been sited to avoid the adjacent open wetland area which will reduce visibility from upstream areas. Avian marker balls will be installed on shield wires and conductors if required. The HVDC transmission line structures will be setback 410' from the stream on the north side, and 560' from the stream on the south side. Riparian vegetation along the stream bank will be preserved and will minimize views into the corridor from the stream. The visual impact to Moxie Stream will be minimal based on the limited duration of exposure and the screening effects of preserved riparian vegetation.

The **Moose River** is not rated as a scenic river segment in the Maine River Study however, the 'Bow River Trip' on the Moose River between Attean and Holeb Ponds in Jackman is a popular 34 mile river trip. Approximately 7.2 miles of the Moose River are located within 3 miles of the Project and at the closest point, the river is 0.9 mile from the Project. As noted above, the viewshed analysis indicates views are possible from the Moose River within 3 miles of the Project, however field work and computer analysis has determined that Project visibility would be very limited to none, due to intervening vegetation along the river banks. See Appendix B Study Area Photographs, Map 1.

South Branch Moose River, Skinner Twp is not rated as a scenic river segment in the Maine River Study. The Project will cross in a location where the river is 70' wide within a wooded strip between logging roads. Logging roads are located approximately 330' to the east and 640' to the west. The closest HVDC structures will be 775' +/- to the east and 575' +/- to the west, in close proximity to the logging roads. Preserved riparian vegetation within the corridor will minimize views into the corridor. The visual impact to South Branch Moose River will be minimal to moderate.

2. What is the closest estimated distance to a similar activity? □ □ ■

The proposed HVDC transmission line will be a new corridor joining with the existing 115kV transmission line on the north end of Moxie Pond in The Forks Plt.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■Yes □No

The adjacent ponds and streams are used throughout the year for a variety of recreational pursuits, including snowmobiling, fishing/ice fishing, and boating. Coburn Mountain is used for hiking year-round, and snowmobiling in winter. Use of the Upper Kennebec River at the crossing location occurs in spring, summer, and fall.

6.2.1.5 Affected Population/User Expectations/Continued Use and Enjoyment

There are four general groups of people who may be affected by the construction of the project.

Motorists

The primary viewing population is the year-round residents who live or work near Route 201 and those who are driving on the Old Canada Road National Scenic Byway for pleasure. Motorists

presently see distribution lines along Route 201 and clustered pockets of development in areas near Parlin Pond, West Forks Plt, and The Forks Plt. The road corridor generally appears wooded on both sides with preserved 'Beauty Strips" remaining to screen commercial timber harvesting areas on either side. At the location of the Route 201 crossing, the existing wooded vegetation on either side of the road is approximately 30' to 50' in height and will screen the cleared corridor for approaching motorists. The tops of one structure on the east side of the road will be partially visible for approximately one mile heading north and 1,800' heading south. In general, the crossing should be minimally noticeable due to the structures being setback from the road, the horizontal curve in the road approaching the crossing heading south, and the limited duration of exposure (30 seconds to a one minute) due to travel speed.

A smaller number of motorists will see the Project while traveling to camps off Spencer Road, Capital Road, and Lake Moxie Road. When traveling on Spencer Road or Capital Road, the motorist will see the Project in context with the working forest. When traveling on Lake Moxie Road the motorist will see the project in context of the existing transmission corridor that crosses the road 700' to the east of the proposed crossing. Motorists will continue to use the roads for work, pleasure driving, and to access their camps. The Project should have no to minimal effect on their continued use and enjoyment of those roads. There should be minimal visual impact to motorists.

Residents

There are a minimal number of residents within the Segment 1 viewshed because it is mostly within commercial forest lands. The primary residents who will view the Project include one camp owner on Beattie Pond, one camp owner and transient campers on Rock Pond, 50+/- camp owners on Parlin Pond, one camp on the south side of Moxie Stream (off Mina's Way), and four camps on the north side of Moxie Stream off Fish Pond Road. As noted above the Project will also cross Lake Moxie Road approximately 700' west of the existing transmission line crossing. There is one home on the southwest side of the corridor on Lake Moxie Road that will have views of the new cleared corridor and conductors but the proposed HVDC transmission line structures will not be visible. The closest structure will be 500' +/- to the southeast but will be screened by intervening vegetation.

The single visible structure from Beattie Pond will most likely not be visible from the camp itself due to intervening vegetation. The camp on Rock Pond is oriented towards the west and will have a view of the Project between Greenlaw and Three Slide Mountains at a distance of 1.6 miles. The majority of camps on Parlin Pond are located on the west side of the Pond and oriented towards the east and away from the Project. The 5 +/- camps on the northeast end of Parlin Pond will have views of the Project as it crosses the shoulder of Coburn Mountain 2.9 +/- miles to the southwest. (See Photosimulation in Appendix D.) The camp owners on either side of Moxie Stream will drive under the transmission line en route to their camps but all but one (on the north side) will not actually see the Project from their camps due to intervening vegetation. The residents on Lake Moxie Road will have limited views of the Project from their homes. Few residents will have views of the Project. For those minimal number of camps with views, there will be minimal to moderate visual impacts depending on viewing distance.

Recreating Population

There are several types of recreational users that will be affected by the Project including hikers on No. 5 Mountain and Coburn Mountain; ATV users and snowmobilers using ITS trails 87 and 89 and Coburn Mountain; those who travel on local roads while hunting; boaters and those who fish on Beattie Pond, Wing Pond, Rock Pond, Moxie Stream and Parlin Pond; and rafters on the Kennebec River.

As described above in the Scenic Resource Checklist, the view from No 5 Mountain is in the background and will be minimally visible. The Project should not negatively affect the hiker's experience or the public's continued use and enjoyment of No 5 Mountain. While Project views from Coburn Mountain are both in the midground and background, and more of the cleared corridor will be visible, the users expects to see active timber harvesting, and logging roads which are similar in line, color and form to the Project. Moreover, the primary users of Coburn Mountain are ATV and snowmobile riders who commonly use transmission corridors as part of

their network of trails. The Project should not negatively affect the public's continued use and enjoyment of Coburn Mountain. Hunters commonly use logging roads and local gravel roads for access while hunting. Those hunting in this area expect to see logging roads and harvested areas which are generally similar to the Project. The Project may even create more opportunities for

hunting access. The Project should not negatively affect hunter's continued use and enjoyment of the Project area.

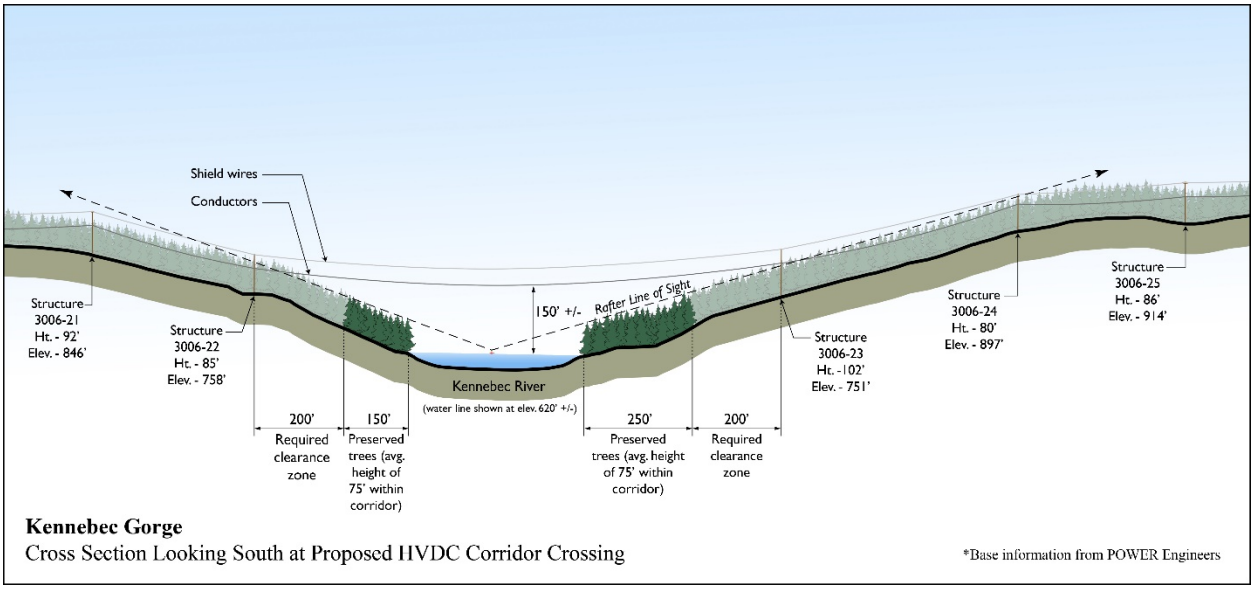
Those who fish on Beattie Pond, Wing Pond, Rock Pond, Moxie Stream and Parlin Pond are primarily interested in the salmon, brook trout and lake trout fisheries resource on each of these waterbodies. Remote ponds such as Beattie Pond are fly fishing only. While boating and/or fishing, these users would have the opportunity to position themselves on the resource to minimize their exposure to the Project. Users of these water resources generally have high expectations for visual quality. The Project may moderately affect the boating/fishing experience but should not decrease the public's continued use and enjoyment of the waterbodies if the fishery resources are maintained.

Rafters using the Kennebec Gorge access the river location via a set of stairs adjacent to the Harris Dam. The rafting resource is dependent on scheduled water releases from the Harris Dam. Rafters are aware of the existing transmission lines adjacent to the parking and preparation areas prior to rafting. Rafters enter the river mid-morning and run a range of Class III – V rapids within the first 5 miles of the rafting experience. The Project crosses the Kennebec about 3 miles downstream of the last major Class III and IV rapids (Black Brook Rapids). The three miles between Back Brook Rapids and the Project crossing location are free flowing with occasional Class I or II rapids. At the Project crossing location the river is generally flatwater and the rafters are allowed to swim. Most rafting companies offer lunch for the rafters at different locations in the vicinity of the Project crossing. Two photosimulations have been prepared to illustrate what the views of the Project would be from the picnic areas north and south of the Project crossing. From the picnic area north of the crossing, the conductors will be visible but the structures will be screened from view by vegetation and topography. From the southern picnic area looking north, one HVDC transmission line structure and conductors will be visible. Lunch typically takes one hour. After lunch, rafters continue down the river for approximately 3.5 miles to the location where the rafts are taken out of the river near The Forks Rest Area. Most trips begin

around 10:30 am and take out is generally around 3pm. Rafters of the Kennebec River have a high expectation for visual quality. The most active portion of the trip will not have Project views so the public's enjoyment of the majority of the resource will not be negatively affected. Rafting companies have options for choosing picnic locations without Project views. If they

choose one of the locations closest to the Project crossing, the rafters may be potentially exposed to the Project for up to an hour. The presence of the Project should not deter rafters from swimming but may slightly diminish their enjoyment of scenery from certain picnic areas. Visibility of the crossing itself will be for a relatively short duration as rafters float past the 150' wide corridor. Woody vegetation, including mature capable trees will be preserved within 150'+/- on the east side and 250'+/- on the west side of the edge of the river to minimize views into the corridor from the river. The calculation to allow capable species to remain within the corridor is based on conductor height and sag, required clearance from conductor to vegetation, topography between the river and each pole, and assumed maximum mature tree height of approximately 75 feet. (Trees taller than 75' height and within the transmission line corridor may need to be removed in order to prevent their encroachment into the conductor safety zone). The tips of one structure will be visible looking in each direction, but the majority of the structures will be screened by the preserved trees. See Illustration 6-1. Kennebec Gorge Cross Section below.

Illustration 6-2.



Brookfield Renewable Power, owner of the Harris Station Dam Hydro Electric Facility, maintains records of all rafting companies and has indicated 20 +/- rafting companies register to use the river throughout the season. There are approximately 10 rafting outfitters consistently running trips on the Upper Kennebec each year. The rafting community has provided use numbers indicating that the average number of rafters (with a rafting company) over the past 3

years was about 42,000 per year. Each rafting company is allowed to have 120 rafters per day during the rafting season from April 15th to October 15th. The industry typically licenses approximately 100 whitewater guides a year, many either rent a raft or own their own raft, and take friends and family down multiple times a year. These individual users account for approximately 10,000 additional users per season.

Overall the Project will have minimal to moderate visual impact on recreational users depending on location, activity, and duration of exposure.

Working Population

The primary working population affected by the Project include the people who are employed throughout Segment 1 in commercial timber harvesting. Segment 1 is primarily located within working forests accessed off Spencer Road in Parlin Pond Twp, Bradstreet Twp, T5 R7 BKP WKR, Hobbstown Twp, Appleton Twp, Skinner Twp, Goldbrook Road in Skinner Twp and Capitol Road in Johnson Mountain Twp. There should be minimal visual impacts to the commercial timber working population in the area.

Another working population affected by the Project includes the seasonal rafting companies and boating guides using the Kennebec River, and recreational and sporting guides who use area waterbodies for boating, fishing and hunting. As noted in the review of the scenic resources above, there will be minimal to moderate impacts to commercial users of the Kennebec River depending on duration of exposure (where picnic sites are chosen). Guides using other recreational resources will experience minimal to moderate visual impacts depending on location, activity and duration of exposure (i.e. if they chose to use a resource with Project views). Guides have many choices as to where to bring clients; there are numerous waterbodies in the area that will have no or minimal visual impacts from the Project.

6.2.1.6 Visual Impact Assessment

Landscape Compatibility

Color: The proposed single-pole HVDC transmission structures will be constructed of weathering steel (self-oxidizing) that will have a dark brown, rusty appearance. For most of the viewpoints from scenic resources, the difference in color should result in a relatively minor visual impact in the context of the surrounding commercial forest. Where the structures are seen silhouetted against water (from elevated viewpoints) or against sky (from low elevation viewpoints), the dark color will create a stronger color contrast. In some locations where just the tips of the structures are visible at longer distances, the rusty brown color will make the structures appear tree-like in form and color and therefore less distinguishable from the surrounding forest.

Form: Segment 1 will use one type of transmission structure: a single pole structure averaging 100± feet tall. Similar single pole structures are currently used in transmission lines in central Maine. The structure form is generally similar in vertical form to adjacent trees resulting in minimal contrast in form. The new cleared corridors are generally similar to areas commonly seen throughout the working forest also resulting in minimal contrast in form.

Line: Segment 1 will contain one HVDC transmission line throughout its length. The conductors and cleared corridor will create new lines visible within the viewshed. The line created by a cleared corridor will be less distinct when located within existing harvested areas, such as when viewed from Coburn Mountain and Wing Pond. From elevated viewpoints where the Project is seen in the background such as from Attean View and No. 5 Mountain, the line is somewhat indistinct and minimal in contrast. Where harvesting is not readily visible and the cleared corridor is partially visible, the Project will create a moderate contrast in line. Where the cleared corridor is visible within the foreground and creates a silhouetted ‘notch’ against the sky along a ridge line, such as from Rock Pond, there will be a strong contrast in line. Similarly, in areas that generally appear undeveloped and natural such as the Kennebec River and Moxie Stream, the structures, cleared corridor and conductors will result in a strong contrast in line.

Texture: The HVDC structures will be single pole self-weathering steel, which have a smoother texture than the standard wooden poles. This texture should cause a minimal contrast in texture.

Scale Contrast

Scale contrast is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource.

In Segment 1, there will be a wider range of scale contrasts due to its location within a working commercial forest. Where forest areas are regenerating the proposed HVDC structures would be the tallest vertical objects in the foreground. The crossings of Moxie Stream and Route 201 will present the greatest scale contrast in Segment 1 because they are foreground views, however in both locations vegetation along the corridor will help to reduce the moderate scale contrast. For most locations within Segment 1, the transmission line is seen at wider landscape midground and background viewing distances which minimizes the scale contrast. The topographic change in elevation and 75’ + tree height on either side of the Kennebec Gorge at the crossing will minimize the scale contrast of the 95’ and 105’ tall structures as seen from the river.

Spatial Dominance

Spatial dominance is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

When the Project is viewed from Beattie Pond, Wing Pond, Rock Pond, Fish Pond, Parlin Pond, No. 5 Mountain, Coburn Mountain, and the Attean View, the mountain ridges will continue to dominate the landscape. The Project has been sited to avoid the most prominent ridgelines, crossing on lower shoulder elevations when necessary. Where the Project crosses Route 201, Moxie Stream, and the Kennebec Gorge, the Project has been sited to avoid the most visually sensitive areas of each scenic resource, in less prominent locations. From the scenic resources in Segment 1, the Project will be subordinate to the surrounding natural and cultural elements in the landscape and in three locations (Fish Pond, No. 5 Mountain, and Attean View) the Project will be visually insignificant. Segment 1 of the Project will not dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.2.1.7 Mitigation Strategies

Several mitigation strategies have been incorporated into the design of Segment 1. Locating the majority of the proposed HVDC transmission line within commercial forest lands and utilizing existing haul roads for access minimizes the need for new clearing and construction of access roads. Where impacts to scenic resources are unavoidable, the Project has been sited to avoid the most sensitive areas of these resource. The HVDC structures will be made of self-weathering steel which will result in minimal color contrast with the surrounding wooded landscape. Non-specular conductors will be used at Rock Pond and the Kennebec Gorge crossing to reduce reflective qualities of the conductors when viewed from the most visually sensitive locations. At the Upper Kennebec River crossing, approximately 200’ of existing mature tree growth will remain on both sides of the riverbanks which will significantly minimize views of the proposed crossing from the river.

6.2.1.8 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, Segment 1 will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area.

6.2.2 SEGMENT 2. Moxie Pond to Wyman Hydro

Segment 2 includes the northern 22+/- miles of HVDC transmission line to be co-located within an existing 115kV transmission line corridor between the new HVDC transmission line near the north end of Moxie Pond in The Forks Plt, through the towns of Caratunk and Bald Mountain TWP T2 R3, to the Wyman Hydroelectric Facility located in Moscow. The co-located section will require the existing 150’ wide corridor clearing to be widened by 75’ on the western side (except for a small section near the former Moscow Radar Station which will be widened on the east side.) The co-located HVDC transmission line will be located on the west side of Moxie Pond and cross the Appalachian Trail south of Joe’s Hole within the existing 115kV transmission corridor. The HVDC transmission line will be supported by single pole self-weathering steel structures with heights ranging from 75’ to 110’.

6.2.2.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 2, 6, 7, 8, and 13, 2017. Representative views from each road crossing within the Study Area are included in Appendix B.

Other data sources include the location, cross sections and structure details provided by POWER Engineers for the Project; project descriptions and maps from Maine Bureau of Parks and Lands website, LUPC comprehensive plans and zoning ordinances; Maine Appalachian Trail Club's Official Map and Guide to the Appalachian Trail 15th Edition (Map 4, Monson to the Kennebec River); National Park Service website; Maine Wildlands Lakes Assessment; Maine Trail Finder; various area recreation websites; and Google Earth.

6.2.2.2 Study Area

Site Context

The Study Area of Segment 2 is located within the Central Mountains Biophysical Region[10]. The Segment 2 Study Area is characterized by medium to large waterbodies surrounded by mountains with elevations ranging between 1,630' and 2,630'. The closest elevated viewpoints on the Appalachian Trail are Bald Mountain and Pleasant Pond Mountain. The Study Area includes seven elevated viewpoints (mountains) within 5 miles of Segment 2 as shown in Table 6-5 below.

Table 6-5 Elevated Viewpoints within 5 miles of Segment 2

MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT	SIGNIFICANCE	VISIBILITY
Black Nubble	Squaretown Twp	3.3 mi	1,632'	None, no trail	None, Privately owned	No - wooded
Mosquito Mountain	The Forks Plt	0.7 mi	2,215'	Trail, American flag	Privately owned, regional resource	Yes, See Photosimulation
Bald Mountain	Bald Mtn Twp T2 R3	3.1+ miles	2,629'	Trail only	Appalachian Trail	Yes, minimal views
Pleasant Pond Mountain	The Forks Plt	3.0+ miles	2,477'	Trail only	Appalachian Trail	Yes, minimal views
Middle Mountain	The Forks Plt	2.7 miles	2,241'	Trail only	Appalachian Trail	Yes, filtered views

[10] *The Biophysical Regions of Maine: Patterns in the Landscape and Vegetation*. Janet McMahon. 1990.

MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT	SIGNIFICANCE	VISIBILITY
Moxie Mountain	Caratunk	4.5 to 5+ miles	2,515'	Radio Installation, Helicopter landing site Trail – not well marked or maintained	Local/regional resource Privately owned	Visibility from rock slide area on southern face
Black Nubble	Caratunk	4.3	2,066'	None, no trail	None, Privately owned	No - wooded

	SCENIC RESOURCE OF STATE OR NATIONAL SIGNIFICANCE

The two largest waterbodies are Moxie Pond (2,370 acres) on the north end of Segment 2 and Wyman Lake (3,200-acre impoundment) at the southern end. The area within 3 miles of Segment 2 includes several small to medium waterbodies typically surrounded by spruce/ fir vegetation averaging 60' to 75' in height and commercially harvested areas. See Table 6-6 for list of waterbodies within three miles of Segment 2.

Table 6-6. Waterbodies within 3 miles of Segment 2

Key	
	SCENIC RESOURCE OF STATE OR NATIONAL SIGNIFICANCE
DIST:	Distance to the Project. AC: Accessible. INAC: Inaccessible. DEV: Developed. UNDEV: Undeveloped.
RES. CLASS:	Resource Class from Maine Wildlands Lakes Assessment (MWLA) and Maine Lakes Study (MLS) 1A: Lakes of Statewide significance with multiple outstanding natural values. 1B: Lakes of Statewide significance with a single outstanding natural value. 2: Lakes of regional significance (no outstanding values but at least one significant resource value). 3: Lakes of local or unknown significance. Note that lakes and ponds smaller than 10 acres do not have a resource assessment. (-)
MAN. CLASS	LUPC Management Class Designation: 7: Lakes not otherwise designated
SCENIC RATING	S: Significant O: Outstanding ratings from the Maine Wildlands Lakes Assessment
VISIBILTY:	Project visibility based on viewshed mapping, fieldwork and 3D modeling/ cross sectional analysis.
NOTES	[1]. MWLA state that Mosquito Pond is 'INAC', but there is an accessible trail to boat launch on pond. Bald Mountain Pond in Bald Mountain Twp and Pleasant Pond in Caratunk are not located within the 3 mile study area. There will be no Project views from either pond.

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Moxie Pond Joe's Hole	East Moxie Twp, The Forks Plt., Bald Mountain Twp T2 R3	Crosses	2370	AC	DEV	1B	O	Yes, see Photo-simulation
Mosquito Pond	The Forks Plt	0. 5 mi	71	AC[1]	UNDEV	1B	O	No
Little Mosquito Pond	The Forks Plt	1.5 mi	24	INAC	UNDEV	-/7	-	No
Baker Stream	Bald Mountain Twp T2 R3	Crosses - 0.6 mi	1.3 entire stream within 3 miles	AC	UNDEV	-	-	Yes, at existing crossing
Little Austin Pond	Bald Mountain Twp T2 R3	1.7 mi	110	AC	UNDEV	2/7	-	No

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Austin Pond	Bald Mountain Twp T2 R3	2.5 mi	684	AC	UNDEV	2/7	-	No
Baker Pond	Caratunk	0.5 mi	186	AC	UNDEV	1B	-	No
Little Dimmock Pond	Caratunk	2.5 mi	41	AC	UNDEV	2	-	No
Big Dimmock Pond	Caratunk	2.0 mi	90	AC	UNDEV	2	-	No
Mountain Dimmock Pond	Caratunk	3.0 mi	50	AC	UNDEV	2	-	
Little Heald Pond	Caratunk	2.1 mi	26	INAC	UNDEV	2	-	No
Chase Pond	Moscow	2.1 mi	96	INAC	UNDEV	2	-	No
Little Chase Pond	Moscow	2.4 mi	1.1	INAC	UNDEV	-	-	No
Mink Ponds	Moscow	1.8 mi	4.5	INAC	UNDEV	-	-	
Austin Stream Austin Gorge	Moscow, Mayfield Twp	0.5 mi	13 +/- miles within 3 miles	AC	UNDEV	-	-	No
Wyman Lake	Moscow	500 ft	3,146	AC	DEV	-	S	Yes, minimal near dam

Land uses in the immediate vicinity of the co-located transmission line includes commercial forest lands, numerous seasonal camps on adjacent ponds, and the former Moscow radar sites. The most significant conservation land parcel is the National Park Service Appalachian Scenic Trail Unit located in Bald Mountain TWP and Caratunk. The largest population center is the village of Moscow at the southern end of Segment 2.

Table 6-7. Conservation Lands within 3 miles of Segment 2

CONSERVATION LAND	HOLDER	LOCATION	DIST +/-	SIZE (ac)	ACCESS	PROJECT VISIBILITY
Appalachian Trail Corridor (Tract 108-01 & 108-03)	NPS	Bald Mountain Twp, Caratunk	crosses	1,822, 1,302 +/- ac within 3 miles	Public	Yes
Caratunk E	BPL	Caratunk, Bald Mountain T2 R3	0.2 mi	549	Public	No

Table 6-8. Structures on the National Register of Historic Places within 3 miles of Segment 2

STRUCTURES on the NATIONAL REGISTER OF HISTORIC PLACES	TOWN	PUBLICALLY ACCESSIBLE	PROJECT VISIBILITY
Arnold Trail Historic District	Portion within 3 miles located on Wyman Lake in Moscow and Pleasant Ridge Plt	Yes	Yes

Scenic Resources[11] with potential views of the Project that were evaluated include:

Moxie Pond in East Moxie Twp, The Forks Plt, and Bald Mountain Twp T2 R3, the Appalachian Trail including the summit of Pleasant Pond Mountain, Bald Mountain, and the existing transmission line crossing at Troutdale Road, Joe's Hole/Baker Stream, the Wyman Lake Recreation Area in Pleasant Ridge Plt., the Arnold Trail and Wyman Lake in Moscow/Pleasant Ridge Plt.

Two additional locations evaluated include Mosquito Mountain in The Forks Plt and Moxie Mountain in Caratunk. Both of these elevated viewpoints are located on privately owned land where public access is allowed.

6.2.2.3 Distance Zones

Foreground (0 to 1/2 mile in distance): Foreground views of the HVDC transmission line corridor are found at road crossings (primarily within the commercial timber harvesting areas), river and stream crossings, and the Appalachian Trail, as listed below:

- The Forks Plt: Troutdale Road/ logging roads, access road to Mosquito Pond, Moxie Pond
- East Moxie Twp: Moxie Pond
- Caratunk: logging roads,
- Bald Mountain Twp: Troutdale Road/Trestle Road, Moxie Pond, Joe's Hole ,Baker Stream, Little Austin Pond access road,
- Moscow: Heald Pond Road, Chase Pond Road, Stream Pond, Wolf Mountain Pass Road, Bassett Lane, Henry Beaudoin Road, Burns Road, Donigan Road, Route 201

Midground (1/2 mile to 3 miles in distance):

- The Forks Plt: Mosquito Mountain
- Bald Mountain Twp: Bald Mountain, Appalachian Trail

Background (greater than 3 miles):

- The Forks Plt: Pleasant Pond Mountain, Appalachian Trail
- Caratunk: Moxie Mountain

[11] *Throughout this section, the term "Scenic Resources" is used as defined by Chapter 315.10, Maine Department of Environmental Protection.*

6.2.2.4 Inventory of Scenic Resources within the Viewshed of Segment 2

FIGURE 6-2-SEGMENT 2
Co-located HVDC Transmission between Moxie Pond and Wyman Hydro
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Co-located HVDC transmission line from north of Moxie Pond and Wyman Hydro
Activity Location: The Forks Plt, Caratunk, Bald Mountain TWP T2 R3, Moscow.
County: Somerset
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: June 2, 6, 7, 8, and 13, 2017.
Observer: Amy Segal, Steve Thompson
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail*?*	■	■	■

The Appalachian National Scenic Trail (AT), a unit of the National Park System, extends 2,175 miles from Mount Katahdin in Maine to Springer Mountain in Georgia. Approximately 14.5 miles of the Trail are located within 5 miles of Segment 2. There will be three general areas of Project visibility from the AT: from the summit area of Pleasant Pond Mountain at distances of 2.9 to 6.5 +/- miles, from within the 115kV transmission line corridor crossings near Troutdale Road, and from the summit area of Bald Mountain, including the North Peak side trail, at distances of 2.8 to 6.5+/- miles. The AT crosses the existing 115 kV transmission line three times in proximity to Troutdale Road near Moxie Pond within the CMP right-of-way. Appendix E describes and illustrates the experience of hiking on the Appalachian Trail (AT) northbound from the summit of Pleasant Pond Mountain to (Moxie) Bald Mountain. The appendix includes maps, aerials, trail character photographs and photosimulations from the summits of Pleasant Pond Mountain and Bald Mountain and Troutdale Road. The field analysis identified eight elevated viewpoints within 5 miles of the Project; the viewpoints are labeled as VP 1-4 near Pleasant Pond Mountain and VP 8-11 near the Bald Mountain summit. There will be filtered/distant Project views from six of the eight elevated viewpoints.

Pleasant Pond Mountain (VP1) in The Forks Plt. The summit of Pleasant Pond Mountain (elev. 2,477) is 3.3 miles from the Project and offers 180+ degree views north to east of Moxie Pond. Mount Kineo and Mount Katahdin are visible along with many other peaks. Moxie Pond and Mosquito Mountain are visible in the midground and Bald Mountain in the background. The character of the summit includes low growing spruce/fir vegetation with intermittent areas of exposed ledge outcropping. Open or minimally filtered views through the vegetation are possible from approximately 900 feet along the AT as it passes over the summit looking northwest to the southeast. The Bingham Wind Project is partially visible 13 miles to the southeast. The existing 115kV transmission line, located along the western shore of Moxie Pond, is

not highly visible from the summit due to intervening vegetation along the edge of the cleared corridor. Approximately 250 feet south of the actual summit on the Trail, there is another viewpoint (VP2), with less obstructing views and a 270-degree view from north to south. This viewpoint (VP2) was selected to photosimulate and analyze because of the wider potential view of the Project.

From Viewpoint 2 in The Forks Plt (elev. 2,463')., the proposed 150' wide co-located HVDC transmission line corridor will be visible at distances of 5.1 miles to the northeast, 2.9 miles to the east toward Moxie Pond, to 6+ miles to the southeast. The new HVDC transmission line will be 5.4 + miles to the northeast and minimally visible. Portions of the co-located HVDC line will be screened by Mosquito Mountain to the northeast and Middle Mountain to the southeast. The closest visible structures will be minimally visible with just tips visible at distances of 2.9 to 3.5 miles. The majority of proposed HVDC structures will be screened by vegetation. There would be potential for up to 12 structures to be visible looking to the southeast at a distance of 4.5 to 6.5 miles but the structures will be difficult to distinguish from the background. The conductors may be more visible in the afternoon when the sunlight reflects off the lines. These 12 structures and conductors would be seen in context of the Bingham Wind Project visible on the horizon. There will be minimal visual impact from the summit of Pleasant Pond Mountain due to the viewing distance and the resulting minimal Project visibility.

Middle Mountain (VP3) in Caratunk. The view from Middle Mountain (elev. 2,300') is similar to VP2 but more filtered due to the lower elevation and height of the spruce/fir vegetation. The viewpoint is approximately 0.6 mile south of the summit of Pleasant Pond Mountain looking north to northeast. The filtered 180-degree view includes Moxie Pond and Mosquito Mountain and is open for approximately 40' of trail. The existing transmission line is difficult to distinguish from this point. The Project would be mostly screened by foreground vegetation. Up to 3 structures would be visible, with the closest 2.7 miles to the east. Due to the partial screening of the Project and viewing distance, there will be a minimal visual impact from this viewpoint on Middle Mountain.

Viewpoint 4 in Caratunk is a filtered viewpoint from a point 1.2 miles southeast of VP3 looking southwest towards the Bigelow Mountain Range. The Project will not be visible from this elevated viewpoint.

Existing Transmission Line Crossings (VP 5 and 6) in Bald Mountain Twp.
The trail from the summit of Pleasant Pond Mountain to Troutdale Road is approximately 4.7 miles. The AT first crosses the existing 115kV transmission as it approaches Troutdale Road, approximately 500' west of Troutdale Road (VP5) where 12+ existing transmission line structures within the 150' wide cleared corridor are visible (looking northwest and southeast towards Joe's Hole) for approximately 400' of Trail. Once the AT reaches Troutdale Road, it parallels the road for approximately 900' before crossing Baker Stream and heading to Bald Mountain. The existing transmission corridor is visible for approximately 400' on the AT on Troutdale Road. The existing 115kV transmission line crosses Troutdale Road within this 900' section. From Troutdale Road (VP6) there are five existing transmission line structures visible to the southeast and two visible to the northwest. The trailhead off Troutdale Road has parking for 3 cars and a small campsite.

The existing 150' wide 115kV transmission line clearing will be widened by 75' on the western side to accommodate the new HVDC transmission line corridor. The widened corridor will result in slightly increased duration of exposure to the transmission lines in each of the two crossing locations. From both VP5 and VP6, two self-weathering steel HVDC structures will be visible looking to the northwest and six to the southeast towards Joe's Hole (Moxie Pond). (See Photosimulation B). The visible proposed HVDC structures will range in height from 75' to 80' on either side of Joe's Hole up to 100' - 105' for the angle structures furthest from view in either direction. The closest structures to Troutdale Road on the north side will be setback 500' from the road, and the structure across Joe's Hole will be 420'+/- from the road. The

structures will be spaced approximately 800' to 900' apart in comparison to 375' to 570' spacing for existing structures. The visual impact as viewed from the AT (VP 5 & VP6) will be minimal to moderate due to the presence of the existing 115kV transmission line corridor and foreground viewing distances.

Existing Transmission Line Crossing (Viewpoint 7) in in Bald Mountain Twp. After walking along or parking at the trailhead on Troutdale Road, hikers head east to reach Bald Mountain requiring the immediate crossing of Baker Stream at the south end of Joe's Hole. (The trail to the summit of Bald Mountain is 4.8 Miles from Baker Stream.) The trail continues for 1,400' after the stream to the third crossing (VP7) of the existing 115kV transmission line. The trail parallels the existing transmission line corridor for approximately 75 feet approaching the cleared corridor until it crosses at a nearly perpendicular angle. There are up to 15 existing transmission line structures visible from VP 7 crossing; up to 7 structures toward the northwest and 8 to the southeast.

The existing 150' wide transmission line clearing will be widened by 75' on the western side to accommodate the co-located HVDC transmission line corridor. There is 290'+/- of trail within the existing cleared corridor at this location. With the 75' of additional cleared corridor width, an additional 425' of the AT will be within the cleared corridor. From this crossing, a hiker would see one HVDC transmission line structure looking to the northwest and six looking to the southeast. The visual impact as viewed from the AT (VP 7) will be minimal to moderate due to the presence of the existing 115kV transmission line corridor, foreground viewing distances, and additional portion of trail within the corridor.

Bald Mountain Brook Lean-To is halfway between Troutdale Road and the summit of Bald Mountain. The area includes a lean-to structure as well as camp/tent sites. It is a heavily wooded area with 40+ foot vegetation and no possible views of the Project.

Near Bald Mountain Summit (VP8) looking south to southwest from a point on the Appalachian Trail, 375 feet west of the summit of Bald Mountain. This area is the first point on the trail to Bald Mountain with open views of Moxie Pond, Moxie Mountain, and the surrounding area. Large open areas of exposed ledge outcropping and small intermittent patches of spruce/fir forest are characteristic of the landscape between this viewpoint and the summit of Bald Mountain. The closest proposed structures will be visible in the co-located HVDC transmission line at a distance of 2.8 miles. The visual impact from this viewpoint will be similar to the summit. See below.

Bald Mountain Summit (VP9). The summit of (Moxie) Bald Mountain (elev. 2,629') is located 3.0 miles from the Project, approximately 5 trail miles east of the crossing at Troutdale Road. The summit landscape consists of open exposed ledge areas with patches of 5-10 foot spruce/fir vegetation. This open landscape character provides a variety of different vantage points for approximately 750' along the trail. The surveyed summit (with USGS marker) has a 360-degree view of the surrounding landscape including the Bigelow Range, Coburn Mountain, Pleasant Mountain, Mosquito Mountain, and the northern half of Moxie Pond. The MATC trail guides described Moxie Bald Mountain as follows: "*The long ridge of Moxie Bald offers many points of interest, including blueberries and raspberries in season. On a clear day, sweeping views are possible, from the coastal lowlands to the south, to the Barren-Chairback Range, White Cap Mountain, Katahdin, Big Moose Mountain, and the Boundary Range to the north, and to the Bigelow Range and Sugarloaf Mountain to the west. The Trail descends to Moxie Pond before traversing Pleasant Pond Mountain (2,477 ft., views similar to Moxie Bald)... Both peaks are popular as day hikes.*"[12] The closest portions of the existing 115kV transmission line are screened by vegetation and not readily visible from the summit. The most visible portion of the existing transmission line is the cleared corridor near the northern end of Moxie Pond at a distance of 5.1 miles. The Bingham Wind Project is visible from most points on

[12] *The Official Appalachian Trail Guide to Maine, Maine Appalachian Trail Club, Fifteenth Edition, 2009.*

the summit at a distance of 12 miles. Just beyond the summit, heading northbound, are views towards Bald Mountain Pond to the east.

From Bald Mountain, only the co-located section of the HVDC transmission line would be visible; the new HVDC transmission line will not be visible more than 8 miles to the northwest. At the closest point, the co-located corridor will be partially visible at a distance of 2.8 miles. The majority of the Project looking southwest will be screened by low spruce/fir trees along the perimeter of the open summit area. The focal point looking southwest is Baker Pond and Moxie Mountain and background mountains. The Project will not interfere with the view towards those landscape elements. Looking to the west and northwest, the Project will be located along the west side of Moxie Pond which is partially screened by foreground vegetation. The focal points looking towards the northwest are Pleasant Pond Mountain, Mosquito Mountain, and highly configured shoreline of Moxie Pond. The only place a hiker will see the proposed widened corridor clearing is where the existing corridor is visible at a distance of 5.1 miles. The proposed HVDC structures will be made of self-weathering steel structures which will blend with the wooded backdrop. The conductors will be the most visible components of the Project, especially in the morning hours when the sunlight is reflecting off the lines. Due to the partial screening of the Project and viewing distance, there will be a minimal visual impact from the summit of Bald Mountain.

Viewpoint 10 in Bald Mountain Twp is a view looking southeast towards Bald Mountain Pond from 600' east of the summit where the Trail starts the descent northbound off the summit of Bald Mountain. The Project will not be visible from this location.

North Peak Trail(VP11) is a side trail off of the AT that is encountered shortly after descending northbound off of the summit of Bald Mountain. Approximately 1,350' of the 0.7 mile side trail to the North Peak is over open ledges with 270 degree views. The summit of Bald Mountain is the only foreground view obstruction. The MATC Guide describe the North Peak Trail on Moxie Bald Mountain *"as a pleasant ledge walk with good views, and good blueberries in season."* The existing 115kV transmission line to the west of Moxie Pond is also visible from the North Peak. The proposed co-located HVDC transmission line will be visible from this location at 3.5 miles. More of the Project will be visible but at greater distance than from the summit of Bald Mountain. There will be a minimal visual impact from the North Peak due to the viewing distance and minimal visibility of the proposed structures and cleared corridor.

Snowmobile trails. The co-located HVDC transmission line corridor will run parallel to and cross ITS 86 in The Forks Plt for approximately one mile. While snowmobile / ATV trails are not considered scenic resources of state or national significance, some of the local trails may cross Moxie Pond, which is a scenic resource of state or national significance. The existing 115kV transmission line corridor will be expanded by 75' on the western side. The visual impact to the ITS trail should be minimal due to the trail's current location within the corridor.

D. A public site or structure listed on the National Register of Historic Places? ☐ ☐ ■

There are no structures on the NRHP within Segment 2 but the **Arnold Trail Historic District** is located along the center line of Wyman Lake from the dam north, approximately 3 miles within the Segment 2 Study Area. The Arnold Trail is the route that Benedict Arnold took in 1775 in an ill-fated attempt to attack Quebec during the Revolutionary War. According to the National Register nomination form,[13] the trail is 194 miles long,

[13] *National Register of Historic Places, Inventory – Nomination Form, Arnold Trail to Quebec. Maine State Park and Recreation Commission. July 14, 1969.*

stretching from Fort Popham at the mouth of the Kennebec River to Coburn Gore on the Canadian Border. The nomination form states "*The rivers have been altered more than anything since 1775…above Augusta, the Kennebec has an entirely different aspect than it did in 1775. Dams have been constructed at 10-15 miles intervals up the river, giving the stream a rather placid appearance, far different from the quick flowing shallow and treacherous Kennebec that the bateaux men saw.*" People interested in traveling along the Arnold Trail do not expect to encounter the same conditions as 1775. The more culturally significant locations (Great Carrying Place Portage Trail) for the Arnold Trail are not within the Segment 2 Project area.

Three HVDC transmission structures and conductors will be visible at distances of 0.5 - 1.3 miles from the middle of Wyman Lake where the Arnold Trail is located, and seen in context of the Wyman Hydroelectric Dam and the Bingham Wind project. There will be a minimal visual impact from the Arnold Trail. See description of Wyman Lake below, and the photosimulation from the Wyman Lake Recreation Area in Appendix D.

E. A National or State Park? ■ ■ ■

The Appalachian National Scenic Trail is a Unit of the National Park System. See above.

F. 1) A municipal park or public open space? □ □ ■

The Wyman Lake Recreation Area/Pleasant Ridge Swim Area on Wyman Lake off Pleasant Ridge Road, in Pleasant Ridge Plt is managed by Brookfield Renewables and the Bingham-Moscow Chamber of Commerce. The area includes a boat launch, swimming beach, picnic areas, and rest rooms. The Project will be visible from the swimming beach adjacent to the existing 115kV transmission line corridor and in context with the Wyman Hydroelectric Dam and portions of six Bingham Wind turbines. Three HVDC transmission structures and conductors will be visible at distances of 0.9 - 1.3 miles from this viewpoint. There will be a minimal visual impact from the Wyman Lake Recreation Area.

2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? □ ■ ■

Mosquito Mountain, west of Moxie Pond in The Forks Plt is privately owned but is presumed to allow public access. The trailhead on Troutdale Road is not well marked and parking is minimal. This 1.2-mile hike seems to be more of a local/ regional resource but is documented on websites as being a popular hike for families and college student groups. Hikers on the trail cross underneath the existing 115kV transmission line corridor approximately 400'from the trailhead. There are two scenic overlook locations: one on the east side of the mountain where there is an American flag anchored to the ledge, and one on the summit, 1,400' further west. Views from the eastern overlook include a 180-degree view including all of Moxie Pond, Mosquito Pond, (Moxie) Bald Mountain, and Pleasant Pond Mountain. The existing 115kV transmission line along the western side of Moxie Pond is visible with the closest point 0.7 mile to the east. The Indian Pond Road along the existing 115kV transmission line to Harris Dam is visible to the north of Moxie Pond at a distance of 3.0 to 5.1 miles and the Bingham Wind Project is visible 14.5 to 16.6 miles to the southeast. Expectations of visual quality among hikers of Mosquito Mountain are moderated by the visibility of the existing transmission line at Troutdale Road and Indian Pond Road

The existing 150' wide 115kV transmission line corridor clearing will be widened by 75' on the western side to accommodate the proposed HVDC transmission line. From the eastern overlook, twenty-four structures and conductors will be visible adjacent to the existing H-frame structures at distances of 0.7 to 1.3 miles. Where the existing cleared corridor is visible, the proposed expanded corridor will be visible. The proposed HVDC

structures will be made of self-weathering steel structures which will blend with the wooded backdrop and be less visible than the existing wood H-frame structures. The proposed conductors will be slightly higher than the existing conductors. Due to the presence of the existing transmission line and roads there will be minimal change in visual impact from the summit of Mosquito Mountain.

Moxie Mountain in Caratunk Twp is on private land, access is off an unmarked trailhead off logging roads/Heald Pond Road. The trail is not well marked or maintained. The south face of the mountain has rock outcrops, rock slides, and unique rock formations which allow for southern views. There are communication installations on the summit. The Project may be minimally visible from the outcrops at a distance at 4.5 to 5 miles to the southeast over the cleared former Moscow radar sites. There will be no visual impact to Moxie Mountain.

3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river? ■ ■ ■

Moxie Pond is a 2,370 acre pond in East Moxie Twp, The Forks Plt., Bald Mountain Twp T2 R3. The *Maine Wildlands Lakes Assessment* designated Moxie Pond as Resource Class 1B with 'Outstanding' Scenic resources and 'Significant' Fisheries, Shore Character, and Cultural resources. The Pond is considered a Scenic Resource of State or National Significance as a great pond with scenic resources rated as 'Outstanding. *The Scenic Lakes Character Evaluation in Maine's Unorganized Towns* characterizes Moxie Pond as having "low complexity" of Relief, "medium complexity" for Shoreline Configuration, Vegetation Diversity, and Special Features and "High complexity" for Physical Features. Moxie Pond was also rated as "High" for Inharmonious Development. There is a boat launch on the northwest end of Lake Moxie Road near the dam, and approximately 145 camps on the west side of the lake and 30+/- camps on the east side. The majority of camps located on the western shoreline are oriented to the east and away from the Project. The main access road for the camps is Lake Moxie Road/Troutdale Road which is located parallel to the existing 115kV transmission line along the western side of Moxie Pond. The existing 115kV wood H-frame transmission structures are typically 45' in height and spaced 350' to 500' apart. The existing transmission line is generally 350' to 900' from the edge of the pond except for a few areas where land extends into the Pond, such as near Caribou Narrows, and in two areas where the transmission line is directly adjacent to the Pond, near Black Narrows and at the southern end near Joe's Hole. The existing transmission line is generally not visible from the pond.

The Project will be located within the existing 115kV transmission line corridor which runs along the entire length of the western side of Moxie Pond. The existing 150' wide corridor clearing will be widened by 75' on the western side (away from the Pond) to accommodate the new transmission line. Of the 36 proposed HVDC structures adjacent to the Pond, the tops of approximately 12 structures will be visible from various areas of the Pond. The majority of the structures and conductors will be screened by shoreline vegetation which averages 60 to 75' in height. The structures will range in height from 75' to 105', the tallest structures being the most visible above the shoreline vegetation. Portions of the cleared corridor will be visible in two areas of the pond where the existing corridor is already visible: at the southern end north of Joe's Hole and near Black Narrows. From the northern end of the Pond, near the boat launch, the tips of six HVDC structures and portions of conductors will be visible at distances of 2,400' to 4,200'. (See Photosimulation 14). From the southern end, the tops of up to three HVDC transmission line structures and conductors will be visible above the tree line (see Photosimulation 15), but seen in context with the two existing H-frame structures and conductors that are visible. The visual impact to Moxie Pond will be minimal due to the presence of the existing transmission line and screening effects of shoreline vegetation. The use of self-weathering steel structures will minimize the contrast with the wooded backdrop as seen from the Pond.

Wyman Lake, the only portion of the Kennebec River where Segment 2 would be visible, is not considered to have scenic resources by the Maine Wildlands Lakes Assessment. The Wyman Dam on the Kennebec River was constructed in 1931 for hydroelectric generation. Wyman Lake, the resultant impoundment, extends for 11 miles to the north. Several recreation facilities have been constructed along the shoreline for boat access, swimming, and picnicking. Boaters and swimmers using the southern 3 miles of the Lake above the dam currently see the dam infrastructure, existing transmission line corridors, camps, Pleasant Ridge Road, and 6 turbines of the Bingham Wind Project. As noted in the description of the Wyman Lake Recreation Area and the Arnold Trail, approximately three HVDC transmission structures and conductors will be visible at distances of 0.5 - 1.3 miles from the southern portion of the Lake. There will be minimal visual impact from the Wyman Lake.

Baker Stream, in Bald Mountain Twp T2 R3, flows from Baker Pond to Moxie Pond. The entire 1.3 miles is within 3 miles of the Project. The existing 115kV transmission line crosses Baker Stream just south of Joe's Hole. The Appalachian Trail crosses Baker Stream approximately 500' south of the transmission line crossing. Troutdale/Trestle Road is located on the west side of Baker Stream and crosses just north of Baker Pond. There are five camps on the west side of the stream. The existing 150' wide corridor clearing will be widened by 75' on the southern side at the stream crossing to accommodate the new HVDC transmission line. The preserved vegetation along the stream will continue to screen the Project from view for the majority of the stream. The visual impact from Baker Stream will be minimal due to the presence of the existing transmission line and screening effects of shoreline vegetation.

2. What is the closest estimated distance to a similar activity? ■ ☐ ☐

The Project will be located within the existing 115kV transmission line corridor.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■ Yes ☐ No

The scenic resources are used throughout the year for a variety of recreational pursuits, including boating, fishing/ice fishing, and hiking.

6.2.2.5 Affected Population/User Expectations/Continued Use and Enjoyment

There are four general groups of people who may be affected by the Project.

Motorists

The main motorists who will see the Project include the camp owners who drive on Lake Moxie Road and Troutdale Road to access camps on Moxie Pond, and homeowners in Moscow who live off Heald Pond Road, Chase Pond Road, Stream Pond Road, Wolf Mountain Pass Road, Bassett Lane, Henry Beaudoin Road, Burns Road, and Donigan Road. Motorists presently see the existing 115 kV transmission line in several locations where they cross existing roads or

where there is no vegetation between the road and the existing corridor. The longest duration of exposure will be on Troutdale Road for approximately 1,000' where the road is located within the eastern side of the existing cleared corridor. (See Photosimulation 18). The proposed widened corridor and HVDC structures will be located on the west side of the corridor away from the road. Motorists will continue to use the roads to access their camps and homes. Due to the Project being co-located with the existing transmission line corridor, there should be minimal effect on motorists' continued use and enjoyment of those roads. There should be minimal visual impact to motorists.

Residents

Most camp residents on the west side of Moxie Pond and Baker Stream have preserved vegetation between their camps and the existing 115kV transmission line corridor. Because the Project will be located on the west side of the corridor, there will be no change in the vegetative buffer and therefore no visual impacts. The camp owners on the east side of Moxie Pond (mostly clustered around Mosquito Narrows) may have limited views of the tops of 3 to 5 HVDC transmission structures at a distance of 0.2 to 1 mile. The majority of the structures and conductors will be either screened by shoreline vegetation or seen against the wooded backdrop. The visual impact to camp owners on the east side of Moxie Pond will be minimal. The Project should not negatively affect the camp owners' experience or their continued use and enjoyment of their camps.

On Troutdale Road near Joe's Hole/Baker Stream and the crossing of the AT, there are camps on either side of the existing transmission line: one 400'+/- to the northeast, and one 180'+/- to the southwest. With the 75' of proposed clearing on the west side of the corridor, the existing vegetated buffer for the camp on the west side of the transmission line will be reduced and may result in a narrow opening to the corridor. The proposed HVDC structures will not be visible from the camp but the widened corridor may allow one existing 115kV transmission structure to be visible. The visual impact to camp owners on Troutdale Road will be none to minimal depending on the screening effect of remaining vegetation.

Most residents in Moscow whose driveways currently cross the existing 115kV transmission line corridor have significant vegetative buffers between their homes and the existing cleared corridor and should not be affected by the Project. Homeowners off of Donigan Road may see portions of

the HVDC structures above the tree line depending on the vegetative buffer on their property. The visual impact to homeowners in Moscow on Heald Pond Road, Chase Pond Road, Stream Pond Road, Wolf Mountain Pass Road, Bassett Lane, Henry Beaudoin Road, Burns Road, and Donigan Road will be none to moderate depending on existing vegetative buffers remaining between their homes and the Project.

Recreating Population

There are several types of recreational users that will be affected by the Project including hikers on the Appalachian Trail and Mosquito Mountain; boaters and those who fish on Moxie Pond, Baker Stream, and Wyman Lake; and ATV users and snowmobilers using ITS trails 86.

As described in the narrative for the elevated viewpoints on the Appalachian Trail, there will be minimal visibility of the Project from the summit areas of Pleasant Pond Mountain and Bald Mountain. AT hikers currently experience crossing the existing 115kV transmission line corridor three times in proximity to Troutdale Road. Hikers expect to see the transmission line as it is noted in Trail Guides and if they park in the trailhead adjacent to the existing corridor. The Project should not negatively affect the hikers' experience or their continued use and enjoyment the Appalachian Trail.

Project views from Mosquito Mountain are seen in context with the existing 115kV transmission line corridor both in the foreground (at the trail crossing), and the midground and background from summit overlooks. The proposed self-weathering steel HVDC structures will be seen against a wooded backdrop which will minimize their visibility. The widened corridor clearing will be visible in areas where the existing corridor is already visible. The Project should not negatively affect the public's continued use and enjoyment of Mosquito Mountain.

Expectations for visual quality among boaters on Moxie Pond, Wyman Lake, and Baker Stream are moderated by the visibility of existing development. Those who fish on these water resources are most interested in the fisheries. While boating and/or fishing, these users would have the opportunity to position themselves on the waterbodies to minimize their exposure to the Project. On Moxie Pond the main areas of Project visibility will be in the southern area near Joe's Hole and near Black Narrows where the existing transmission line is already visible. On Wyman Lake, boaters and those who fish will see the Project in context with the dam, the existing transmission

line, and Bingham Wind turbines. The Project will minimally affect the boating/fishing experience and should not decrease the public's continued use and enjoyment of the waterbodies.

6.2.2.6 Visual Impact Assessment

Landscape Compatibility

Color: The proposed single-pole HVDC transmission structures will be constructed of weathering steel (self-oxidizing) that will have a dark brown, rusty appearance. From most of the Segment 2 viewpoints, the difference in color between structures and surrounding vegetation should result in a relatively minor visual impact. Where the HVDC structures are seen adjacent to the existing wooden H-frame structures, there will be a stronger color contrast.

Form: Most of Segment 2 will use one type of transmission structure: a single pole structure averaging 100± feet tall which will result in a minimal to moderate contrast in form. The angle structures will be 2-pole structures more similar in form to the existing H-frame structures.

Line: Segment 2 is co-located with an existing transmission line therefore the proposed conductors and cleared corridor will create minimal additional line contrast. Where the proposed conductors but not the existing conductors are visible, there will be a moderate line contrast. However, increased viewing distances will diminish the line contrast visibility from elevated viewpoints.

Texture: The HVDC structures will be single pole self-weathering steel, which have a smoother texture than the standard wooden poles. This texture should cause a minimal contrast in texture.

Scale Contrast

Scale contrast is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource.

In general, there will be a moderate scale contrast created by co-locating the proposed HVDC structures, which average 100' in height, with the existing H-frame structures that average 45' in height. In locations along Moxie Pond where the average height is 90', the scale contrast will be

slightly less. With the corridor widened by 75', the total cleared corridor width will be 225' which is a 50% increase resulting in a moderate scale increase of the corridor itself. The scale contrast will be most visible from the foreground corridor crossings at roads and at Joe's Hole/Baker Stream crossing and from the southern end of Moxie Pond where the existing transmission structures are visible.

Spatial Dominance

Spatial dominance is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

When viewed from the summits of the AT or Mosquito Mountain, the Project will not dominate the landscape because of its co-location with the existing transmission line which is at a low elevation along Moxie Pond. Views towards Moxie Pond and the surrounding mountain ridges will continue to dominate the landscape from elevated viewpoints. In foreground viewing locations such as road crossings and the crossing of Joe's Hole/Baker Stream, the Project will be co-dominant with existing transmission line structures. Segment 2 of the Project will not dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.2.2.7 Mitigation Strategies

The primary mitigation strategy utilized for Segment 2 was co-locating the line with an existing 115kV transmission line. The HVDC structures will be made of self-weathering steel which will result in minimal color contrast with the surrounding wooded landscape when viewed from elevated viewpoints and waterbodies. The height of the HVDC structures on the western side of Moxie Pond has been minimized to the extent possible to reduce the contrast in scale and reduce potential visibility from Moxie Pond. Where the widening of the cleared corridor results in a longer duration of exposure to AT hikers (east of Baker Stream), trail relocation may be possible.

6.2.2.8 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, Segment 2 will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.2.3 SEGMENT 3. Co-located HVDC from Moscow to Lewiston.

Segment 3 will include 70+/- miles of the co-located HVDC transmission line from the Wyman Hydroelectric Facility in Moscow, through the towns of Concord Twp, Embden, Anson, Starks, Industry, New Sharon, Farmington, Wilton, Chesterville, Jay, Livermore Falls, Leeds, Greene, and Lewiston. It will terminate at the new 345kV AC to +/-320kV HVDC 1200 MW Merrill Road Converter Station, just north of Larrabee Road Substation in Lewiston. (See Merrill Road Converter Substation in Section 6.3.4.) The existing corridor clearing ranges between 150' and 225' in width for the majority of Segment 3, except for a 400' wide 1.1-mile long section ending at the Livermore Falls Substation. The new co-located transmission line section will require the existing cleared corridor to be widened by 75' on the western side. The Converter Station and Larrabee Road Substation will be connected by a new 1.2-mile 345kV AC Transmission Line (Section 3007). In proximity to the Larrabee Road Substation, there will be a partial rebuild of 0.8 miles of 34.5kV transmission line (Section 72) to accommodate the connecting segment of 345kV transmission line and the installation of a new 345kV transmission line terminal. The terminal at Larrabee Road Substation will be located within the existing fenced-in facility and be similar in height to the existing adjacent substation components. The structures in Segment 3 will be single pole self-weathering steel structures with an average height of 100'.

6.2.3.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 22 & 26 and July 3 & 5, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, Maps 5 – 9.

Other data sources include the aerial photographs and cross sections provided by POWER Engineers for the Project; project descriptions and maps from comprehensive plans and zoning ordinances where available; Maine Trail Finder website; Kennebec Land Trust website; Androscoggin Land Trust website; Somerset Woods Trustee website; Chamber of Commerce websites; Maine DACF website (State Parks); the *Vision and Master Plan for the Androscoggin Riverlands State Park, by BPL, 5/2010*, and Google Earth.

6.2.3.2 Study Area

Segment 3 is divided into two different landscape characters. The northern portion of the Study Area is located within the Central Mountains and Western Foothills Biophysical Regions[14] and is characterized by the Kennebec River and Sandy River watersheds with numerous small to medium waterbodies ranging in size from 6 to 196 acres. There are also a few larger waterbodies: Embden Pond (1,568 ac) in Embden and Clearwater Pond (751 ac) in Industry. The northern portion of the Project area is surrounded by medium hills and mountains with elevations ranging between 1,200' and 1,850'. This portion of the Study Area includes Bingham, Concord Plt, Embden, Solon, Anson, Madison, Starks, Industry, Farmington, New Sharon, Wilton, and Chesterville. The Kennebec River flows for 27 miles through the north portion of Segment 3 with several of the population centers located along its banks including the villages of Bingham, Solon, North Anson, Anson, and Madison. The Project will be located within the existing 115kV transmission line corridor which is 0.25 to 1.5 miles to the west of the Kennebec River. The Sandy River flows through Farmington and the central portion of the Study Area towards the Kennebec River.

Table 6-9 Elevated Viewpoints within 5 miles – Segment 3

MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT	SIGNIFICANCE	VISIBILITY
Fletcher Mountain	Concord Twp	2.8 mi	1,709'	Harvesting	None	No - wooded
Barton Hill	Anson	4.2 mi	1,295'	Private residence	None, private	No - wooded
Boardman Mountain	Industry	3.5 mi	1,490'	None	None	No - wooded
Bannock Mountain	Industry	0.7 mi	1,230'	Private residence	None, private	Not likely - wooded
Norton Mountain	New Vineyard	4.0 mi	1,850'	Harvesting	None	No - wooded
Spruce Mountain	Jay	2.0 mi	1,114'	None	None	No - wooded
Moose Hill	Livermore Falls	2.0 mi	1,116'	Private residence	None, private	Not likely - wooded
Academy Hill	Canton	3.9 mi	1,112'	Conservation Land (Androscoggin Land Trust)	Recreation, wildlife habitat, ATV, multi-use trails	No - wooded
Jug Hill	Androscoggin	0.8 mi	790'	None	None	Not likely - wooded
Monument Hill	Leeds	1.5 mi	665'	None	Hiking trail	Possible

[15] *The Biophysical Regions of Maine: Patterns in the Landscape and Vegetation*. Janet McMahon. 1990.

The southern portion of the Segment 3 Study Area is within the Western Foothills Biophysical Region. It is characterized by the Androscoggin River watershed, small to medium waterbodies generally ranging in size from 3 to 208 acres, and medium hills with elevations ranging between 665' and 1,116'. The largest waterbodies are Androscoggin Lake (3,980 acres) and Lake Auburn (2,260 acres) within the Study Area. The southern portion of Segment 3 includes the Towns of Jay, Livermore Falls, Leeds, Greene, and Lewiston. The largest population center is Lewiston.

The Androscoggin River flows for 41 miles through the southern portion of the Study Area and is crossed by the Project in Auburn. The Project will be located within the existing 115kV transmission line corridor which is 0.7 to 1.8 miles east of the Androscoggin River.

The majority of the vegetation on the land immediately surrounding Segment 3 is mixed forestland with occasional agricultural fields. The existing transmission line is predominantly edged with 50 to 70-foot tall mixed deciduous and evergreen trees. Land uses in the immediate vicinity of the transmission line are predominantly woodland, farmland, and low density rural residential with clusters of village development.

Table 6-10. Waterbodies within 3 miles of Segment 3

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Lower Kennebec River	Moscow to Norridgewock	Crosses In Moscow	27.5 miles within 3 miles	ACC	DEV	-	-	Yes, at Wyman Hydro, and other areas
Jackson Pond	Concord Twp	0.9 mi	32	AC	UNDEV	1B/7	O	No
Lily Pond	Concord Twp	0.7 mi	25	AC	DEV, 1 camp	-	-	No
Tibbetts Pond	Concord Twp	0.9 mi	6	AC	UNDEV	3	-	No
Embden Pond	Embden	2.1 mi	1,568	AC	DEV	1B	-	Not within 3 miles
Sandy Pond	Embden	1.3 mi	107	AC	DEV	1B	-	No
Fahi Pond	Embden	0.4 mi	196	AC	DEV	1B	-	Possible Not likely
Carrabassett River	Anson	crosses	3.9 mi within 3 miles	AC	DEV	-	-	Yes, at crossing
Nevens Pond	Anson	2.0 mi	10.6	INAC	UNDEV	-	-	No
Cold Pond* (Redneck Rd Starks)	Starks	0.4 mi	4.2	INAC	UNDEV	-	-	Possible Not likely
Clearwater Pond	Industry	1.2 mi	751	AC	DEV	2	-	Possible but Minimal

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Sandy River	Farmington	crosses	9.3 mi within 3 miles	AC	DEV	-	-	Yes, at crossing
Pease Pond	Wilton	1.4 mi	109	AC	DEV	2	-	Possible Not likely
Locke Pond	Chesterville	1.4 mi	120	AC	DEV	-	-	Possible Not likely
Sand Pond	Chesterville	1.6 mi	81	AC	DEV	2	-	No
Robinson Pond	Chesterville	1.5 mi	8	AC	UNDEV	-	-	No
North Pond	Chesterville	1.9 mi	170	AC	UNDEV	2	-	Possible Not likely
Parker Pond	Jay	1.3 mi	17	AC	DEV, 2 camps	2	-	Possible Not likely
Androscoggin River	Jay	crosses	41.5 mi within 3 miles	AC	DEV	-	-	Not likely
Moose Hill Pond	Livermore Falls	1.4 mi	95	AC	DEV	2	-	No
Mosher Pond	Fayette	2.9 mi	70, 10.5 acres within 3 miles	AC	DEV, low	1B		No
Long Pond	Livermore	2.3 mi	208	AC	DEV	2	-	No
Round Pond	Livermore	2.9 mi	151	AC	DEV	-	-	No
Bartlett Pond	Livermore	2.7 mi	28	AC	DEV	2	-	No
Rack Pond	Livermore Falls	1.7 mi	8	INAC	UNDEV	-	-	No
Round Pond	Livermore Falls	1.7 mi	3.4	AC	DEV, 1 camp	-		No
Turner Pond	Livermore Falls	1.5 mi	7.8	AC	DEV, 2 camps	-	-	No
Schoolhouse Pond	Livermore Falls	1.8 mi	17	AC	DEV	-	-	No
Pleasant Pond	Turner	2.8 mi	189	AC	DEV	2	-	No
Nezinscot River	Turner	0.9 mi	3.3 miles within 3 miles	AC	DEV	-	-	No
Androscoggin Lake	Leeds	2.4 mi	3980, 550 within 3 miles	AC	DEV	1A	-	Not within 3 miles
Dead River	Leeds	crosses	5.5 miles	AC	DEV	-	-	Yes
Deane Pond	Greene	1.3 mi	6.3	INAC	UNDEV	-		No
Allen Pond	Greene	250 ft	183	AC	DEV	2	-	Yes
Little Sabattus Pond	Greene	1.6 mi	25	AC	UNDEV	3	-	No
Berry Pond	Greene	0.3 mi	31	AC	UNDEV, 1 dock	3	-	Yes, tops of 1 or 2 structures
Lake Auburn	Auburn	2.0 mi	2260, 752 within 3 miles	AC	DEV	1B	-	No

Table 6--11. Conservation Lands within 3 miles of Segment 3

CONSERVATION LAND	HOLDER	LOCATION	DIST +/-	SIZE (ac)	ACCESS	PROJECT VISIBILITY
Tibbetts Pond	IFW	Bingham	0.8 mi	16.5	Public	No
Indian & Fowl Meadow Islands	SWT	Solon	1.5 mi	33.9	Private publicly accessible	No
Fahi Pond	WMA, IFW	Embden	700 ft	4 parcels, 337	Public	Not likely
Madison Easement	BPL	Madison	0.8 mi	6 parcels incl. Weston Island, 292	Public	No
Thompson & Dinsmore Island	SWT	Madison	1.1 mi	19.2	Private publicly accessible	Not likely
Sterry Hill	MFT	Starks	crosses	195	Restricted	Yes
Sunnyview	MFT	Farmington	1.8 mi	30.3	Restricted	Not likely
Clifford Woods	MWO	Farmington	1.0 mi	55.1	Public for certain uses	No
French Falls Recreation Area	AlT, BPL	Jay	1.3 mi	28 ac	Public	No
Whistlestop Rail Trail Jay to Farmington	BPL	Farmington, Wilton, Jay	1.3 mi	145, 116.2 within 3 miles	Public	No
Chesterville	WMA	Chesterville	1.7 mi	894, 708 within 3 miles	Public	No
Spruce Mountain	ALT, BPL	Jay	1.4 mi	157	Public	No
Meadowbrook / Sturtevant Farm Conservation Area	KLT	Fayette	2.6 mi	335, 118 within 3 miles	Private, publicly accessible	No
Tolla Walla	WMA, MIFW	Livermore	0.2 mi	515	Public	No
Nutting	MFT	Leeds	crosses	82	Restricted	Yes
Fish Farm	ALT	Leeds	1.1 mi	79	Restricted	No
River Rise Farm	ALT, BPL	Turner	1.0 mi	247	Restricted	No
Pleasant Pond	ALT	Turner	2.0 mi	220	Restricted	No
Brackett-Longley Rare Plant Preserve	KLT	Leeds	2.2 mi	46	Private publicly accessible	No
Androscoggin Riverlands State Park	BPL	Turner	crosses	2923	Public	Yes
Marden Chittick	ALT	Greene	0.1 mi	195	Restricted	No
Hooper Pond	ALT, IFW	Greene	1.6 mi	178	Private publicly accessible	No
Captain Harris	ALT	Greene	2.8 mi	301, 34 within 3 miles	Private Public allowed	No
Sunnyview	MFT	Farmington	1.8 mi	30.3	Restricted	Not likely

Table 6-12. Structures on the National Register of Historic Places within 3 miles of Segment 3

STRUCTURES on the NATIONAL REGISTER OF HISTORIC PLACES	TOWN	PUBLICALLY ACCESSIBLE	PROJECT VISIBILITY
Bingham Free Meetinghouse	Bingham	Yes	No
Concord Haven	Embden	No	No
Embden Town House	Embden	Yes	No
Carrabassett Inn	Anson	Yes	No
Anson Grange No.88	North Anson	Yes	No
Bailey Farm Windmill	North Anson	No	No
Steward--Emery House	North Anson	No	No
Temples Historic District	North Anson	Yes	No
Old Point and Sebastian Rale Monument	Mad	Yes	No
Madison Public Library	Madison	Yes	No
Weston Homestead	Madison	No	No
Thompson's Bridge	Industry	Yes	No
Cutler Memorial Library	Farmington	Yes	No
Farmington Historic District	Farmington	Yes	No
First Congregational Church; United Church of Christ	Farmington	Yes	No
Franklin County Courthouse	Farmington	Yes	No
Free Will Baptist Meetinghouse	Farmington	Yes	No
Greenacre	Farmington	No	No
Greenwood; Chester; House	Farmington	No	No
Little Red Schoolhouse	Farmington	No	No
Merrill Hall	Farmington	Yes	No
Nordica Homestead	Farmington	Yes	No
Old Union Meetinghouse	Farmington	Yes	No
Ramsdell; Hiram; House	Farmington	No	No
Tufts House	Farmington	No	No
Holmes-Crafts Homestead	Jay	Yes	No

Scenic Resources with potential Project views that were evaluated include the Lower Kennebec River and Arnold Trail from Moscow to Norridgewock; Fahi Pond Wildlife Management Area in Embden; the Carrabassett River in Anson; the Sandy River in Farmington; the Dead River in Leeds; Allen and Berry Pond in Greene; and the Androscoggin Riverlands State Park in Leeds and Turner. Monument Hill in Leeds was evaluated as the one elevated viewpoint with potential Project views.

6.2.3.3 Distance Zones

Foreground: 0 to 1/2 mile in distance. Views of the transmission line corridor are primarily limited to foreground views, primarily road crossings and waterbodies:

- Concord Twp.: Pleasant Ridge Road, Bluff Road, Jackson Pond Road, Owens Road, and 5 unnamed roads/farm roads.
- Embden: Bert Berry Road, Town Road, and three unnamed roads/farm roads.
- Anson: Solon Road, Madison Street, River Road, Campground Road, Bookerville Road, Lloyd Road, Starks Road, and 2 unnamed roads.
- Starks: Starks Road, Redneck Road, Mayhew Road, W. Mills Road.
- Industry: Industry Road (Route 43), Bailey Road.
- New Sharon: Goodrich Road, Clearwater Road.
- Farmington: Perham Hill Road, Osborne Road, Bailey Hill Road, Davis Road, US Route 2, Whittier Road, Knowlton Corner Road, Webster Road, Sandy River.
- Wilton: McCrillis Corner Road.
- Chesterville: Wilton Road.
- Jay: Soules Hill Road, Belanger Road, E. Jay Road, Claybrook Road, Turmel Road, Moose Hill Road.
- Livermore Falls: Fayette Road, Pomeroy Hill Road, Park Street, Hillman Ferry Road, Bear Brook Road, Androscoggin Bluff Road, Lyman Lane, River Road, Strickland Loop Road.
- Leeds: Knapp Road, Campbell Road, Howes Corner Road, Fish Street, River Road, Church Hill Road, N-Line Road.
- Greene: Linda Drive, Additon Road, Rose Road, Allen Pond Campground Road, Packard Road, Meadow Hill Road, Daggett Hill Road, Route 100.
- Lewiston: Merrill Road, Substation at Larrabee Road.

Midground: 1/2 mile to 3 miles in distance.

- Leeds: Monument Hill

Background: greater than 3 miles. None.

6.2.3.4 Inventory of Scenic Resources within the Viewshed

FIGURE 6-3 -Segment 3
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Segment 3, installation of co-located HVDC transmission line
Activity Location: Moscow, Concord Twp., Embden, Anson, Starks, Industry, New Sharon, Farmington, Wilton, Chesterville, Jay, Livermore Falls, Leeds, Greene, Lewiston
County: Somerset**,** Franklin, Androscoggin
GIS Coordinates, if known: See project location maps from POWERS Engineers.
Date of Survey: June 2, 21, 22, 26 and July 3, 5, 2017
Observer: Amy Segal, Steve Thompson

Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge?	☐	☐	☐

There are three Wildlife Management Areas within Segment 3: Fahi Pond Wildlife Management Area in Embden
Tolla Wolla Wildlife Management Area in Livermore, and Chesterville Wildlife Management Area in Chesterville.
Fieldwork and computer modeling have confirmed that none of these Wildlife Management Areas should have Project views due to intervening vegetation.

C. A state or federal trail?	■	☐	☐

Segment 3 is crossed or paralleled by four ITS snowmobile trails: ITS 84 in Anson on the Kennebec Valley Trail, ITS 82 and ITS 115 in Jay, and ITS 87 in Leeds as well as within the corridor between Livermore Falls and Lewiston. Snowmobilers are accustomed to seeing the existing transmission line corridor. There will be minimal visual impact to the ITS trails.

The 14.5-mile Kennebec Valley Trail follows the edge of the Kennebec River from North Anson through, Embden and Solon to Bingham. The trail is multi-use allowing ATV's, snowmobiles, horseback riding, hiking, cross country skiing and biking. The Trail currently crosses the existing 115kV transmission line in North Anson to the east of the Carrabec High School playing fields. The proposed widening of the corridor will increase the duration of exposure for the users but the overall visual change will be minimal. See narrative for Route 8 crossing below.

D. A public site or structure listed on the National Register of Historic Places?	■	☐	☐

The Project will not be visible from any structures on the National Register in Segment 3. There will be no Project views from the Farmington Historic District or the Temples Historic District in Anson.

The Arnold Trail, as noted in Segment 2, is located along the Kennebec River through Segment 3. The only location where the Project will be visible from the Arnold Trail will be where it crosses the Lower Kennebec River directly below the Wyman Hydroelectric Dam. In this context, a visitor expects to the see the dam, substation and numerous transmission lines. The visual impact to the visitor should be minimal to none due to the context adjacent to the Dam.

E. A National or State Park?	■	☐	☐

The Androscoggin Riverlands is a 2,675-acre State Park located in Leeds and Turner with 12 miles of frontage on the Androscoggin River. The Park is split into two parcels; a 2,345 acre parcel on the west side of the river in

Turner, and a 330-acre parcel on the east side of the river in Leeds. The park includes a wide variety of trails for different users including skiers and snowmobilers in the winter and ATVs, pedestrian hikers, mountain bikers, and horseback riders in the other seasons. Hunting is also allowed within the Park. The park and river are part of the Androscoggin Greenway and Androscoggin River Water Trails, with numerous boat access points along the riverfront within the Park.

The pedestrian trails in the Turner parcel closest to the shoreline include remnants of several old homesteads, water access locations, a picnic area, and several overlooks. There will be no views of the Project from the trails or riverfront overlooks.

The Leeds parcel is less developed with less formal boat access. The existing 115kV transmission line crosses the Leeds parcel for approximately 0.6 miles west of Church Hill Road. The relatively flat topography allows for distant views into the corridors in both directions. Vegetation edging the corridor is mixed evergreen and deciduous at heights ranging from 50’ to 70’. The corridor contains one 115kV transmission line supported on wood H-frame structures typically 45’ in height and one 115kV transmission line supported on single pole wood structures typically 75’ in height. The existing 225’ corridor clearing will be widened by 75’ on the western side to accommodate the proposed co-located HVDC transmission line. Widening of the corridor will not make the corridor visible from the river. The proposed HVDC structures in the corridor will be typically 100’ in height and spaced typically 1,000’ apart. Visitors to this portion of the State Park expect to the see the transmission line and may even use the Project corridor for some recreation pursuits including snowmobiling, ATV riding, and hunting. Though there will be a moderate contrast in material, color, and structure height, the visual impact to users of the Androscoggin Riverlands State Park will be minimal due to the presence of the existing transmission lines. (See Photosimulation 23).

F. 1) A municipal park or public open space? ■ □ □

The only municipal parcel that will have views of Segment 3 will be the municipally owned Carrabec High School athletic fields on the west side of the existing corridor in Anson. The Kennebec Valley Trail (a multi-use trail) runs along the northern edge of the fields and crosses the existing transmission line about 800’ north of the Route 8 crossing. The existing 115kV transmission lines are currently visible across the street over a field to the southeast. Currently there is a 150’ to 250’ wide mixed evergreen/deciduous vegetative buffer between the fields and the existing corridor which screens the views of the transmission lines. The existing 225’ corridor clearing will be widened by 75’ on the western side to accommodate the proposed co-located HVDC transmission line which will decrease the buffer to 75’ to 175’ in width. The proposed HVDC structures in the corridor will be typically 100’ in height and spaced typically 1,000’ apart. The tip of one HVDC structure will be visible above the tree line from the athletic fields and one will be visible south of Route 8 over the open fields. The visual impact to users of the athletic fields will be minimal due to the limited amount of structures visible and the remaining vegetative buffer. Photosimulation 21 illustrates the change in the corridor visible from Route 8 looking northwest. See Appendix B for photographs from the area.

2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? □ □ ■

Monument Hill, located in Leeds, is a popular short local hike to a summit (elev 665') where a Civil War monument is located. Views from the summit look to the east over Androscoggin Lake and to the west towards the existing transmission lines located 1.5 miles to the west. The existing 115kV transmission line corridor is not readily visible due to intervening vegetation and topography. With the widening of the corridor, the tips of a few proposed HVDC structures may be visible. Because the structures will be made of self-weathering steel and seen against a wooded backdrop, they will be minimally visible. There are currently patches of visible agricultural fields from the summit. The widened cleared corridor will be minimally visible and appear similarly to the existing openings. The visual impact to Monument Hill will be minimal.

3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river? ■ □ □

Lower Kennebec River. As noted in the description of the Arnold Trail in Segment 2, the Project will cross the Lower Kennebec River south of Wyman Hydroelectric Dam. The existing 150' corridor clearing will be widened by 75' on the western side to accommodate the proposed co-located HVDC transmission line corridor. At this location, viewers also see the dam infrastructure, substation, and existing transmission line. The Kennebec River in this area has restricted access due to the potential for rapid water level rise. The visual impact to a viewer in this area will be minimal to none.

The lower portion of the **Kennebec River** between Madison and The Forks is rated as a "B" river in the Maine Rivers Study. The section of river between the headwater to the Kennebec River is rated for its Geologic/Hydrologic, Critical/Ecologic, Scenic, Inland Fisheries, Canoe Touring and Historic Resources. The viewshed analysis shows potential for Project views in several locations along the 27 miles of Kennebec River within the Segment 3 Study Area. This analysis is conservatively based on calculating visibility assuming maximum 40' tree height. Field work and 3D Modeling has concluded that the vegetation along the River in most locations is taller than 40' and will therefore screen the Project from view. In some isolated areas such as near the confluence of the Carrabassett River, portions of the proposed HVDC structures may be visible where the existing transmission line is also visible or where the riparian vegetation is below 40' in height.

The **Carrabassett River** is rated as a "B" river in the Maine Rivers Study. The section of river between the headwater to the Kennebec River is rated for its Geologic/Hydrologic, Critical/Ecologic, Inland Fishery, Whitewater Boating, Canoe Touring and Historic Resources. While the river is not necessarily ranked for Scenic resources, the Study notes that North Anson Gorge has been identified as 'Significant' by the Critical Areas Program because it's scenic and scientific attributes. The AMC River Guide: Maine notes that boaters "*need to take out above the village of North Anson because you come upon an unpassable falls in town*". There is no description of river east of the falls other than it is 1.0 miles to the Kennebec River. The existing transmission lines are not visible from the North Anson Gorge.

The Project will cross the Carrabassett River 0.5 mile downstream of the Route 8 bridge on the western side of the existing transmission line crossing in a relatively flat landscape where the River is 450' +/- wide. The existing 225' corridor clearing will be widened by 75' on the western side to accommodate the proposed co-located HVDC transmission line. The proposed structures on either side of the river will be setback 270' on the north side and 223' on the south side which is a similar or greater setback than the existing structures. The existing vegetation on either side of the corridor will partially screen the structures from view when approaching the corridor crossing. There will be no views of Segment 3 from the North Anson Gorge or from the Route 8 bridge due to intervening topography and vegetation. There will be minimal visual impact to users of the Carrabassett River due to the presence of the existing transmission line and screening effects of preserved riparian vegetation.

Clearwater Pond is a heavily developed 751-acre pond located in Industry. Clearwater Pond is not rated for Scenic qualities in the Maine Lakes Study. At its closest point the existing transmission line is located 1.2+/- miles southeast of the pond. Portions of the Segment 3 HVDC transmission lines may be visible from the central and northwestern ends of the pond at distances of 1.5 to 3.4 miles. Visual impact on the pond should be none to minimal due to intervening vegetation screening and the viewing distance.

The existing transmission line corridor crosses **Sandy River** in Farmington southwest of Route 2. (See Photosimulation 23 for view from Route 2.) The Maine Lakes Study determined that the scenic resources of this section of Sandy River were not unique or significant, *i.e.*, they did not meet a minimum standard of significance. (The portion from Phillips to the headwaters - not within the Project Study Area - is rated for scenic resources). The AMC River Guide: Maine describes the area of the crossing within a 6.0-mile section as "smooth and winding" with scenery of rural land use with towns. The areas on either side of the river crossing are agricultural fields with a buffer of riparian vegetation along the banks. The existing corridor is partially buffered except within the corridor. The existing conductors are visible for approximately 0.3 miles heading southeast downstream, and 0.25 mile looking to the northwest after the crossing.

In this area of Segment 3, the existing 225' wide cleared corridor will be widened by 75' on the western side to accommodate the new HVDC transmission line. Because of the existing open fields, the expanded corridor clearings may appear to be extended agricultural fields to recreational boaters on the river. Approximately five proposed HVDC structures and conductors will be visible from within the crossing along with 10+/- H-frame 115kV transmission line structures. The closest proposed HVDC structure will be 150' from the edge of the river, setback further than the existing structures. Visual impact on the Sandy River should be minimal due the presence of the existing transmission line and existing openings on both sides of the river.

The Project will be visible from the **Dead River** in Leeds within the existing cleared transmission line corridor. There is an approximately 125'+/- long suspension bridge for the ITS Route 87 across this section of river. The existing 225' wide cleared corridor will be widened by 75' on the western side to accommodate the new HVDC transmission line. There will be minimal visual impact to recreational users of the river and snowmobile bridge, due to the presence of the existing transmission line and the preserved riparian vegetation.

There are two ponds in Greene that may have Project visibility because of their close proximity to the existing transmission line corridor. The first, **Allen Pond**, is a 183 acre highly developed pond located approximately 250 feet east of the existing corridor. Recreational uses of the pond may see up to 5 to 6 HVDC structures above the treeline. **Berry Pond** is a 31-acre undeveloped pond located 1,800'+/- west of the existing corridor. Recreational uses of Berry Pond may see up to up to 2 structures. The visual impact to users of these two ponds will be minimal to moderate depending on the viewer's location on the resource.

2. What is the closest estimated distance to a similar activity? ■ ☐ ☐

The proposed transmission line will parallel the existing transmission structures within the corridor.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■ Yes ☐ No

The scenic resources described above are used throughout the year for a variety of recreational pursuits.

6.2.3.5 Affected Population/ User Expectations/Continued Use and Enjoyment

There are four general groups of people who already see the existing transmission lines at times during the year and may be affected by the Project.

Motorists

The primary viewing population is the year-round residents who live or work in or near Concord Twp, Embden, Anson, Starks, Industry, New Sharon, Farmington, Wilton, Chesterville, Jay, Livermore Falls, Leeds, Greene, and Lewiston and use State Routes 201 in Moscow, Route 16 in Concord Twp and Embden, Route 8 in Anson, Route 43 in Starks, Route 2 in Farmington, Route 156 in Chesterville, Route 133 in Jay and Livermore Falls, Route 219 in Leeds, Route 100/202 in Greene and Lewiston, and the surrounding local roads. Segment 3 will include 64 road crossings in its 70 +/- mile length.

At 39 of these crossings, motorists currently see an existing 115kV transmission line on H-frame structures that are typically 45' tall within a 150' cleared transmission line corridor. At the remaining 25 crossings, motorists see two 115kV transmission lines – one on wooden H-frame structures typically 45' in height and one on wooden single pole structures typically 75' in height within a 225' cleared transmission line corridor. The existing 150' or 225' wide corridors will be widened by 75' on the west side to accommodate the proposed HVDC transmission line corridor which will be supported on self-weathering steel structures that will be typically 100' in height. The Project should minimally increase the overall visual impact of the transmission line corridor as motorists cross under the lines.

Residents

There are approximately 96 homes located directly adjacent to or that have a view of the existing transmission line and proposed Segment 3. The majority are single family homes on individual lots or farmsteads in rural settings. For the most part, the homes are oriented away from the transmission line corridor. In most locations homeowners have maintained a sufficient amount

of woods on their properties to provide an adequate buffer between themselves and the proposed widened corridor. In a few locations, such as along Route 16 in Concord Twp, there will be open views towards the Project because of adjacent open fields. There will be minimal to moderate visual impact on the residential properties that are adjacent to or within view of the transmission line corridor, depending on the viewing distance and amount of intervening or preserved vegetation.

Recreating Population

Existing trails are used by ATV riders, snowmobilers, and hikers throughout Segment 3. Since current users are accustomed to riding or walking in the cleared transmission line corridors and seeing transmission structures and overhead conductors, there should be minimal visual impact to recreational trail users resulting from the Segment 3 activities. Recreational boaters using the Carrabassett, Sandy, and Dead Rivers are also accustomed to viewing the existing transmission lines and adjacent open fields on either side of the corridors while using these resources. Increasing the cleared width by 75' and installing HVDC transmission line structures will have minimal visual impact on canoeists and kayakers who cross under the lines and should not affect the continued use and enjoyment of the rivers. The Project views for boaters on Clearwater Pond will be in the midground/background viewing distance and should not affect the continued use and enjoyment of the pond. Allen Pond is a smaller pond located within foreground viewing distances from the Project. The Project will be most visible from the southern end of Pond where the existing transmission line is visible. The proposed HVDC transmission line should have minimal to no impact on the continued use and enjoyment of these water resources. Segment 3 will also be located adjacent to the Bowman Airfield in Livermore. The proposed Project will be located to avoid impacts to the airfield.

Working Population

The majority of the working population within the Segment 3 viewshed are agricultural and commercial forestry workers. There are also adjacent gravel pits and smaller commercial businesses (such as RV Sales and car repair). The project is located within the foreground of two high school campuses (Carrabec High School in Anson and Mt Blue High School in Farmington), but there will be no Project views for teachers/administrators from within the

school facilities. The visual impacts to the working population in the Segment 3 area should be minimal to none.

6.2.3.6 Visual Impact Assessment

Landscape Compatibility

Color: The proposed single-pole HVDC transmission structures will be constructed of weathering steel (self-oxidizing) that will have a dark brown, rusty appearance. From most of the Segment 3 viewpoints, the difference in color should result in a relatively minor contrast with the surrounding vegetation. Where the HVDC structures are seen adjacent to the existing wooden H-frame structures, there will be a strong color contrast.

Form: Most of Segment 3 will use one type of transmission structure: a single pole structure averaging 100± feet tall which will result in a minimal to moderate contrast in form. The angle structures will consist of two poles more similar in form to the existing H-frame structures.

Line: Segment 3 is co-located with an existing transmission line therefore the proposed conductors and cleared corridor will create minimal additional line contrast. Where the proposed conductors are visible and the existing conductors are not, there will be a moderate line contrast.

Texture: The HVDC structures will be single pole self-weathering steel, which have a smoother texture than the standard wooden poles. This texture should cause a minimal contrast in texture.

Scale Contrast

Scale contrast is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource.

In general, there will be a moderate scale contrast created by co-locating the proposed HVDC structures, which average 100’ in height, with the existing H-frame structures that average 45’ in height and single pole structures averaging 75’ in height. With the corridor widened by 75’, the total cleared corridor width will be 225’ to 300’ which results in a moderate scale increase of the cleared corridor itself. The scale contrast will be most visible from the foreground corridor crossings at roads and river crossings where the existing transmission structures are visible.

Spatial Dominance

Spatial dominance is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

When viewed from road and river crossings, the Project will be co-dominant with existing transmission line structures. Segment 3 of the Project will not dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.4.8 Mitigation Strategies

The primary mitigation strategy utilized for Segment 3 was co-locating the line with an existing 115kV transmission lines. The structure material and form are also mitigation strategies. The HVDC structures will be made of self-weathering steel which will blend with the surrounding wooded landscape better than the silver gray color of galvanized steel.

6.2.3.8 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, Segment 3 will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.2.4 SEGMENT 4. Rebuild of Sections 62 and 64, Lewiston to Pownal

Segment 4 will include a new 345kV STATCOM Substation off Fickett Road in Pownal and a 0.3 mile 345kV AC Transmission Line (Section 3005) connection from this facility to the Surowiec Substation in Pownal. In addition, two 115kV transmission lines will be rebuilt: the 9.3 mile Section 62 between Crowley's Substation in Lewiston and Surowiec Substation in Pownal,

and the 16.1 mile Section 64 between Larrabee Road Substation and Surowiec Substation. The typical 45' wooden H-frame structures will be replaced with 75' wooden single pole structures. Both rebuilt sections are located in the towns of Lewiston, Auburn, Durham, and Pownal. This section assesses the rebuilt lines only. An analysis of Fickett Road Substation is found in the Substation Section 6.3.8.

6.2.4.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on May 24 and June 2 & 3, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, Maps 19 and 10.

Other data sources include the aerial photographs and cross sections provided by POWER Engineers for the Project; project descriptions and maps from municipal comprehensive plans and zoning ordinances of Lewiston, Auburn, Durham, and Pownal; Maine Trail Finder website; Androscoggin Land Trust website; and Google Earth.

6.2.4.2 Study Area

Site Context

The area within one mile of Segment 4 is characterized by low rolling hills with average elevations of 100 to 350 feet above the surrounding landscape. The general topography is shaped by watershed drainage toward the No Name River, Sabattus River, and the Androscoggin River. The vegetation is mixed evergreen and deciduous second growth. The transmission line is edged with a mixture of light mixed hardwoods and stands of 50 to 70-foot tall evergreen trees. Land use in the immediate vicinity of the transmission line is predominantly woodland, farmland, and low to medium density rural residential.

Downtown Lewiston is within 0.5 miles to the west; Durham village is 3.0± miles to the south east; the village of New Gloucester is 4.2± miles to the west; and North Pownal is approximately 0.5 miles to the east.

Scenic resources with potential Project views that were evaluated include the Androscoggin River crossing in Auburn and No Name Pond in Lewiston.

Table 6-13. Elevated Viewpoints within 5 miles of Segment 4

MOUNTAIN	LOCATION	DIST	ELEV	DEVELOPMENT	SIGNIFICANCE	VISIBILITY
Bradbury Mountain	Pownal	2.5 mi	483'	Trail to Summit Picnic areas, Playground at lower elevation	State Park	No – Summit overlook is to the southeast away from the Project
Pisgah Hill	New Gloucester	1.0 mi	400'	Trail, parking at lower trailhead	RRCT – public access	No

Table 6-14. Waterbodies within 3 miles of Segment 4

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
No Name Pond	Lewiston	0.3 mi	143	AC	DEV	3	-	Possible, up to 7 structures
Sabattus Pond	Greene, Sabattus	2.2 mi	1962, 566 within 3 miles	AC	DEV	1B	-	No
Runaround Pond	Durham	0.2 mi	91	AC	DEV, low	2	-	Not likely

6.2.4.3 Distance Zones

Foreground (0 to 1/2 mile in distance): Views of the transmission line corridor are limited to foreground views, primarily road crossings. Road crossings include:

- Lewiston: College Road, Old Green Road, Pond Road, Sabattus Street/Route 126, Riley Road, Grove Street, Old Webster Road, Maine Turnpike, Old Lisbon Road, Lisbon Street/Route 196, South Lisbon Road, Old Lisbon Road, Pinewoods Road, Ferry Road, Dyer Road, and Cotton Road.
- Auburn: Riverside Drive/Route 136.
- Durham: Cloutier Road, Bowen Road, Bowie Hill Rd. Ext, Stackpole Road, Auburn Pownal Road, Durham Road.
- Pownal: Fickett Road.

Midground (1/2 mile to four miles in distance): None

Background (greater than four miles): None

Table 6-15. Conservation Lands within 3 miles of Segment 4

CONSERVATION LAND	HOLDER	LOCATION	DIST +/-	SIZE (ac)	ACCESS	PROJECT VISIBILITY
Thorncrag Bird Sanctuary	SBC	Lewiston	730 ft	366	Private, publicly accessible	No
Garcelon Bog	ALT	Lewiston	1.5 mi	108	Private, publicly accessible	No
No Name Pond	ALT	Lewiston	0.6 mi	34	Restricted	No
Packard Farm	ALT	Lisbon	1.0 mi	194	Restricted	No
Packard-Littlefield Farm	ALT	Lisbon	1.5 mi	193	Restricted	No
Breton Preserve	ALT	Lisbon	1.6 mi	103	Private, publicly accessible	No
Durham Riverpark	ALT	Durham	2.5 mi	12.2	Private, publicly accessible	No
Davis Farm	RRCT, DA	Durham	1.7 mi	66	Restricted	No
Runaround Pond State Park	BPL	Durham	0.9 mi	129	Public	No
Pisgah Hill Preserve	RRCT, BPL	New Gloucester	1.0 mi	117	Public	No
Bradbury-Pineland Corridor	BPL	Pownal	0.9 mi	246	Public	No
Deerfield Pines Easements	RRCT	Pownal	0.5 mi	41	Private	No
Verrill Preserve	RRCT	Pownal	0.8 mi	17	Private	No
Snowfields Easement	RRCT	Pownal	1.1 mi	101	Private	No
Whitney Easement	RRCT	Pownal	2.0 mi	93	Private	No
Sweetser-Adcock Preserve	RRCT	Pownal	2.4 mi	14	Private	No
Crain-Lawrence Easement	RRCT	Pownal	1.9 mi	47	Private	No
Knight Farm Easement	RRCT	Pownal	2.9 mi	16.5	Private	No
Bradbury Mountain State Park	BPL	Pownal	1.7 mi	705	Public	No
Graham	RRCT	New Gloucester	1.5 mi	47	Private	No

Table 6-16. Structures on the National Register of Historic Places within 3 miles of Segment 4

STRUCTURES on the NATIONAL REGISTER OF HISTORIC PLACES	TOWN	PUBLICALLY ACCESSIBLE	PROJECT VISIBILITY
Briggs; William; Homestead	Auburn	No	No
Clifford, John D., House	Lewiston	No	No
Free Baptist Church	Lewiston	Yes	No
Frye; Sen. William P.; House	Lewiston	No	No
Hathorn Hall; Bates College	Lewiston	Yes	No
Holland; Captain; House	Lewiston	No	No
Holland-Drew House	Lewiston	No	No

STRUCTURES on the NATIONAL REGISTER OF HISTORIC PLACES	TOWN	PUBLICALLY ACCESSIBLE	PROJECT VISIBILITY
Jordan School	Lewiston	No - apts	No
Kora Temple	Lewiston	Yes	No
Lord; James C.; House	Lewiston	No	No
Marcotte Nursing Home	Lewiston	Yes	No
Martel; Dr. Louis J.; House	Lewiston	No	No
Saint Mary's General Hospital	Lewiston	Yes	No
St. Joseph's Catholic Church	Lewiston	Yes	No
Sts. Peter and Paul Church	Lewiston	Yes	No
Wedgewood; Dr. Milton; House	Lewiston	No	No
Webster Rubber Company Plant	Sabattus	No	No
Universalist Meeting House	New Gloucester	Yes	No
Pownal Cattle Pound	Pownal	Yes	No
Randall; Jacob; House	Pownal	No	No
West Durham Methodist Church	West Durham	Yes	No

6.2.4.4 Inventory of Science Resources within the Viewshed

FIGURE 6-4 - SEGMENT 4
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: NRPA
Activity Type: Segment 4, Rebuild of Section 62 and 64
Activity Location: Lewiston, Auburn, Durham, and Pownal, Maine
Counties: Androscoggin and Cumberland
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: May 24, June 2 and 3, 2017
Observer: Amy Segal, Steve Thompson
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
The Thorncrag Bird Sanctuary is a 357-acre wildlife preserve in Lewiston established by the Stanton Bird Club. There will be no Project views from the Sanctuary.			
C. A state or federal trail?	■	☐	☐
A portion of the ITS snowmobile trail is co-located in the corridor for 3± miles of Segment 4.			

D. A public site or structure listed on the National Register of Historic Places? ☐ ☐ ☐

There are no structures on the NRHP with Project views.

E. A National or State Park? ☐ ☐ ☐

Segment 4 will not impact Bradbury Mountain State Park, which is 2 miles to the southeast of the Surowiec Substation in Pownal.

F. 1) A municipal park or public open space? ☐ ☐ ☐

The Randall Road Ball Fields off Randall Road in Lewiston are located to the west to the existing transmission line corridor. There is currently a 130± foot wooded buffer between the fields and the transmission line which will remain. The proposed rebuilt Section 62 115kV transmission line structures will be shorter than the existing single pole structures that are now visible above the tree line. The typically 75' structures will be screened by the existing buffer remaining.

The Durham Boat Launch on the Androscoggin River in Durham is located 0.6 miles to the southeast of the Project. Views of the Project from the riverfront would be screened by a hedgerow of evergreen trees and existing riparian vegetation.

The 12-acre Durham River Park on the Androscoggin River, is owned by the Town of Durham and managed by the Durham Conservation Commission. The Androscoggin Land Trust holds a conservation easement on the property. The park is located approximately 3.2 miles downriver (southeast) from the proposed rebuilt Section 62 and 64 crossing of the River but intervening vegetation will screen the Project from view.

Runaround Pond Recreation Area, off Runaround Pond Road in Durham, is a 133 acre are managed by the Town of Durham for paddling, fishing, skating, and wildlife viewing. The boat launch is approximately 1.5 miles east of the existing transmission line. The transmission line and Section 62 and 64 do not cross the pond itself, but do cross the waterbodies that drain into the Pond. No additional vegetation will be removed therefore there will be no impacts to the Pond or Recreation Area.

2) A publicly owned land visited, in part, for the use , observation, enjoyment, and appreciation of natural or man-made visual qualities? See above. ☐ ☐ ☐

3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river? ■ ☐ ☐

The Rebuilt Section 64 crosses the No Name Brook, Stetson Brook, and Libby Brook, and both Sections 62 and 64 will cross Runaround Brook and the Androscoggin River. The No Name, Stetson, Libby, and Runaround Brooks are not rated in the Maine Rivers Study.

No Name Pond in Lewiston is a 143-acre pond located approximately 0.3 miles from Segment 4. From the pond, up to 7 structures and conductors may be visible above the treeline looking to the southwest at a distance of 1.6 miles. No Name Pond is not rated in Maine's Finest Lakes for scenic resources. It is a lightly developed pond with public access on the north end.

The proposed Rebuilt Sections 62 and 64 crosses the Androscoggin River between Lewiston and Auburn, adjacent to Riverside Drive/Route 136. The segment of the Androscoggin River where Segment 4 crosses was not rated as scenic by the Maine River Study. The existing wooden H-frame structures on the either side of the river crossing will be replaced with single pole steel structures made of self-weathering steel. The rebuilt section will be supported by single pole wooden structures typically 75' in height. No additional tree removal will be necessary. There will be minimal additional visual impact due to the presence of the existing 345kV transmission line and 115kV transmission lines. See Photosimulation 25.

2. What is the closest estimated distance to a similar activity? ■ ☐ ☐

The proposed Rebuilt Sections 62 and 64 transmission line will replace the existing H-frame structures in the same corridor adjacent to the existing 345kV transmission line corridor.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■Yes ☐No

The transmission line corridor is used throughout the year for a variety of recreational pursuits. The Androscoggin River is used for recreational boating and fishing.

6.2.4.5 Affected Population/User Expectations/ Continued Use and Enjoyment

There are four general groups of people who already see the existing transmission lines at times during the year and may be affected by the Project.

Motorists

The primary viewing population is the year-round residents who live or work in Lewiston, Auburn, Durham, New Gloucester, and Pownal. Motorists presently see the existing 115kV and 345kV transmission lines within the 340 to 400 feet wide corridor. The rebuilding of two 115kV transmission lines will minimally increase the overall visual impact of the transmission line as motorists cross under the lines. Segment 4 should not affect the continued use and enjoyment of the local roads.

Residents

There are approximately 102 homes located in Segment 4 that are directly adjacent to or have views of the existing transmission line corridor. The majority are single family homes on individual lots in rural settings or within small subdivisions or mobile home parks. For the most part, the homes are oriented away from the transmission line corridor. The majority of these homes will not be affected by the Segment 4 Rebuild. No additional tree removal will be required. Vegetation that was preserved abutting homes as part of the MPRP will be preserved in the proposed Segment 4.

Recreating Population

Current recreational users of the transmission line corridor are accustomed to seeing the existing transmission line corridors and structures. Local ATV and snowmobile clubs include northern portions of Segment 4 on their trail maps. The ITS 87 and ITS 115 snowmobile trails are located

on portions of Segment 4 in Lewiston. There should be minimal visual impact to recreational trail users. Recreational boaters using the Androscoggin River, or any of the small brooks crossed are accustomed to viewing the existing transmission lines while using the resource. Rebuilding Section 62 and 64 will have minimal visual impact to paddlers who cross under the lines and should not affect the continued use and enjoyment of those waterbodies. The Project views for boaters on No Name Pond will be in the midground/background viewing distance and should not affect the continued use and enjoyment of the pond.

Working Population

There are a several businesses located directly adjacent to or within close proximity to the existing transmission line corridor on in Lewiston. In both areas, the roadside character is generally open with minimal vegetative buffer and businesses oriented toward the roads. Interstate 95 crosses Lisbon Street 0.5 mile east of the transmission line corridor crossing. The proposal for Segment 4 should have a minimal visual impact to those working in these businesses. There are a few working farms within view of the transmission line corridor in Durham. In general, the workers are accustomed to seeing the transmission line, and the structures do not appear to interfere with the use of the land for farming operations.

6.2.4.6 Visual Impact Assessment

Landscape Compatibility

Color: The colors and materials to be used for most of the proposed Rebuilt Section 62 and 64 structures are similar in color to the existing wooden H-frame and single pole structures that viewers are familiar with. The new wood structures may initially be darker than the existing ones, but the contrast will diminish with time as normal aging occurs. The self-weathering steel structures used at the Androscoggin River crossing will present a moderate to strong color contrast with the existing wood structures. Where the 345kV transmission line is supported by 115’ steel structures, the proposed single pole structures will contrast in color, similar to existing conditions.

Form: The forms of individual single pole structures are typical of those found throughout central and southern Maine. The single pole structures will present a minor contrast with the H-

frame structure within the corridor. The structures should result in a minimal contrast in form with the trees and occasional buildings that define or are visible from the edge of the corridor.

Line: New transmission lines will be parallel to the existing transmission lines within the corridor but slightly higher. The additional transmission lines are expected to result in a minor contrast in line due to their limited visibility outside of the transmission line corridor.

Texture: The texture of the proposed structures will be similar to the existing structures and should not cause a contrast in texture.

Scale Contrast

In most cases the proposed single pole 115V transmission line structures will be seen in context with the existing 345kV transmission line on H-frame structures already in the existing corridor, and against the 50 to 70-foot tall trees that line the corridor. The proposed single pole structures will typically be the same height as the 345kV transmission line structures. There will be no contrasts in scale as seen from the roads and rivers from the installation of the single pole structures.

Spatial Dominance

The Project will be contained within the existing transmission line corridor. When seen from the scenic resources identified above, the new transmission line will not dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.2.4.7 Mitigation Strategies

The primary mitigation strategy utilized for Segment 4 was rebuilding the 115kV transmission lines within the existing 115kV transmission line corridor which results in no additional tree removal. The structure material and form are also mitigation strategies. The proposed single pole 115kV structures will be made of wood which will be similar to the existing structures and minimize contrast in color, line, form and texture.

6.2.4.8 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, Segment 4 will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.2.5 SEGMENT 5

Segment 5 includes a new 26.5-mile 345kV transmission line from the existing Coopers Mills Substation in Windsor to the existing Maine Yankee Substation in Wiscasset and partial rebuilds of a 0.3 mile segment of the Section 3025 345kV transmission line and a 0.8mile segment of the Section 392 345kV transmission line outside of Coopers Mills Substation; and a 0.8 mile segment of the Section 66/80 115kV transmission line outside of Coopers Mills Substation. Segment 5 is located in the Towns of Windsor, Whitefield, Alna, Woolwich, and Wiscasset.

The northern portion of Segment 5 (0.7 mile +/-) will be located between four existing 115kV transmission lines and two existing 345kV transmission lines near Cooper's Mills Substation. The majority of the co-located 345kV transmission line will be located between an existing 115kV transmission line supported on wooden single pole structures typically 75' in height and one existing 345kV transmission line supported by wooden H-frame structures typically 75' in height. The southernmost section (2.9 miles +/-) from the Maine Yankee Substation crossing Route 1 and Montsweag Brook in Wiscasset includes two or three steel lattice structures, typically 125' in height. The co-located 345kV structure will be supported by wooden H-frame structures typically 75' in height, similar to the existing 345kV structures except for the southern section which will be supported on existing steel double-circuit lattice structures.

The typical existing corridor clearing width in the northern section is 575' to 640', the majority of the corridor ranges from 300' to 480' in width, and the southern section closest to Maine Yankee has an existing cleared corridor width of 370' to 550'. No additional tree removal is anticipated with the exception of a 1.4 mile section located between Old Stage Road and Bradford Road in Wiscasset, where 75' of additional tree removal will be necessary on the eastern side of the existing cleared corridor.

6.2.5.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 27, and July 3, 5, 6, 2017. Representative views from each road crossing within the Study Area are included in Appendix B, Maps 11 and 12. Other data sources include aerial photographs and cross sections provided by POWER Engineers; Chewonki website regarding the Montsweag Brook Buffer project; Midcoast Conservancy website; Boothbay Regional Land Trust; municipal comprehensive plans and zoning ordinances where available; Maine Trail Finder; and Google Earth.

6.2.5.2 Study Area

Site Context

The area within three miles of the northern portion of Segment 5 is characterized by low rolling hills and numerous linear ponds, small rivers and meandering streams draining towards the Sheepscot River. Most landforms rise 60 to 400 feet above the surrounding landscape. Vegetative cover throughout the segment is mixed coniferous and deciduous second growth, with many open fields. The transmission line is predominantly edged with 40 to 60-foot tall mixed second growth hardwoods and softwoods.

The area within three miles of the southern section of Segment 5 is characterized by rolling topography with steep-sided wooded ravines cut by streams draining south to Montsweag Bay and the Back River. The former Maine Yankee site at the southern end of Segment 5 is flat, with little vegetation except along the access roads. The vegetation on the land surrounding Segment 5 north of the Maine Yankee site is mixed deciduous and coniferous. The transmission line is edged with 40 to 60-foot tall mixed deciduous and coniferous trees.

Land uses in the immediate vicinity of the northern portion of Segment 5 are predominantly woodland, farmland, gravel pits, rural residential, and some limited commercial along Route 17. Land uses in the immediate vicinity of the southern portion of the Segment 5 transmission line are predominantly woodland, farmland, and rural residential, with highway commercial along the Route One corridor and industrial development near the Maine Yankee Substation site. Windsor is 1.5 miles to the northwest of Coopers Mills Substation, the village of Whitefield is 0.25 miles

to the east, the Head Tide Historic District in Alna is 0.5 mile to the east, and the Wiscasset town center is approximately 1.0 mile to the east of Segment 5.

The Scenic Resources that were evaluated include the Alonzo Garcelon and Earle R. Kelley Wildlife Management Areas, the West Branch of the Sheepscot River, Sheepscot River, Back River between Wiscasset and Westport Island, Montsweag Brook on the Wiscasset/Woolwich town line, and several waterbodies (Savade Pond, Long Pond, Travel Pond, Clary Lake, Dresden Bog). Historic structures and districts including Wiscasset Historic District and Head Tide Historic District were evaluated. Additional locally sensitive resources evaluated included villages, private and public conservation lands, and municipal lands. See Resource Tables below.

Table 6-17. Waterbodies within 3 miles of Segment 5

WATERBODY	LOCATION	DIST +/-	SIZE (ac)	ACCESS	DEV	RES. CLASS/ MAN. CLASS	SCENIC RATING	PROJECT VISIBILITY
Savade Pond	Windsor	1.5 mi	42	AC	DEV, 1 camp	1B/-	-	No
Givens Pond	Whitefield	2.4 mi	20	AC	DEV, 1 camp	1B/-	-	No
Tinkham Pond	Chelsea	2.9 mi	17	AC	DEV, 1 camp	3/-	-	No
Long Pond	Windsor, Somerville	1.8 mi	490	AC	DEV	-	-	No
Travel Pond	Jefferson	2.3 mi	102	AC	DEV	1B/-	-	No
Clary Lake	Jefferson	2.5 mi	666	AC	DEV	1B/-	-	No, flat terrain and distant
Joys Pond	Pittston	1.6 mi	21	AC	DEV	3/-	-	No
Weary Pond	Jefferson	2.3 mi	42	AC	UNDEV	-	-	No
Pinkham Pond	Alna	1.2 mi	21	AC	DEV, 1 camp	3/-	-	No
Dresden Bog Reservoir	Dresden	1.6 mi	185	AC	DEV	-	-	No
Gardiner Pond	Wiscasset	1.6 mi	78	AC	UNDEV	2/-	-	No
Lily Pond	Edgecomb	2.7 mi	67	AC	DEV, 1 camp	1B/-	-	No

Table 6-18. Conservation Lands within 3 miles of Segment 5

CONSERVATION LAND	HOLDER	LOCATION	DIST +/-	SIZE (ac)	ACCESS	PROJECT VISIBILITY
Savade Pond Boat Access	IFW	Windsor	1.5 mi	2 parcels, 71	Public	No
Alonzo H. Garcelon	WMA, IFW	Windsor	2.1 mi	2,300, 700 within 3 miles	Public	No
Paradise Green	Private	Whitefield	1.5 mi	345	Restricted	No
Haines	Private	Whitefield	0.2 mi	88	Private	No
Whitefield Salmon Preserve	Private	Whitefield	1.0	32	Public access allowed	No
Crowe Rope	IFW	Whitefield	1.0 mi	57	Private, possible access	No
Happy Farm	Private	Whitefield	1.0 mi	64	Restricted	No
Uncas	MFT	Whitefield	1.5 mi	57	Restricted	Not likely
Hidden Valley Farm	MFT	Whitefield, Alna	1.5 mi	529	Restricted	No
Heart of the Watershed, Barth Parcels	Private	Alna	1.4 mi	194	Public	No
River Glen	Private	Whitefield	0.7 mi	26	Restricted	No
Holy Apostles	Private	Whitefield	0.4 mi	20	Restricted	No
Earle R. Kelly (Dresden Bog)	WMA, IFW	Alna, Dresden	1.0 mi	853	Public	No
McCullough	Private	Alna	1.3 mi	37	Private, allowed for some uses	No
Walker	Private	Alna	1.4 mi	91	Restricted	No
Bass Falls Preserve	Private	Alna	1.7 mi	31	Public access allowed	No
Fossell	Private	Alna	1.8 mi	4.3	Private, allowed for some uses	No
Wood	Private	Alna	2.2 mi	10.6	Restricted	No
Philbrick	Private	Alna	1.6 mi	60	Restricted	No
Biddle Preserve	Private	Alna	2.0 mi	16	Public access allowed	No
Brun Life Estate	Private	Wiscasset	1.4 mi	11.5	Private, allowed for some uses	No
Clark's Point	MCHT	Wiscasset	2.2 mi	83	Private, no public access	No
Sortwell Memorial Forest	NEFF	Wiscasset	0.6 mi	96	Public access allowed	No
Eaton Farm	CF	Woolwich	0.2 mi	198	Private, allowed for some uses	No
Oak Island	IFW	Woolwich	2.1 mi	71	Possible access	No
Ovens Mouth West Preserve	BRLT, MCHT	Boothbay	2.9 mi	49	Private, allowed for general uses	No
Fowle's Cove	MCHT	Westport Island	1.7 mi	56	Private, no public access	No

Table 6-19 Structures on the National Register of Historic Places within 3 miles of Segment 5

STRUCTURES on the NATIONAL REGISTER OF HISTORIC PLACES	TOWN	PUBLICALLY ACCESSIBLE	PROJECT VISIBILITY
Alna Meetinghouse	Alna	Yes	No
Alna School	Alna	Yes	No
Carleton; Moses; House	Alna	No	No
Head Tide Historic District	Alna	Yes	No
Parson's Bend	Alna	No	No
Nickels-Sortwell House	Wiscasset	Inn	No
Red Brick School	Wiscasset	No	No
Scott; Capt. George; House	Wiscasset	No	No
U.S. Customhouse (Old Customhouse) and Post Office	Wiscasset	Yes	No
Wiscasset Historic District	Wiscasset	Yes	No
Wiscasset Jail and Museum	Wiscasset	Yes	No
Congregational Church of Edgecomb	Edgecomb	Yes	No
Fort Edgecomb	Edgecomb	Yes	No
Moore; John; House	Edgecomb	No	No
Parsons; Stephen; House	Edgecomb	No	No
Parsons; Josiah K.; Homestead	Westport	No	No
Moody Mansion	Pittston	No	No
Clary Mill	Whitefield	No	No

6.2.5.3 Distance Zones

Foreground (0 to 1/2 mile in distance): The majority of views of the transmission line corridor are foreground views, primarily at road crossings. Road crossings include:

- Windsor: Maxcy's Mill Road, Griffin Road, Route 32/Augusta Rockland Road
- Whitefield: Doyle Road, Partridge Lane, Devine Road, Cooper Road, Route 126/Gardiner Road, Philbrick Lane, Route 194/Pittston Road, Route 218/Wiscasset Road
- Alna: Route 218/Wiscasset Road, Rabbit Path Rod, Lothrop Road
- Woolwich: Old Stage Road
- Wiscasset: Route 27/Gardiner Road, Foye Road, Willow Lane, Bradford Road, Old Bath Road, US Route 1 (Bath Road), Route 144 (Birch Point Road), Old Ferry Road

Midground (1/2 mile to 3 miles in distance): In a few locations there will be midground views of the project where the existing corridor crosses over open fields adjacent to roads. Those locations include:

- Windsor: Intersection of Route 17 and 32 where tops of a few structures may be visible approximately 1.4 miles to the east and approaching the existing crossing on Route 32
- Whitefield: Approaching the existing crossing over open fields near Route 194
- Wiscasset: Approaching Route 27

Background (greater than 3 miles): None.

6.2.5.4 Inventory of Scenic Resources within the Viewshed

FIGURE 6-5 - SEGMENT 5
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Segment 5, Co-located 345kV transmission line
Activity Location: Windsor, Whitefield, Alna, Woolwich, Wiscasset
County: Kennebec and Lincoln
GIS Coordinates, if known: See project location maps
Date of Survey: June 27, and July 3, 5, 6, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	□	□	□
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? The Alonzo H. Garcelon Wildlife Management Area in Windsor and the Earle R. Kelley (Dresden Bog) Wildlife Management Area in Dresden and Alna are within the Study Area, but the Project will not be visible from either area due to intervening topography and vegetation.	□	□	□
C. A state or federal trail? None There are no ITS Routes crossing the corridor	□	□	□
D. A public site or structure listed on the National Register of Historic Places? None. There are 19 structures on the National Register of Historic Places within the Segment 5 APE, including the Wiscasset Historic District and the Head Tide Historic District in Alna. The Wiscasset Historic District includes most of the central village in Wiscasset with over 22 contributing structures. The village of Wiscasset is located 1.4 miles to the east of the Project. The Head Tide Historic District was formerly a mill town on the Sheepscot River on Head Tide Road. The mills have been removed but a dam, bridge, cluster of historic homes, the store, the Head Tide Church, and school house remain. The Head Tide Historic District is 0.5 miles east of the Project. The Project will not be visible from any of the structures or either District. See the Resource Chart for list of structures. Photos of the structures and districts are included in Appendix B.	□	□	□
E. A National or State Park? None	□	□	□

F. 1) A municipal park or public open space? None □ □ □

Several privately owned but publicly accessible conservation areas were evaluated. None of these areas will have Project views. See Resource Table.

2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None. □ □ □

The Wiscasset Community Trails/West Woods Trails (including the Town-owned Forest, Sortwell Memorial Forest, and Morris Farm) are 0.5 miles east of the Project and will not have Project views. The Project will not be visible from the following evaluated local resources: Bass Falls Preserve in Alna, Drucker Parcel in Whitefield, and Clark's Point, Sortwell Memorial Forest, Eaton Farm, and Fowles Cove in Wiscasset. Private conservation parcels with restricted access were not evaluated (Paradise Green, Happy Farm, Uncas in Whitefield; Blueberry Hill Farm in Jefferson; Hidden Family Farm, River Glen, Holy Apostles, Sweet Fern Farm, Walker parcel, Philbrick parcel, Wood parcel, and Moses Carleton parcels in Alna).

3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river? ■ □ □

None of the ponds or lakes within the 3 mile Study Area will have Project views. Resources evaluated include Savade Pond including the public boat launch in Windsor, Long Pond in Somerville, Barton Road boat launch on Long Pond and Travel Pond in Jefferson, Whitefield Salmon Preserve and IF&W on the Sheepscot River and Clary Lake (portion within 3 miles) in Whitefield, and Pinkham Pond in Alna.

The Project will be visible from the West Branch of the Sheepscot River in Windsor and from the Montsweag Brook in Wiscasset within the existing cleared transmission line corridor. Approximately 0.4 miles of West Branch of the Sheepscot River is located within existing cleared corridor south of Maxcy's Mill Road that ranges in width from 300' to 600'. The transmission line crossing of Montsweag Brook is at the southern end of the Montsweag Dam Preserve, a 22-acre area owned by the Town of Wiscasset. The Montsweag Brook and Montsweag Dam Preserve are used mainly for research by the State and Chewonki staff and students for ongoing monitoring after the removal of the Lower Montsweag Dam. There should be a minimal visual impact to these waterbodies since the cleared width of the transmission line corridor will not change and the riparian vegetation within the stream crossing will be preserved.

At its closest point, the Maine Yankee Substation is approximately 1,000 feet from the main channel of the Back River in Wiscasset. The Back River is not included in the Maine Rivers Study. The additional 345kV conductors (on existing lattice structures) connecting to Maine Yankee will not be visible from the river due to shoreline topography and riparian vegetation. There will be no Project views from the Old Ferry Road boat landing in Wiscasset or from the Wright Landing Public Boat Launch in Westport.

The Sheepscot River from Wiscasset to the headwaters is rated as an "A" river by the Maine Rivers Study for its geologic/hydrologic, critical/ecologic, scenic, anadromous fisheries, inland fisheries, whitewater boating, and historic resources. The Project will not be visible from the main branch of the Sheepscot River.

2. What is the closest estimated distance to a similar activity? ■ □ □

For its entire length Section 5 will be constructed within the existing transmission line corridor.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■Yes □No

The West Branch of the Sheepscot River may be used in the spring, summer, and fall for boating and fishing.

6.2.5.5 Affected Population/User Expectations/ Continued Use and Enjoyment

There are four general groups of people who already see the existing transmission lines at times during the year and may be affected by the construction of the project. No recreational resources would be affected by or within Segment 5.

Motorists

The primary viewing population is the year-round residents who live or work in or near Windsor, Whitefield, Alna, Woolwich, and Wiscasset as well as the general population who use US Route 1 and State Routes 32, 126, 194, 218, 27, and 144. Motorists presently see a variety of configurations within the transmission line corridor in Segment 5: two or three steel lattice structures for 115kV and 345kV transmission lines crossing the southern areas of Wiscasset and Woolwich and a 345kV transmission line on 75' tall H-frame structures and 115kV transmission line on 75' single pole structures in Alna, Whitefield, and Windsor. The additional double circuit 345kV conductors on the existing lattice structures crossing Route 1 will be minimally visible. The additional 345kV transmission line between the existing 115kV and 345kV transmission lines within an existing clearing will minimally increase the overall visual impact for motorists crossing under the lines.

Residents

There are approximately 33 homes located directly adjacent to, or that may have a view of, the existing transmission line and the proposed Segment 5. The majority are single family homes on individual lots or farms in rural settings. All of the homes have views of the existing transmission lines over open fields or openings in wooded areas. For the most part, the homes are oriented away from the transmission line corridor, and in most locations homeowners have maintained a sufficient amount of vegetation on their properties to provide an adequate buffer between themselves and the existing transmission lines. No additional tree removal is anticipated except for a 1.4 mile section located between Old Stage Road and Bradford Road in Wiscasset, where 75' of additional tree removal will be necessary on the eastern side of the existing cleared corridor. This section of additional clearing will not decrease any existing buffers between homes and the existing clearing. There should be a minimal visual impact on the residential properties that are adjacent to or within view of the transmission line corridor.

Recreating Population

The existing transmission line corridor is used informally by ATV riders, snowmobilers, and walkers. Snowmobile / ATV trails are not considered scenic resources of state or national significance. There are no designated ITS routes that use the transmission line corridor or cross it. Current recreational users are accustomed to seeing the existing 115kV and 345kV structures and conductors. There should be minimal visual impact to these informal recreational users.

Working Population

The major concentration of workers is at the former Maine Yankee site, at the farms on the surrounding roads, and at commercial establishments on Routes 1, 27, and 32. The additional conductors and structures should be a minimal change in context given the existing transmission structures. There will be minimal visual impacts to the working population in the area.

6.2.5.6 Visual Impact Assessment

Landscape Compatibility

- **Color**: The colors and materials to be used for the proposed structures are similar to the existing wooden H-frame structures that are already used in the existing transmission line corridor. The new wood structures may initially be darker than the existing ones, but the contrast will diminish with time as normal aging occurs.
- **Form**: The forms of individual 345kV H-frame structures are typical of those found throughout central and mid-coast Maine. There should be no contrast in form.
- **Line**: The relocated 345kV transmission line will be parallel to the existing transmission lines within the corridor. There should no contrast in line.
- **Texture**: The texture of the proposed structures will be similar to the existing structures and should not cause a contrast in texture.

Scale Contrast

The relocated 345kV transmission line will be installed on H-frame structures that are typically 75± feet tall, in an existing transmission line corridor that is 370 to 550± feet wide, and will be

seen in context of the existing 115kV and 345kV structures that are typically 75± feet in height. Where trees line the transmission line corridor, they average 50 to 70 feet in height. The new transmission structures will be in scale with the existing structures and surrounding vegetation, so there will not be a contrast in scale.

Spatial Dominance

Throughout most of its length, the new 345kV transmission line for Segment 5 will be contained within the existing cleared transmission line corridor. The only scenic resources with visibility will be the West Branch of the Sheepscot River and Montsweag Brook, which are both within existing cleared corridors. In these locations, Segment 5 will not dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.2.5.7 Mitigation Strategies

The primary mitigation strategy utilized for Segment 5 was co-locating the proposed 345kV transmission line within an existing 115kV and 345kV transmission line corridor. The structure material and form are also mitigation strategies. The proposed H-frame 345kV structures will be made of wood which will be similar to the existing structures and minimize contrast in color, line, form and texture.

6.2.5.8 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, Segment 5 of the NECEC Project will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it will be located and in neighboring municipalities, where applicable.

6.3 SUBSTATION ASSESSMENTS

6.3.1 COOPERS MILLS ROAD SUBSTATION

The Coopers Mills Road Substation is located on the west side of Coopers Mills Road in Windsor. The NECEC Project includes installing an additional 345kV AC Transmission Line Terminal and additional 345kV +/-200MVAR STATCOM (+/-400MVAR total with the +/-200MVAR existing) at the existing Coopers Mills Substation. The additional components will be located on the north side of the Substation within the existing 17.0 acre substation area. No additional tree removal is required. The Substation is currently most visible from the northern end of Coopers Mills Road.

6.3.1.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on July 5, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, Map 12. Other data sources include the site plans and cross sections provided by POWER Engineers for the Project; Windsor comprehensive plans and zoning ordinances; Maine River Study; and Google Earth.

6.3.1.2 Study Area

Site Context

The area within three miles of the Coopers Mills Road Substation is characterized by open fields and woodland, and meandering streams. Nearby land uses include rural residential, forestland, agriculture, and existing transmission lines. The closest population centers are the villages of Windsor, approximately 1.5 miles to the northwest of the Substation site. There are no views of the Substation from the village. The closest scenic resource is the West Branch of the Sheepscot River, 0.3± miles west of the Substation. Likewise, the NECEC Project components will not be visible from the West Branch of the Sheepscot River.

Distance Zones

Foreground (0 to 1/2 mile in distance): Views of the Substation will be primarily limited to foreground views from Coopers Mills Road in Windsor. The Substation is set back approximately 1,000 feet from the road.

Midground (1/2 mile to 3 miles in distance): None.

Background (greater than 3 miles): None.

6.3.1.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Coopers Mills Road Substation
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law /NRPA
Activity Type: Additions to the Coopers Mills Substation
Activity Location: Windsor
County: Kennebec
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: July 5, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
The NECEC Project will not be visible from the Alonzo H. Garcelon Wildlife Management Area, located 2.4 miles to the west of the NECEC Project.			
C. A state or federal trail? None	☐	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None.	☐	☐	☐
E. A National or State Park? None	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None.	☐	☐	☐
The NECEC Project will not be visible from Savade Pond or its boat access, located 1.5 miles to the northeast.			

3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? ☐ ☐ ☐

The West Branch of the Sheepscot River is 0.3± mile west of the site of the proposed substation and separated by dense woodland (some of which has been selectively harvested recently). The West Branch is rated as an "A" river by the Maine Rivers Study for its anadromous fisheries resources. The Study determined that the scenic resources of the West Branch were not unique or significant (*i.e.*, they did not meet a minimum standard of significance). The NECEC Project will not be visible from the River due to intervening vegetation. The proposed NECEC Project will have no visual impact on the West Branch of the Sheepscot River.

2. What is the closest estimated distance to a similar activity? ■ ☐ ☐

The NECEC Project components are located within the existing Coopers Mills Substation.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? None ■ Yes ☐ No

6.3.1.4 Affected Population/User Expectations/Continued Use and Enjoyment

There are three general groups of people who already see the existing Coopers Mills Substation and may be affected by the NECEC Project.

Motorists

The primary viewing population are the year-round residents who live or work in the vicinity of the Substation. Motorists on Coopers Mills Road currently see the Substation and existing 345kV and 115kV transmission lines in a 270± foot-wide transmission line corridor east of the Substation site. From Coopers Mills Road the northern portion of the Substation and the upper part of the Substation A-frame dead end structures and 180'± microwave tower are visible across the fields and cleared transmission line corridor at a distance of 1,200' to 1,500'±. The additional 345kV AC Transmission Line Terminal and additional 345kV +/-200MVAR STATCOM will be visible in context of the existing components. The NECEC Project will have minimal to no additional visual impact on motorists.

Residents

Three abutters on the north side of Coopers Mill Road will have foreground views of the NECEC Project. These residential properties are single family homes surrounded by open agricultural fields. There will be minimal additional visual impact to these properties due to the presence of

the Substation, the existing topography, and vegetation located on the north side of the Substation.

Working Population

There should be virtually no visual impacts to the working population in the area (primarily farmers) since the NECEC Project will be located within the existing substation boundary.

6.3.1.5 Visual Impact Assessment

Landscape Compatibility

Color: The 345kV AC Transmission Line Terminal and additional 345kV +/-200MVAR STATCOM structures will be the same galvanized metal color as the existing substation components. There will be minimal contrast in color within the substation site.

Form: The forms proposed for the 345kV AC Transmission Line Terminal and additional 345kV +/-200MVAR STATCOM will be the similar to the existing substation components. There will be no additional contrast in form with the existing substation.

Line: While these components will be minimally visible, they will appear similar in form and line to the existing substation.

Texture: The texture of the NECEC Project components will be the same as the existing substation. There will be no additional contrast in texture.

Scale Contrast

The Terminal structure and STATCOM components will be the same height as the existing substation components permitted for MPRP. There should be no scale contrast with the existing substation.

Spatial Dominance

Most of the components within the existing substation are approximately the same height as or shorter than the surrounding trees. The additional Terminal structure and STATCOM components will be visible in the context of the Substation and existing transmission structures. The Substation will not be visible from any scenic resources, nor will it dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.3.1.6 Mitigation Strategies

The primary mitigation strategy used is to site the NECEC Project within the existing substation facility. No additional tree removal will be required. Mitigation completed for MPRP (earth berms and preserved vegetation) have been installed and provide partial screening of the facility from Coopers Mills Road.

6.3.1.7 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, the 345kV AC Transmission Line Terminal and additional 345kV +/-200MVAR STATCOM at the Coopers Mills Substation will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.2 CROWLEY SUBSTATION

The Crowley Substation is located approximately 1,400’ south of Route 196 in Lewiston. The NECEC Project includes installing 115kV Switch and bus wire replacements at the existing Substation. The additional components will be located within the existing structure. No additional tree removal is required. The substation is currently not visible from any public viewpoints.

6.3.2.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on May 24, 2017. Representative views from road crossings near the Study Area are included in Appendix B: Study Area Photographs, Map 9 and 10. Other data sources include the site plans and cross sections provided by POWER Engineers for the Project; Lewiston comprehensive plans and zoning ordinances; and Google Earth.

6.3.2.2 Study Area

Site Context

The area within three miles of the Crowley Substation is characterized by open fields and woodland, and meandering streams/wetlands. Nearby land uses include rural residential, forestland, agriculture, existing 115kV transmission lines, light commercial along Route 196 and Interstate 95. The closest population centers is Lewiston to the west. The closest scenic resource is the Androscoggin River approximately 3.0 miles to the southwest.

Distance Zones

Foreground (0 to 1/2 mile in distance): None.

Midground (1/2 mile to 3 miles in distance): None.

Background (greater than 3 miles): None.

6.3.2.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Crowley Substation
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law /NRPA
Activity Type: Additions to the Crowley Substation
Activity Location: Lewiston
County: Androscoggin
GIS Coordinates, if known: See project location maps from POWERS Engineers
Date of Survey: May 24, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail? None	☐	☐	☐

D. A public site or structure listed on the National Register of Historic Places? None.	☐	☐	☐
E. A National or State Park? None	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None. None.	☐	☐	☐
3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? None.	☐	☐	☐
2. What is the closest estimated distance to a similar activity? The NECEC Project components are located within the existing Crowley Substation.	■	☐	☐

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■Yes ☐ No None. If there are recreational users of the transmission corridor their use would be potentially year-round.

6.3.2.4 Affected Population/User Expectations/Continued Use and Enjoyment

There are no motorists, residents or working population who would be affected by upgrades to the Crowley Substation. There do not appear to be any ITS Snowmobile Routes located within the Section 62 and 64 transmission line corridor adjacent to the Crowley Substation. The corridor maybe used as a local trail.

6.3.2.5 Visual Impact Assessment

Landscape Compatibility

Color: The 115kV Switch and bus wire replacements will be the same galvanized metal color as the existing substation components. There will be no contrast in color.

Form: The forms proposed for the 115kV Switch and bus wire replacements will be the similar to the existing substation components. There will be no additional contrast in form.

Line: The lines created by the 115kV Switch and bus wire replacements will not be visible from public viewpoints.

Texture: The texture of the 115kV Switch and bus wire replacements components will be the same as the existing substation. There will be no additional contrast in texture.

Scale Contrast

The 115kV Switch and bus wire replacements components will be the same height as the existing substation components. There should be no scale contrast with the existing substation.

Spatial Dominance

Most of the components within the existing substation are approximately the same height as or shorter than the surrounding trees. The additional 115kV Switch and bus wire replacements would be visible in the context of the substation and existing transmission structures. The substation will not be visible from any scenic resources, nor will it dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.3.2.6 Mitigation Strategies

The primary mitigation strategy used is to upgrade within an existing substation. No additional tree removal will be required.

6.3.2.7 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, the 115kV Switch and bus wire replacements at the Crowley Substation will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.3 LARRABEE ROAD SUBSTATION

The Larrabee Road Substation is located at the eastern end of Larrabee Road in the northern part of Lewiston. The Substation was constructed as part of MPRP at the terminus of, or adjacent to, several existing transmission line corridors. As part of the NECEC Project, the existing Larrabee Road 345/115 kV 448MVA autotransformer will be replaced by a 600MVA autotransformer and an additional 345kV AC Transmission Line Terminal will be installed within the Substation.

6.3.3.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 2, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, Map 9. Other data sources include the aerial photographs and cross sections provided by POWER Engineers for the Project; Lewiston comprehensive plans and zoning ordinances; Maine Trail Finder; and Google Earth.

Site Context

The area within three miles of the Larrabee Road Substation is characterized by mixed woodland, open fields, and widespread commercial, light industrial, and residential development. Nearby land uses include single-family homes, commercial development along Route 11/100/202, gravel pits, and existing transmission lines.

The scenic resources within the 3 to 5 mile Study Area of the Larrabee Road Substation are the Androscoggin River, (0.5 mile to the west), the Androscoggin Riverlands State Park in Turner (3.3 miles to the northwest), Thorncrag Sanctuary in Lewiston (1.4 miles to the southeast), Androscoggin River Preserve in Lewiston (1.0 mile to the southwest), the East Auburn Community School (1.6 miles to the southwest) and Mount David on the Bates College Campus in Lewiston (2.5 miles to the southwest). The only scenic resource with potential views of the additions to the Larrabee Road Substation is Mount David.

Distance Zones

Foreground (0 to 1/2 mile in distance): Public views of the Substation will be limited to foreground views from the end of Larrabee Road in Lewiston. The Substation will be located approximately 400 feet from the nearest homes on Larrabee Road. Preserved riparian vegetation and buffer plantings on the western side of the property screen the Substation from view from most of the homes on the road.

Midground (1/2 mile to 3 miles in distance): The only scenic resource and elevated viewpoint with potential Project views is Mount David on the Bates College Campus in Lewiston, located 2.5 miles southwest of the Substation.

Background (greater than 3 miles): None.

6.3.3.2 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Larrabee Road Substation Upgrades
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Upgrades to the Larrabee Road Substation
Activity Location: Lewiston
County: Androscoggin
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: June 2, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail? None	☐	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None	☐	☐	☐
E. A National or State Park? None	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities?	☐	☐	■

Mount David is a 5 minute hike within the Bates College Campus on the corner of College Street and Mountain Avenue in Lewiston. The short hike to the rock outcrop at the summit affords 360 degree views of Lewiston and the surrounding landscape. The existing Larrabee Road Substation is visible 2.5 miles +/- to the northeast from the summit Upgrades to the Substation, the new Section 64 Rebuild transmission line, and the 345 kV transmission line connection between the new Merrill Road Converter Station and Larrabee Road Substation will be minimally noticeable at this distance. There will be minimal visual impact to Mount David.

3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? None	☐	☐	☐

2. What is the closest estimated distance to a similar activity? ■ ☐ ☐

The additions to the Larrabee Road Substation will occur within the existing facility.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■ Yes ☐No

Mount David is used throughout the year.

6.3.3.3 Affected Population/User Expectation/Continued Use and Enjoyment

There are three general groups of people who may be affected by the construction of the new Substation.

Motorists

The proposed Substation is located at the end of a dead-end road, therefore the number of motorists who will see the facility is very limited. The Substation should have a minor visual impact on motorists.

Residents

One home at the eastern end of Larrabee Road abuts the Substation site. The existing 150' +/- vegetative buffer will remain for the home on the north side of the road. Visual impacts on this property should be none to minimal. The other seven private homes on Larrabee Road do not have views of the Substation.

Recreating Population

Hikers using Mount David currently see the Larrabee Road Substation from the summit. The view is of a mostly wooded landscape but it also includes open fields, buildings on Bates Campus and in the City of Lewiston, and communication towers. The vegetation at the summit screens the majority of the foreground development. The additions to the Larrabee Road Substation will be minimally visible from the summit and therefore should not negatively affect the continued use and enjoyment of the resource.

6.3.3.4 Visual Impact Assessment

Landscape Compatibility

Color: The new 600MVA autotransformer will be the same galvanized metal color as the existing 345/115 kV 448MVA autotransformer. The additional 345kV AC Transmission Line Terminal will be similar in color to the existing terminal structures.

Form: The forms proposed for the 600MVA autotransformer and 345kV AC Transmission Line Terminal will be similar to the existing Substation components. There will be no additional contrast in form with the existing Substation.

Line: While these components will be minimally visible, they will appear similar in form and line to the existing Substation.

Texture: The texture of the NECEC Project components will be the same as the existing Substation. There will be no additional contrast in texture.

Scale Contrast

The proposed 600MVA autotransformer and 345kV AC Transmission Line Terminal will be located on the west and north side of the existing Larrabee Road Substation. The proposed components will be the same heights as the existing Substation components which range from 25' to 105' in height, so there will be no scale contrast. The vegetation surrounding the Substation is approximately 50 to 70 feet tall and is generally sufficient to screen most of the facility from public view. There will be minimal scale contrast.

Spatial Dominance

Most of the components within the existing Substation are approximately the same height as or shorter than the surrounding trees with the exception of the 105' A-frame structure. The additional 600MVA autotransformer and 345kV AC Transmission Line Terminal components will be visible in the context of the Substation and existing transmission structures. The additional Substation components will not be highly visible from any scenic resources, nor will they dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.3.3.5 Mitigation Strategies

The primary mitigation strategy used is to site the NECEC Project within the existing Substation facility. No additional tree removal will be required. Mitigation completed for MPRP (buffer planting plan) has been installed and provides partial screening of the facility from the end of Larrabee Road. The Substation will not be visible from any public roads, with the exception of the end of Larrabee Road. Preserved vegetation surrounding the Substation will screen the NECEC Project components from most public views.

6.3.3.6 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, the replacement 600MVA autotransformer and 345kV AC Transmission Line Terminal at the Larrabee Road Substation will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.4 MERRILL ROAD CONVERTER SUBSTATION

The new 345kV AC to +/-320kV HVDC 1200MW Merrill Road Converter Substation will be located approximately 2,400 feet north of Merrill Road and approximately 1.0 mile north of the Larrabee Road Substation in Lewiston. The major components of the Converter Substation which include the HVDC Plus Converter Equipment Enclosure Building, Control Building, Converter Precharging Unit and Transformers will be screened from public views by preserved vegetation. The required grading (cut slopes) on the east side of the Substation will also provide additional screening from abutters to the east of the Substation. The Enclosure Building will be approximately 60’ in height and the tallest component of the converter Substation will be approximately 85’ in height. The surrounding mixed deciduous and evergreen tree range in height from 50’ to 80’+/-. A 20’ wide gravel access road, gate, and grassed lined stormwater facility within the existing transmission line corridor will be visible from Merrill Road. The Project also includes a new 1.2 mile 345kV AC Transmission Line from the new Merrill Converter Substation to the existing Larrabee Road Substation (Section 3007). The cleared corridor will be widened by 75’ on the west side to accommodate the proposed 345 kV to +/- 320 kV transmission line connection to the Larrabee Road Substation.

6.3.4.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 2, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, Map 9. Other data sources include the aerial photographs and cross sections provided by POWER Engineers for the Project; Lewiston comprehensive plans and zoning ordinances; and Google Earth.

6.3.4.2 Study Area

Site Context

The area within three miles of the Merrill Road Converter Substation is characterized by mixed woodland, open fields, and widespread commercial, light industrial, and residential development. Nearby land uses include single-family homes, commercial development along Route 11/100/202, gravel pits, and existing transmission lines.

There are no scenic resources with potential views of the proposed Converter Substation. The closest scenic resources are the Androscoggin River, (0.6 mile to the west), the Androscoggin Riverlands State Park (2.5 miles to the northwest), Thorncrag Sanctuary (2.4 miles to the southeast), Androscoggin River Preserve (2.1 miles to the southwest), the East Auburn Community School (1.9 miles to the southwest) and the ITS Snowmobile Route 87. The view from Mount David will not include the Converter Substation.

Distance Zones

Foreground (0 to 1/2 mile in distance): Public views of the Converter Substation will be very limited. The access road, gate and stormwater facilities will be the most visible component from Merrill Road.

Midground (1/2 mile to four miles in distance): None.

Background (greater than four miles): None.

6.3.4.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Merrill Road Converter Substation
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: New Merrill Road Converter Substation and 1.2 mi 345kV transmission line
Activity Location: Lewiston
County: Androscoggin
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: June 2, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None There will be no views from the Thorncrag Sanctuary or the Androscoggin River Preserve.	☐	☐	☐
C. A state or federal trail? ITS snowmobile 87 is currently located within the existing transmission line corridor adjacent to the Converter Substation site. The trail may need to be relocated within the corridor during and after the construction of the proposed Converter Station.	■	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None	☐	☐	☐
E. A National or State Park? None The Converter Station will not be visible from the Androscoggin Riverlands State Park in Turner, 2.5 miles to the northwest.	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None	☐	☐	☐
3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? None The Converter Station will not be visible from the Androscoggin River.	☐	☐	☐
2. What is the closest estimated distance to a similar activity? The Converter Substation will be 1,200' north of the existing Larrabee Road Substation	☐	☐	☐

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■ Yes ☐No

6.3.4.4 Affected Population/User Expectations/ Continued Use and Enjoyment

There are three general groups of people who may be affected by the construction of the new Substation.

Local Motorists

The proposed converter Substation will be located off an access road north of Merrill Road, so the number of motorists who will see the facility or site improvements will be very limited. The Substation should have a minor visual impact on motorists.

Residents

There are 4 single family homes and one apartment building immediately adjacent to the Project site. One abutter on northwest side of Merrill Road will be impacted the most by the cleared corridor widening of 75' on the west side to accommodate the 345kV AC Transmission Line. Currently the home has approximately 300' of vegetative buffer on the eastern side. After the corridor is widened, the buffer will be reduced to 120'+/-. The existing 120' vegetative buffer for the home on the northeast side of the corridor will remain. Visual impacts on these properties will be minimal to none.

The two single family homes and apartment buildings off Route 11, west of the site are 250', 350', and 580' from the proposed Converter Substation. With the widening of the cleared corridor, the buffers will be reduced by 75' but the Converter Substation and transmission lines will continue to be screened by the remaining vegetation. There will be no visual impact to those homes closest to Route 11.

There is one home located approximately 560' to the east of the proposed Converter Substation site. The intervening vegetation will screen the Converter Substation from view. In addition, because the site will require grading in order to create a level elevation for the facility, the buildings will be lower in the landscape and less potentially visible. There will be no visual impact to the home located on the east side of the Converter Substation site.

Recreating Population

The only recreating population that would be affected by the Converter Substation would be snowmobilers using ITS Route 87. Snowmobilers frequently use transmission line corridors in this area and are accustomed to seeing the transmission line structures and nearby Larrabee Road Substation. The Project should not affect the continued use and enjoyment of the snowmobilers.

6.3.4.5 Visual Impact Assessment

Landscape Compatibility

Color: Most of the Converter Substation structures will be galvanized metal, which will have a moderate color contrast with the existing and proposed wooden transmission structures and wooded surroundings. The materials used for the siding and roof of the Equipment Enclosure and Control Buildings will be a muted tan color which will generally blend in with the surrounding wooded landscape. The proposed 345kV transmission line structures will be made of wood and are similar in color to the existing structures.

Form: The forms proposed for the Converter Substation are similar to those found at the Larrabee Road Substation. If the Substation were highly visible from public vantage points, it would have a moderate contrast in form. However, since visibility will be limited by its location and the dense vegetation being preserved around portions of the site, there will be minor contrasts in form. The forms of the proposed 345kV H-frame transmission line structures will be similar to the existing 115kV transmission lines structures.

Line: If it were highly visible from public vantage points, the horizontal, vertical, and angular lines of the Converter Substation components would result in a moderate contrast in what is mostly a vertical line form of trees and transmission structures surrounding the site. Visibility and contrast in line will be limited by the Converter Substations location and the dense vegetation that is being preserved around portions of the site. The proposed 345kV transmission line will result in minimal contrast in line.

Texture: The texture of the Converter Substation components will result in a moderate contrast to the natural vegetation that surrounds the site. The proposed 345kV transmission line will have no contrast in texture with existing transmission line structures.

Scale Contrast

The Merrill Road Converter Substation will be located on the east side of two 115kV transmission lines located in a 225’ wide cleared transmission line corridor. The proposed NECEC Project will widen the transmission line corridor from 225’ to 340’ and construct a 345kV transmission line supported by H-frame structures that are typically 75’ +/- feet tall. The tallest components in the Converter Substation will be 85’+/- in height and the Enclosure Building will be 60’+/- to the ridge. The vegetation surrounding the Substation is approximately

50’ to 70’ tall and should be sufficient to screen the facility from public view. The Converter Substation and 345kV transmission line corridor will have minimal scale contrast.

Spatial Dominance

The Converter Substation will not be visible from any scenic resources, nor will it dominate the landscape composition or the surrounding land forms, water bodies, or sky. With the preserved vegetation surrounding the development site, the Substation will not dominate the landscape.

6.3.4.6 Mitigation Strategies

The primary mitigation strategy used to minimize potential visual impacts from the Merrill Road Converter Substation include siting the facility in a wooded area that provides the opportunity to preserve a significant vegetative buffer on all sides of the Converter Substation and where there is minimal potential for public viewpoints or roads. The only potential impacts will be to snowmobile users.

6.3.4.7 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, new 345kV AC to +/-320kV HVDC 1200MW Merrill Road Converter Substation and the 1.2 mile 345kV AC Transmission Line from the new Merrill Converter Substation to the existing Larrabee Road Substation (Section 3007) will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.5 MAINE YANKEE SUBSTATION EXPANSION

The existing Maine Yankee Substation is located on a 3.7-acre site off Old Ferry Road in Wiscasset, on a peninsula surrounded on the east, south, and west by the Back River. The Substation expansion includes the installation of an additional 345kV AC Transmission Line Terminal on the western side of the facility within the existing fence line. No additional tree removal is required.

The existing transmission line corridor entering the Substation includes four 345kV transmission lines located on two sets of lattice structures and one set of H-frame structures. The proposed

Segment 5 activities will relocate one of the 345kV transmission lines to an existing lattice tower and add one 345kV transmission line conductor to one of the existing lattice towers. No additional transmission line structures will be installed.

6.3.5.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on June 26, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, Map 11. Other data sources include the site plans and cross sections provided by POWER Engineers for the Project; Wiscasset comprehensive plans and zoning ordinances; and Google Earth.

6.3.5.2 Study Area

Site Context

The area surrounding the Maine Yankee Substation is a mixture of open fields, mixed woodlands, rivers, embayment, and transmission line corridors. The Substation itself is located within the site of the former Maine Yankee nuclear power plant and adjacent to industrial buildings and the storage facilities. The Wiscasset town center is approximately 2.5 miles to the north. An inlet off the Back River would be the only scenic resource to have potential views of the expansion.

Distance Zones

Foreground (0 to 1/2 mile in distance): Views of the Substation upgrade will be limited to foreground views from Old Ferry Road in Wiscasset and an inlet off the Back River. The Substation expansion is set back 1,800'± from the road and 300'+/- from the inlet.

Midground (1/2 mile to four miles in distance): None

Background (greater than four miles): None.

6.3.5.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Maine Yankee Substation Expansion
MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Maine Yankee Substation Expansion
Activity Location: Wiscasset
County: Lincoln
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: June 26, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail? None	☐	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None.	☐	☐	☐
E. A National or State Park? None	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None	☐	☐	☐

Eaton Farm/Chewonki, a private environmental education institution is located 0.2 mile to the west of the existing Substation. The proposed upgrade will not be visible from Eaton Farm or it's frontage along the Back River. The proposed upgrade will not be visible from the Wright Landing public boat launch on Westport Island or the Old Ferry Road boat landing in Wiscasset.

3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river?	☐	☐	☐

At its closest point, the existing Maine Yankee Substation is approximately 600 feet from the main channel of the Back River and 300 feet from a tidal inlet of the Back River in Wiscasset. The expansion will be 1,000 feet from the river at its closest point. Back River is not included in waterbodies rated by the Maine Rivers Study. From the main channel of the Back River, the Substation expansion will be screened by the shoreline topography, riparian vegetation, and the structures in the existing Substation. The expansion may be partially visible from the upper end of the tidal inlet on the west side of the peninsula. There should be minimal visual impact on the Back River from the Maine Yankee Substation expansion.

2. What is the closest estimated distance to a similar activity? ■ ☐ ☐

The expansion will be similar to existing components within the existing Maine Yankee Substation.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? ■ Yes ☐ No

Inlet off the Back River may have year-round use.

6.3.5.4 Affected Population/User Expectation/ Continued Use and Enjoyment

There are four general groups of people who already see the existing Substation from Old Ferry Road and other locations at all times during the year and may be affected by the Substation expansion.

Motorists

The primary viewing population are the year-round residents who live or work in or near the Maine Yankee Substation. Motorists presently see the existing Substation at a distance of 1,500 to 1,800± feet from Old Ferry Road. The proposed expansion will be on the west side of the existing Substation and not any closer to the road. No additional tree removal will be required. The overall visual impact of the Substation expansion to motorists should be minimal.

Residents

There are approximately four single-family homes near the intersection of Old Ferry Road and Ready Point Road on the north side of the Maine Yankee Substation. These homes will not have views of the expansion due to intervening vegetation. There will be no visual impact on the residential properties that are adjacent to or within view of the Substation.

Recreating Population

Portions of the expansion may be visible from boaters on the Back River tidal channel on the west side of the peninsula at mid to high tide. The expansion will be partially screened by riparian vegetation on the river bank and will be seen in the context of the existing Substation.

There should be minimal visual impact on the recreational population on this limited section of the Back River.

Working Population

The major concentration of workers who may see the expansion would be at the former Maine Yankee site. The additional Substation expansion components should be insignificant in comparison to the existing Substation. There should be no visual impacts to the working population in the area.

6.3.5.5 Visual Impact Assessment

Landscape Compatibility

Color: The colors and materials to be used for the proposed Substation structures should be similar to the existing Substation materials. There should be no contrast in color.

Form: The forms of the Substation expansion structures are already used at the Maine Yankee Substation. There should be no contrast in form.

Line: The lines created by the expansion components should be seen in context of similar linear elements used in the existing Substation. There should be no contrast in line.

Texture: The texture of the proposed Substation structures should be similar to those already present at the existing Substation. There should be no contrast in texture.

Scale Contrast

The Maine Yankee Substation expansion will be located adjacent to an existing Substation. The new 345kV AC Transmission Line Terminal will be approximately the same size and height as the existing equipment at the Substation. The expansion components should be in scale with all of the existing elements, so there should not be a contrast in scale.

6.3.5.6 Mitigation Strategies

The primary mitigation strategy being employed is to expand an existing Substation adjacent to an existing transmission line within an existing industrial area.

Spatial Dominance

The proposed expansion will be a minimal addition to the existing Substation and will not dominate the landscape as seen from public roadways or scenic resources.

6.3.5.7 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, the 345kV AC Transmission Line Terminal at the Maine Yankee Substation will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.6 Raven Farm Substation

The Raven Farm Substation is located approximately 500 feet from Greely Road in Cumberland, approximately 0.2 mile southwest of the existing Elm Street Substation in Yarmouth. The substation occupies 14.4 acres within a mostly wooded parcel. An existing buffer of mixed vegetation approximately 40 to 60 feet tall and ranging in width from 70’ to 300’ remains around the northwestern side of the substation. The proposed upgrade to Raven Farm includes the installation of an additional 345/115kV 448MVA Autotransformer, associated 115kV buswork and terminating the existing 115kV Sections 164, 164A, and 165 at the existing Raven Farm Substation.

6.3.6.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on April 11, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, aerial photos on Map 13. Other data sources include the site plans and cross sections provided by POWER Engineers for the Project; Cumberland comprehensive plans and zoning ordinances; and Google Earth.

6.3.6.2 Study Area

Site Context

The area within one mile of the Raven Farm Substation is characterized by rolling open fields and second growth woodlands and suburban residential development. Nearby land uses include single-family homes, residential subdivisions, a commercial fencing company, a landscape supply company, construction company, forestland, active agriculture, the Elm Street Substation, and existing transmission lines. The center of Yarmouth Village is 1.5± miles to the northeast; the center of Cumberland is 2.9± miles to the northwest. There are no scenic resources within the viewshed of the substation site. The closest scenic resource is Casco Bay, 0.9 mile to the southeast. Twin Brooks Recreation Area in Cumberland is 1.0 mile to the west. The project will not be visible from the scenic roadway portion of Greely Road as designated in the Cumberland Open Space Plan. There should be minimal additional visual impact to Greely Road. There will be no visual impacts to any scenic resources.

Distance Zones

Foreground (0 to 1/2 mile in distance): Public views of the substation expansion will be limited to foreground views from Greely Road down the existing access road. The existing planted earth berm installed as part of MPRP will screen the majority of the additional 345/115kV 448MVA Autotransformer, associated 115kV buswork and termination of the existing 115kV Sections 164, 164A, and 165. The Autotransformer will be set back approximately 750' from Greely Road, within the cleared area west of the existing substation.

Midground (1/2 mile to four miles in distance): None.

Background (greater than four miles): None.

6.3.6.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Raven Farm Substation

MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST
(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Raven Farm Substation Expansion
Activity Location: Cumberland
County: Cumberland
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: April 11, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail? None	☐	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None.	☐	☐	☐
E. A National or State Park? None	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities?	☐	☐	☐

A portion of Greely Road west of the existing transmission line corridor is designated as a Scenic Roadway in the Town of Cumberland's Open Space Plan. The Raven Farm Substation will not be visible from the designated scenic road section of Greely Road due to preserved vegetation. An earthen berm and buffer plantings installed for MPRP will screen the majority of the proposed expansion.

3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? None	☐	☐	☐
2. What is the closest estimated distance to a similar activity?	■	☐	☐

The expansion will be located adjacent to the existing Raven Farm substation.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? Greely Road ■ Yes ☐No

6.3.6.4 Affected Population/User Expectations/Continued Use and Enjoyment

There are two general groups of people who may be affected by the construction of the new substation.

Motorists

The primary viewing population are the year-round residents who travel on Greely Road to their homes or workplaces. Motorists presently see the existing substation, access road, two existing 115kV transmission lines and a 345kV transmission line crossing Greely Road within a 360' +/- cleared opening. The earth mound screens a substantial portion of the substation from view. The substation expansion should have a relatively minor visual impact on motorists on Greely Road,

Residents

There are no homes with direct views of the expansion area. One home on Middle Road that accepted earth berms, evergreen plantings and fencing as part of visual mitigation for the initial construction of Raven Farm should not have views of the additional 345/115kV 448MVA Autotransformer, associated 115kV buswork and termination of the existing 115kV Sections 164, 164A, and 165. There should be minimal to minor visual impact on the majority of the residential properties due to the vegetative buffer that surrounds the substation.

6.3.6.5 Visual Impact Assessment

Landscape Compatibility

Color: The proposed additional 345/115kV 448MVA Autotransformer, associated 115kV buswork and termination of the existing 115kV Sections 164, 164A, and 165. Components of the substation will be galvanized metal, similar to the existing components which should have no color contrast with the existing substation and minimal color contrast with the existing wooden and self-weathering steel structures.

Form: Because the forms proposed for the expansion are similar to the existing substation and there is limited public visibility there should be a minor contrast in form.

Line: The proposed expansion will create minimal additional contrast in line compared to the existing substation and transmission lines.

Texture: The texture of the expansion will be similar in texture to the existing substation structures resulting in no additional contrast in texture. The existing visual buffer vegetation and the distance from Greely Road will help to minimize the contrast in texture.

Scale Contrast

The substation expansion will be partially visible on the west side of the existing substation. The tallest components in the substation expansion will be similar in height to the existing substation components which range in height from 105' to 65' with the majority of the electrical equipment 22 to 25' in height. The vegetation surrounding the substation, in addition to the earth mound and planted vegetation will screen most of the 345/115kV 448MVA Autotransformer, associated 115kV buswork and termination of the existing 115kV Sections 164, 164A, and 165 from view so there will not be any scale contrast visible to the general public.

Spatial Dominance

Most of the components that comprise the substation expansion will be approximately the same height as the existing substation and seen in context with the existing transmission line structures some of which range from 75' to 100'± tall. The substation expansion will not be visible from any scenic resources, nor will it dominate the landscape composition or the surrounding land forms, water bodies, or sky.

6.3.6.6 Mitigation Strategies

The primary mitigation strategy used to minimize potential visual impacts for the expansion to the Raven Farm Substation is to locate the proposed components within the cleared/developed area west of the existing substation. No additional tree removal will be necessary. The existing planted earthen berm and buffer plantings will screen the majority of the expansion from Greely Road.

6.3.6.7 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, the 345/115kV 448MVA Autotransformer, associated 115kV buswork and termination of the existing 115kV Sections 164, 164A, and 165 at the Raven Farm Substation will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in

the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.7 Surowiec Substation

The Surowiec Substation is located on a 10± acre site on the east side of Allen Road in Pownal. There are currently five 345kV transmission lines and seven 115kV transmission lines entering the substation from the east and west. As part of MPRP, the Surowiec Substation was expanded on the north and east sides. The NECEC Segment 4 proposes to rebuild two of the 115kV transmission lines (Section 62 and 64) that enter the substation. The proposed expansion to the substation includes an additional 345kV AC Transmission Line Terminal and 115kV switch replacements at the existing Surowiec Substation.

6.3.7.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on May 24, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, on Map 10. Other data sources include the site plans and cross sections provided by POWER Engineers for the Project; Pownal comprehensive plans and zoning ordinances; and Google Earth.

6.3.7.2 Study Area

Site Context

The area within three miles of the Surowiec Substation is characterized by open fields, freshwater wetlands, wet meadows, and woodland. Predominant land uses near the facility include low-density single-family homes, overgrown fields, hayfields, forestland, and electrical transmission line corridors. The closest population center is North Pownal, approximately 0.6 miles to the northeast of the substation. The closest scenic resource is the Bradbury-Pineland Corridor, approximately 0.8 mile south of the substation. The Pisgah Hill Parcels are 1.0 mile to the southwest, and Bradbury Mountain State Park is 2.5 miles to the southeast near Pownal Center. No scenic resources will be affected by the additional 345kV AC Transmission Line Terminal and 115kV switch replacements at the existing Surowiec Substation.

Distance Zones

Foreground (0 to 1/2 mile in distance): Public views of the substation will be limited to foreground views from Allen Road and Fickett Road in Pownal. The existing facility is set back approximately 420'± from Allen Road on the northeastern corner of the facility. The proposed components will be located in an expanded area permitted for the MPRP. No additional tree removal will be required.

Midground (1/2 mile to four miles in distance): None.

Background (greater than four miles): None.

6.3.7.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Surowiec Substation

MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST

(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Surowiec Substation: Additional 345kV AC Transmission Line Terminal and 115kV switch replacements
Activity Location: Pownal
County: Cumberland
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: May 24, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail? None	☐	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None.	☐	☐	☐
E. A National or State Park? None	☐	☐	☐

Bradbury Mountain State Park is 2.5 miles to the southwest. The Project will not be visible from the summit of the mountain.

F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None	☐	☐	☐
3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? None	☐	☐	☐
2. What is the closest estimated distance to a similar activity?	■	☐	☐

The closest similar activity is the existing Surowiec Substation that will be expanded.

3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? None	☐ Yes	☐No

6.3.7.4 Affected Population/User Expectation/Continued Use and Enjoyment

There are two general groups of people who currently see the existing substation and the transmission lines crossing Allen Road and may be affected by the expansion.

Motorists

The primary viewing population are the year-round residents who live or work in the immediate vicinity of the substation. Motorists presently see the existing 115kV and 345kV transmission lines crossing Allen Road. Motorists on Fickett Road presently see two 115kV transmission lines crossing the road. Since there are so many existing transmission lines and a large existing substation in the immediate area, the expansion should have a relatively minor visual impact on motorists.

Residents

The proposed expansion may be minimally visible from one single family home on the north side of Fickett Road, especially during leaf-off periods. There should be minimal to no visual impact on these residential properties from the expansion at Surowiec Substation.

6.3.7.5 Visual Impact Assessment

Landscape Compatibility

Color: Most of the substation components to be added will be galvanized metal, which should match the color used in the existing substation. There should be no contrast in color.

Form: The forms of the structures used in the expansion should be very similar to those already used in the Surowiec Substation. There should be minimal contrast in form.

Line: The lines of the substation components that will be added should match the strong horizontal and vertical lines of the existing substation, so there should be no contrast in line.

Texture: The texture of the proposed substation components should be similar to the existing substation. There should be no contrast in texture.

Scale Contrast

The expansion will be located on the north or back side of the existing Surowiec Substation and seen in context of 115kV and 345kV transmission structures that typically vary in height from 45’ to 75’. The tallest components in the existing substation are 102’± in height, the tallest proposed components will be 80’+/- in height and seen behind the taller structures. The predominantly evergreen trees that surround the substation are approximately 40’ to 60’ tall. The expansion will be in scale with all of these elements and the surrounding vegetation, so there should not be a contrast in scale.

Spatial Dominance

The substation is already a dominant feature on Allen Road. The expansion will be visible in context of the existing substation and will not make the substation more dominant. Visual buffer plantings installed for the MPRP screen a portion of the substation.

Mitigation Strategies

The primary mitigation strategy used to minimize potential visual impacts for the expansion to the Surowiec Substation was to locate the proposed components within the cleared/developed area north of the existing substation. No additional tree removal will be necessary.

6.3.7.6 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts, the additional 345kV AC Transmission Line Terminal and 115kV switch replacements at the Surowiec Substation will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

6.3.8 Fickett Road Substation

The proposed Fickett Road Substation with 345kV +/-200MVAR Static Compressors (STATCOM) will be located on a 4± acre site on the south side of Fickett Road and west side of Allen Road in Pownal. The proposed Substation will be 60'+/- from Allen Road and 115' to 380' from Fickett Road. The proposed Substation components will range from 15' to 60' in height and will be galvanized gray in color. The closest substation components will be 450 +/- feet from Fickett Road. Other proposed visible components will include the gravel access road and gates off Allen Road and Fickett Road and the enclosure fence. To the extent possible, existing vegetation along the south side of Fickett Road will be preserved. The 0.5 acre clump of mature evergreen trees in the field south of Fickett Road will be removed.

In proximity to the proposed Substation site there are currently five 345kV transmission lines and seven 115kV transmission lines entering the Surowiec Substation on Allen Road. Segment 4 of NECEC includes rebuilding Sections 62 and 64, from two 115kV transmission lines on H-frame structures to single pole structures and connecting into the Surowiec Substation. The Surowiec Substation will be expanded and connected to the proposed Fickett Road Substation. See Section 6.3.7.

6.3.8.1 Data Collection

TJD&A staff collected field data in the Study Area to assess visibility from public roads and other vantage points on May 24, 2017. Representative views from road crossings within the Study Area are included in Appendix B: Study Area Photographs, on Map10. Other data sources include the site plans and cross sections provided by POWER Engineers for the Project; Pownal comprehensive plans and zoning ordinances; and Google Earth.

6.3.8.2 Study Area

Site Context

Similarly to the Surowiec Substation site, the area within three miles of the proposed Fickett Road Substation is characterized by open fields, wetlands, and woodland. Predominant land uses near the facility include rural residential (single-family homes), horse farm, hayfields, forestland, and electrical transmission line corridors. The closest population center is North Pownal, approximately 0.6 mile to the northeast of the substation. The closest scenic resource is the Bradbury-Pineland Corridor, approximately 0.8 miles south of the Substation. Bradbury Mountain State Park is 2.5 miles to the southeast near Pownal Center. No scenic resources will be affected by the proposed Substation.

Distance Zones

Foreground (0 to 1/2 mile in distance): Public views of the Substation will be limited to foreground views from Fickett Road and Allen Road in Pownal.

Midground (1/2 mile to four miles in distance): None.

Background (greater than four miles): None.

6.3.8.3 Inventory of Scenic Resources within the Viewshed

FIGURE 6-1-Surowiec Substation

MDEP VISUAL EVALUATION FIELD SURVEY CHECKLIST

(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: Central Maine Power Company
Application Type: Site Law/NRPA
Activity Type: Fickett Road Substation
Activity Location: Pownal
County: Cumberland
GIS Coordinates, if known: See project location maps from POWER Engineers
Date of Survey: May 24, 2017
Observer: Amy Segal
Phone: 207-846-0757

Visibility	**Distance Between the Proposed Activity and Resource (in Miles)**		
1. Would the activity be visible from:	**0-1/4**	**1/4-1**	**1+**
A. A National Natural Landmark or other outstanding natural feature? None	☐	☐	☐
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge? None	☐	☐	☐
C. A state or federal trail? None	☐	☐	☐
D. A public site or structure listed on the National Register of Historic Places? None.	☐	☐	☐
E. A National or State Park? None Bradbury Mountain State Park is 2.5 miles to the southwest. The Project will not be visible from the summit of the mountain.	☐	☐	☐
F. 1) A municipal park or public open space? None	☐	☐	☐
2) A publicly owned land visited, in part, for the use, observation, enjoyment, and appreciation of natural or man-made visual qualities? None	☐	☐	☐
3) A public resource, such as the Atlantic Ocean a great pond or a navigable river? None	☐	☐	☐
2. What is the closest estimated distance to a similar activity? The closest similar activity is the existing Surowiec Substation that will be expanded.	■	☐	☐
3. Are any of the resources checked in Question 1 used by the public during the time of year during which the activity will be visible? None	☐ Yes	☐ No	

6.3.8.4 Affected Population/User Expectations/Continued Use and Enjoyment

There are two general groups of people who will see the proposed Substation and may be affected by the expansion.

Motorists

The primary viewing population are the year-round residents who live or work in the immediate vicinity of the proposed Substation. Motorists on Fickett Road presently see two 115kV transmission lines crossing the road and the existing 115kV and 345kV transmission lines crossing the fields and Allen Road connecting into the Surowiec Substation. There is an

intermittent hedgerow of mixed deciduous and evergreen trees along the south side of Fickett Road that will partially screen the transmission line infrastructure. Most motorists who travel on this road regularly expect to see the existing transmission lines and the Surowiec Substation. The proposed Substation should have a moderate visual impact on motorists.

Residents

Three single-family homes on the north side of Fickett Road, all with driveways adjacent to the proposed Substation, will have filtered views of the proposed Substation from their property/driveways, especially during leaf-off periods. Two of the four homes have sufficient existing vegetative buffers around their homes to adequately screen views toward the proposed Substation. One home will have a direct view into the proposed Substation across the proposed access road off Fickett Road. All of these homes currently have filtered views of the existing Substation and transmission lines from the southern portion of their property along Fickett Road. With the removal of the 0.5 acre clump of mature evergreens located in the middle of the proposed Substation site, more of the existing transmission lines and Surowiec Substation will be visible. The proposed Substation will have a moderate to strong visual impact to the three homes directly north of the proposed Substation site and may reduce the continued use and enjoyment of a portion of the abutters property. The remainder of the homes along Fickett Road will not have Project views. See Photosimulation 26 in Appendix D.

6.3.8.5 Visual Impact Assessment

Landscape Compatibility

Color: The Substation components will be galvanized metal, which will look similar to the existing Surowiec Substation. The existing transmission lines are a combination of wood H-frame structures and self-weathering steel single poles. There should be minimal contrast in color.

Form: The forms of the structures used in the proposed Substation will similar to those already used in the Surowiec Substation. There should be minimal contrast in form.

Line: The lines of the Substation components will be similar to the horizontal and vertical lines of the existing Substation and transmission line structures so there should be no contrast in line.

Texture: The texture of the proposed Substation components should be similar to the existing Substation. There should be no contrast in texture.

Scale Contrast

The expansion will be located across Allen Road from the existing Surowiec Substation and seen in context of 115kV and 345kV transmission structures that typically vary in height from 45' to 75' in height. The proposed Substation components will range from 15' to 60 in height, similar to most of the Substation and transmission line structures. The proposed Substation will be in scale with all of these elements and the surrounding vegetation, so there should be no contrast in scale.

Spatial Dominance

When viewed from Fickett Road, the new components will appear to break the skyline, similar to the existing transmission line structures. While the proposed Substation will not be visible from any scenic resources, it will be seen as a co-dominant element with the existing Substation.

6.3.8.6 Mitigation Strategies

The proposed Substation has been cited within a landscape filled with electrical infrastructure in an area that requires minimal additional clearing and within a desired distance from Surowiec Substation. Though there are no scenic resources impacted, the adjacent homes will have expanded views of the entire developed landscape. As part of NECEC, visual buffer plantings will be installed on the south side of Fickett Road to minimize adverse effects on the scenic character of the surrounding area. This additional buffer will also minimize views of the Surowiec Substation. Buffer plantings will take into consideration the need for proper setbacks, avoiding wetland impacts, limitations on planting within and adjacent to transmission line corridors, and visibility requirements for security around the proposed Substation. The proposed visual buffer plantings will be designed by the Project Landscape Architect.

6.3.8.7 Conclusion

Based upon this VIA review of the Project, and the range of potential visual impacts and proposed visual buffer mitigation, the proposed Fickett Road Substation with 345kV +/- 200MVAR Static Compressors (STATCOM) will not unreasonably interfere with existing scenic and aesthetic uses and will not adversely affect scenic character in the surrounding area including in the municipalities in which it is located or in neighboring municipalities, where applicable.

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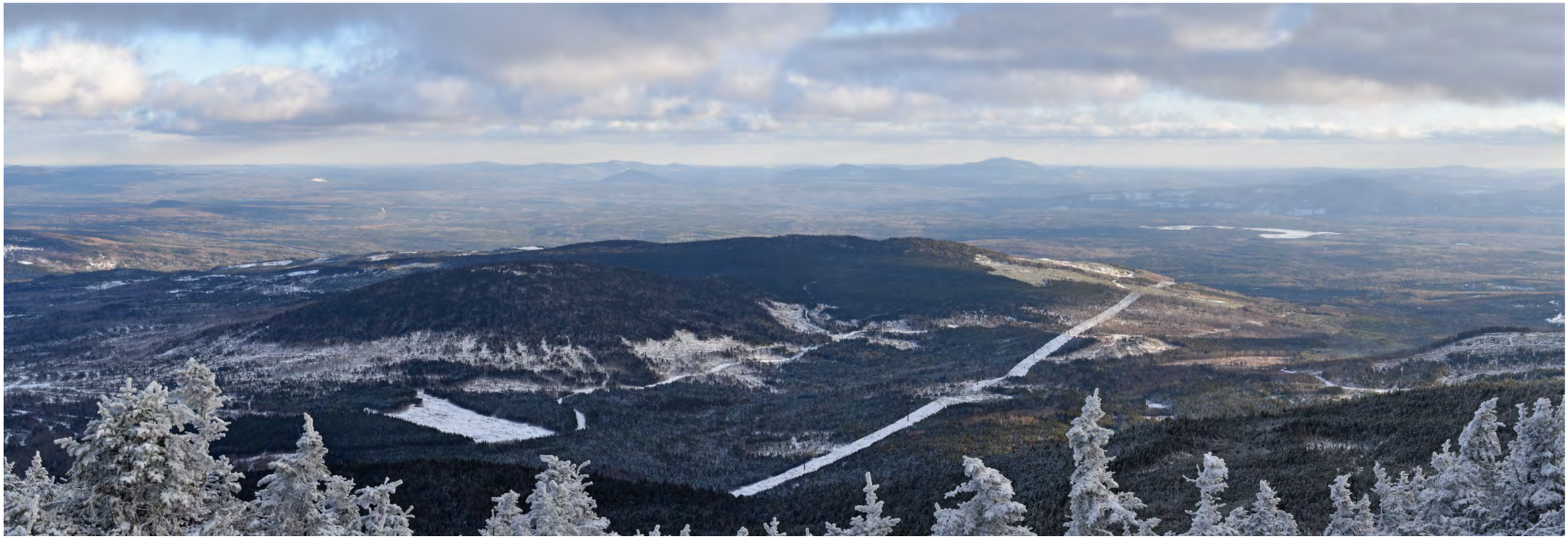
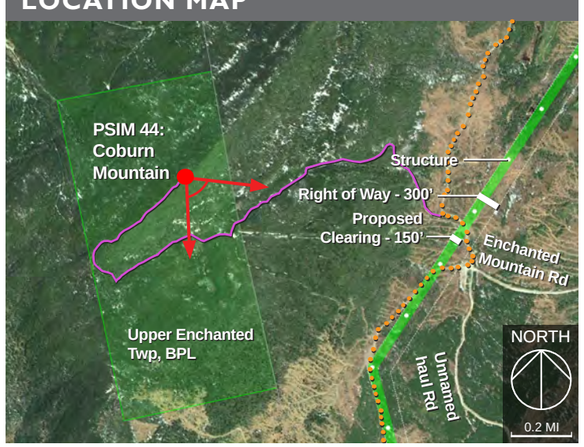
PHOTOSIMULATION 44: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

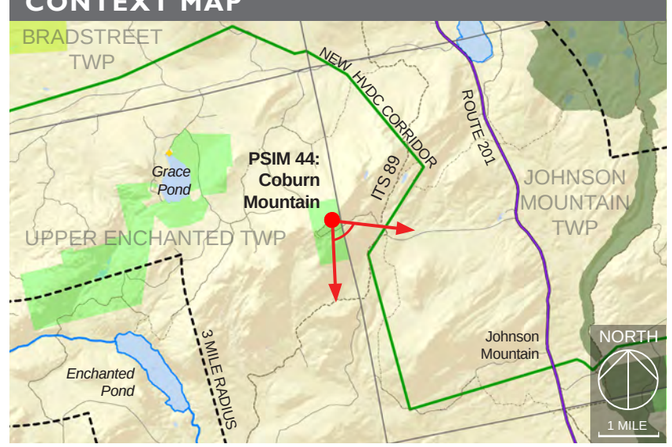


Proposed Conditions: Panoramic view looking east to south from the observation tower at the summit of Coburn Mountain in Upper Enchanted Twp toward the proposed HVDC transmission line. The new 150 ft wide corridor clearing will be visible in the midground on the west side of Johnson Mountain and in the background to the southeast. The closest visible structure will be 1.0 miles from this viewpoint. A local snowmobile trail to the summit is accessed off ITS 89. During snow cover conditions, the most visible portion of the Project will be the proposed corridor from the summit. The corridor will be seen in context with the active timber harvesting areas and haul roads that are typical in a working forest.

LOCATION MAP

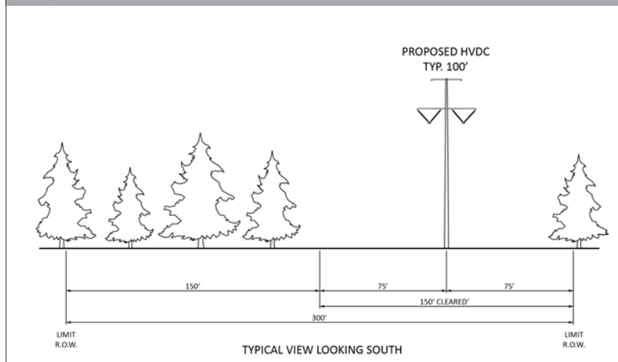


CONTEXT MAP



TECHNICAL INFORMATION

Typical Cross Section



Photograph / Photosimulation Information

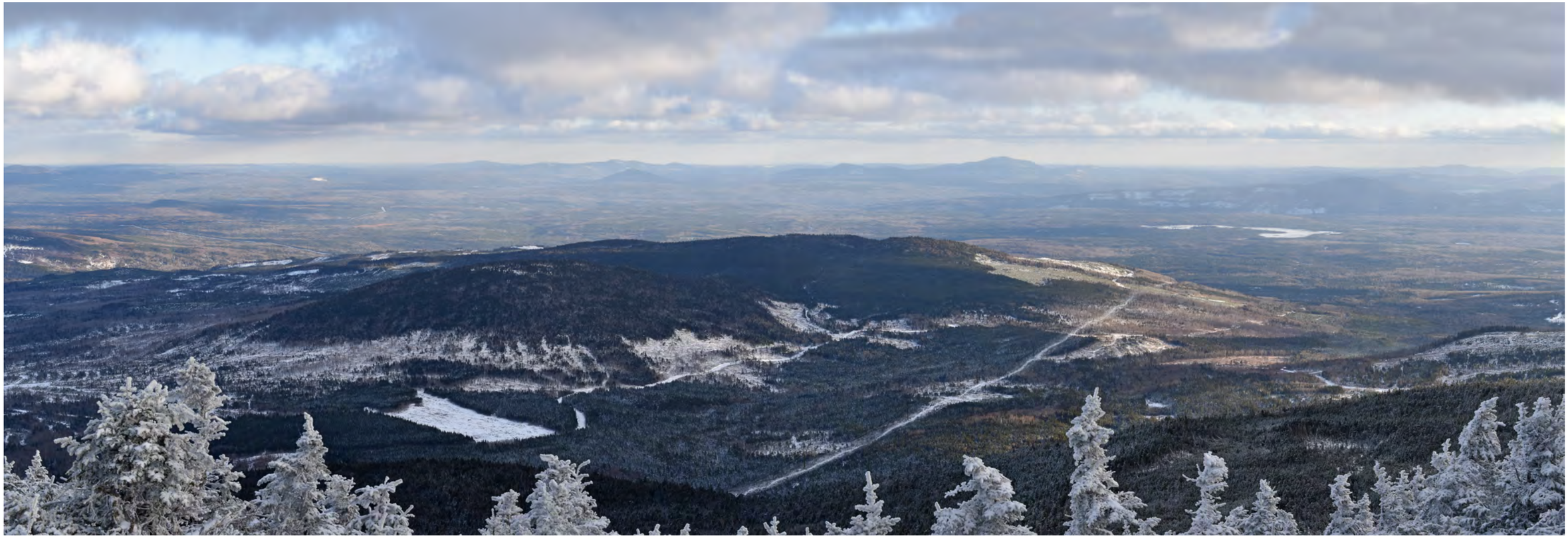
Location	45.468580°, -70.126432°
Viewing Direction	East to South
Horizontal Angle of View	73°
Date and Time	11/11/18 at 4:08 pm
Camera Focal Length	35 mm (50 mm equiv.)
Camera Make/Model	Nikon D5500
Photo Source	TJD&A
Proposed Structures Visible	11 within 3 miles
Approximate Distance to Nearest Visible Structure	1.0 mile

CENTRAL MAINE POWER

tjd&a

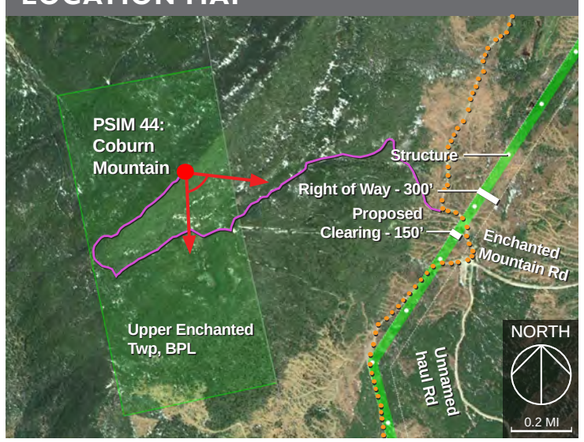
January 8, 2019

PHOTOSIMULATION 44: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

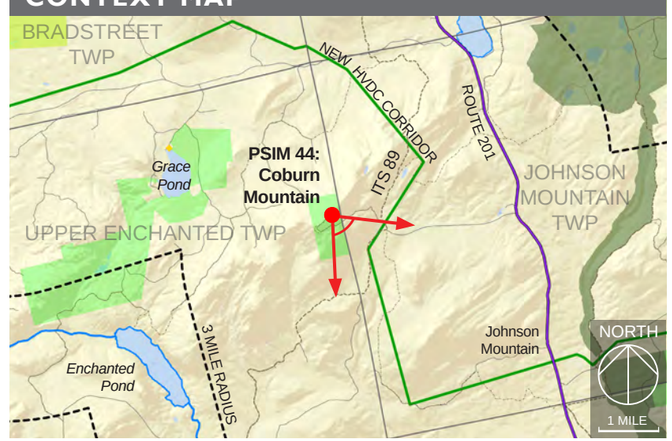


Proposed Conditions: Panoramic view looking east to south from the observation tower at the summit of Coburn Mountain in Upper Enchanted Twp toward the proposed HVDC transmission line. The new 150 ft wide corridor clearing will be visible in the midground on the west side of Johnson Mountain and in the background to the southeast. In this photosimulation, tapered vegetation is illustrated. The closest visible structure will be 1.0 miles from this viewpoint. The corridor will be seen in context with the active timber harvesting areas and haul roads that are typical in a working forest.

LOCATION MAP

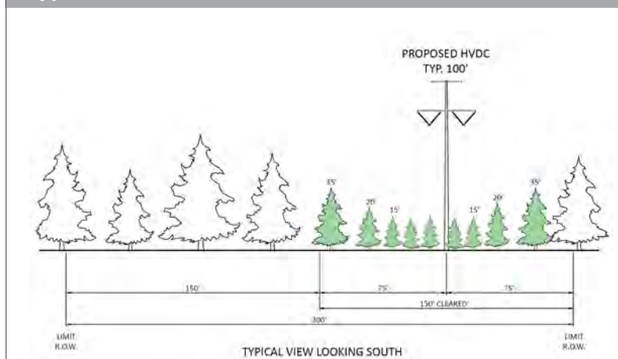


CONTEXT MAP



TECHNICAL INFORMATION

Typical Cross Section



Photograph / Photosimulation Information

Location	45.468580°, -70.126432°
Viewing Direction	East to South
Horizontal Angle of View	73°
Date and Time	11/11/18 at 4:08 pm
Camera Focal Length	35 mm (50 mm equiv.)
Camera Make/Model	Nikon D5500
Photo Source	TJD&A
Proposed Structures Visible	11 within 3 miles
Approximate Distance to Nearest Visible Structure	1.0 mile

CENTRAL MAINE POWER

tjd&a

EXISTING CONDITIONS 44A: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

Existing Conditions: Normal view looking east from the observation tower at the summit of Coburn Mountain. Evidence of active timber harvesting (patch cuts and haul roads) are visible in the midground on Johnson Mountain off an unnamed road in Johnson Mountain Twp.

PHOTOSIMULATION 44A: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

NEW ENGLAND CLEAN ENERGY CONNECT

Proposed Conditions: Normal view looking east from the observation tower at the summit of Coburn Mountain toward the proposed HVDC transmission line. The proposed corridor clearing and HVDC transmission line structures will be minimally visible in the background, to the left of Johnson Mountain in the photograph.

PHOTOSIMULATION 44A: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

Proposed Conditions: Normal view looking east from the observation tower at the summit of Coburn Mountain toward the proposed HVDC transmission line. The proposed corridor clearing and HVDC transmission line structures will be minimally visible in the background, to the left of Johnson Mountain in the photograph. This photosimulation illustrates how the proposed tapered vegetation management would visually reduce the appearance of the 150 ft wide corridor on the west side of Johnson Mountain (lower right in image.)

January 8, 2019

EXISTING CONDITIONS 44B: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

Existing Conditions: Normal view looking south from the observation tower at the summit of Coburn Mountain. Evidence of active timber harvesting (patch cuts and haul roads) are visible in the midground on Johnson Mountain off an unnamed road in Johnson Mountain Twp.

PHOTOSIMULATION 44B: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

Proposed Conditions: Normal view looking south from the observation tower at the summit of Coburn Mountain toward the proposed HVDC transmission line. The new 150 ft wide corridor clearing will be visible in the midground on the west side of Johnson Mountain. The closest visible structure and conductors will be 1.0 miles from this viewpoint.

PHOTOSIMULATION 44B: COBURN MOUNTAIN, OBSERVATION TOWER, Upper Enchanted Twp

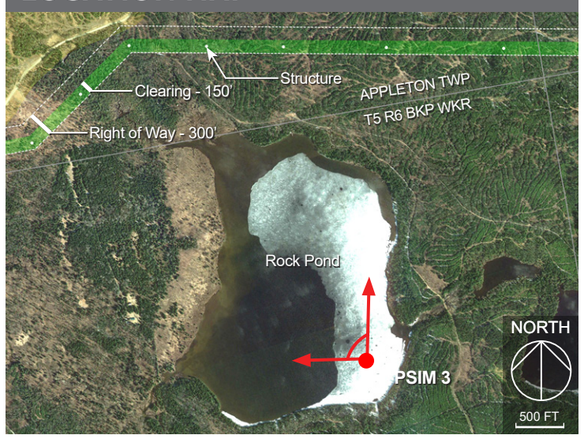
Proposed Conditions: Normal view looking south from the observation tower at the summit of Coburn Mountain toward the proposed HVDC transmission line. This photosimulation illustrates how the proposed tapered vegetation management would visually reduce the appearance of the 150 ft wide corridor on the west side of Johnson Mountain. The closest visible structure and conductors will be 1.0 miles from this viewpoint.

PHOTOSIMULATION 3: ROCK POND, T5 R6 BKP WKR

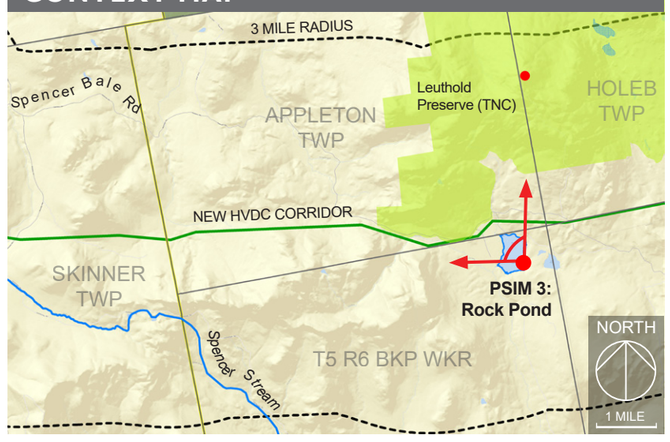
Proposed Conditions: Panoramic view looking west to north from the southeast end of Rock Pond toward the proposed HVDC transmission line. Approximately twelve structures, conductors, and portions of the cleared corridor will be visible at distances of 0.7 to 2.5 miles from this viewpoint. As previously submitted, a portion of the cleared corridor would have been visible as a 'notch' between Three Slide and Greenlaw Mountains. Visible mountains from left to right: Three Slide Mountain, Greenlaw Mountain, No. 6 Mountain, and No. 5 Mountain.

See Appendix B: Study Area Photographs for additional images.

LOCATION MAP

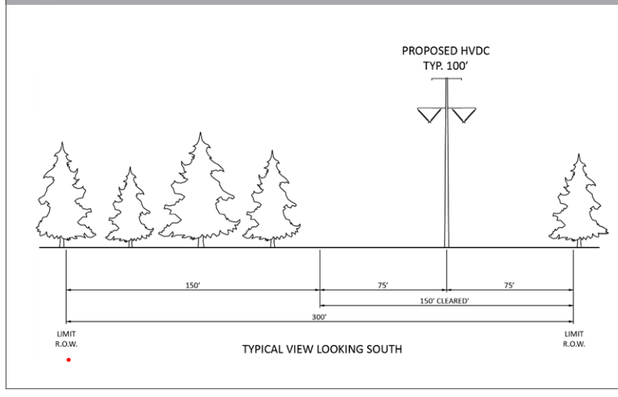


CONTEXT MAP



TECHNICAL INFORMATION

Typical Cross Section



Photograph / Photosimulation Information

Location	45.457577°, -70.387233°
Viewing Direction	West to North
Horizontal Angle of View	94°
Date and Time	07/25/17 at 2:29 pm
Camera Focal Length	35 mm
Camera Make/Model	Nikon D5500
Photo Source	TJD&A
Proposed Structures Visible	12
Approximate Distance to Nearest Visible Structure	0.7 miles

CENTRAL MAINE POWER | tjd&a

September 22, 2017 | PAGE 1 OF 8

Revised December 7, 2018

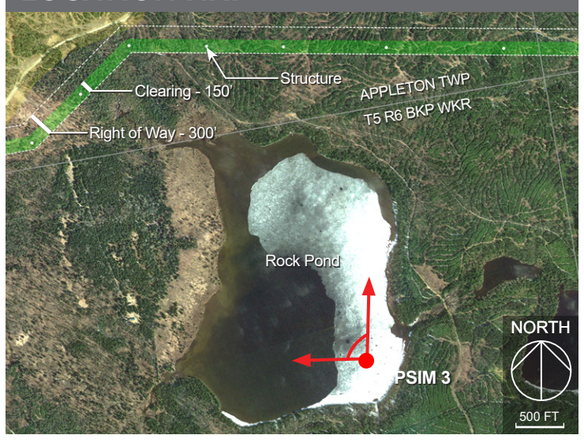
PHOTOSIMULATION 3: ROCK POND, T5 R6 BKP WKR, Structure 731-735 Visibility Analysis

NEW ENGLAND CLEAN ENERGY CONNECT

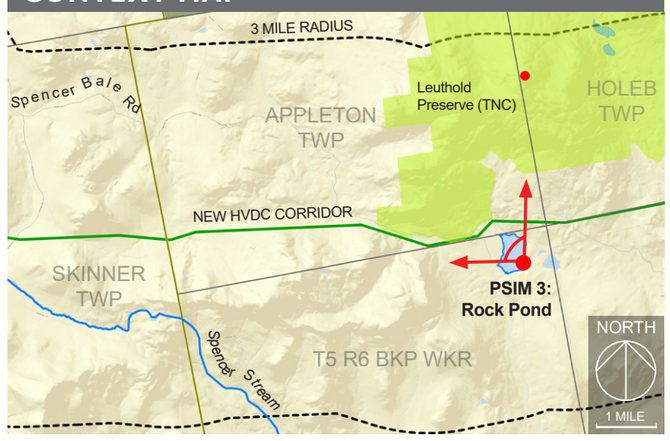
Proposed Conditions: Panoramic view looking west to north from the southeast end of Rock Pond toward the proposed HVDC transmission line. Approximately twelve structures, conductors, and portions of the cleared corridor will be visible at distances of 0.7 to 2.5 miles from this viewpoint. Visible mountains from left to right: Three Slide Mountain, Greenlaw Mountain, No. 6 Mountain, and No. 5 Mountain.

This simulation reflects a change in height for five structures in proximity to Gold Brook on the northern shoulder of Three Slide Mountain. Full vegetation height will be preserved for approximately 4,269 feet of corridor to maintain habitat. An additional 2,059 feet of corridor would be maintained using a tapering vegetation management technique which allows vegetation at heights ranging from 15 feet to 35 ft to be preserved along both sides within the corridor. This mitigation would minimize the visual 'notch' potentially viewed from Rock Pond.

LOCATION MAP



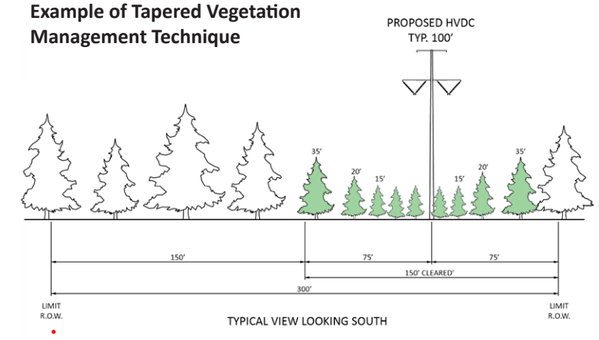
CONTEXT MAP



TECHNICAL INFORMATION

Typical Cross Section

Example of Tapered Vegetation Management Technique



Photograph / Photosimulation Information

Location	45.457577°, -70.387233°
Viewing Direction	West to North
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Date and Time	07/25/17 at 2:29 pm
Camera Focal Length	35 mm
Camera Make/Model	Nikon D5500
Photo Source	TJD&A
Proposed Structures Visible	12
Approximate Distance to Nearest Visible Structure	0.7 miles

CENTRAL MAINE POWER | tjd&a

Revised December 7, 2018

EXISTING CONDITIONS 3A: ROCK POND, T5 R6 BKP WKR

Existing Conditions: Normal view looking northwest from the southeast end of Rock Pond. Three Slide Mountain is visible on the left side of the image. Greenlaw Mountain is visible on the right side of the image.

September 22, 2017

PHOTOSIMULATION 3A: ROCK POND, T5 R6 BKP WKR

Proposed Conditions (Submitted September 2017): Normal view looking northwest from the southeast end of Rock Pond toward the proposed HVDC transmission line. Approximately six structures and conductors will be visible in the cleared corridor in the valley between Three Slide and Greenlaw Mountains. Additionally, the tops of three structures and conductors will be visible above the tree tops from this viewpoint.

September 22, 2017

PHOTOSIMULATION 3A: ROCK POND, T5 R6 BKP WKR, Revised Structures 731-735

Proposed Conditions: (Revised 12.7.18) Normal view looking northwest from the southeast end of Rock Pond toward the proposed HVDC transmission line. Approximately six structures and conductors will be visible in the partially cleared corridor in the valley between Three Slide and Greenlaw Mountains. A portion of the corridor on three slide mountain will include taller structures and allow full vegetation growth.

September 22, 2017

PAGE 5 OF 8

PHOTOSIMULATION 3A: ROCK POND, T5 R6 BKP WKR, Revised Structures 731-735

Proposed Conditions: (Revised 12.7.18) Normal view looking northwest from the southeast end of Rock Pond toward the proposed HVDC transmission line. Approximately six structures and conductors will be visible in the partially cleared corridor in the valley between Three Slide and Greenlaw Mountains. A portion of the corridor on Three Slide Mountain will include taller structures and allow full vegetation growth. The remainder of the visible corridor will be maintained with a tapered vegetation management technique to minimize the visual notch affect as viewed from Rock Pond.

December 4, 2017

Revised December 7, 2018

EXISTING CONDITIONS 3B: ROCK POND, T5 R6 BKP WKR

Existing Conditions: Normal view looking north from southeast end of Rock Pond. Greenlaw Mountain is visible on the left side of the image. No. 6 Mountain is visible on the right side of the image.

PHOTOSIMULATION 3B: ROCK POND, T5 R6 BKP WKR

Proposed Conditions: Normal view looking north from southeast end of Rock Pond toward the proposed HVDC transmission line. Three structures, conductors, and portions of the cleared corridor will be visible at distances of 0.6 to 0.8 miles. The structure height for these structures has remained the same.

September 22, 2017

Revised December 7, 2018

scenic quality
consultants

23 April 2019

James R. Beyer
Regional Licensing and Compliance Manager
Bureau of Land Resources - Eastern Maine Regional Office
Maine Department of Environmental Protection
106 Hogan Road
Bangor, Maine 04401

Dear Jim,

It is my understanding that The nature Conservancy has made mitigation proposals for several areas in the new corridor portion of the NECEC. Specifically, tall pole structures would be used in these areas that were sufficiently tall to maintain the full canopy tree height. Another option would be to taper the vegetation in the corridor so that it is as tall as possible yet remains outside the wire hazard zone. This proposal is being made to minimize wildlife impacts. I have been asked to comment on the visual effects.

It is my understanding that this area is valued for its relative remoteness; visual impacts would be to people engaged in activities that value this condition. Where viewers are in the forest, which is most of this area, they will not have views of the taller structures and they will not encounter a cleared ROW. The impacts will occur in two situations: open water and rivers with associated wetlands, and from elevated viewpoints, such as summit viewpoints. A cursory review identifies the following locations with potential visibility of the proposed NECEC project that may have increased visibility of larger structures.

Several lakes are likely to have increased visibility of significantly taller structures.

- Beattie Pond in Beattie Twp
- Fish Pond in Hobbstown Twp is identified as having outstanding scenic quality
- Grace Pond in Upper Enchanted Twp
- Hall Pond in T5 R7 BKP WKR
- Iron Pond in T5 R6 BKP WKR
- Little Wilson Hill Pond in Johnson Mountain Twp
- Moore Pond in Bradstreet Twp
- Mud Pond in Beattie Twp
- Parlin Pond in Parlin Pond Twp
- Rock Pond, in T5 R6 BKP WKR is identified as having significant scenic quality
- Spencer Lake in Hobbstown Twp is identified as having outstanding scenic quality
- Toby Pond in Hobbstown Twp
- Upper Tobey Pond in T5 R7 BKP WKR
- Whipple Pond in T5 R7 BKP WKR is identified as having significant scenic quality

james f. palmer, phd, fasla • 42 killarney drive, burlington, vermont 05408
palmer.jf@gmail.com.com • 802.735.5043

- Wing Pond in Lowelltown Twp

The current proposal also is visible from wetland in the Attean Pond-Moose River Focus Area, and it will likely increase with significantly taller structures. This includes Number 5 Bog, which is a national Natural Landmark.

The other situation where larger structures may increase visibility is from elevated viewpoints. In the review of the VIA, concern was expressed about views from the Attean View Reset Area. The nearest structures are 5 miles distant and and will be difficult to discern. Larger structures have a greater chance of being seen, but at this distance it is the cleared ROW that is most visible and TNC's proposal is to eliminate ROW clearing. Other elevated viewpoints include Number 5 Mountain, where the nearest structure is 3.9 miles away, and Coburn Mountain, where the closest structures will be approximately 1.7 miles away. In both cases the larger structures may be slightly visible, but the weathered steel will not have a high contrast against a forested ROW. There is the added benefit that in these areas, the ROW is not cleared, so it will not present a straight line in an otherwise natural setting. This reduces the project's overall visibility, particularly in winter.

Generally, I would anticipate that the ROW would be more visible and more difficult to maintain if the clearing were "tapered." In any event, it is important that the taller structures be weathered steel poles, not lattice structures. The public generally views poles more favorably than lattice structures.

Sincerely yours,

James F. Palmer

Scenic Quality Consultants
42 Killarney Drive
Burlington, VT 05408

1.4 Needs Assessment

The Massachusetts RFP seeks proposals for long term contracts for annual deliveries of up to 8,500,000 MWh of Clean Energy Generation and related transmission starting no later than 2022, pursuant to Section 83D of Chapter 169 of the Acts of 2008 (the "Massachusetts Green Communities Act"), as amended by Chapter 188 of the Acts of 2016, An Act to Promote Energy Diversity (the "Massachusetts Energy Diversity Act").[4] The Massachusetts RFP defines "Clean Energy Generation" as "(i) firm service hydroelectric generation from hydroelectric generation alone; (ii) new Class I Renewable Portfolio Standard ("RPS") eligible resources that are firmed up with firm service hydroelectric generation; or (iii) new Class I RPS eligible resources."[5]

The NECEC is designed to provide a cost-effective and environmentally friendly transmission path to deliver the Clean Energy Generation sought by the Massachusetts RFP from Quebec-based sources and will be capable of delivering the entire annual quantity of clean energy sought. On July 27, 2017, CMP submitted the NECEC as part of such bid(s) in conjunction with proposals for Clean Energy Generation.

The use of the NECEC for delivery of up to 8,500,000 MWh of Clean Energy Generation will provide many significant benefits to Maine and all of New England. In particular, the delivery of Quebec-sourced Clean Energy Generation is expected to reduce greenhouse gas emissions from fossil-fuel fired thermal generation in New England, enhance electric reliability (particularly during winter months when natural gas supply constraints have occurred in recent years), and reduce the wholesale cost of electricity for the benefit of retail customers across the region.

1.5 Natural Resource Impacts

Attachment 13 of the NECEC Project Natural Resource Protection Act ("NRPA") application provides a summary of transmission line and substation impacts for which compensation will be provided.

[4] The Massachusetts Energy Diversity Act is available at https://malegislature.gov/Laws/SessionLaws/Acts/2016/Chapter188.
[5] Massachusetts RFP at A, available at https://macleanenergy.files.wordpress.com/2017/03/83d-rfp-and-appendices-final.pdf.

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2.0 ALTERNATIVES ANALYSIS

2.1 Introduction

Under Chapter 310 (Wetlands and Waterbodies Protection Rules), pursuant to the Maine Natural Resources Protection Act (NRPA), as well as 40 C.F.R. § 230.10(a) (the 404(b)(1) Guidelines), pursuant to Section 404 of the Federal Clean Water Act, a permit applicant must document that a proposed project will avoid and minimize impacts to protected natural resources to the maximum extent practicable. Under NRPA, the applicant must demonstrate that there is no "practicable alternative to the activity that would be less damaging to the environment (DEP Reg. 310.5(A)). A project will not be permitted if there are practicable alternatives that would meet the project purpose and have less environmental impact. As defined by Chapter 310 of the DEP's rules, "practicable" means "[a]vailable and feasible considering cost, existing technology and logistics based on the overall purpose of the project" (06-096 CMR § 310(3)(R)). Similarly, pursuant to the 404(b)(1) Guidelines, "[a]n alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 C.F.R. § 230.10(a)(2)).

The discussion included in this section of the NRPA application describes the process by which alternatives were developed and evaluated to identify a technically and economically sound solution that avoids and minimizes environmental impacts to achieve the least environmentally damaging practicable alternative. Ownership, landscape, location, design constraints on the transmission system, cost and potential environmental impacts of alternatives are compared against the proposed route.

2.2 NECEC Purpose and Need

The purpose of the NECEC Project is to deliver up to 1,200 MW of Clean Energy Generation from Québec to the New England Control Area[1] via a High Voltage Direct Current (HVDC) transmission line, at the lowest cost to ratepayers. This Project is proposed in response to the Request for Proposals for Long-Term Contracts for Clean Energy Projects dated March 31, 2017 (RFP) issued by the electric distribution companies of the Commonwealth of Massachusetts[2] and the Massachusetts Department of Energy Resources. However, if the NECEC Project is not awarded through this RFP, the Project will still

[1] The New England Control Area includes the transmission system administered by ISO-New England, the regional transmission organization (RTO), located in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont, but does not include the transmission system in northern Maine (i.e., Aroostook County and parts of Penobscot and Washington counties).
[2] National Grid, NStar Electric d/b/a Eversource Energy, Fitchburg Gas & Electric Light Company d/b/a Unitil, and Western Massachusetts Electric Company d/b/a Eversource Energy.

fulfill the purpose and need of delivering renewable energy from Canada to New England, which has a continuing need for such power.

The NECEC project is expected to reduce regional CO_2 (greenhouse gas) emissions by over one million metric tons per year in Massachusetts, which is a direct benefit to neighboring states, including Maine. This amount would help achieve the stated goals of the Regional Greenhouse Gas Initiative (RGGI) by reducing the total amount of CO_2 emissions from the power sector of the six New England states, and Delaware, Maryland, and New York. The NECEC's ability to deliver reliable, renewably-generated electricity from Québec will help alleviate the need to build new non-renewable generation plants, and may allow retirement of older, less efficient fossil fueled power plants.

2.3 NECEC Alternatives

The alternative routes considered in this analysis are limited to the HVDC line component, from the Canadian border to the interconnection point with the grid at Larrabee Road Substation (Segments 1, 2 and 3), and associated substation upgrades; with all other components (i.e., Section 62/64 115kV rebuilds (Segment 4) and the new Section 3027 345kV line (Segment 5)) assumed to remain as proposed in all three scenarios. These latter line sections are being proposed in existing CMP corridors and, as such, the alternatives to these line sections would be to site these sections in new corridors, which would not meet the intended objectives of the least environmental impact on the environment. Thus, route alternatives for these project components are not discussed in detail in this narrative.

2.3.1 No-Action Alternative

Not constructing the NECEC project is the no-action alternative. The no-action alternative, however, would not meet the NECEC Project's purpose of allowing CMP to deliver 1,200 MW of the clean energy generation from Quebec to the New England Control Area at the lowest cost to ratepayers. In addition, even if a non-CMP project could be permitted elsewhere and could economically deliver 1,200 MW of clean energy generation from Quebec to the New England Control Area, such a project would not meet CMP's need to deliver that energy, and such a project would have unknown environmental impacts.

Further, the no-action alternative, if no alternative projects are built, would not reduce greenhouse gas emissions, would not reduce the wholesale cost of electricity for the benefit of retail customers across the region, and would not enhance electric reliability, particularly in winter months when natural gas supply and transfer constraints have occurred in recent years.

Thus, the no action alternative would not meet the project purpose and need.

2.3.2 Transmission Alternatives

The three HVDC transmission line routes, which have been considered as part of this analysis, would all meet the purpose and need to deliver clean energy generation from Québec to the New England Control Area. However, as discussed below, the two potential alternatives would result in more environmental impact than the proposed route for the NECEC corridor, and are not practicable.

2.3.2.1 Criteria for Assessment of Route Alternatives

The HVDC transmission line route alternatives were first identified through a geospatial desktop analysis, utilizing publicly available Geographic Information System (GIS) data. Alternatives were then evaluated and compared based on several parameters (points of comparison). CMP quantified and evaluated the following comparison criteria, listed in order of generally decreasing priority with respect to transmission line route selection:

- Conserved Lands
- Undeveloped Right of Way
- Clearing
- Stream Crossings
- Transmission Line Length
- National Wetlands Inventory (NWI) Mapped Wetlands
- Deer Wintering Areas
- Inland Waterfowl and Wading Bird Habitat
- Public Water Supplies
- Significant Sand and Gravel Aquifers
- Parcel Count Total

Each of these parameters is described in more detail below.

2.3.2.1.1 Conserved Lands

CMP's analysis identified the number of distinct parcels in federal, state, municipal, or non-profit ownership that would be crossed, some of which may be subject to conservation-related land use restrictions, and the acreage of conserved lands directly impacted (i.e., acreage cleared or otherwise altered) by the NECEC. Conserved lands include (i) parcels whose rights are partially or entirely owned or controlled by the National Park Service (NPS) (i.e., the Appalachian Trail, for which CMP granted NPS an easement) and the Maine Bureau of Parks and Lands and (ii) lands subject to conservation

easements that restrict development or other alteration of the land. These lands are often of high ecological, recreational, and/or aesthetic value. To preserve these values, CMP considered and favored transmission line routes that minimized crossings of conserved lands.

2.3.2.1.2 Undeveloped Right of Way

CMP's analysis identified the total length, in miles, of previously-undeveloped transmission line corridor to be developed and considered. To minimize wildlife habitat conversion, loss, or fragmentation, the analysis favored transmission line routes that minimized previously undeveloped land requiring clearing and development as a transmission line corridor.

2.3.2.1.3 Clearing

CMP's analysis identified the acreage of tree clearing required within the transmission line corridor and considered and favored transmission line routes that minimized tree clearing, to minimize habitat conversion-related impacts.

2.3.2.1.4 Stream Crossings

CMP's analysis identified the number of mapped features listed in the USGS - National Hydrography Dataset (USGS NHD) that would be crossed by the transmission line. CMP considered and favored transmission line routes that minimized stream crossings, in order to minimize unavoidable temporary (e.g., construction mat crossings) and permanent (e.g., increased insolation) impacts to these resources.

2.3.2.1.5 Transmission Line Length

CMP's analysis identified the total length, in miles, of new transmission line required and CMP considered and favored transmission line routes that minimized total transmission line length in order to reduce overall environmental impacts.

2.3.2.1.6 NWI Mapped Wetlands

CMP's analysis identified wetlands and water bodies (generally one acre and larger), listed in the National Wetlands Inventory (NWI) maps developed by the United States Fish and Wildlife Service (USFWS), which would be crossed by the transmission line. CMP considered and favored transmission line routes that minimized crossings of wetlands and water bodies, in order to minimize unavoidable temporary (construction mat crossings) and permanent (habitat conversion, filling) impacts to these resources.

2.3.2.1.7 Deer Wintering Areas

CMP's analysis identified the number of deer wintering areas listed by the Maine Office of GIS that are crossed by the transmission line, and the acreage of deer wintering areas directly impacted (i.e., acreage cleared or otherwise altered). CMP considered and favored transmission line routes that minimize intersections with DWAs, to minimize the need for clearing of woody vegetation within DWAs as a result of construction and maintenance activities.

2.3.2.1.8 Inland Waterfowl and Wading Bird Habitat

CMP's analysis identified the number of distinct waterfowl and wading bird habitats, and the total acreage listed by the Maine Office of GIS, crossed by the transmission line. Inland waterfowl and wading bird habitats include breeding, feeding, roosting, loafing, and migration stopover areas. Waterfowl habitats are divided behaviorally and seasonally into three categories: breeding habitats, migration and staging habitats, and wintering habitats (Maine Department of Inland Fisheries & Wildlife 2005b). CMP considered and favored transmission line routes that minimized intersections with IWWHs, in order to avoid and minimize clearing of vegetation within IWWHs required for transmission line construction and maintenance.

2.3.2.1.9 Public Water Supplies

CMP's analysis identified the number of public water supplies listed by the Maine Office of GIS and within 500 feet of the transmission line corridor. CMP considered and favored transmission line routes that minimized crossing of public water supplies in order to minimize the potential for any construction-related impacts to these resources.

2.3.2.1.10 Significant Sand and Gravel Aquifers

CMP's analysis identified the number of significant sand and gravel aquifers identified by the Maine Office of GIS that would be crossed by the transmission line. CMP considered and favored transmission line routes that minimized crossing of significant sand and gravel aquifers, which are, or may be, used as private or public water supplies, to minimize the potential for any construction-related impacts to these resources.

2.3.2.1.11 Parcel Count Total

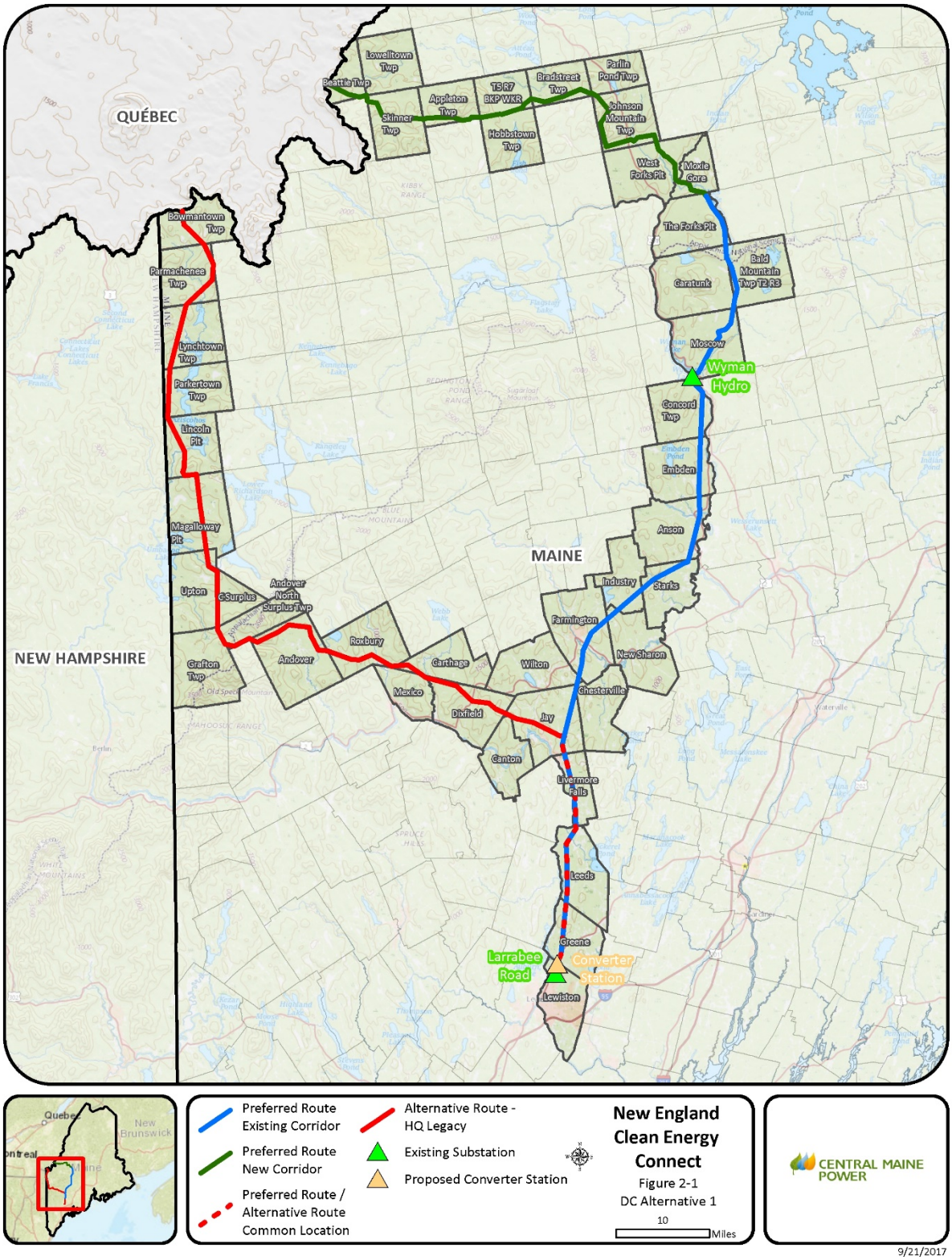
CMP's analysis identified the number of land parcels for which CMP would require the acquisition of title, right, or interest. CMP considered and favored transmission line routes with the highest likelihood of successful land rights acquisition, and utilized the number of parcels for which it would need title, right, or interest as one indicator of this.

2.3.2.2 HVDC Alternative 1

2.3.2.2.1 1980's Quebec Corridor Description

DC Alternative 1 (Alternative 1) is based on CMP's attempt to acquire and permit a transmission line project from Québec to the Lewiston, Maine area in the late 1980s. At that time, CMP had acquired title, right, or interest, primarily through real estate option agreements, on a significant portion of this corridor. However, the Maine Public Utilities Commission did not approve this project and these real estate option agreements have since expired. The Alternative 1 corridor would extend from the Canadian border in western Maine approximately 119.3 miles to an interconnection point in Lewiston, Maine (see **Figure 2-1**). Alternative 1 would be located primarily in a new corridor and partially in undeveloped width in existing corridors.

Figure 2-1: HVDC Alternative 1



Alternative 1 begins in Bowmantown Township, Oxford County, Maine at a point on the Maine/Québec border about 0.75 mile east of the Maine/New Hampshire line. The corridor extends southerly through Bowmantown Township, Parmachenee Township, Lynchtown Township, Parkertown Township and Lincoln Plantation, all in Oxford County. The corridor is west of Parmachenee Lake and Aziscohos Lake. In Lincoln Plantation, the corridor crosses Route 16 approximately 0.75 mile west of the bridge across the Magalloway River and then crosses the Magalloway River. At the south line of Lincoln Plantation, the corridor turns east for about 1.25 miles and then south across Magalloway Plantation, Oxford County, following the west property boundary of an industrial forest landowner to the south line of Magalloway Plantation. The entire eight miles across Magalloway Plantation is now subject to a conservation easement held by the New England Forestry Foundation, so a realignment to cross other properties would be necessary in this area.

From Magalloway Plantation the corridor continues south across the Town of Upton, Oxford County, crossing the Rapid River about 0.5 mile south of the outlet of Pond-in-the-River. In the 1980s the land along the Rapid River was owned by an affiliate of CMP. That land and additional land on each side of the river is now controlled by the Rangeley Lakes Heritage Trust and the MDIFW and is subject to a conservation easement. Obtaining rights for a transmission line through this conservation easement is highly unlikely.

South of the Rapid River the corridor runs southeast to C Surplus Township, Oxford County, and then turns south following the west line of C Surplus Township to the southerly line of the township. C Surplus Township is now subject to a conservation easement held by the New England Forestry Foundation; therefore, the alignment would need to be moved to the east line of Upton Township. From C Surplus, the route follows the westerly line of Andover North Surplus or the east line of Grafton Township, both in Oxford County, for about two miles before turning east to the southerly line of Andover North Surplus and the west line of the Appalachian Trail Corridor. No records could be located to determine how CMP planned to cross the Appalachian Trail corridor on the circa 1985 project.

From the easterly line of the Appalachian Trail corridor the Alternative 1 corridor follows the southerly line of Andover North Surplus for about a mile before turning east and crossing into the Town of Andover, Oxford County where the corridor roughly follows the north and then east town lines before crossing into the town of Roxbury, Oxford County. The corridor crosses Route 120, the Swift River and Route 17 in the southeast part of the town and then exits Oxford County, entering Franklin County for about three miles in the town of Carthage before reentering Oxford County on the north line of the town of Mexico. In less than 0.75 mile, the Alternative 1 corridor crosses the Webb River and into the Town of

Dixfield, Oxford County where the corridor continues southeasterly across Dixfield, crossing U.S. Route 2 before crossing the east line of the town into the Town of Jay, Franklin County. Continuing southeasterly across the town of Jay and the very northern tip of the Town of Canton, Oxford County, the corridor crosses Route 4 and then Route 133 before connecting with the Section 278 corridor about 2.25 miles north of the Livermore Falls Substation. From the point of intersection with Section 278 south to Larrabee Road Substation, a distance of approximately 26 miles, Alternative 1 is the same as the Preferred Alternative.

2.3.2.2.2 HVDC Alternative 1 Comparison

Table 2-1, below, compares the NECEC Preferred Alternative to Alternative 1.

Table 2-1: Comparison of NECEC Preferred Alternative to Alternative 1

Point of Comparison	Unit	Preferred Alternative	Alternative 1
Conserved lands	no./acres	6 parcels/42 acres	8 parcels/275.3 acres
Undeveloped ROW	miles	53.5	93.1
Clearing	acres	1,823	1,934
Parcel count total	no.	7	120
Stream crossings	no.	115	88
Transmission line length	miles	146.5	119.3
NWI mapped wetlands	no./acres	263 wetlands/76.3 acres	238 wetlands/118.3 acres
Deer wintering areas	no./acres	8 DWAs/44.3 acres	8 DWAs/71.3 acres
Inland waterfowl and wading bird habitat	no./acres	12 IWWH/22.7 acres	9 IWWH/23.1 acres
Public water supplies within 500 feet	no.	1	1
Significant sand and gravel aquifers	no.	12	7

Conserved Lands

The Preferred Alternative crosses fewer conserved land parcels, and significantly less conserved lands acreage than Alternative 1, indicating that the Preferred Alternative would cause less habitat fragmentation than Alternative 1.

A crossing of the Appalachian Trail would be required by both routes. An overhead crossing of the Appalachian Trail for Alternative 1 would require the acquisition of an easement and a 150-foot wide swath of tree clearing across the trail corridor where no transmission line corridor currently exists. In comparison, the Preferred Route crosses the Appalachian Trail in an existing transmission line corridor and is next to an existing gravel road. CMP owns the Appalachian Trail on Section 222. CMP acquired the rights in fee circa 1950. It later conveyed an easement to the NPS, but kept the fee ownership and specifically the right to construct overhead electric transmission and communication lines for the entire 300-foot wide corridor when the NPS purchased the trail corridor. CMP would only require an additional 75 feet of tree clearing for the installation of the overhead transmission line for the Preferred Alternative.

Undeveloped Right of Way

Alternative 1 would require 93.1 miles of new corridor, compared to 53.5 miles of new corridor for the Preferred Alternative, an increase in 39.6 miles of currently undeveloped ROW.

Clearing

Although Alternative 1 is shorter in overall length than the Preferred Route, Alternative 1 would require an additional 111 acres of tree clearing compared to the Preferred Alternative.

Parcel Count Total

The Alternative 1 corridor would require CMP to acquire title, right, or interest in 120 parcels of land. In contrast, the Preferred Alternative requires the acquisition of rights in only seven parcels. CMP has acquired rights for all seven parcels.

Stream Crossings

The USGS NHD identified more stream crossings along the Preferred Alternative than Alternative 1, likely a function of transmission line corridor length. CMP standard construction practice is to install temporary equipment spans over streams and to avoid all in-stream activities. Consequently, the primary potential impacts to stream habitat are sedimentation and insolation. CMP mitigates the potential for these impacts by installing erosion and sedimentation controls, by routine cleaning of temporary crossing (construction mats) spans, and by maintaining riparian buffers during operations and maintenance of the line. As a result, temporary and permanent impacts to streams on either route would be insignificant.

Transmission Line Length

The Alternative 1 transmission line corridor is 119.3 miles in length; about 27.2 miles shorter than the Preferred Alternative. Alternative 1, in comparison to the Preferred Alternative, would require 93.1 miles of new corridor, an increase in 39.6 miles of new corridor.

NWI Mapped Wetlands

A comparison of mapped NWI wetlands along Alternative 1 and the Preferred Alternative identified 25 more wetlands along the Preferred Route. However, construction in the Alternative 1 corridor would result in an additional 42 acres of wetland impact when compared to the Preferred Route. The primary impact to wetlands from construction of the project will be the conversion of forested wetland to early successional scrub-shrub and meadow cover types. As a result, other than a minor amount of permanent fill associated with structures placed in wetlands where no siting alternatives are available, the permanent loss of wetlands from construction of the project on either route is negligible.

Deer Wintering Areas

The Preferred Route would cross eight deer wintering areas (DWAs) and would require the conversion of 44.3 acres of DWA habitat. In comparison, Alternative 1 would also cross eight DWAs, but would require the conversion of 27 more acres of DWA habitat than the Preferred Route.

Inland Waterfowl and Wading Bird Habitat

The Preferred Alternative would cross 12 IWWHs and require the conversion of 22.7 acres of IWWH habitat, while Alternative 1 would cross nine IWWHs and would require the conversion of 23.1 acres of IWWH.

Public Water Supplies within 500 Feet

One public water supply is located within 500 feet of both the Preferred Alternative and Alternative 1.

Significant Sand and Gravel Aquifers

Impacts from the construction and operation of a transmission line are unlikely to impact aquifers due to the short duration of equipment operation and the implementation of environmental controls, and spill reporting and cleanup procedures utilized by CMP and its contractors during construction.

Preferred Alternative vs. Alternative 1 Summary

A comparison of the environmental resources traversed by both routes does not substantively differentiate the two routes in terms of overall number of resources impacted. However, when assessing the extent of impact, the conversion of habitat is much greater along the Alternative 1 route than the Preferred Route.

Alternative 1 transmission structures would be visible from Black Mountain Ski Area in the Town of Rumford, Maine, Rapid River in Upton, and Aziscohos Mountain in Lincoln Plantation as well as from the Appalachian Trail. The Preferred Route is comparatively advantageous in that it would cross the Appalachian Trail in a location with an existing overhead transmission line corridor.

Alternative 1 would require the acquisition of 120 parcels of private land in addition to rights needed to cross conservation lands. Additionally, 93.1 miles of Alternative 1 consists of a new corridor with no land rights under agreement, controlled or owned by CMP.

For these reasons, Alternative 1 is more environmentally damaging than the Preferred Route, and it is not a practicable alternative.

2.3.2.3 HVDC Alternative 2

2.3.2.3.1 Bigelow Corridor Description

DC Alternative 2 (Alternative 2) would extend from the Canadian border in western Maine approximately 138.5 miles to an interconnection point in Lewiston, Maine (see **Figure 2-2**). The line would be located partially in a new corridor and partially in undeveloped width in existing corridors.

The Alternative 2 corridor begins in western Maine in Beattie Township, Franklin County, Maine at a point on the Canadian border approximately 2.5 miles north of the southwest corner of the township. The alternative corridor extends southeast along the Preferred Alternative for approximately 7.75 miles across Beattie Township, the southwest corner of Lowelltown Township and southerly across Skinner Township to a point where the Preferred Alternative turns east. The Preferred Alternative corridor has been acquired, therefore no additional acquisition would be necessary in the first 7.75 miles of Alternative 2. Both routes require the acquisition by lease of the Lowelltown parcel from the Passamaquoddy Tribe.

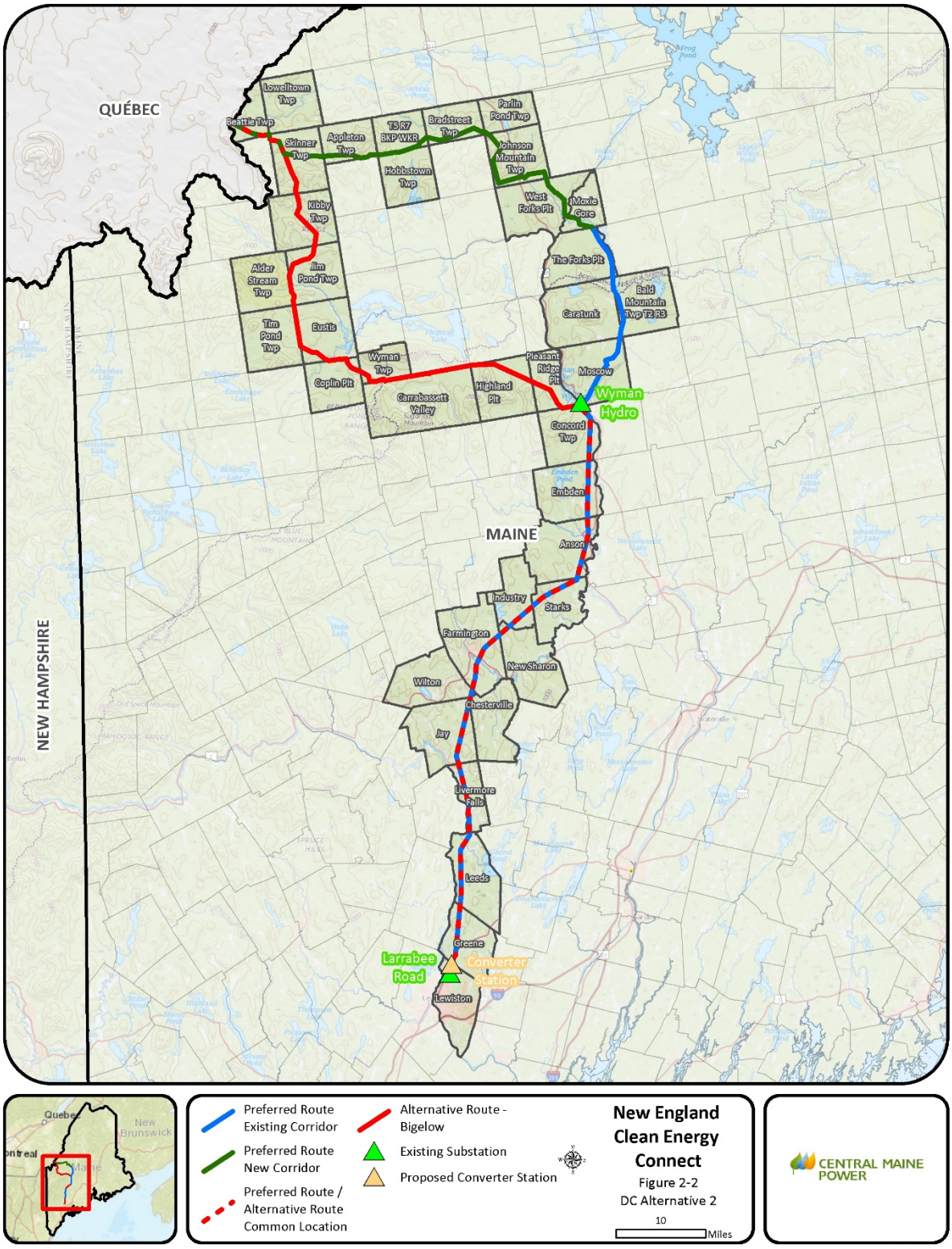
Alternative 2 continues southerly approximately 8.75 miles to a point in Kibby Township, Franklin County, where the corridor begins to parallel the Kibby Mountain Wind Farm 115kV generation lead line. Elevations range from 1,900 feet near the intersection with the generator lead to just under 2,700 feet. The Alternative 2 corridor parallels the generator lead south across Kibby Township, Jim Pond Township, the Town of Eustis, and Coplin Plantation, all in Franklin County. The 115kV generator lead from the Stratton Energy biomass plant begins to parallel the Kibby generator lead in Coplin Plantation and both lines continue to parallel the Alternative 2 corridor southeasterly across Coplin Plantation and Wyman Township to the Bigelow Substation located on the east side of Route 27 along the north line of the Town of Carrabassett Valley.

Alternative 2 parallels the generator lead for a total distance of approximately 27.5 miles. Elevation ranges from about 1,250 feet to about 1,900 feet on this portion of the alternative. The Alternative 2 corridor from the Preferred Alternative to Bigelow Substation would require the acquisition of a 150-foot wide corridor. This section of new corridor would be located parallel to, but would not overlap, the existing generator lead corridor. It is not possible to co-locate the Alternative 2 corridor and the Kibby generator lead corridor because of real estate constraints. Thus, development of Alternative 2 would result in a new full width corridor adjacent to the existing corridor in this location.

The surrounding land generally is industrial forest land typified by spruce-fir and northern hardwoods forest types that are owned and managed for timber production. Most of the area is undeveloped with only a few seasonal dwellings. Recreation is typically permitted on the industrial forest lands. The Village of Stratton is located about 0.25 miles east of the alternative corridor but the corridor does not impact any residential areas. There is one industrial wind farm located in Kibby Township, and both a biomass generation plant and a saw mill are located in Stratton.

The Alternative 2 corridor crosses Route 27 twice and Route 16 once. Generally, access would need to be obtained over private roads. The alternative corridor crosses the Appalachian Trail on the north side of the Wyman/Carrabassett Valley town line. Overhead rights were obtained from the U.S. Department of the Interior (DOI) for the Stratton Energy generator lead circa 1985. However, DOI refused to grant rights to cross the AT, either overhead or underground, for the Kibby Wind generator lead circa 2010 and the generator lead was placed underground in the Route 27 highway right of way. Obtaining a Special Use permit from the NPS to cross the Appalachian Trail corridor with an overhead line is highly unlikely. The cost and complexity of an underground crossing, whether buried roadside in the Route 27 right of way or placed underneath the Appalachian Trail corridor via directional bore, would pose a financial barrier and an engineering challenge.

Figure 2-2: HVDC Alternative 2



Starting at the Bigelow Substation, the Alternative 2 corridor would be co-located for approximately 23.5 miles with CMP's Section 215 corridor, which crosses Carrabassett Valley, Franklin County, Highland Plantation and Pleasant Ridge Plantation, Somerset County. Elevation ranges from about 1,100 feet to about 1,900 feet for this portion of the alternative.

Section 215 is a 115kV radial line[3] built on H-frame structures in a 150-foot wide corridor. For approximately 9.5 miles, the Section 215 corridor is located along the north line of Carrabassett Valley which is also the south line of the Bigelow Preserve, a large Maine-owned tract with strict land use restrictions designed to limit development. A one mile long portion of the Bigelow Preserve extends across the Section 215 corridor. Section 215 originates at Wyman Hydro and terminates at Bigelow substation.

Most of the eastern half of Carrabassett Valley is owned by the Penobscot Indian Nation. Most of the land in Highland Plantation and Pleasant Ridge Plantation is industrial forest land although there are smaller tracts of private forest ownership and some residential development along Rowe Pond Road in Pleasant Ridge, which is crossed twice by Section 215. The acquisition of an additional 75 feet of width would generally be necessary to co-locate with the Section 215 corridor. However, acquiring additional width through the Bigelow Preserve would be very difficult or impossible due to significant land use restrictions in the Preserve. Therefore, Alternative 2 would require that the DC line be double-circuited with Section 215, placed underground, or rerouted southerly around the Bigelow Preserve ownership. Given the probable need to cross the Appalachian Trail underground, the difficulty in taking radial line Section 215 out of service (i.e., there is no other CMP 115 kV line connected to Bigelow substation so the loss of Section 215 could jeopardize the entire load and generation serviced by this substation), and the expected visual impacts of Alternative 2, CMP anticipates that regulators would require the Alternative 2 line to be installed underground from the north side of the Appalachian Trail corridor to the Highland Plantation town line, a distance of approximately ten miles. Because underground transmission line construction costs can be approximately 4-10 times that of overhead construction, this represents a significant financial barrier. Conversely, the Preferred Alternative would cross the Appalachian Trail in an existing corridor owned by CMP.

[3] A radial transmission line is a transmission line that is supplied from one direction only and terminates without connecting with another transmission line.

A new corridor approximately 0.75-mile long will be necessary to connect the Section 215 corridor in southeastern Pleasant Ridge Plantation and the Section 63 corridor in northeastern Concord Township. This segment of the Alternative 2 corridor would need to be 150 feet wide.

From the point of intersection with the Section 63 corridor, which is approximately 0.75 mile south of the Wyman Dam, Alternative 2 would follow the preferred route to Larrabee Road Substation in Lewiston.

2.3.2.3.2 Alternative 2 Comparison

Table 2-2, below, compares the NECEC Preferred Alternative to Alternative 2.

Table 2-2: Comparison of NECEC Preferred Alternative to Alternative 2

Point of Comparison	Unit	Preferred Alternative	Alternative 2
Conserved lands	no./acres	6 parcels/42 acres	9 parcels/53.2 acres
Undeveloped ROW	miles	53.5	17.3
Clearing	acres	1,823	1,670
Parcel count total	no.	7	34
Stream crossings	no.	115	123
Transmission line length	miles	146.5	138.5
NWI mapped wetlands	no./acres	263 wetlands/ 76.3 acres	283 wetlands/ 113.3 acres
Deer wintering areas	no./acres	8 DWAs/44.3 acres	8 DWAs/44 acres
Inland waterfowl and wading bird habitat	no./acres	12 IWWH/22.7 acres	12 IWWH/16.5 acres
Public water supplies within 500 feet	no.	1	1
Significant sand and gravel aquifers	no.	12	10

Conserved Lands

The Preferred Alternative and Alternative Route 2 both cross conserved land parcels. However, Alternative 2 would traverse three additional conserved parcels, resulting in 11.2 acres of additional impact to conserved lands compared to the Preferred Route. Alternative 2 would require crossing the Appalachian Trail on Route 27 in the town of Wyman. An overhead or direct bore underground crossing of the Appalachian Trail on Alternative 2 would require the acquisition of an easement from the NPS and an overhead crossing would require a 150-foot wide swath of tree clearing across the trail corridor where no transmission line corridor currently exists. Otherwise, underground installation of the DC transmission line would be required within the ROW of State Highway 27. Both options are prohibitively expensive.

In comparison, the Preferred Alternative crosses the Appalachian Trail corridor within an existing transmission line corridor and is adjacent to an existing gravel road. CMP owns the land where the Appalachian Trail is located on Section 222. CMP acquired the rights in fee circa 1950. It later conveyed an easement to the NPS, but retained fee ownership, and specifically retained the right to construct overhead electric and communication transmission lines for the entire 300-foot wide corridor when the NPS purchased the trail corridor easement. CMP would only require an additional 75 feet of tree clearing for the installation of the overhead transmission line for the Preferred Alternative.

Undeveloped Right of Way

The Preferred Alternative would require 53.5 miles of currently undeveloped right of way to be developed, compared to 17.3 miles of currently undeveloped right of way required for Alternative 2.

Clearing

The Preferred Alternative would require clearing 1,823 acres, compared to Alternative 2 which would require clearing 1,670 acres.

Parcel Count Total

The Alternative 2 corridor would require CMP to acquire title, right, or interest in 34 parcels of land. In contrast, the Preferred Route requires the acquisition of rights in only seven parcels. CMP has acquired the rights for all seven parcels.

Stream Crossings

The Preferred Route would cross 115 streams, while Alternative 2 would cross 123 streams. CMP standard construction practice is to install temporary equipment spans over streams and to avoid all in-stream activities. Consequently, the primary potential impacts to stream habitat are sedimentation and insolation. CMP mitigates the potential for these impacts by installing erosion and sedimentation controls,

by routine cleaning of temporary crossing (construction mats) spans, and by maintaining riparian buffers. As a result, impacts to streams on either route would be insignificant.

Transmission Line Length

The Preferred Route transmission line corridor is 146.5 miles, whereas the Alternative 2 transmission line corridor is 138.5 miles.

NWI Mapped Wetlands

The Preferred Route crosses 263 wetlands and impacts 76.3 acres, whereas Alternative 2 crosses 283 wetlands and impacts 113.3 acres. The primary impact to wetlands from construction of the project will be the conversion of forested wetland to early successional scrub-shrub and meadow cover types. As a result, other than a minor amount of permanent fill associated with structures placed in wetlands where no siting alternatives are available, the permanent loss of wetlands from construction of the project on either the Preferred Route or Alternative 2 is negligible.

Deer Wintering Areas

Deer wintering areas crossed, and converted, are virtually identical between the Preferred Route and Alternative 2. There is no significant environmental advantage to either route with respect to DWAs.

Inland Waterfowl and Wading Bird Habitat

The Preferred Route crosses 12 IWWHs and would require conversion of 22.7 acres, while Alternative 2 crosses 12 IWWHs and would require conversion of 16.5 acres. There is no significant environmental advantage to either route with respect to IWWHs.

Public Water Supplies within 500 Feet

One public water supply is located within 500 feet of both routes. There is no significant environmental advantage to either route with respect to public water supplies.

Significant Sand and Gravel Aquifers

The Preferred Route crosses 12 significant sand and gravel aquifers, while Alternative 2 crosses 10 significant sand and gravel aquifers. Impacts from the construction and operation of a transmission line are unlikely to impact aquifers due to the short duration of equipment operation and the implementation of environmental controls, and the spill reporting and cleanup procedures utilized by CMP and its contractors during construction.

Preferred Alternative vs. Alternative 2 Summary

Alternative 2, while slightly shorter and containing less new corridor than the Preferred Route, has more wetland and stream crossings than the Preferred Alternative and would create more significant environmental impacts as well as severe land acquisition and social impact issues.

Approximately 34 parcels would need to be acquired, including rights across the Penobscot Indian Nation, the Bigelow Preserve and the Appalachian Trail corridor. Past attempts by others, including Highland Wind and Foster Mountain Wind (a/k/a West Hills Wind) to develop transmission and generation in this area have not been successful, due in part to local opposition; therefore, the acquisition of private land in these areas is expected to be difficult.

In addition, Alternative 2 transmission structures would likely be visible from points on the Appalachian Trail and other trails on the Bigelow Preserve and from the Sugarloaf Mountain Ski area. Based on recent National Park Service objections to the proposed overhead transmission line associated with the Kibby Mountain Wind generator lead, an overhead crossing near the Appalachian Trail on Route 27 in the town of Wyman would likely be opposed by the National Park Service and is therefore unlikely to be permittable.

For these reasons, Alternative 2 is more environmentally damaging than the Preferred Route, and is not a practicable alternative.

2.3.3 Alternative Locations to Merrill Road Converter Station

Several sites for the DC to AC converter station were identified and evaluated based on adequacy of land area suitable for the converter station siting, location along the preferred HVDC transmission route, proximity to the nearest substation capable of interconnection, and potential impacts to the environment and on surrounding land uses (see **Figure 2-3**).

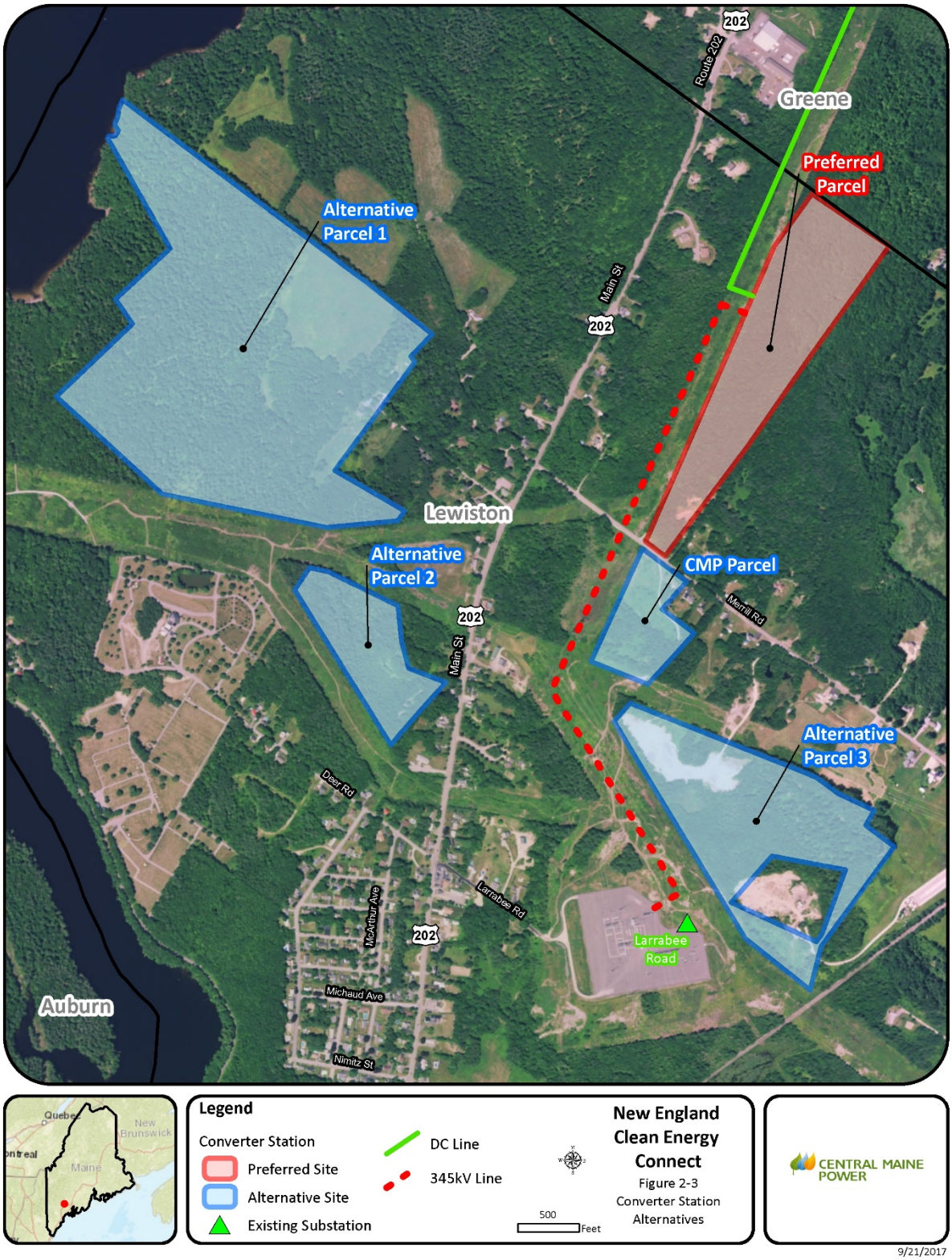
CMP evaluated six sites (including the Larrabee Road Substation) as possible options for the converter station. The unimproved forested parcel owned by CMP, “CMP Parcel,” on the south side of Merrill Road and a forested parcel, “Alternative 2 Parcel,” were ruled out as not being large enough to accommodate the proposed facility. The Larrabee Road Substation was ruled out for this same reason. “Alternative Parcel 3,” on the south side of Merrill Road, north of the Larrabee Road Substation has sufficient land area, but the NRCS soil maps indicated ScA (Scantic silt loam, 0-3% slopes) and Pa (Peat and muck) soils throughout the lot. These soils are poorly drained or very poorly drained and therefore reflective of wetlands, and are therefore not preferred from an environmental impact and an engineering standpoint.

CMP identified two of the six properties as being most suitable: 1) the "Preferred Parcel" (the preferred site) located along the project corridor 0.5 mile north of Merrill Road in Lewiston; and 2) the "Alternative Parcel 1" situated along an adjacent transmission corridor (0.6 miles from the project corridor) located at the end of Taylor Hill Road in Lewiston. These two sites are approximately one mile from the Larrabee Road Substation in Lewiston. Both properties contain adequate land area, are located a suitable distance from residential structures, are bordered by significant vegetative buffers, and would allow for interconnection to the Larrabee Road Substation through existing ROWs. However, Alternative Parcel 2 would require the HVDC line to extend an additional 0.5 mile, including one HVDC line crossing of U.S. Route 202 and one crossing of U.S. Route 202 by the 345kV tie to the Larrabee Road Substation. Alternative Parcel 2 would also require an approximately one mile segment of transmission line Section 61 and Section 255 to be placed on double-circuit structures, which are not preferred for reliability reasons.

Both the preferred and alternative parcels contain wetlands, but based on existing natural resource data and NRCS soil survey maps, the location of wetlands on the Alternative Parcel 2 would not allow the converter station to be positioned immediately adjacent to the transmission line corridor without significant fill for both the converter station and the access road to the site. The preferred site is positioned directly along the project's HVDC corridor. There is one mapped significant vernal pool (SVP) on the preferred site; however, the six-acre converter station will be sited in an upland area outside of the SVP depression. Impacts will occur to the critical terrestrial habitat adjacent to this pool, however, a significant amount of adjacent forestland will remain undeveloped in the immediate vicinity.

For these reasons, the alternative site on Alternative Parcel 2 is more environmentally damaging than the preferred Merrill Road Converter Station site on the Preferred Parcel, and is not practicable.

Figure 2-3: Merrill Road Converter Station Alternatives



2.3.4 Alternative Locations to the Fickett Road Substation

CMP Transmission Planning analyzed several locations across the CMP transmission system to identify the optimal location and size of the STATCOM units needed to maintain system voltage stability. The optimal design and location to ensure electrical performance and to maintain system voltage stability, and in order to minimize the size and number of the units required, was determined to be a 200 MVAR STATCOM site located at Fickett Road in Pownal, adjacent to the existing Surowiec Substation, as well as a 200 MVAR STATCOM at the existing Coopers Mill Substation.

The STATCOM at Coopers Mill Substation will be within the existing fence line, no alternatives were considered for this option as it meets the objective of avoiding or minimizing environmental impact.

The location of the STATCOM proposed at Fickett Road is electrically optimal to be located as close to Surowiec Substation as possible. The existing Surowiec Substation yard is not large enough to accommodate the new STATCOM, and site restrictions due to the location of Runaround Brook do not allow for an expansion of the yard. The parcel located north of the Surowiec Substation, bordered by Fickett and Allen Road is on existing CMP owned land, adjacent to an existing CMP transmission line corridor. The close proximity of the proposed substation to Surowiec Substation will minimize the length of overhead transmission line required to connect the two substation sites, thereby minimizing impacts compared to the STATCOM compared to it any alternative location farther from Surowiec Substation

2.4 Site Specific Design to Minimize Environmental Impacts

In addition to the comprehensive analysis of alternatives completed for the NECEC, the various segments of the route have been designed to include site-specific adjustments to utility structure locations, temporary access roads, and substation designs that avoid and minimize potential natural resource impacts to the greatest extent practicable. Each segment of the NECEC route was assessed using GIS datasets available from the Maine Office of GIS, Maine Department of Inland Fisheries & Wildlife (MDIFW), Maine Natural Areas Program (MNAP), and the National Wetland Inventory (NWI). These datasets included: rare, threatened, and endangered species; unique natural areas; significant wildlife habitat; wetlands designated in the NWI; public lands (e.g., state and local parks); and conservation land trust properties. Field surveys were completed during the 2015, 2016 and 2017 field seasons to identify new and verify previously mapped vernal pools, wetlands and rivers and streams. Desktop reviews of prehistoric and historic archaeological sites and historic architectural resources were conducted to locate potentially significant cultural resources. Visual analysis field surveys were conducted and photo simulations were created to study visual impacts. Findings of the field investigations specific to wetlands

and other protected natural resources are discussed in **Attachment 9.0** of this NRPA Application; findings specific to other topics are discussed in the Site Law Application.

After selecting the preferred NECEC route, CMP designed each transmission component to further avoid and minimize community, private property, and environmental impacts while maintaining a cost-effective and technically sound design in accordance with Chapter 310 and the 404(b)(1) Guidelines. These goals were achieved through two key design considerations. First, CMP attempted to site and design each NECEC transmission line segment within existing transmission corridors owned by CMP, although this was not practicable in all cases. Second, CMP established structure locations and temporary access roads that, to the extent practicable, avoided protected natural resources.

In some instances, construction within areas of mapped protected or sensitive species occurrences or plant communities cannot be avoided due to topography or safety concerns associated with existing infrastructure, however the proposed work will not necessarily adversely impact the species or identified resource. In some instances, rare plant or natural communities are enhanced by, or result from, conditions created and maintained within transmission line corridors. Furthermore, the species, plant community, or habitat mapped in the vicinity may not occur within the specific area of proposed construction, or may be absent at the time of construction. CMP has been in consultation with MNAP and MDIFW regarding potential rare, threatened, and endangered plant communities and animal occurrences along the proposed transmission line corridors, and will continue such consultations to ensure that potential effects on sensitive biological resources during and after construction are avoided and minimized to the maximum extent practicable.

Procedures that will also be utilized to further reduce environmental impacts during construction include implementation of CMP's Environmental Guidelines (See Section 14 Basic Standards of the Site Law Application), preconstruction wildlife surveys, possible time of year restrictions, and utilization of third-party inspectors and environmental inspectors during construction. CMP has also developed an NECEC-specific Vegetation Clearing Plan (See Section 10 Buffers of the Site Law Application).

2.4.1 LUPC Site Specific Alternative Analysis

CMP evaluated alternatives where impacts to LUPC subdistricts requiring special exception approval could not be avoided. A description of these subdistricts and a discussion of the alternatives evaluated is provided in the LUPC Certification section (**Section 25**) of the Site Law Application and in addition, is provided below.

2.4.1.1 Beattie Pond

The Project corridor crosses the P-RR subdistrict associated with Beattie Pond, which is classified as a Management Class VI Lake, also referred to as a Remote Pond (**Figure 2-4**). The criteria to be designated Management Class 6 includes:

a. Having no existing road access by two-wheel drive motor vehicles during summer months within 1/2 mile of the normal high-water mark of the water body;
b. Having existing buildings within 1/2 mile of the normal high-water mark of the water body limited to no more than one non-commercial remote camp and its accessory structures; and
c. Supporting cold water game fisheries.

The P-RR subdistrict associated with Beattie Pond encompasses a ½ mile buffer from the normal high-water mark of the waterbody. Portions of the P-RR subdistrict are located in Beattie Twp, Lowelltown Twp, Skinner Twp, and Merrill Strip Twp. Of note, there is an existing, gated road access by two-wheel drive motor vehicles within 400 feet of the pond, available during the summer months within the P-RR subdistrict and signage indicating that the single camp on the pond is accessible by club members only, both of which appear to be inconsistent with the above criteria for classification as a remote pond.

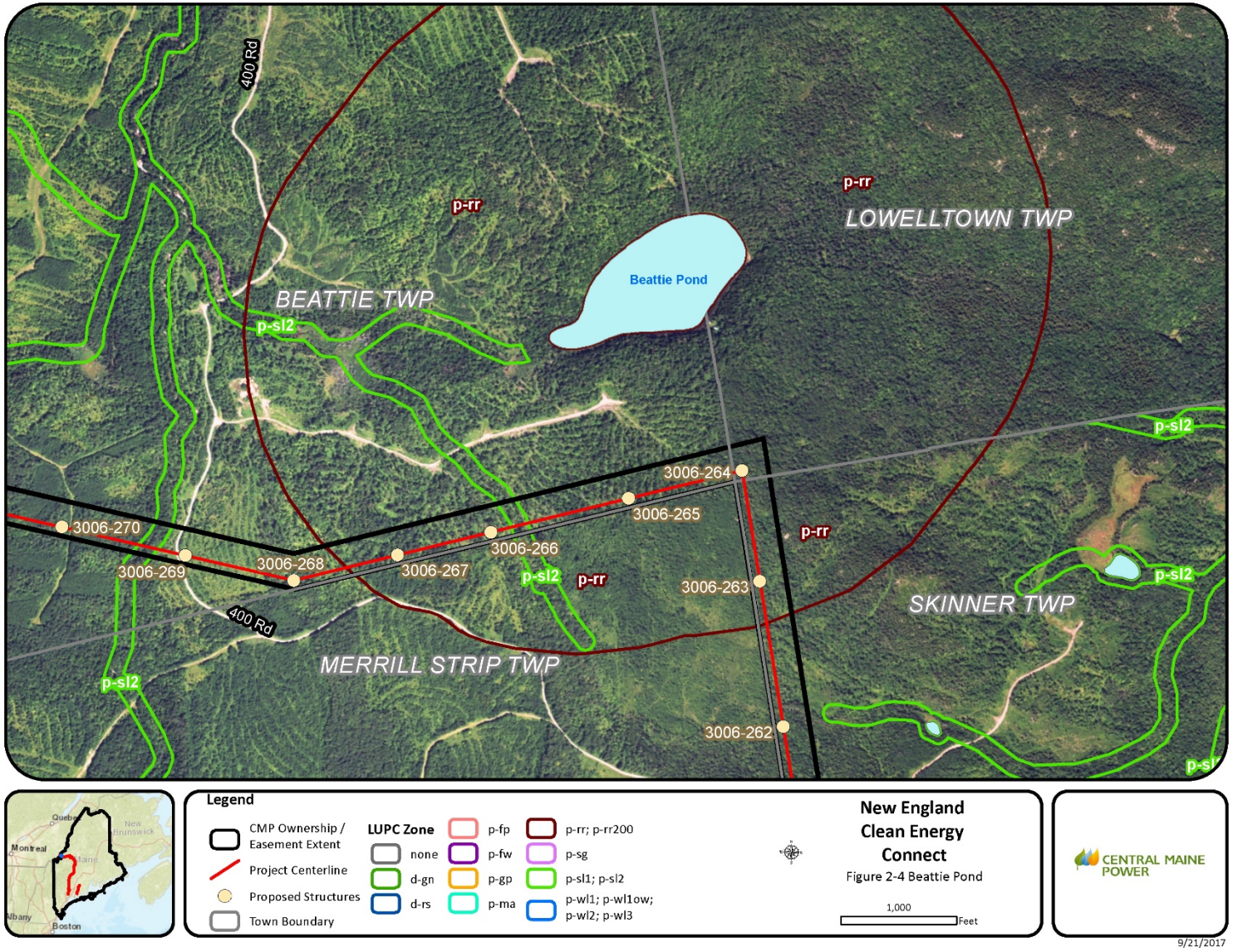
The project corridor is located within ¼-mile of the high-water mark of Beattie Pond but is located farther away from the pond than the existing road access. The P-RR zoning is intended to protect the pond from permanent improvements in access that could lead to more intensive use or development. The presence of a transmission line corridor at a distance greater than the existing developed road access will not include permanent improvements that promote more intensive use or development of the pond, and is therefore consistent with the intent of the P-RR zoning.

Views of the Project from Beattie Pond are limited to one transmission line structure which will be located approximately 1,300 feet from the pond. The majority of the structure will be buffered by existing vegetation such that only the tallest portion of the structure will be visible. The structure will be made of weathered steel, appearing rusty and brown, which will further reduce contrast in color with the surrounding vegetation when viewed from the pond.

CMP attempted to negotiate an alternative alignment south of the Beattie Pond P-RR subdistrict through Merrill Strip Twp, but was unable to come to mutually-acceptable terms with the landowner. Re-routing north of the pond to avoid the P-RR subdistrict would result in approximately two miles of additional corridor and associated vegetation clearing, and would lead to potentially higher visibility from the pond,

due to the higher elevations associated with Caswell Mountain. Neither alternative route is suitable for the proposed use, and reasonably available to CMP.

Figure 2-4: Beattie Pond



2.4.1.2 Kennebec River Gorge

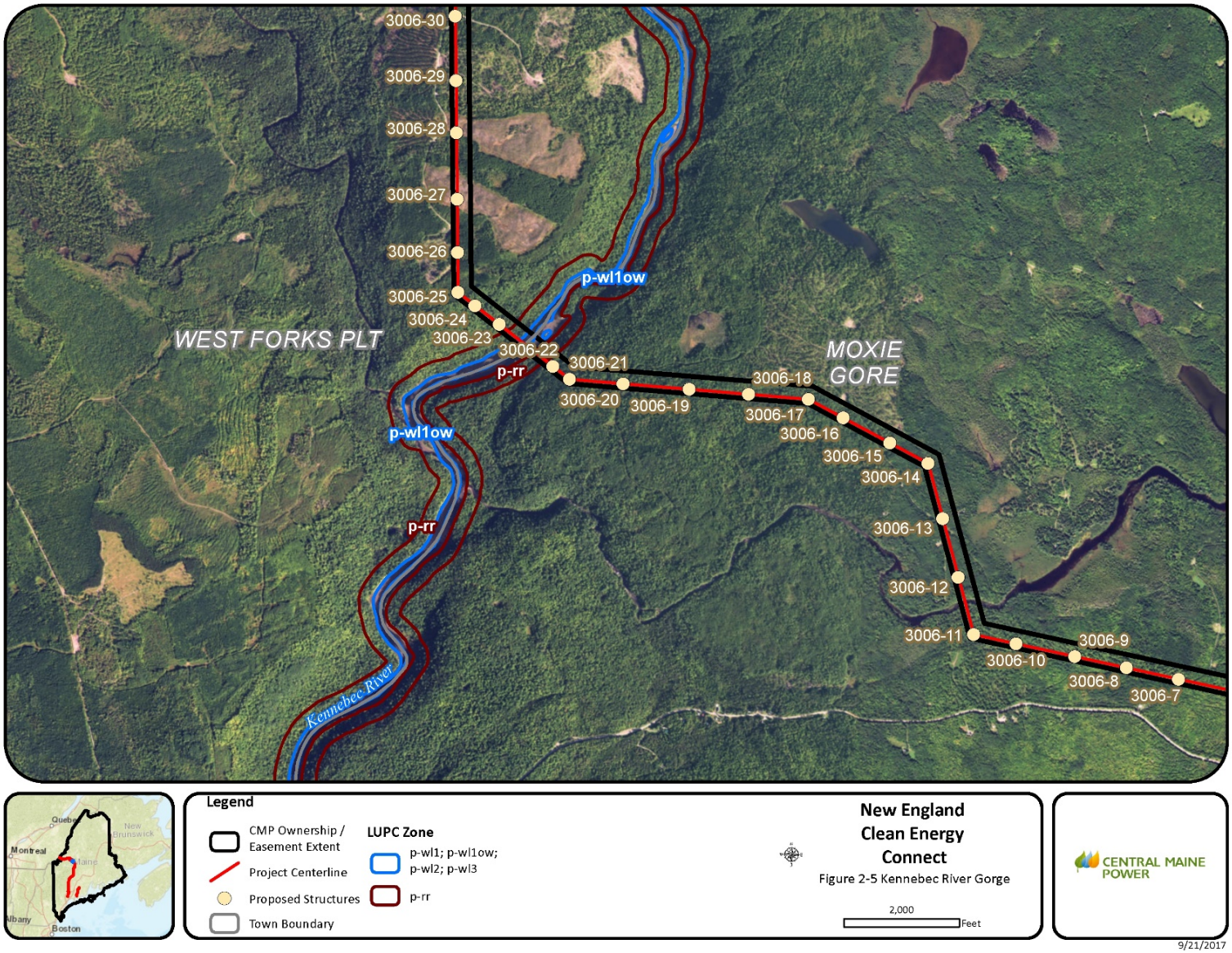
The Project corridor crosses the P-RR subdistrict associated with the Kennebec River Gorge in West Forks Plt and Moxie Gore (**Figure 2-5**). The P-RR subdistrict extends 250 feet from the normal high-water mark on both sides of the river. As stated previously, the P-RR subdistricts identified by the LUPC are those areas that provide or support unusually significant primitive recreation opportunities.

Whitewater rafting is the primary recreational use in this portion of the river. Notably, the Comprehensive Land Use Plan (LUPC 2010) identifies whitewater rafting as an intensive recreational use.

The project has been designed to minimize impact to the P-RR subdistrict at the gorge by positioning transmission line structures outside of the P-RR subdistrict. Additionally, if terrain conditions permit, trees will be allowed to grow within the P-RR subdistrict adjacent to the gorge in those areas where maximum tree heights are anticipated to remain below the conductor safety zone.

Views of the transmission line structures will be limited to the west side of the gorge, and overhead conductors will be visible to rafters passing through or stopping in this portion of the gorge. CMP will mitigate this visual impact by installing non-specular conductors, which reduce the reflection of light by the transmission line. Additionally, the mature capable tree species with a maximum height of 75’ will be preserved within 200’ +/- of the edge of the river to minimize views into the corridor from the river. The calculation to allow capable species to remain within the corridor on the edge of the river is based on conductor height and sag, required clearance from conductor to vegetation, topography between the river and each pole, and assumed maximum mature tree height of approximately 75 feet. Bird diverters will be installed on the overhead shield wires to deter avian collisions. Minimally-obtrusive bird diverters will be installed to lessen their visual impact.

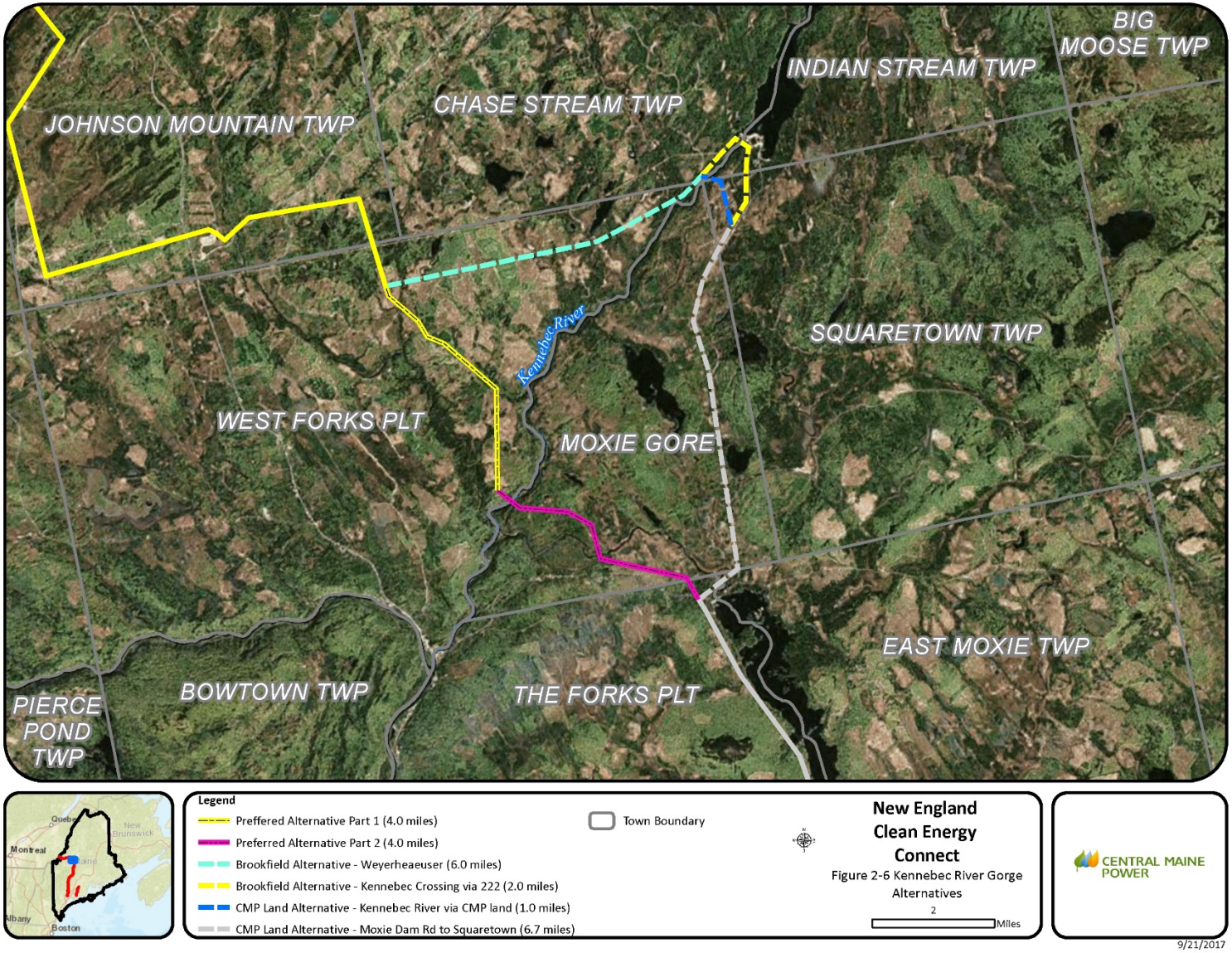
Figure 2-5: Kennebec River Gorge



2.4.1.2.1 Overhead Transmission Alternatives

There are three alternative locations for the proposed crossing of the Kennebec River (**Figure 2-6**): (1) a crossing north of Moxie Stream between Moxie Gore and West Forks Plt (the Preferred Alternative), (2) a crossing on CMP land about one mile downstream of Harris Dam (the CMP Land Alternative), and (3) a crossing near the Harris Station powerhouse (the Brookfield Alternative).

Figure 2-6: Kennebec River Gorge Alternative



CMP Land Alternative 13.3 miles

The CMP Land Alternative, represented by the white, blue and turquoise line shown on **Figure 2-6**, would follow the existing Section 222 corridor toward Harris Dam. The width of Section 222 decreases from 300 feet wide to 225 feet wide at Moxie Dam Road in The Forks Plt and maintains the 225-foot width north to the Harris Station powerhouse/substation located on Brookfield land at Harris Dam. Section 222 is an H-frame 115 kV line on the easterly half of the corridor. The corridor is owned in fee by CMP to the Harris Dam Hydropower Project ("Hydro Project") line and the remaining distance of about one mile across the Hydro Project is held as an easement. For most of the 6.7 miles, the Section 222 corridor is bordered on the east by the Harris Dam Road and on the west by 40 acre recreational parcels created in a 1980s subdivision. Eight of the subdivision parcels are now subject to a conservation easement and approximately forty parcels remain in private ownership. Also subject to a conservation easement is the Weyerhaeuser Company land in Squaretown Twp, located southeasterly of Harris Dam Road (the Moosehead Region Conservation Easement) and the Hydro Project land located westerly of Section 222 in Squaretown Twp and Indian Stream Twp (i.e., the Moosehead Kennebec Headwaters conservation easement).

At the point at which the fee owned portion of Section 222 becomes easement, the CMP Land Alternative would be in new corridor, due west approximately 1mile and across the upper gorge. CMP owns a 300 +/- acre parcel located between the Harris Dam Road and the Kennebec River in Squaretown Twp and Indian Stream Twp and an 85+/- acre parcel on the northwesterly side of the Kennebec River in Chase Stream Twp (i.e., the blue-dashed line on **Figure 2-5**). CMP reserved the right to place transmission lines across the Kennebec River in this area when CMP placed a conservation easement on its Kennebec River Gorge properties as part of the Maine Power Reliability Program (MPRP) project compensation.

The Project route would then continue in new corridor approximately 5.6 miles long (i.e., the turquoise line on **Figure 2-5**). This land would need to be acquired from a private landowner in West Forks Plt, from the CMP ownership in Chase Stream Twp to where it meets the Preferred Alternative.

Brookfield Alternative 14.5 miles

The Brookfield Alternative is similar to the CMP Land Alternative with one exception. Instead of crossing the upper gorge across the MPRP conserved lands the route would cross the river at Harris Dam (see yellow dashed line on **Figure 2-5**). A transmission line crossing of the Kennebec River at Harris Dam requires the use of Section 222 within the Hydro Project. CMP reserved a 225-foot wide easement within the Project limits. However, unless the new line is to cross directly over the powerhouse, the transmission line crossing corridor will need to leave the Section 222 corridor south of the first angle point in Section 222. The river crossing would be about 1,200 feet and would require a 90°+/- angle

structure on the north side. A new corridor would need to be created on the northwesterly side of the Kennebec River between the river and the existing Jackman Tie Line (JTL) corridor. The JTL corridor will need to be widened by 200 feet for approximately ¼ mile until the JTL corridor leaves the Indian Pond Project and enters CMP land. About 900 feet of the JTL widening will involve Brookfield land that is encumbered by the Moosehead Kennebec Headwaters conservation easement. The use of this route depends on being able to widen the JTL corridor through the Moosehead Kennebec Headwaters conservation easement in addition to reaching an agreement with Brookfield and FERC on the other land that is inside the Hydro Project and outside the Section 222 easement. Although Section 222 connects to the Harris Substation from the south side of the river and the JTL connects from the north side, there is no transmission line that currently crosses the river in this location.

Greater environmental impacts, relative to transmission line length (i.e., the CMP Land and Brookfield Alternatives are 5.1 and 6.3 miles longer than the Preferred Alternative, respectively), would result from construction of either the CMP Land Alternative or the Brookfield Alternative. The addition of an HVDC transmission line along both alternatives would have a significant visual impact on recreational users of the upper Kennebec Gorge and Indian Pond area. The Brookfield Alternative would be visible to all rafters and private boaters putting into the Kennebec River and most likely would be directly over the stairway and marshalling area where rafters are given instructions before launching. Both alternatives would present similar perceived visual concerns as the Preferred Alternative and would cost approximately $30 million dollars more than the Preferred Alternative.

2.4.1.2.2 Underground Transmission Alternative

CMP has also evaluated an underground alternative at the gorge crossing using horizontal directional drill (HDD) technology. HDD construction to cross the Kennebec River Gorge would cost approximately 8 times more than standard overhead construction and would require additional facilities, known as transition stations, to be located at the first angle in the corridor on either side of the river.

The transition stations would consist of structures that would transition the transmission line from an overhead to an underground configuration, and a control building within an approximately 2-acre fenced in yard with a stone covering. Additionally, permanent roads would need to be constructed to each of the transition stations. It is likely that the infrastructure for both transition stations would be hidden from view from the river due to topography and existing vegetation, however the contrast in vegetation from the removal of capable species would likely still be visible from the river.

CMP prefers the overhead transmission line crossing for several reasons. First, overhead transmission lines are easier to operate, inspect, and maintain than underground installations. In the event of a line outage, CMP can inspect, identify, and repair deficiencies on an overhead transmission line much more quickly than an underground line. Outages directly related to an underground transmission line are more difficult to repair. The installation of the underground option would likely require the installation of a backup circuit in the event the primary circuit failed. In addition to the technical difficulty of installing the transmission line underground and beneath the Kennebec River, the additional estimated cost is not financially practicable. The long-term operation and maintenance of the transition stations also presents additional cost to CMP. Thus, the underground alternative is not suitable to the proposed use and not reasonably available to the applicant, given that the preferred alternative can be sufficiently buffered from other uses in this location.

2.4.1.3 Appalachian Trail

The NECEC Project crosses the P-RR subdistrict in three locations at the Appalachian Trail adjacent to Moxie Pond and Trestle Road in Bald Mountain Twp in an existing CMP corridor containing a 115kV transmission line (**Figure 2-7**). The P-RR subdistrict in this location includes a 200-foot-wide strip centered over the Appalachian Trail. The configuration of the trail, within and adjacent to an approximately 3,500-foot long portion of transmission line corridor, prevented CMP from avoiding direct impacts to the subdistrict through the siting of the transmission line structures. As a result, one of five transmission line structures in this portion of the Project corridor is located within the P-RR subdistrict. Because the existing land use is transmission line corridor, there would be a negligible change in visual impact to hikers using the trail. Alternative alignments of the transmission line to meet the purpose and need of the Project would result in crossings of the Appalachian Trail in one or more locations where there are no existing transmission line corridors. Co-location of the transmission line within the existing transmission line corridor is therefore the least environmentally-damaging practicable alternative.

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Maine Power Reliability Project
WETLAND SUMMARY FORM

Team F

Observers: MOORE, PETERS, LASHER Date: 5 SEP 2007
Town: LIVERMORE FALLS Series: 1-37, 38-51, 52-7
Segment #: 14 CMP Section #: 200 CMP Pole #: 88 Wetland ID #: 2
Stream/Waterbody ID: F-14-200-88-2 Corps plot: ___ Yes X No

Dominant NWI Class: PSS (50%) Other NWI Classes: PEM, PSS

Representative Wetland Vegetation (by Strata):

HERBS	SHRUBS	TREES
• ONO SEN • CAR FLA	• ILE VER • KAL ANG	• ERA PEN
• OSM CIN • CAL CAN	• SPI LAT • RHO CAN	• ACER RUB
• OSM REG • CAR CRI	• SPI TOM	• BET POP
• SPHAGNUM SP. • SCI MAS	• LYO LIG	• LAR LAR
• EQU VAR • GLY CAN	• COR AMO	
• POL SAG		
• ERI VIR		

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ___ Seasonally Flooded (approximate depth -) X Saturated

Hydrologic Indicators: ___ Silt Deposition X Water-Stained Leaves
___ Water Marks ___ Drift Lines ___ Surface Scouring
X Drainage Patterns ___ Buttressed Trees X Elevated Roots

Other Observations:
- PIT & MOUND TOPO IN FORESTED AREA

Representative Wetland Soils:
X Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
3-0	O	DARK	BR.	FIBRIC
0-1	A	5YR3/1	—	SIL
1-6	B1	2.5Y5/1	—	M SAND
6+	B2	2.5Y4/1	10YR5/8	M SAND

REDOX: C, M, D ←

Other Observations:
Meets NEIWPCC (2004) Criteria X B * (NOTES)

Stream # 1 Data:
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

N/A

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
- DEER TRACKS

Notes:
*: SOILS - APPEARS TO [illegible] BUT STRIPPED TE LAYER IS BETWEEN DARK A AND SAND w/ REDOX FEATURES, PLANT COMM, & HYDROLOGY DEMONSTRATE WETLAND CONDITION.

☐ Cedar Swamp ☐ Wetland of Special Significance

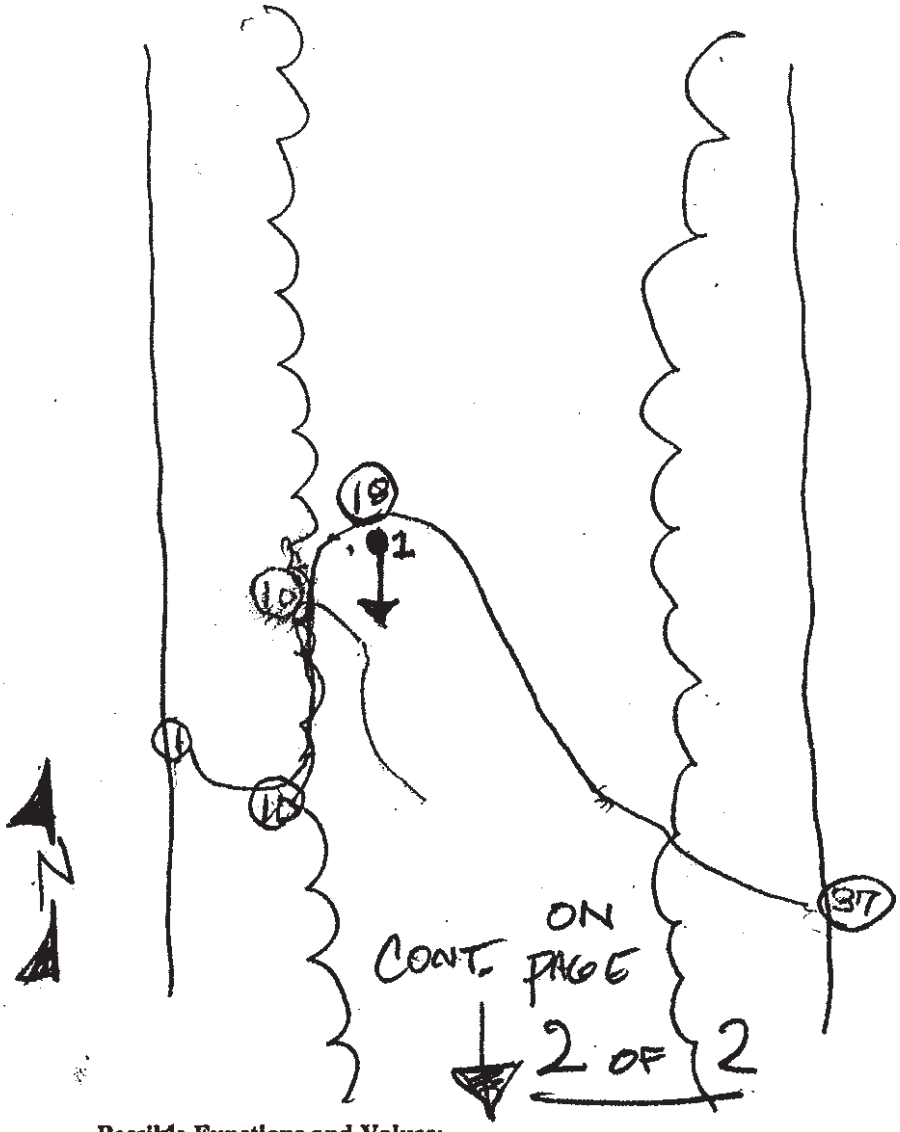
Photo # ___

SKETCH ON BACK

WETLAND SKETCH

3700

Line Flagging Series
-37
28-5
52-1



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- __ Fish and Shellfish Habitat
- __ Nutrient Removal
- __ Sediment/Shoreline Stabilization
- __ Recreation
- __ Uniqueness/Heritage
- __ Endangered Species Habitat
- __ Floodflow Alteration
- __ Sediment/Toxicant Retention
- __ Production Export
- __ Wildlife Habitat
- __ Educational/Scientific Value
- __ Visual Quality/Aesthetics
- __ Other

Checklist:

- __ **Wetland ID#** F-V4-200-88-2
- __ North arrow.
- __ Detailed sketch of wetland boundary and flagging sequence.
- __ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- __ Photo locations.
- __ Location of important wildlife sign.

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team F

Observers: PETERS / MOORE / LAGUER Date: 15 SEP 2004
Town: LIV. FALLS Series: 1-37, 38-51, 52-7
Segment #: 14 CMP Section #: 200 CMP Pole #: 68 Wetland ID #: 2
Stream/Waterbody ID: Corps plot: ___ Yes X No

Dominant NWI Class: Other NWI Classes:

Representative Wetland Vegetation (by Strata):

CONT.

* PAGE 2 OF 2 *

Representative Wetland Hydrology

_____ Permanently Flooded (approximate depth -) _____ Seasonally Flooded (approximate depth -) _____ Saturated

Hydrologic Indicators: _____ Silt Deposition _____ Water-Stained Leaves
_____ Water Marks _____ Drift Lines _____ Surface Scouring
_____ Drainage Patterns _____ Buttressed Trees _____ Elevated Roots

Other Observations:

Representative Wetland Soils:
_____ Mineral
_____ Organic

Depth	Horizon	Color	Redox Features	Texture

Other Observations:
Meets NEIWPCC (2004) Criteria _____

Stream # 1 Data:
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent_____
Bank Configuration: ____Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent_____
Bank Configuration: ____Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:
* SKETCH CONT. ON BACK →

☐Cedar Swamp ☐Wetland of Special Significance

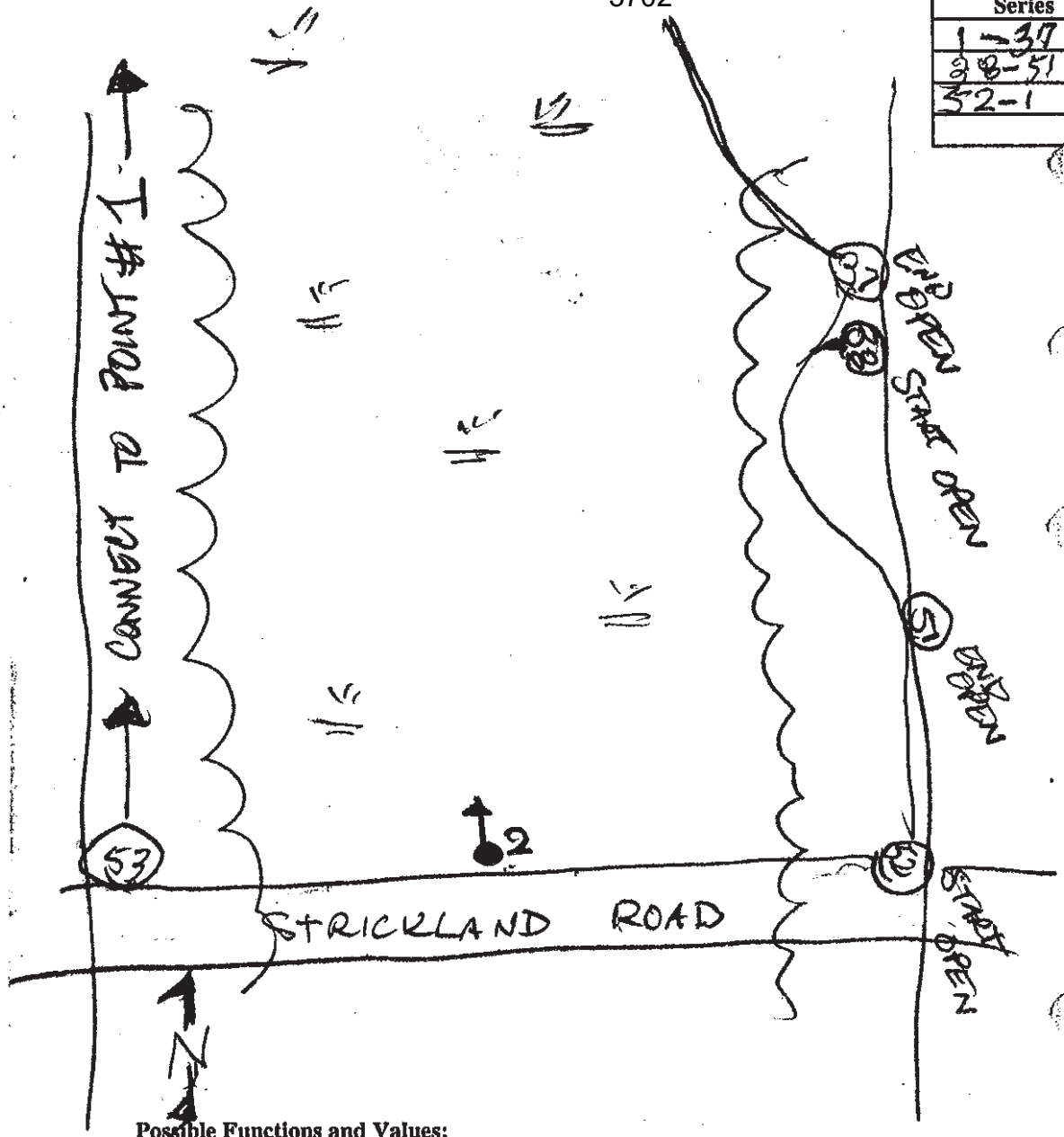
Photo # _____

SKETCH ON BACK

WETLAND SKETCH

3702

Line Flagging Series
1-37
38-51
52-1



Possible Functions and Values:

- X Groundwater Recharge/Discharge
- __ Fish and Shellfish Habitat
- __ Nutrient Removal
- __ Sediment/Shoreline Stabilization
- __ Recreation
- __ Uniqueness/Heritage
- __ Endangered Species Habitat
- __ Floodflow Alteration
- __ Sediment/Toxicant Retention
- __ Production Export
- X Wildlife Habitat
- __ Educational/Scientific Value
- __ Visual Quality/Aesthetics
- __ Other

Checklist:

- __ Wetland ID# F-14-200-88-2
- __ North arrow.
- __ Detailed sketch of wetland boundary and flagging sequence.
- __ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- __ Photo locations.
- __ Location of important wildlife sign.

WET-131-01

3703

Sam Hayden 4/29/17
Veg, soil, hydro, delineation: good.
correct S.H.

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team F

Observers: SE ML MW Date: 9/10/07
Town: LEEDS Series:
Segment #: 14 CMP Section #: 200 CMP Pole #: 115 Wetland #: 1
Stream/Waterbody ID: F14-200-115-1-1 Corps plot: X Yes ___ No
Dominant NWI Class: PFO1 Other NWI Classes: PEM1

Representative Wetland Vegetation (by Strata):

HERBS: JEWEL WEED, ONO SEN, OSM CIN

SHRUBS: POA PRE, SILKY DOGWOOD, ULN RUG

TREES: FRA PEN, AM. ELM, ACE RUB

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth - 2')
___ Saturated

Hydrologic Indicators: ___ Silt Deposition ___ Water-Stained Leaves
✓ Water Marks ✓ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ✓ Elevated Roots
Other Observations:

Representative Wetland Soils:
✓ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-6	A	10YR 3/1	—	S. LOAM
6-18"	B	2.5Y 4/2	10% 10YR 4/6	S. LOAM

Other Observations:
Meets NEIWPCC (2004) Criteria XI.1

Stream # 1 Data:
Width (Bank-Bank): 4' Depth @ Center: 2' Peren. ___ Intermittent ✓
Bank Configuration: ___ Undercut ✓ Vertical ✓ Gradual
Channel Substrate: ___ Peat-Muck ✓ Silt-Mud ✓ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

DEER TRACKS

Notes:

☐ Cedar Swamp ☒ Wetland of Special Significance

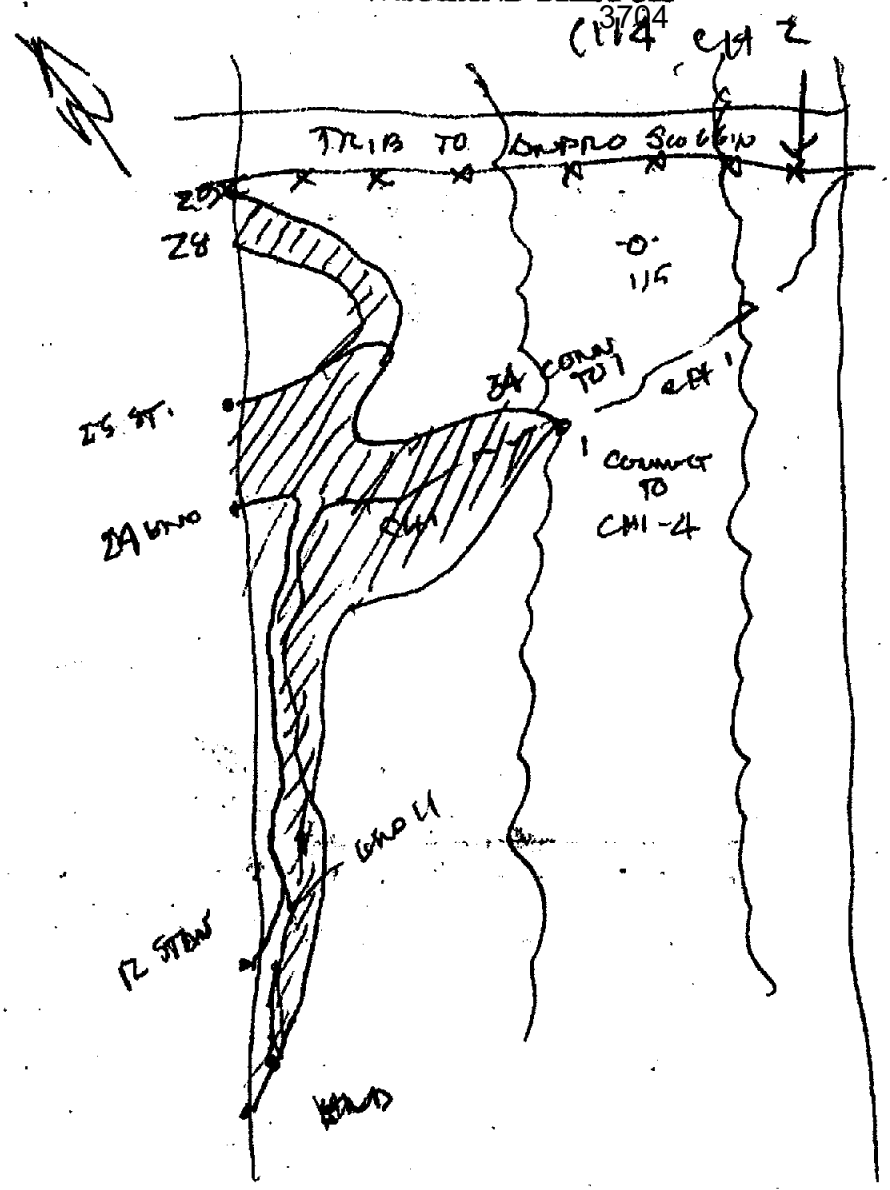
Photo # ___

SKETCH ON BACK

WETLAND SKETCH

3704

Line Flagging Series
1-11
12-24
25-28
29-34



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ✓ Sediment/Shoreline Stabilization
- ✓ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ✓ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ✓ Visual Quality/Aesthetics
- ___ Other

Checklist:

- — Wetland ID# F14-200-115-1
- — North arrow.
- — Detailed sketch of wetland boundary and flagging sequence.
- — Natural and man-made features – roads, culverts, outcrops, structures, etc.
- — Photo locations.
- — Location of important wildlife sign.

3705 Sam Hayden 4/29/17

Field conditions match form data

Correct SH.

FA-200-115-1

PROJECT TITLE: MPRP TRANSECT: PLOT: WET

DELINEATOR(S): SE ML MW DATE: 9/10/07

VEGETATION Stratum and Species	Dominance Ratio	Percent Dominance	D O M	NWI Status
HERBS				
JEWEL WEED - 80%				
OHO SEN - 10%				
SHRUBS				
SILKY DOGWOOD - 10%				
ALN RUG - 10%				
SAPS				
AM. ELM - 5%				
FRA PEN - 5%				
TREES				
FRA PEN - 80%				

HYDROPHYTES

OBL FACW FAC *OTHER

Hydrophytes Subtotal (A): ___

NON-HYDROPHYTES

FAC- FACU UPL

Non-hydrophytes Subtotal (B): ___

PERCENT HYDROPHYTES (100A/A+B): _____

HYDROLOGY

☐ RECORDED DATA
Stream, lake, or tidal gage Identification: _____
Aerial photography Identification: _____
Other Identification: _____

☐ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water: _____
Depth to Saturation (including capillary fringe): _____
Altered Hydrology (explain): _____

☐ Inundated ☐ Saturated in upper 12" ☑ Water Marks ☑ Drift Lines ☑ Sediment Deposits ☑ Drainage Patterns within Wetland

☐ OTHER (explain):

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USCA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A	10yR 3/2	—	S. Loam
6-18	B	2.5y 4/2	10% 10yR 4/6	S Loam

HYDRIC SOIL INDICATOR(S): REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☐	☐	
Hydric soils criterion met?	☐	☐	
Wetland hydrology criterion met?	☐	☐	
IS THIS DATAPOINT IN A WETLAND?	☐	☐	

CENAE-COR-FT Version 7/1/03 Page 2

PROJECT TITLE: MPPD TRANSECT: F14-200-115-1 PLOT: *

F14-200-115-1

PROJECT TITLE: MPRP TRANSECT: PLOT: Dry

DELINEATOR(S): SE ML MW DATE: 9/10/07

VEGETATION Stratum and Species	Dominance Ratio	Percent Dominance	DOM	NWI Status
HERBS				
ONOCLEA 5%				
FALSE SOLOMONSEAL -10%				
TRILLIUM - 2%				
POISON IVY - 10%				
SAPS				
CHOCK CHERRY - 50%				
ACE SUG - 5%				
QUE RES - 15%				
TREES				
PINSTR - 20%				
QUE RES - 20%				
BASS WOOD - 15%				

HYDROPHYTES

OBL FACW FAC *OTHER

Hydrophytes Subtotal (A): ___

NON-HYDROPHYTES

FAC- FACU UPL

Non-hydrophytes Subtotal (B): ___

PERCENT HYDROPHYTES (100A/A+B): _____

HYDROLOGY

☐ RECORDED DATA

Stream, lake, or tidal gage Identification: Absent

Aerial photography Identification: ___

Other Identification: ___

☐ NO RECORDED DATA

☐ OBSERVATIONS:

Depth to Free Water: ___

Depth to Saturation (including capillary fringe): ___

Altered Hydrology (explain): ___

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain):

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-8	A	10YR 3/3	—	Sandy Loam
8-20"	B	2.5y 5/6	—	F Sandy Loam

HYDRIC SOIL INDICATOR(S): NONE -

REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class: XB
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☒	☒	
Hydric soils criterion met?	☒	☒	
Wetland hydrology criterion met?	☒	☒	
IS THIS DATAPOINT IN A WETLAND?	☒	☒	

CENAE-COR-PT Version 7/100 Page 2

PROJECT TITLE: MPRP FM-200-115-1 TRANSECT: PLOT: 02

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team B

Observers: MC, MP Date: 10-2-07
Town: Greenville Series: OVER
Segment #: 14 CMP Section #: 200 CMP Pole #: 236 Wetland #: 1
Stream/Waterbody ID: CH1 Corps plot: ✓ Yes No

Dominant NWI Class: PSS 1 Other NWI Classes: PFO

Representative Wetland Vegetation (by Strata):

Ile vert (Sh)	Glycan osmcin	Ace rub Y4
Vib dent (Sh)	Cranberry spilat	Ace spi
Ace rub (Sh)	Ler org sol gig	Bet all
Aln rug (Sh)	onoclea carlur	Bet pap
	Scicyp Carcrin	Abi bal
		Ulm Amer

Representative Wetland Hydrology

✓ Permanently Flooded (approximate depth - 12-24") Center
✓ Seasonally Flooded (approximate depth - 6") upper portions
___ Saturated

Hydrologic Indicators: ___ Silt Deposition ✓ Water-Stained Leaves
___ Water Marks ___ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots
Other Observations:

Representative Wetland Soils:
✓ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-15	A1	5Y 4/1		Silo
15-18	B1	5Y 4/2		Silo
18-4	B2	5Y 5/2	10YR 4/6	Silo

Other Observations:
Meets NEIWPCC (2004) Criteria VII

Stream # 1 Data:
Width (Bank-Bank): 6' Depth @ Center: 12" Peren. ✓ Intermittent ___
Bank Configuration: ✓ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ✓ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
Moose
deer

Notes: Streamside flows into ~~lake~~ Allen Pond

☐ Cedar Swamp ☑ Wetland of Special Significance

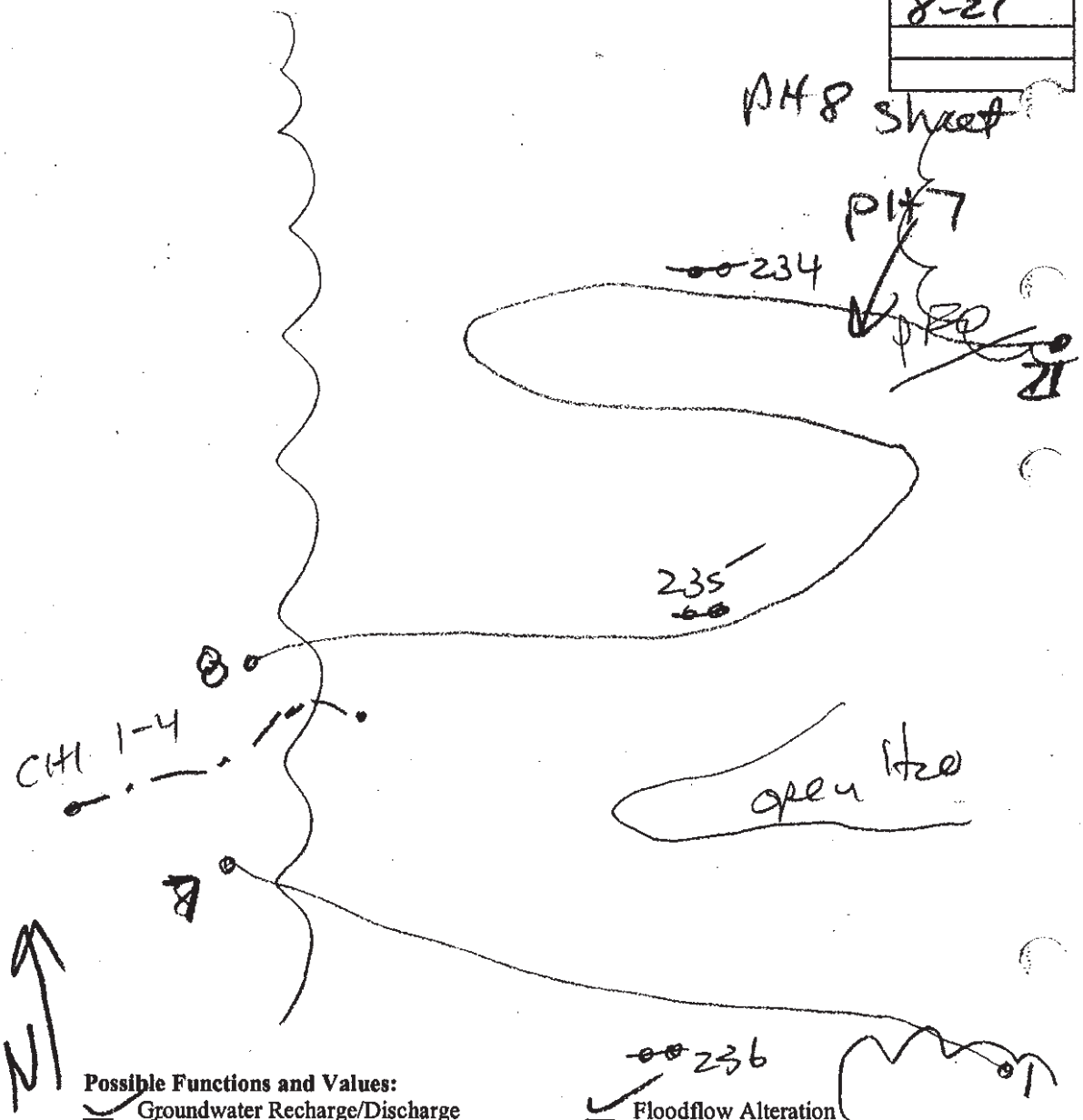
Photo # 7/8

SKETCH ON BACK

WETLAND SKETCH

3710

Line Flagging Series
1-7
8-21



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ✓ Fish and Shellfish Habitat
- ✓ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** B14-200-236-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team B

Observers: KF, MC Date: 9/28/07
Town: Greene Series: OVAR
Segment #: 14 CMP Section #: 200 CMP Pole #: 267 Wetland #: 1
Stream/Waterbody ID: — Corps plot: Yes No

Dominant NWI Class: PEM1 Other NWI Classes: PFO

Representative Wetland Vegetation (by Strata): 1/4

Sci cyp
Car lac
Solgig
Typ lat
Vib dent (sh)
Aln rug (sh)
Spi Tom
Calcan
Spi lat
Ace rub
Aln rug
Larch
Bet all
Abi bal

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth - 12")
____ Saturated

Hydrologic Indicators: ____ Silt Deposition ✓ Water-Stained Leaves
✓ Water Marks ____ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots
Other Observations:

Representative Wetland Soils:
✓ Mineral
____ Organic

Depth	Horizon	Color	Redox Features	Texture
18-0	Oe	10yr 2/2	—	Hemic
0-1	B1	5gy 5/1	—	Silo

Other Observations:
Meets NEIWPCC (2004) Criteria III

Stream # 1 Data:
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent ____
Bank Configuration: ____ Undercut ____ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ____ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

Stream # 2 Data
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent ____
Bank Configuration: ____ Undercut ____ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ____ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes: Prob. connects to Dagget Bog ✓ w/ IFW re DWA

☐ Cedar Swamp ☑ Wetland of Special Significance

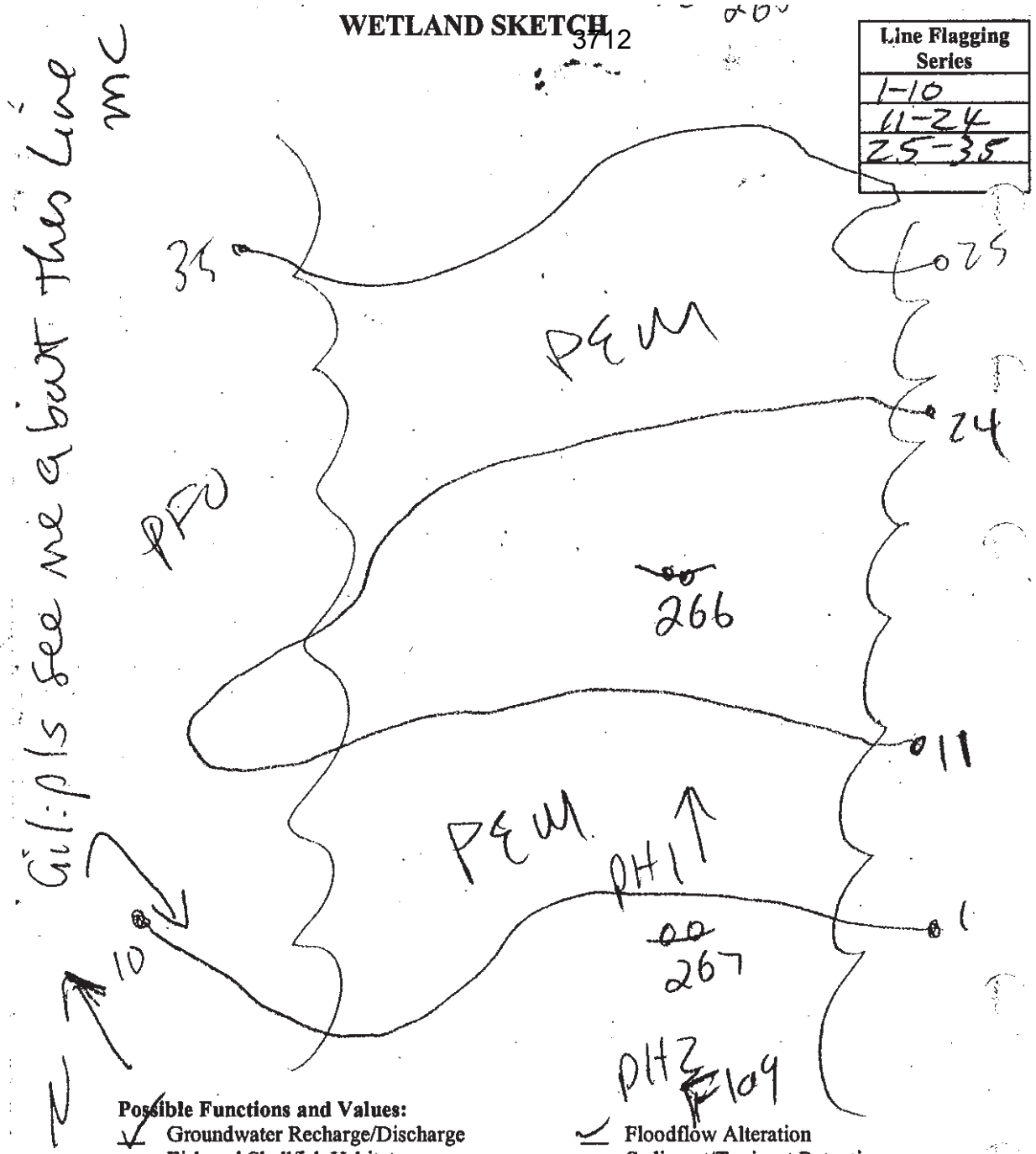
Photo # 1/2 ? 5

SKETCH ON BACK

WETLAND SKETCH

3712

Line Flagging Series
1-10
11-24
25-35



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ✓ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** B14.200.267-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ___ Photo locations.
- ___ Location of important wildlife sign.

WOSS
Data Form Examples

Segment 4

WET-146-04

Sam Hayden 5/14/17

Veg, soil, hydro good. Extended B-17-64-24-1 to entirely encompass this area.

C-17-64-24-2 **Maine Power Reliability Project** Team C

WETLAND SUMMARY FORM

Observers: L. LECLERC, D. BRENNEMAN Date: 8-8-08
Town: LEWISTON Series: 1-16
Segment #: 139 CMP Section #: 10 CMP Pole #: 0 Wetland ID #: 1
Stream/Waterbody ID: NA Corps plot: Yes X

Dominant NWI Class: PSSIE 100 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

H/Rubpub, Equsyl, Carint, Vibden, Athang
Sh/Acerub, Ilever
Sa/Fraper, Acerub
T/Acerub

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -)
X Seasonally Flooded (approximate depth - 2-0")
X Saturated generally

Hydrologic Indicators: ___ Silt Deposition X Water-Stained Leaves
___ Water Marks ___ Drift Lines ___ Surface Scouring
___ Drainage Patterns ___ Buttressed Trees X Elevated Roots
Other Observations: sat to soil surface

Representative Wetland Soils:	Depth	Horizon	Color	Redox Features	Texture
X Mineral	0-6	A	2543/2		Sil
___ Organic	6-9+	B	2544/2	2545/6-10%	Sil

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): NA Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:

Cedar Swamp Wetland of Special Significance

Photo # P2 Facs SKETCH ON BAC

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team 2 WET-146-04

Observers: MP AG MC Date: 10-17-07
Town: Lewiston Series: OVER
Segment #: 17 CMP Section #: 64 CMP Pole #: 24 Wetland ID #: 2
Stream/Waterbody ID: — Corps plot: Yes ✓ No

B-17-64-24-2

Dominant NWI Class: PSS1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

Shrub
Lyo lig
Ilevert
Spi tom
Spi lat

Sci cyp
Juncus spp.
Kalang
Calcan
Alycan
Swt vern grass
Reb his

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -) ____ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ____ Silt Deposition ____ Water-Stained Leaves
____ Water Marks ____ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots

Other Observations: H2O wli 10"

Representative Wetland Soils:
X Mineral
____ Organic

Depth	Horizon	Color	Redox Features	Texture
0-6	A1	5Y 2/1	—	Salo
6-12+	B1	5Y 6/1	5Y 7/1	Salo

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent ____
Bank Configuration: ____ Undercut ____ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ____ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

Stream # 2 Data
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent ____
Bank Configuration: ____ Undercut ____ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ____ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
POT VP or ABA in Rots

Notes:

☐ Cedar Swamp ☐ Wetland of Special Significance

Photo # 6/7 **SKETCH ON BAC**

Sam Hayden 5/19/17 Veg, soil, hydro good. It extends S. and connects with B-17-64-24-1

S.H.

~~B-17-64-24-1~~

WET-146-04

Sam Hayden. 5/19/17 Veg, soil, hydro look good 3716

Added ✓ areas along N boundary and removed ✓ areas that had been filled by substation construction. B-17-64-24-2 was connected.

Maine Power Reliability Project Team —

WETLAND SUMMARY FORM

Observers: MP, AG, MC Date: 10-17-07

Town: Lewiston Series: OVGR

Segment #: 17 CMP Section #: 64 CMP Pole #: 24 Wetland ID #: 1

Stream/Waterbody ID: — Corps plot: ✓ Yes No

Dominant NWI Class: PSS1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

Shrub	Herb	
Lyolig	Calcan	Thelpal
Ilvert	Ondden	Sci cyp
Spilat	Sol rug	Spi tom
Vibdent	Car lur	Equ arv

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ___ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ___ Silt Deposition ___ Water-Stained Leaves ___ Water Marks ___ Drift Lines ✓ Surface Scouring ✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:

Representative Wetland Soils: ✓ Mineral ___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-6	A1	5y 3/2	—	Sa lo
6-10+	B1	5y 4/2	5y 5/1	Si lo
			5y 5/2	

Other Observations:

Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:

Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___

Bank Configuration: ___ Undercut ___ Vertical ___ Gradual

Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data

Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___

Bank Configuration: ___ Undercut ___ Vertical ___ Gradual

Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Pot VP or ABA in Tree Ruts

Notes:

☐ Cedar Swamp ☐ Wetland of Special Significance

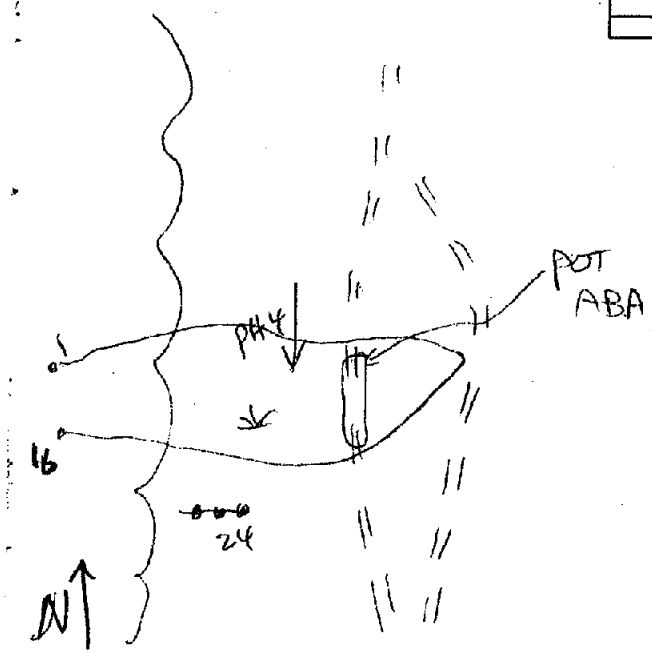
Photo # 4/5

SKETCH ON BAC

WETLAND SKETCH

PH5 Flag

Line Flagging Series
1-PS



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- ___ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ Wetland ID# B17-64-24-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

Sam Hayden. 5/19/17

Sprawling ✓ encompasses many cover types and hydrology regimes.

I was able to find sections that match each of the Wet corps

Plot data.

SH.

3717

B17-64-24-1-WGT

PROJECT TITLE: MPRP TRANSECT: PLOT: ✓

DELINEATOR(S): MP AG MC DATE: 10-17-07

VEGETATION Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Shrub					
Ilex dent	10	10/60	16		
Myo lig	20	20/60	33	✓	FACW
Spi tat	10	10/60	16		
Ilex vert	20	20/60	33	✓	FACW
Herb					
Gly can	25	25/60	[illegible]	✓	FACW
Sol nig	10	10/60	16		
Sci cyp	15	15/60	24	✓	FACW
Rub bis	10	10/60	16		

HYDROPHYTES: 4 (OBL, FACW, FAC, OTHER)

NON-HYDROPHYTES: (FAC, FACU, UPL)

Hydrophytes Subtotal (A): 4

Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 4/4 = 100%

HYDROLOGY

☐ RECORDED DATA (Stream, lake, or tide gage / Aerial photography / Other) Identification:

☑ NO RECORDED DATA

☐ OBSERVATIONS:

Depth to Free Water:

Depth to Saturation (including capillary fringe):

Altered Hydrology (explain):

☐ Inundated ☑ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☑ Drainage Patterns within Wetland

☐ OTHER (explain):

CENAP-CO-R-R (Version 2) (4/03) Page 1

Soil U Soil ✓

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plain.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, mottles, concretions, moisture, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A_1	5Y 3/2	—	Sa Lo
6-10+	B_1	5Y 4/2	5Y 5/1 5Y 5/2 .5cm ±15%	Si Lo

HYDRIC SOIL INDICATOR(S): VI REFERENCE(S): NE Hydric Soils

OPTIONAL SOIL DATA REFERENCE(S):

Taxonomic subgroup:

Soil drainage class:

Depth to active water table:

NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☑	☐	
Hydric soils criterion met?	☑	☐	
Wetland hydrology criterion met?	☑	☐	
IS THIS DATAPOINT IN A WETLAND?	☑	☐	

CENAP-CO-R-R (Version 2) (4/03) Page 2

PROJECT TITLE: MPRP TRANSECT: PLOT:

C-17-64-24-2

Maine Power Reliability Project

Team C

WETLAND SUMMARY FORM

Observers: L.LECLERC, D.GLENNEMAN Date: 8-8-08
Town: LEWISTON Series: 1-16
Segment #: 139 CMP Section #: 10 CMP Pole #: 0 Wetland ID #: 1
Stream/Waterbody ID: NA Corps plot: Yes X N

Dominant NWI Class: PSS1E 100 % Other NWI Classes:

Representative Wetland Vegetation (by Strata):

H/Rubpub
Equ syl
Car int
Vibden, Athang

Sh/Acerub
Ilver

Sa/Fraper
Acerub

T/Acerub

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -)
X Seasonally Flooded (approximate depth - 2-0")
X generally Saturated

Hydrologic Indicators: ____ Silt Deposition X Water-Stained Leaves
____ Water Marks ____ Drift Lines ____ Surface Scouring
____ Drainage Patterns ____ Buttressed Trees X Elevated Roots
Other Observations: sat to soil surface

Representative Wetland Soils:	Depth	Horizon	Color	Redox Features	Texture
X Mineral	0-6	A	2543/2		Sil
____ Organic	6-9+	B	2544/2	2545/6-10 10	Sil

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): NA Depth @ Center: ____ Peren. ____ Intermittent ____
Bank Configuration: ____ Undercut ____ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ____ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

Stream # 2 Data
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent ____
Bank Configuration: ____ Undercut ____ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ____ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:

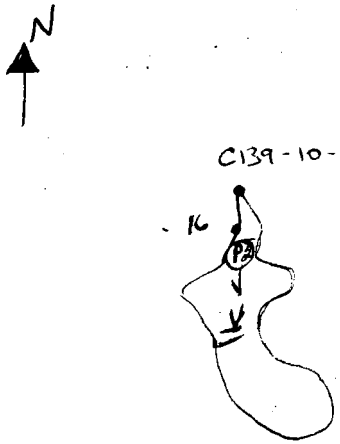
Cedar Swamp Wetland of Special Significance

Photo # P2 Facs

SKETCH ON BAC

WETLAND SKETCH

Line Flagging Series
1-16



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- X Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- X **Wetland ID#** C139-10-0-1
- X North arrow.
- X Detailed sketch of wetland boundary and flagging sequence.
- X Natural and man-made features – roads, culverts, outcrops, structures, etc.
- X Photo locations.
- X Location of important wildlife sign.

B-17-64-105-1

WET-152-01

Sam Hayden 5/21/17
Veg, soil, hydro good
Added sketch
3720

Maine Power Reliability Project Team 5

WETLAND SUMMARY FORM

Observers: SE, AG, MC Date: 10/25/07
Town: Lewiston Series: OVER
Segment #: 17 CMP Section #: 64 CMP Pole #: 105 Wetland #: 1
Stream/Waterbody ID: Corps plot: Yes ✓ No
Dominant NWI Class: PEM1 Other NWI Classes: PFO1

Representative Wetland Vegetation (by Strata):

Sci cyp, Cau lut, Car crin, Solgig, Thel pal
Onoclea sens, Cornsgics, Juncus cam, Phalaris, Spiraea tom, Pol sag, Thy lat, Alnus rug, Ilex ver, Vib dent, Glyceria
Shrub: Spi alb
Betula pap, Ulm Amer, Acer rub, Agi gra

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth - 2")
____ Saturated

Hydrologic Indicators: ____ Silt Deposition ____ Water-Stained Leaves
✓ Water Marks ____ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots
Other Observations: Saturated 6-8"

Representative Wetland Soils:	Depth	Horizon	Color	Redox Features	Texture
✓ Mineral	0-12"	[illegible]	5Y5/2	10YR4/6	Silt
____ Organic				7.5YR4/6	

Other Observations:
Meets NEIWPCC (2004) Criteria VI no apparent "A"

Stream # 1 Data:
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____
Bank Configuration: ____Undercut ____ Vertical ____ Gradual
Channel Substrate: ____Peat-Muck ____Silt-Mud ____Sand ____Gravel/Cobble ____Boulder ____Bedrock

Stream # 2 Data
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____
Bank Configuration: ____Undercut ____ Vertical ____ Gradual
Channel Substrate: ____Peat-Muck ____Silt-Mud ____Sand ____Gravel/Cobble ____Boulder ____Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:

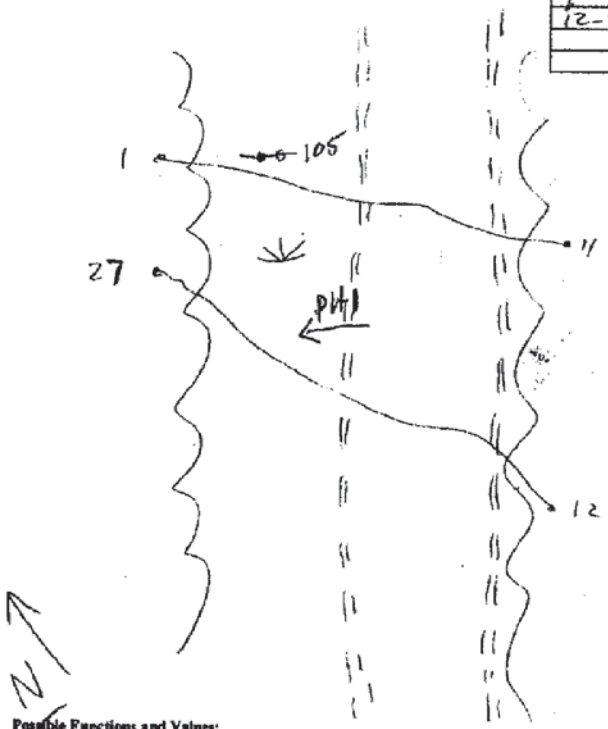
☐Cedar Swamp ☐Wetland of Special Significance

Photo # 1/2 SKETCH ON BACK

WETLAND SKETCH

Pit2 ~~Flag~~

Line Flagging Series
1-11
12-27



N boundary SH

Possible Functions and Values:
___ Groundwater Recharge/Discharge
___ Fish and Shellfish Habitat
___ Nutrient Removal
___ Sediment/Shoreline Stabilization
___ Recreation
___ Uniqueness/Heritage
___ Endangered Species Habitat
___ Floodflow Alteration
___ Sediment/Toxicant Retention
___ Production Export
___ Wildlife Habitat
___ Educational/Scientific Value
___ Visual Quality/Aesthetics
___ Other

Checklist:
✓ Wetland ID# B17-64-105-1
✓ North arrow.
✓ Detailed sketch of wetland boundary and flagging sequence.
✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
✓ Photo locations.
— ~~Location of important wildlife sign.~~

Maine Power Reliability Project Team B

WETLAND SUMMARY FORM 3721

Observers: SE, AG, MC Date: 10/25/07

Town: Lewiston Series: OVER

Segment #: 17 CMP Section #: 64 CMP Pole #: 105 Wetland #: 1

Stream/Waterbody ID: — Corps plot: Yes ✓ No

Dominant NWI Class: PEM1 Other NWI Classes: PFO1

Representative Wetland Vegetation (by Strata):

Sci cyp, Car lur, Car crin, Solgig, Thel pal, Onoc sens, Juncom, Spi tom, Thylat, Cal can, Cotnigras, Phalaru, Pol sag, Alu rug, Vib dent, Shrub, Spi alb, Ilex ver, Betpap, Ulm Amer, Acer rub, Abi bal

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -)

✓ Seasonally Flooded (approximate depth - 2")

____ Saturated

Hydrologic Indicators: ____ Silt Deposition ____ Water-Stained Leaves

✓ Water Marks ____ Drift Lines ✓ Surface Scouring

✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots

Other Observations: Saturated 6-8"

Representative Wetland Soils:

✓ Mineral

____ Organic

Depth	Horizon	Color	Redox Features	Texture
0-12+	B	5Y5/2	10YR4/6	SiLo
			2.5Y5/1	

Other Observations:

Meets NEIWPCC (2004) Criteria VI no apparent "A"

Stream # 1 Data:

Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____

Bank Configuration: ____Undercut ___ Vertical ___ Gradual

Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Stream # 2 Data

Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____

Bank Configuration: ____Undercut ___ Vertical ___ Gradual

Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:

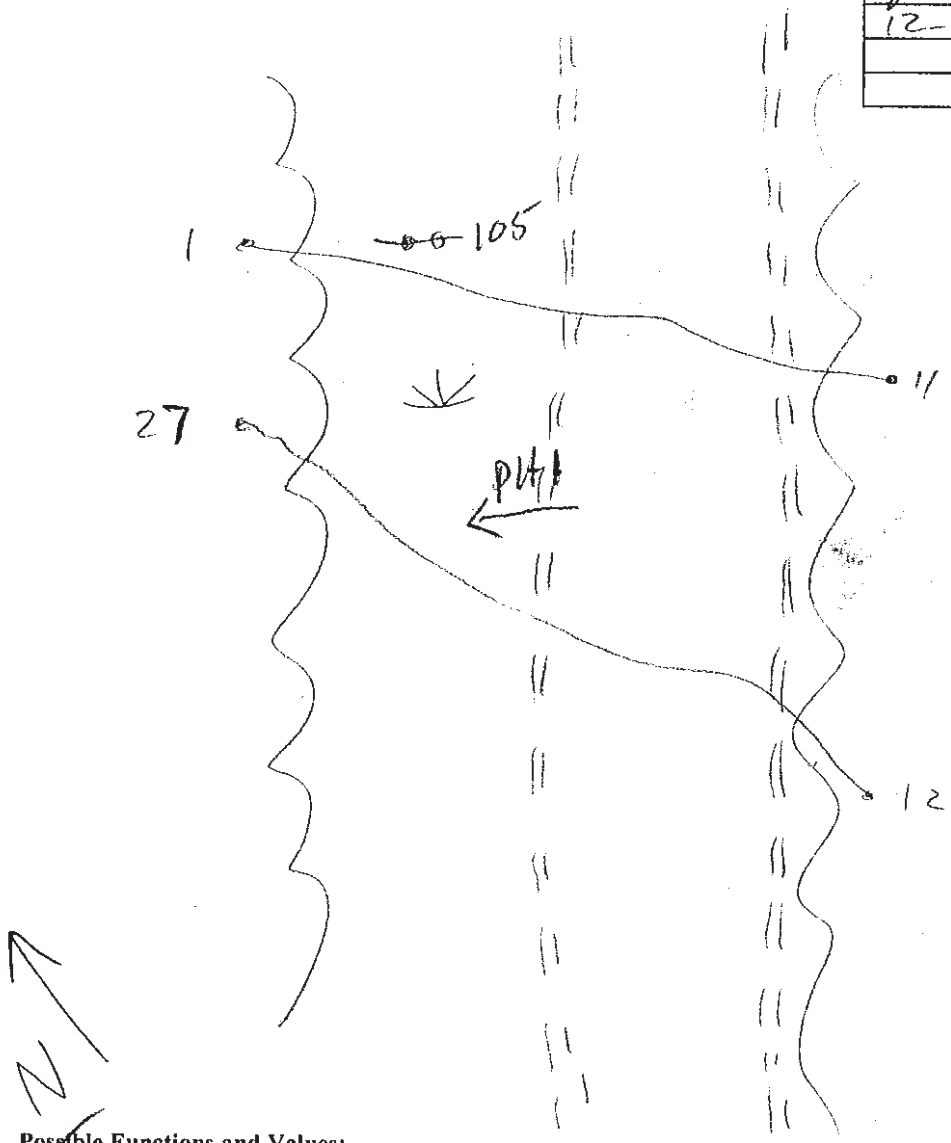
☐Cedar Swamp ☐Wetland of Special Significance

Photo # 1/2

SKETCH ON BACK

PH2 flag **WETLAND SKETCH**

Line Flagging Series
1 – 11
12 – 27



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- ___ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** B17-64-105-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ ~~Location of important wildlife sign.~~

~~B-17-64-148~~-1 / WET-155-03

WET-155-03

Sam Hayden 5/23/17
3723
Veg, soil, hydro, delineation good. S.H.

Maine Power Reliability Project

WETLAND SUMMARY FORM

Observers: AG MC Date: 10/30/07
Town: Lewiston Series: OTER
Segment #: 17 CMP Section #: 64 CMP Pole #: 148 Wetland #: 1
Stream/Waterbody ID: — Corps plot: ✓ Yes ___ No

Dominant NWI Class: PEM1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

Phalarin (5) Verhast (5) Sci cyp (5)
Lyt Sol (5)
Bushy Aster (5) Car lac
Juv eff Car lur

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth -6")
___ Saturated

Hydrologic Indicators: ___ Silt Deposition ___ Water-Stained Leaves
___ Water Marks ___ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:

Representative Wetland Soils:
✓ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-6	A1	5Y 3/2		Sa Lo
6-12+	B2	5Y 4/1	5Y 5/1 c.5cu	Si Lo
			±5%	

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
Agric. Swale

Notes:

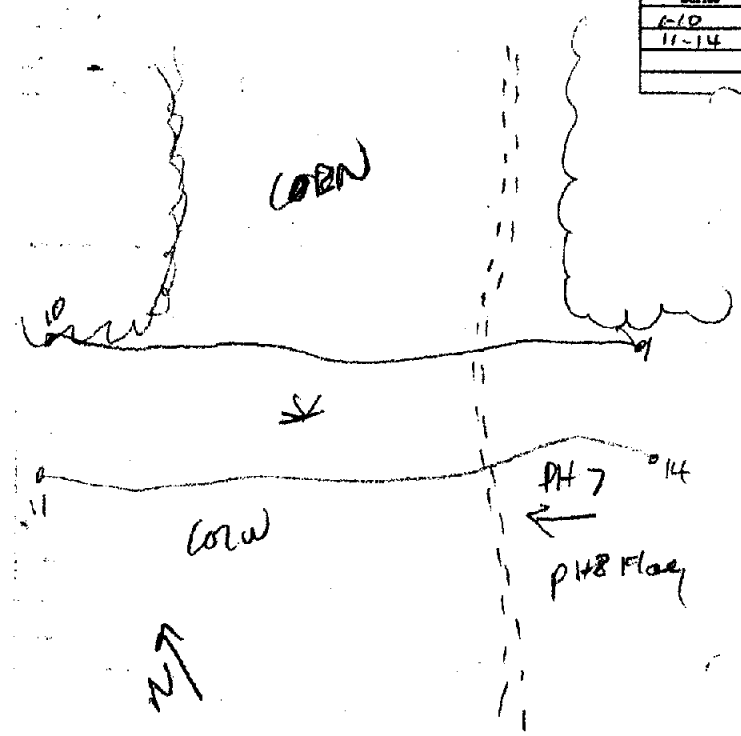
☐ Cedar Swamp ☐ Wetland of Special Significance

Photo # 7/8

SKETCH ON BACK

WETLAND SKETCH

Line Flagging Series
6-10
11-14



Possible Functions and Values:
✓ Groundwater Recharge/Discharge
___ Fish and Shellfish Habitat
___ Nutrient Removal
___ Sediment/Shoreline Stabilization
___ Recreation
___ Uniqueness/Heritage
___ Endangered Species Habitat
___ Floodflow Alteration
___ Sediment/Toxicant Retention
___ Production Export
___ Wildlife Habitat
___ Educational/Scientific Value
___ Visual Quality/Aesthetics
___ Other

Checklist:
✓ Wetland ID# B17-64-148-1
✓ North arrow.
✓ Detailed sketch of wetland boundary and flagging sequence.
✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
✓ Photo locations.
___ ~~Location of important wildlife sign.~~

Sam Hyde 5/23/17 3724
field conditions match prior data. SH

B17-64-148-1-WET

PROJECT TITLE: MPRP
TRANSECT: PLOT:
DELINEATOR(S): AG MC
DATE: 10-30-07

VEGETATION Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Herb					
Phal arun	85	85/105	82		FACW
Lyt Sal	5	5/105	5		
Bushy Aster	5	5/105	5		
Verhast	5	5/105	5		
Scicyp	5	5/105	5		

HYDROPHYTES: OBL / FACW 1 / FAC / OTHER
NON-HYDROPHYTES: FAC- / FACU / UPL
Hydrophytes Subtotal (A): 1
Non-hydrophytes Subtotal (B): 0
PERCENT HYDROPHYTES (100A/A+B): 1/1 = 100%

HYDROLOGY
☐ RECORDED DATA
Stream, lake, or tidal gage — Identification:
Aerial photography — Identification:
Other — Identification:
☑ NO RECORDED DATA
☐ OBSERVATIONS:
Depth to Free Water: @ surface
Depth to Saturation (including capillary fringe):
Altered Hydrology (explain):
☐ Inundated ☑ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☑ Drainage Patterns within Wetland
☐ OTHER (explain):

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.
Soil Soil
Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A	5Y 3/2		SaLo
6-12 +	B1	5Y 4/1	5gy 5/1	SiLo
			<.5cm ± 10%	

HYDRIC SOIL INDICATOR(S): VI
REFERENCE(S): NE Hydric Soils

OPTIONAL SOIL DATA
REFERENCE(S):
Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☑	☐	
Hydric soils criterion met?	☑	☐	
Wetland hydrology criterion met?	☑	☐	
IS THIS DATAPOINT IN A WETLAND?	☑	☐	

PROJECT TITLE: MPRP TRANSECT: PLOT:

B17-64-148-1-WET

3725

PROJECT TITLE: MPRP TRANSECT: PLOT:

DELINEATOR(S): DATE: 10/30/07

VEGETATION Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Shrub					
Sthorn Sumac	65	65/65	100	✓	upl
Herb					
phalarw	20	20/45	43	✓	RACU
Sol cow	10	10/45	21	✓	RACU
Sol rug	5	5/45	5		
Swt verw gr.	10	10/45	21	✓	RACU

HYDROPHYTES: OBL 1 FACW FAC OTHER

Hydrophytes Subtotal (A): 1

NON-HYDROPHYTES: FAC 2 FACU 1 UPL

Non-hydrophytes Subtotal (B): 3

PERCENT HYDROPHYTES (100A/A+B): 1/4 = 25%

HYDROLOGY Hillside / knoll

☐ RECORDED DATA
Stream, lake, or tidal gage Identification:
Aerial photography Identification:
Other Identification:

☑ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water:
Depth to Saturation (including capillary fringe):
Altered Hydrology (explain):

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain): N/A

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plot.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, mosses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A1	10YR 3/2	—	Salo
6-18	B1	10YR 6/6		Salo

HYDRIC SOIL INDICATOR(S): N/A REFERENCE(S):

OPTIONAL SOIL DATA REFERENCE(S):
Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☐	☑	
Hydric soils criterion met?	☐	☑	
Wetland hydrology criterion met?	☐	☑	
IS THIS DATAPOINT IN A WETLAND?	☐	☑	

PROJECT TITLE: MPRP TRANSECT: PLOT:

B12-64-148-1-upl

Maine Power Reliability Project

WETLAND SUMMARY FORM

3726

Observers: AG MC Date: 10/30/07

Town: Lewiston Series: OJER

Segment # : 17 CMP Section #: 64 CMP Pole #: 148 Wetland #: 1

Stream/Waterbody ID: — Corps plot : ✓ Yes ___ No

Dominant NWI Class: PEM1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

Phalarin (5) Verhast (5) Scicyp (5)
Lyt Sal (5)
Bushy Aster (5) Car lac
Jun eff Car lur

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth -6")
___ Saturated

Hydrologic Indicators: ___ Silt Deposition ___ Water-Stained Leaves
___ Water Marks ___ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:

Representative Wetland Soils:
✓ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-6	A1	5Y 3/2		Salo
6-12+	B1	5Y 4/1	5gy 5/1	Silo
			<.5cm	
			±5%	

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Agric. Swale

Notes:

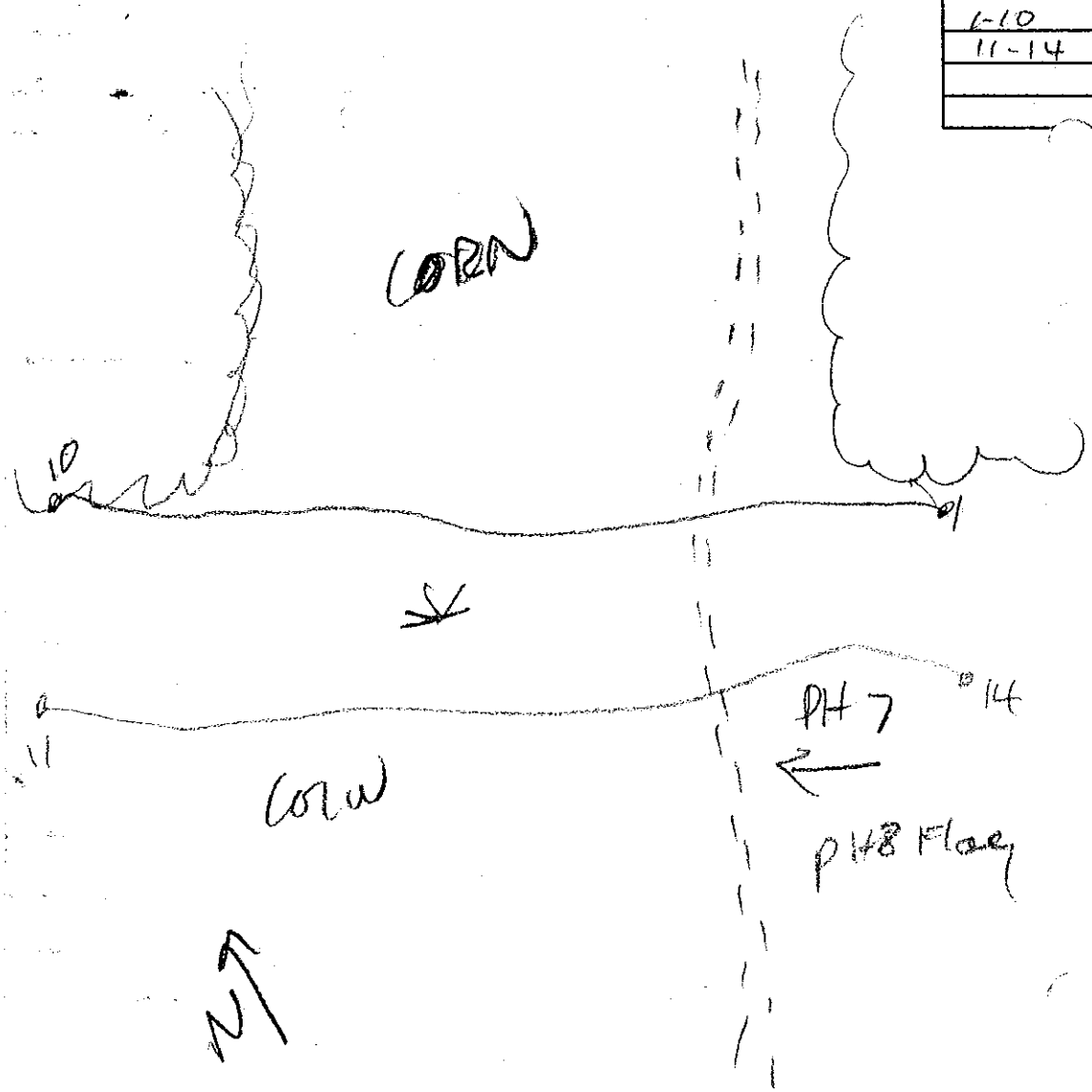
☐ Cedar Swamp ☐ Wetland of Special Significance

Photo # 7/8

SKETCH ON BACK

WETLAND SKETCH

Line Flagging Series
1-10
11-14



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- __ Fish and Shellfish Habitat
- __ Nutrient Removal
- __ Sediment/Shoreline Stabilization
- __ Recreation
- __ Uniqueness/Heritage
- __ Endangered Species Habitat
- __ Floodflow Alteration
- __ Sediment/Toxicant Retention
- __ Production Export
- __ Wildlife Habitat
- __ Educational/Scientific Value
- __ Visual Quality/Aesthetics
- __ Other

Checklist:

- ✓ **Wetland ID#** B17-64-148-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- __ ~~Location of important wildlife sign~~

PROJECT TITLE: MPRP

TRANSECT: 3728 PLOT:

DELINEATOR(S): AG MC

DATE: 10-30-07

VEGETATION Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Herb					
Phal arun	85	85/105	82		FACW
Lyt Sal	5	5/105	5		
Bushy Aster	5	5/105	5		
Verhast	5	5/105	5		
Scicyp	5	5/105	5		

HYDROPHYTES

OBL	FACW	FAC	*OTHER
	1		

Hydrophytes Subtotal (A): 1

NON-HYDROPHYTES

FAC-	FACU	UPL

Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 1/1 = 100%

HYDROLOGY

☐ RECORDED DATA
Stream, lake, or tidal gage Identification:
Aerial photography Identification:
Other Identification:

☑ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water: @ surface
Depth to Saturation (including capillary fringe):
Altered Hydrology (explain):

☐ Inundated ☑ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☑ Drainage Patterns within Wetland

☐ OTHER (explain):

Soil Soil

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A	5Y 3/2		SaLo
6-12 +	B_1	5Y 4/1	5Y 5/1 <1.5cm ±10%	SiLo

HYDRIC SOIL INDICATOR(S): VI NE Hydric Soils

REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☑	☐	
Hydric soils criterion met?	☑	☐	
Wetland hydrology criterion met?	☑	☐	
IS THIS DATAPOINT IN A WETLAND?	☑	☐	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: MPRP TRANSECT: PLOT:

B12-64-148-1-WET

PROJECT TITLE: MPRP TRANSECT: PLOT:

DELINEATOR(S): DATE: 10/30/07

VEGETATION

Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Shrub					
Sthorn Sumac	65	65/65	100	✓	upl
Herb					
phalarw	20	20/45	43	✓	RAC-w
Solcaw	10	10/45	21	✓	RAC-w
Sol nig	5	5/45	5		
Sut verw gr.	10	10/45	21	✓	RAC-w

HYDROPHYTES

OBL	FACW	FAC	*OTHER
	1		

Hydrophytes Subtotal (A): 1

NON-HYDROPHYTES

FAC-	FACU	UPL
	2	1

Non-hydrophytes Subtotal (B): 3

PERCENT HYDROPHYTES (100A/A+B): 1/4 = 25%

HYDROLOGY Hillside / knoll

☐ RECORDED DATA
Stream, lake, or tidal gage Identification:
Aerial photography Identification:
Other Identification:

☑ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water:
Depth to Saturation (including capillary fringe):
Altered Hydrology (explain):

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain): N/A

Soil Soil

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A,	10yR 3/2	–	Salo
6-18	B,	10yR 6/6		Salo

HYDRIC SOIL INDICATOR(S): N/A

REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☐	☑	
Hydric soils criterion met?	☐	☑	
Wetland hydrology criterion met?	☐	☑	
IS THIS DATAPOINT IN A WETLAND?	☐	☑	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: MPRP ~~TRANSECT:~~ ~~PLOT:~~

B12-64-148-1-UPL

D-17-62-99-1 / ~~WET-159-12~~

WET-159-08 Sean Hayden 5/24/17 Veg, soil, hydro good delineation good, SH

3732

Maine Power Reliability Project

WETLAND SUMMARY FORM

Observers: Gulbeau / Bartlett / Bartlett Date: 10/18/07

Town: Durham Series: 1, 18, 31-32, 34, 22, 23-100

Segment #: 17 CMP Section #: 62 CMP Pole #: 99 Wetland ID #: D17-62-99-1

Stream/Waterbody ID: N/A Corps plot: ___ Yes ✓ No

Dominant NWI Class: PEM 60% Other NWI Classes: PSS 40%

Representative Wetland Vegetation (by Strata):

Herbs: Sci cyp, Ton rad, Car sca, Car vul, Sphag spp, Ver bas, Bugleweed, Rub his, Eut gra

Shrubs: Ilex vir, Sp. lat, Ace rub, Malaberry

Trees: Ace rub, Oxy bel

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ___ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ___ Silt Deposition ✓ Water-Stained Leaves ___ Water Marks ___ Drift Lines ___ Surface Scouring ___ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations: Some sections of wetland inundated w/ 1-3" of standing H_2O

Representative Wetland Soils:	Depth	Horizon	Color	Redox Features	Texture
X Mineral	8-0	Oi	–	–	Sapric
___ Organic	~~[illegible]~~	A	10YR 2/1	10YR 3/4	~~[illegible]~~
	4-7BH	Bh	10YR 2/1	10YR 3/6	Clay

Other Observations: Water @ 6"

Meets NEIWPCC (2004) Criteria XI

Stream # 1 Data:

Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___

Bank Configuration: ___ Undercut ___ Vertical ___ Gradual

Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data

Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___

Bank Configuration: ___ Undercut ___ Vertical ___ Gradual

Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP): Deer sign

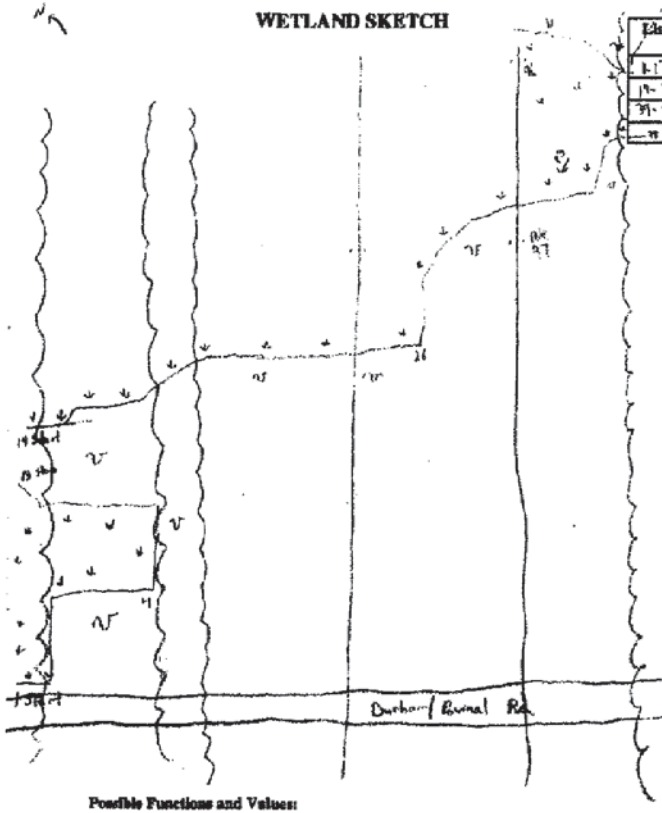
Notes: wetland recieves hydrology from Pownal/Durham Rd at road crossing. Large wetland complex stretching for many miles

☐ Cedar Swamp ☐ Wetland of Special Significance

P 3 x WL Sh

Photo # ___ SKETCH ON BACK

WETLAND SKETCH



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ Wetland ID# D17-62-99-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ✓ Location of important wildlife sign.

Maine Power Reliability Project — Team ___

WETLAND SUMMARY FORM

Observers: Galbasso / Battaglia / Boothby 3733 — Date: 10/18/07

Town: Durham — Series: 1-13, 14-38, 39-82, 83-100

Segment #: 17 — CMP Section #: 62 — CMP Pole #: 99 — Wetland ID #: 017-62-99-1

Stream/Waterbody ID: N/A — Corps plot: ___ Yes ✓ No

Dominant NWI Class: PEM 60% — Other NWI Classes: PSS 20%, PFO 20%

Representative Wetland Vegetation (by Strata):

Herbs: Sci cyp, Tan eff, Car sco, Car vul, Sphag. spp, Ver has, Bugleweed, Rub his, Eut gra

Shrubs: Ilex ver, Spi tot, Ace rub, Malberry

Trees: Ace rub, Abi bal

Y4

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) — ___ Seasonally Flooded (approximate depth -) — ✓ Saturated

Hydrologic Indicators: ___ Silt Deposition ✓ Water-Stained Leaves ___ Water Marks ___ Drift Lines ___ Surface Scouring ___ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations: Some sections of wetland inundated w/ 1-3" of standing H_2O

Representative Wetland Soils: X Mineral ___ Organic

Depth	Horizon	Color	Redox Features	Texture
8-0	Oi	–	–	SAPRIC
0-4	A	10YR 2/1	10YR 3/4	Mucky
4-18+	Bg	10YR 4/1	10YR 3/6	Clay

Other Observations: WATER @ 6"

Meets NEIWPCC (2004) Criteria XI A

Stream # 1 Data:
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP): Deer sign

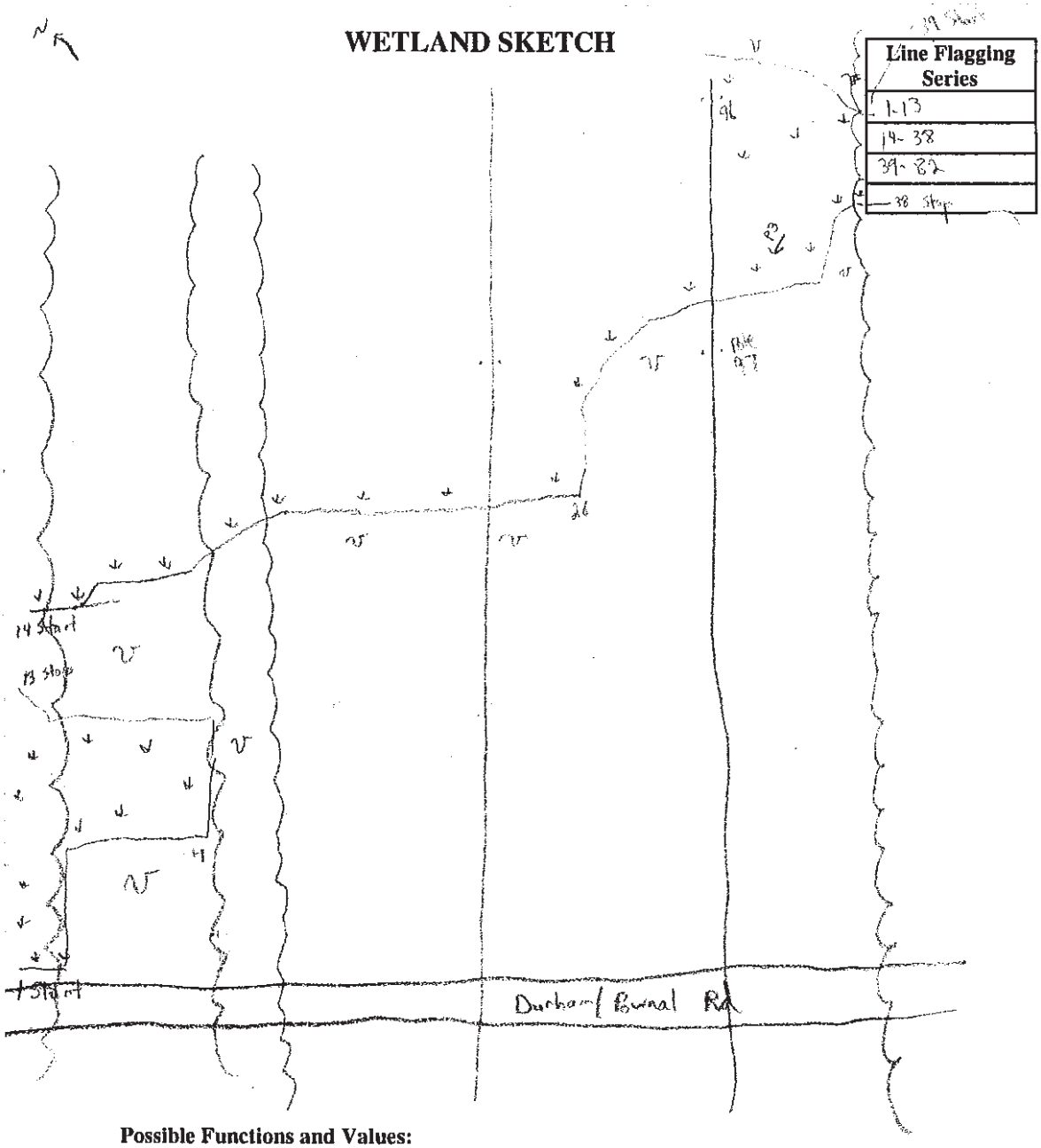
Notes: wetland recieves hydrology from Pennell/Durham Rd at road crossing. Large wetland complex stretching for many poles

☐ Cedar Swamp — ☐ Wetland of Special Significance

P 3 of WL SW

Photo # ___ — **SKETCH ON BACK**

WETLAND SKETCH



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** D17-62-99-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

WOSS
Data Form Examples

Segment 5

6-10-67-422-1
Maxcy's sub check

Boyle
Team C

Maine Power Reliability Project
WETLAND SUMMARY FORM

Observers: RES TLD Date: 14 NOV 2008
Town: Windsor Series: SEE Back Notes
Segment #: 10 CMP Section #: 67 CMP Pole #: 422 Wetland #: 1
Stream/Waterbody ID: 1 Corps plot: X Yes ___ No

Dominant NWI Class: PEM1E 80 PFO2E 10 Other NWI Classes: PSS1E 10

Representative Wetland Vegetation (by Strata):

I	SL	H
Acerub	Alninc	onosen
Fraper	Illver	osmcin
Abibal	Vib cass	Typ lat
		Calcan

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) X Seasonally Flooded (Portions) (approximate depth - 12") X Saturated

Hydrologic Indicators: ___ Silt Deposition X Water-Stained Leaves
___ Water Marks X Drift Lines ___ Surface Scouring
X Drainage Patterns X Buttressed Trees X Elevated Roots

Other Observations: sphagnum, sat'd to 0"

Representative Wetland Soils:
___ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-8	Ap	2.5y 4/1	5% conc	S/O
8-20+	Bg	G1 4/5g	40% conc	S/O

Other Observations:
Meets NEIWPCC (2004) Criteria ___

Stream # 1 Data:
Width (Bank-Bank): 6-10' Depth @ Center: 3' Peren. X Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical X Gradual
Channel Substrate: ___ Peat-Muck 50 Silt-Mud 50 Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP): Deer sign, dead porcupine

Notes: Recollection of data for Maxcy's

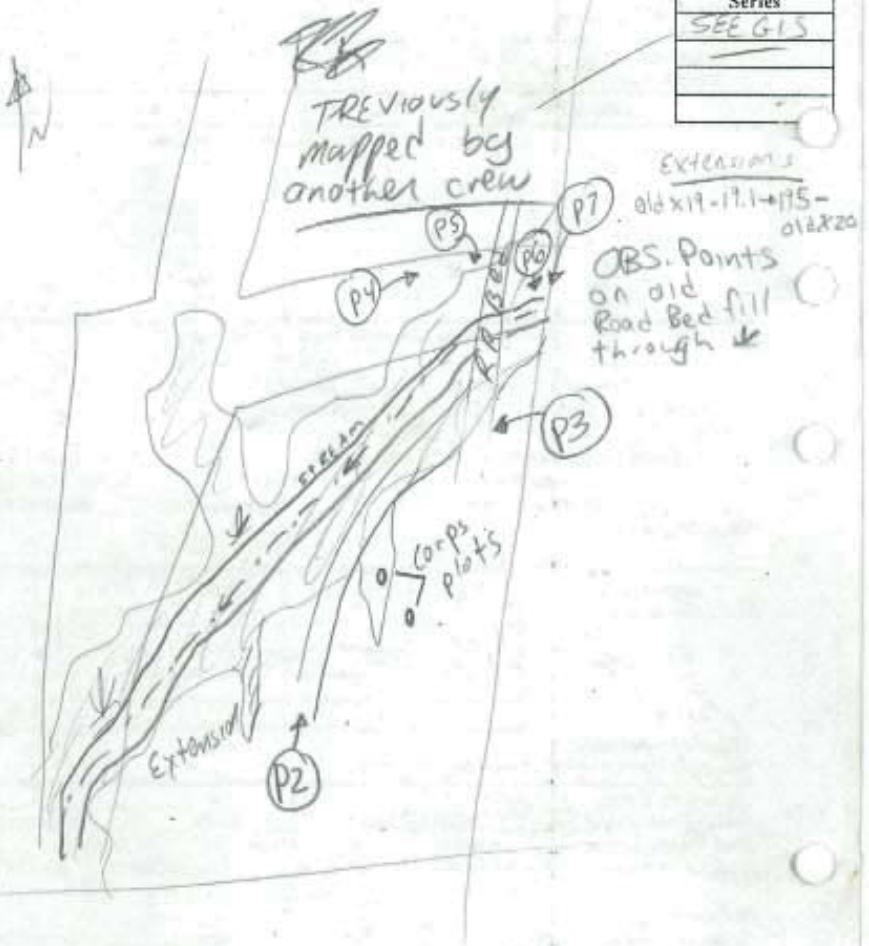
Stream
Azok EM

☐Cedar Swamp NO ☐Wetland of Special Significance yes

Photo # ~~1-6~~ 2-7 SKETCH ON BACK

WETLAND SKETCH

Line Flagging Series
SEE GIS
—



Possible Functions and Values:

- X Groundwater Recharge/Discharge
- X Fish and Shellfish Habitat
- X Nutrient Removal
- — Sediment/Shoreline Stabilization
- — Recreation
- — Uniqueness/Heritage
- — Endangered Species Habitat
- X Floodflow Alteration
- X Sediment/Toxicant Retention
- X Production Export
- X Wildlife Habitat
- — Educational/Scientific Value
- — Visual Quality/Aesthetics
- — Other

Checklist:

- X **Wetland ID#** G-10-67-422-1
- X North arrow.
- — Detailed sketch of wetland boundary and flagging sequence.
- — Natural and man-made features – roads, culverts, outcrops, structures, etc.
- — Photo locations.
- — Location of important wildlife sign.

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team A

Observers: DWP, CGD, KJW Date: 9/5/07
Town: WHITEFIELD Series: 1-10; 11-34; 35-40; 41-
Segment #: 11 CMP Section #: 392 CMP Pole #: 183 Wetland ID #: 1
Stream/Waterbody ID: Corps plot: (Yes) (No)
Dominant NWI Class: PEM1 Other NWI Classes: PSS1

Representative Wetland Vegetation (by Strata):

Shrubs
Rho gro
Spi tom
Aln inc (scattered)

Herbs
Sci spp
Carex spp
Eup spp
Doe umb
Cal can
Glycan
Lythrum
Salicarea

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth -)
✓ Saturated

Hydrologic Indicators: ____ Silt Deposition ____ Water-Stained Leaves
✓ Water Marks ____ Drift Lines ____ Surface Scouring
✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots
Other Observations:

Representative Wetland Soils:
____ Mineral
✓ Organic

Depth	Horizon	Color	Redox Features	Texture
0-16	Oa	10YR2/2		Muck

Other Observations:
Meets NEIWPCC (2004) Criteria III Taken near #9

Stream # 1 Data:
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent____
Bank Configuration: ____Undercut ____ Vertical ____ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ____ Depth @ Center: ____ Peren. ____ Intermittent____
Bank Configuration: ____Undercut ____ Vertical ____ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
Osprey nest on Pole #176

Notes:

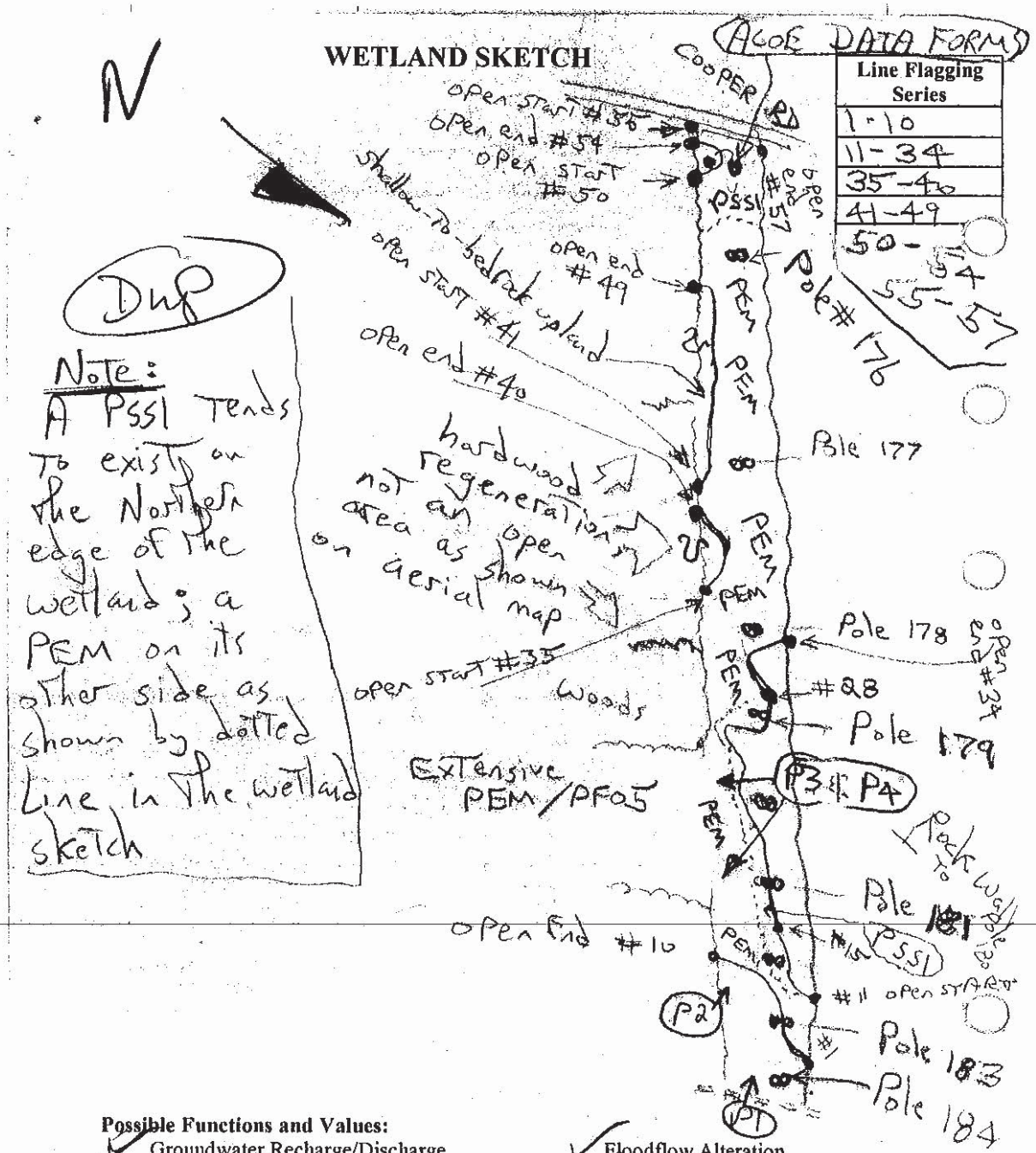
☐Cedar Swamp ☒Wetland of Special Significance

Photo # 111

WETLAND SKETCH

(ACOE DATA FORMS)

Line Flagging Series
1-10
11-34
35-40
41-49
50-54
55-57



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ✓ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ✓ Sediment/Toxicant Retention
- ___ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** A11-392-183-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ___ Photo locations.
- ___ Location of important wildlife sign.

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team A

Observers: DWP, CCD, KW Date: 10/11/07
Town: WHITEFIELD Series: 1-9, 10-36, 37-47, 48-62
Segment #: 11 CMP Section #: 392 CMP Pole #: 161 Wetland #: 1
Stream/Waterbody ID: A11-392-161-1-CH1 Corps plot: Yes No

Dominant NWI Class: PSS1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

PSS1
Aln inc (s)
Cic mac
Sambucus sp
Sci cyp (h)
Eupatorium sp
Sci mac
Gly can
Gly str
Eup gra
Car gyn
Solidago spp
Bro cil
Sym lan
Typ lat
Cal can

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -) ____ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ____ Silt Deposition ✓ Water-Stained Leaves
✓ Water Marks ____ Drift Lines ✓ Surface Scouring
____ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots
Other Observations:

Representative Wetland Soils:
✓ Mineral
____ Organic

Depth	Horizon	Color	Redox Features	Texture
0-4	10YR4/2	Ap	None	SiL
4-10	Bg	2.5Y4/1	CMF 2.5Y5/1	SiL
10-14+	Cg	5Y3/1	—	SiL

Other Observations:
Meets NEIWPCC (2004) Criteria XIII "Problem Area" (no A horizon)

CH1: **Stream # 1 Data:**
Width (Bank-Bank): 2' Depth @ Center: 6" Peren. ____ Intermittent ✓
Bank Configuration: ✓ Undercut ____ Vertical ✓ Gradual
Channel Substrate: ____ Peat-Muck ✓ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

CH2: **Stream # 2 Data**
Width (Bank-Bank): 1' Depth @ Center: 6" Peren. ____ Intermittent ✓
Bank Configuration: ____ Undercut ✓ Vertical ____ Gradual
Channel Substrate: ____ Peat-Muck ✓ Silt-Mud ____ Sand ____ Gravel/Cobble ____ Boulder ____ Bedrock

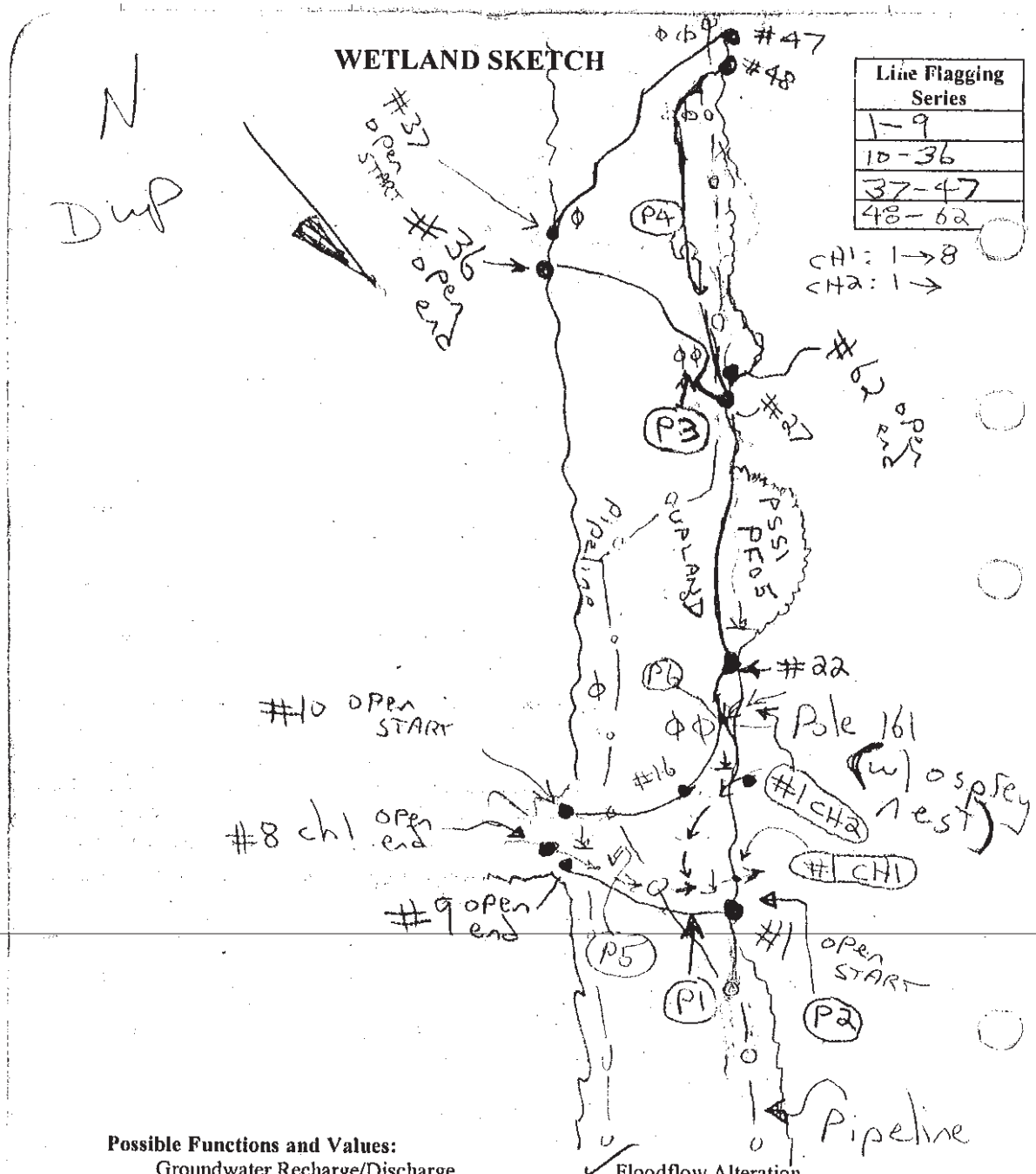
Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
deer sign, osprey nest on Pole,

Notes:

☐ Cedar Swamp ☒ Wetland of Special Significance

Photo # A + 2 stream photos (Est b)

WETLAND SKETCH



Line Flagging Series
1-9
10-36
37-47
48-62

CH1: 1→8
CH2: 1→

Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ✓ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** A-11-392-161-1-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

Feature(s) ID: [illegible]

#51

BOYLE ASSOCIATES

Routine Wetland Field Data Form

3742

WET-178-06

Date: 4.14.17	Project Name: QM1
Job #: 532	Cowardin Class(es) & %: PSS1E
Observers: HSW SH	Photo(s) #:
Comments: re-flagged a portion of VE. 11-1 thru 11-14 added. tie flag 11-14 to existing bnd.	

Dominant Vegetation (by stratum):

Herbs	Herbs (cont.)	Shrubs/Saplings	Trees	Vines
	SEE	FORM	A	

Wetland Hydrology Indicators:

____ Perm. Flooded (approx. depth: ____) ___ Seasonally Flooded/Saturated (approx. depth: _____) ___ Saturated

*A1 – Surface water	*B5 – Iron deposits	*B15 – Marl deposits	*C7 – Thin muck surface
*A2 – High water table	B6 – Surface soil cracks	B16 – Moss trim lines	C8 – Crayfish burrows
*A3 – Saturation	*B7 – Inundated aerial imagery	*C1 – Hydrogen sulfide odor	C9 – Saturation visible on aerial imagery
*B1 – Water marks	*B8 – Sparse veg. concave surface	C2 – Dry-season water table	*D1 – Stunted or stressed plants
*B2 – Sediment deposits	*B9 – Water-stained leaves	*C3 – Oxidized rhizospheres - living root	*D2 – Geomorphic position
*B3 – Drift deposits	B10 – Drainage patterns	*C4 – Presence of reduced iron	*D3 – Shallow aquitard
*B4 – Algal mat or crust	*B13 – Aquatic fauna	*C6 – Recent iron reduction in tilled soils	*D4 – Microtopographic relief
*Denotes Primary Indicator			*D5-FAC-neutral test

Representative Hydric Soils:

Depth (in)	Horizon	Texture	Color	Redox. Features	Other

Hydric Soil Indicator & Reference:

Other Soil Comments:

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team A

Observers: KJW, CCD, DWP Date: 10/23/07
Town: ALNA Series: 1-7; 8-29
Segment #: 11 CMP Section #: 392 CMP Pole #: 85 Wetland ID #: 1
Stream/Waterbody ID: A-11-392-85-1-CH1, 2 Corps plot: ___Yes (No)

Dominant NWI Class: PSS1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

Shrub
Aln inc
Spi alb, Tom

Herb/Graminoid
Gly can Dul aru
Cal can Car sco, str
Sci cyp
Jun eff

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ✓ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ✓ Silt Deposition ✓ Water-Stained Leaves
✓ Water Marks ✓ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:

Representative Wetland Soils:
✓ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-2	Oa	7.5YR3/2	—	Mucky
2-8	Cg1	2.5Y3/2	CFP 10YR4/3	Mucky Sil
8-14	Cg2	5Y3/1	—	Mucky Sil

Other Observations:
Meets NEIWPCC (2004) Criteria I Frequently ponded/Flooded

CH1
Stream # 1 Data:
Width (Bank-Bank): 8-25' Depth @ Center: 5' Peren. ✓ Intermittent ___
Bank Configuration: ✓ Undercut ✓ Vertical ✓ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ✓ Gravel/Cobble ✓ Boulder
see photos P7, P8, P9 ___ Bedrock ≈ During high water

CH2
Stream # 2 Data
Width (Bank-Bank): 10' Depth @ Center: 3' Peren. ✓ Intermittent ___
Bank Configuration: ___Undercut ✓ Vertical ✓ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ✓ Gravel/Cobble ___Boulder
___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Beaver sign - nibbled alders; Coyote scat; ABA (see Photo 5)

Notes: CH1 width varies; 25' to 8' TROUT BROOK

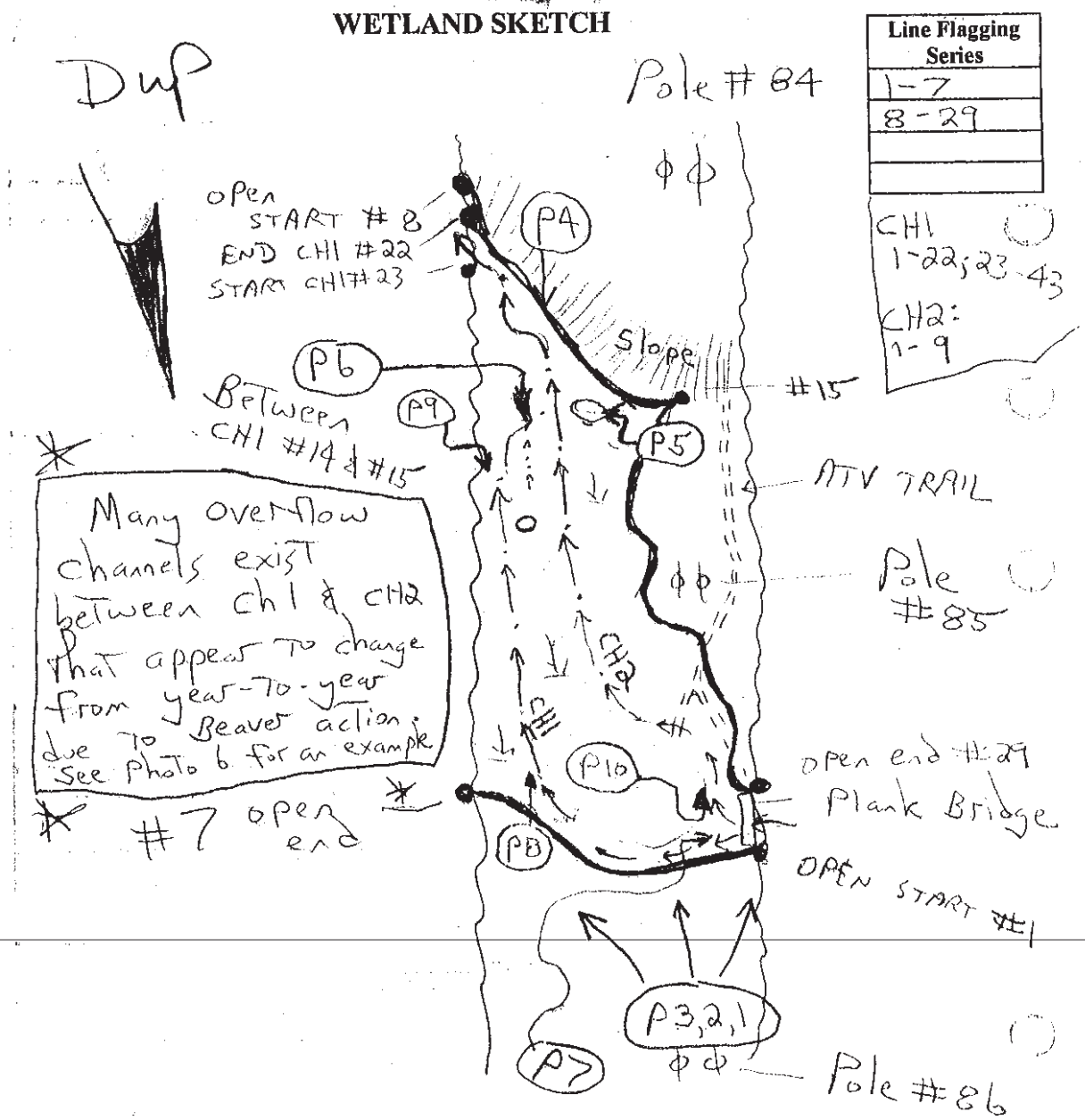
☐ Cedar Swamp ☒ Wetland of Special Significance

Photo # _____

SKETCH ON BACK

WETLAND SKETCH

Line Flagging Series
1-7
8-29



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ✓ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ✓ Sediment/Shoreline Stabilization
- ✓ Recreation ATV USAGE etc
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ✓ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** A-11-392-85-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

A-29-392-1-1

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team F/A

Observers: JLM, DAB Date: 10/23/08
Town: Wiscasset Series: X1 - X12
Segment #: 29 CMP Section #: 392 CMP Pole #: 1 Wetland ID #: 1
Stream/Waterbody ID: N/A Corps plot: ___ Yes X No
Dominant NWI Class: PEM1 85% Other NWI Classes: PSS1

Representative Wetland Vegetation (by Strata):

Typ. lat (H) Sci. atr (H)
Spi. lat (Sh, H) Sci. cyp (H)
Jun. eff (H) Car. sco (H)
Ono. sen (H)

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -)
X Seasonally Flooded (approximate depth - 6" to full
___ Saturated

Hydrologic Indicators: ___ Silt Deposition ___ Water-Stained Leaves
___ Water Marks ___ Drift Lines ___ Surface Scouring
X Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:
Impounded by road

Representative Wetland Soils:
X Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-4"	Bg	2.5Y 3/2	7.5YR 3/3	Sa Lo
4-16"	Cg	10Y 3/1	10YR 4/4	Sa Lo w/Gr
16+	refusal			

Disturbed soil

Other Observations: Gravel in Cg from ditch. top soil gone Swanton

Meets NEIWPCC (2004) Criteria ___

Stream # 1 Data: Ditch: not Stream
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

deer tracks

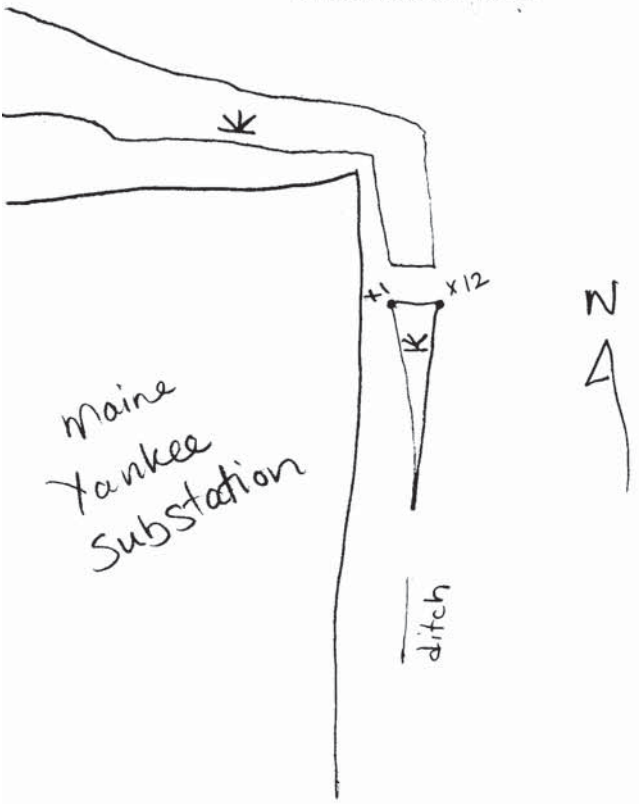
Notes:
free water @ 2"
saturated to surface

☐ Cedar Swamp ☐ Wetland of Special Significance

Photo # **SKETCH ON BACK**

WETLAND SKETCH

Line Flagging Series
X1-X12



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- X Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ___ **Wetland ID#** F-29-392-1-1
- ___ North arrow.
- ___ Detailed sketch of wetland boundary and flagging sequence.
- ___ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ___ Photo locations.
- ___ Location of important wildlife sign.

WOSS
Data Form Examples

Merrill Road Converter Station

Maine Power Reliability Project

Team B

WETLAND SUMMARY FORM

Observers: KF, MC Date: 9/25/07

Town: Lewiston Series :

Segment # : 14 CMP Section #: 200 CMP Pole #: 299 Wetland #: 1

Stream/Waterbody ID: Corps plot : ✓ Yes No

Dominant NWI Class: PEM 1 Other NWI Classes: PSS1

Representative Wetland Vegetation (by Strata):

Calcan Sci cyp
Thy lat owo fen
Ast umb
Sol gig

Aln rug
vib dent
spi lat

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -) ✓ Seasonally Flooded (approximate depth - 4") ____ Saturated

Hydrologic Indicators: ____ Silt Deposition ____ Water-Stained Leaves
✓ Water Marks ____ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots

Other Observations:

Representative Wetland Soils:
✓ Mineral
____ Organic

Depth	Horizon	Color	Redox Features	Texture
2-0	Oi	10YR2/2		Fibric
0-6	Bi	5Y 4/1		SiLo
6-10	B2	5Y 5/1	10YR4/6	
			5Y 6/1	

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____
Bank Configuration: ____Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___Bedrock

Stream # 2 Data
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____
Bank Configuration: ____Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:

☐Cedar Swamp ☐Wetland of Special Significance

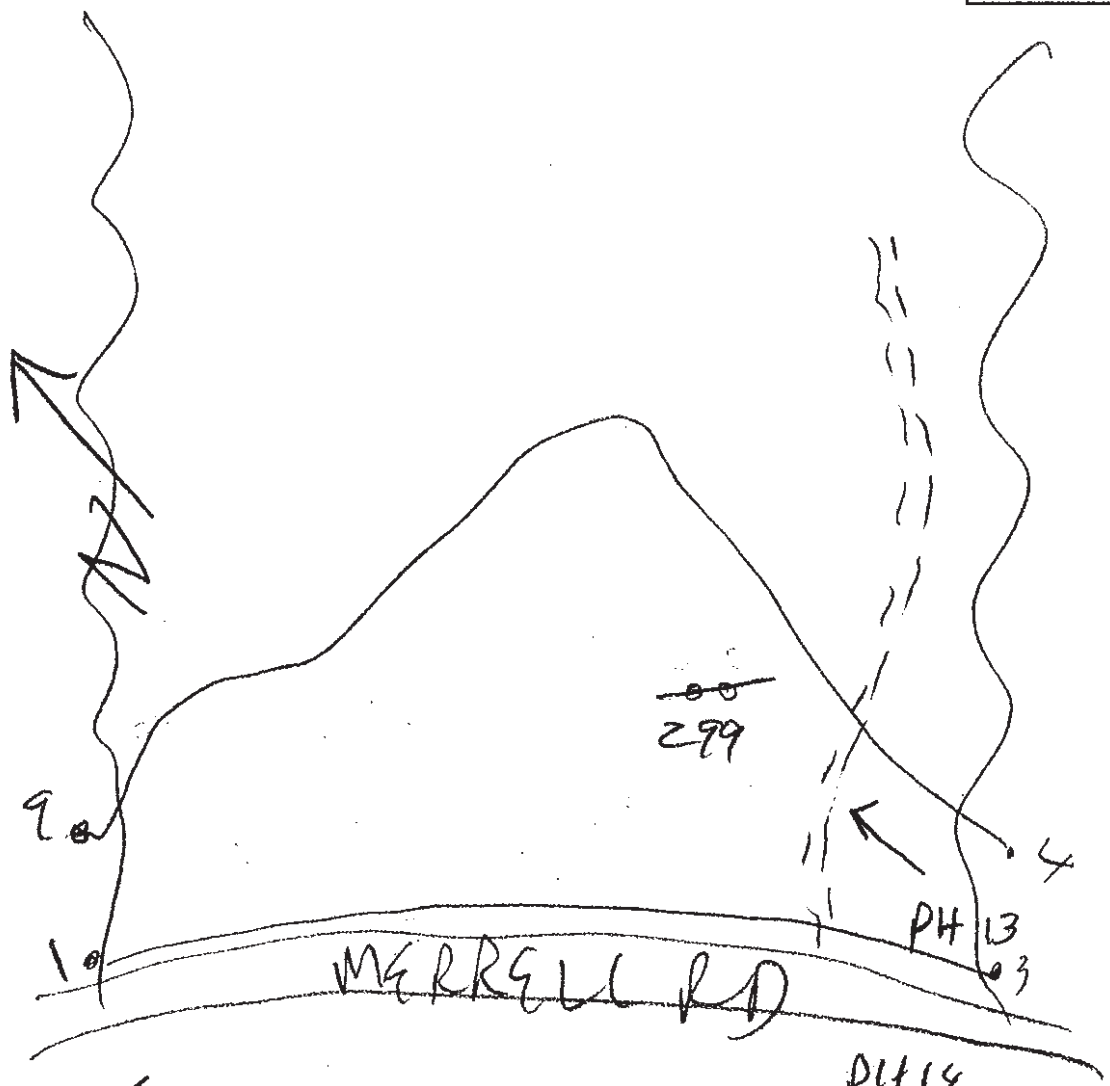
Photo # 13/14

SKETCH ON BACK

WETLAND SKETCH

3749

Line Flagging Series
1-3
4-9



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- ___ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** BLY-20D-299-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

Feature(s) ID: WET-PERRON-1

3750

BOYLE ASSOCIATES

Routine Wetland Field Data Form

Date: 4/30/17	Project Name: QMI
Job #: 532	Cowardin Class(es) & %: PFO 1/4 E
Observers: J. Boyle, C. Flink	Photo(s) #: 2
Comments: linear ⊻ containing 2 VPs. (1 significant)	

Dominant Vegetation (by stratum):

Herbs	Herbs (cont.)	Shrubs/Saplings	Trees	Vines
Osm cin	Abi bal	Abi bal	Ace rub	
Ono sen	Sphagnum	Acer rub	Thu occ	
Car cri		Bet pen	Fra nig	
Car str			Bet pen	
			Abi bal	

Wetland Hydrology Indicators:

____ Perm. Flooded (approx. depth: ____) ✓ Seasonally Flooded/Saturated (approx. depth: 10") ___ Saturated

*A1 – Surface water	*B5 – Iron deposits	*B15 – Marl deposits	*C7 – Thin muck surface
*A2 – High water table	B6 – Surface soil cracks	B16 – Moss trim lines	C8 – Crayfish burrows
*A3 – Saturation	*B7 – Inundated aerial imagery	*C1 – Hydrogen sulfide odor	C9 – Saturation visible on aerial imagery
*B1 – Water marks	*B8 – Sparse veg. concave surface	C2 – Dry-season water table	*D1 – Stunted or stressed plants
*B2 – Sediment deposits	*B9 – Water-stained leaves	*C3 – Oxidized rhizospheres - living root	*D2 – Geomorphic position
*B3 – Drift deposits	B10 – Drainage patterns	*C4 – Presence of reduced iron	*D3 – Shallow aquitard
*B4 – Algal mat or crust	*B13 – Aquatic fauna	*C6 – Recent iron reduction in tilled soils	*D4 – Microtopographic relief
*Denotes Primary Indicator			*D5-FAC-neutral test

Representative Hydric Soils:

Depth (in)	Horizon	Texture	Color	Redox. Features	Other
0-20+	0	Sapric	Blk	–	very deep in
					center of
					wetland.
					full auger
					length +.

Hydric Soil Indicator & Reference: A1. Histosol.

Other Soil Comments:

WOSS
Data Form Example

Fickett Road Substation

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team F

Observers: MW, SE Date: 10/9/07
Town: Pownal Series: 1-19, 51 (1-14)
Segment #: 16 CMP Section #: 375 CMP Pole #: 240 Wetland #: 1
Stream/Waterbody ID: F16-375-240-1-1 Corps plot: ___Yes X No

Dominant NWI Class: PSS1/PEM1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

winterberry
arrowwood
alnus
meadowsweet
3-way sedge
dark green bulrush
wool grass
typha lat
carex crinita
carex lurida
eleocharis obtusa
blue flag
solidago rugosa

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -)
___ Seasonally Flooded (approximate depth -)
X Saturated

Hydrologic Indicators: ___Silt Deposition ___ Water-Stained Leaves
X Water Marks ___ Drift Lines ___ Surface Scouring
X Drainage Patterns ___ Buttressed Trees ___ Elevated Roots
Other Observations:

Representative Wetland Soils:
X Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-3	O	–	–	ORGANICS
3-18	Bg	5/5BG	10%10YR 4/6	SiLo

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): 5' Depth @ Center: 1.5' Peren. X Intermittent ___
Bank Configuration: ___Undercut ___ Vertical X Gradual
Channel Substrate: ___Peat-Muck X Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
DEER BEDS & TRACKS

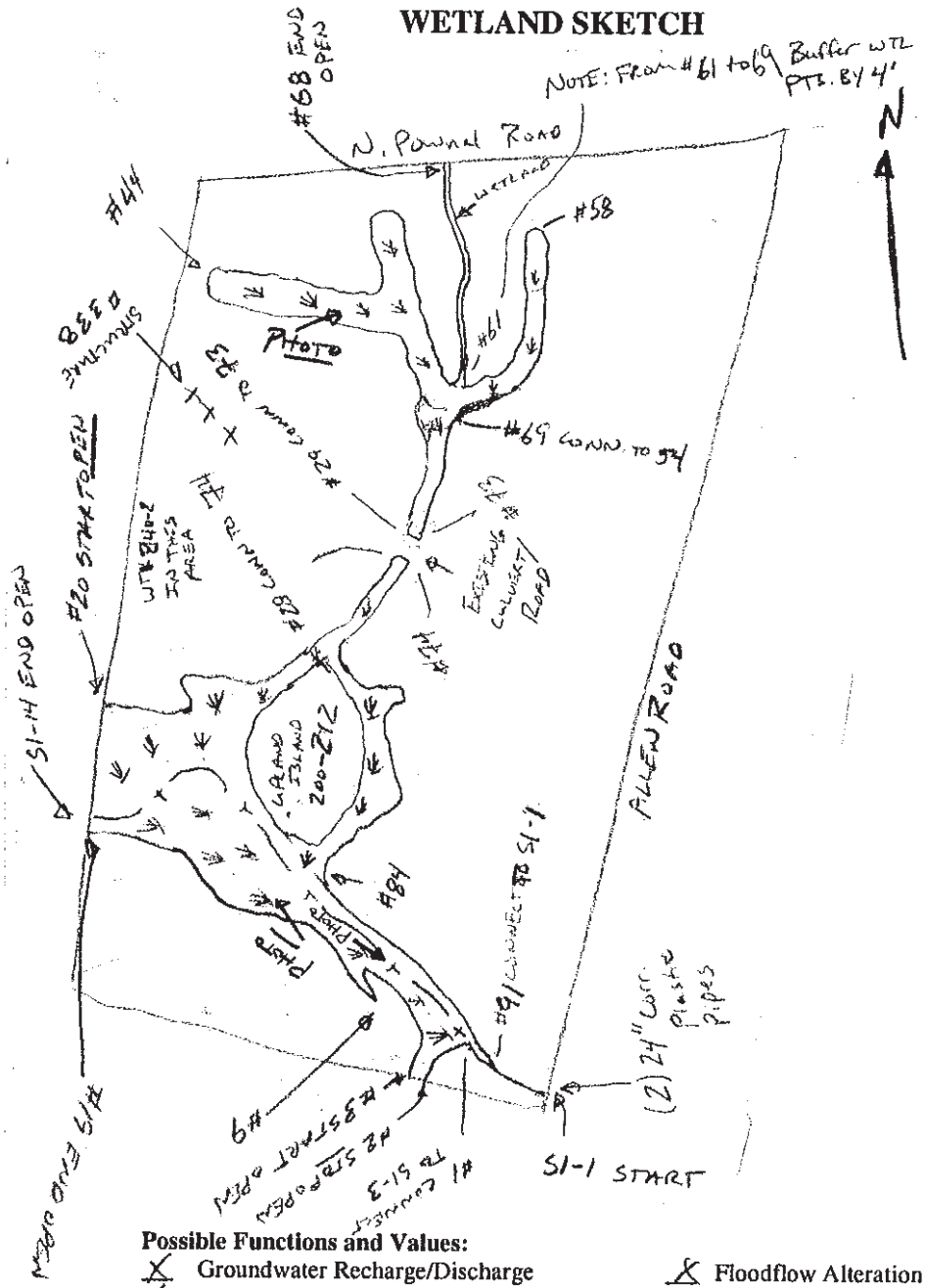
Notes:
Peren. STREAM Buffered by PSS/PEM WETLANDS

☐Cedar Swamp ☒Wetland of Special Significance

Photo # 3 PHOTOS, 2 OF WTL, 1 OF STREAM **SKETCH ON BACK**

WETLAND SKETCH

Line Flagging Series
1-19
S1(1-14)
20-28, 69-73
29-68, 74-91
200-212



Possible Functions and Values:

- X Groundwater Recharge/Discharge
- X Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- X Floodflow Alteration
- ___ Sediment/Toxicant Retention
- X Production Export
- X Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- X **Wetland ID#** F-16-375-2410-1
- X North arrow.
- X Detailed sketch of wetland boundary and flagging sequence.
- X Natural and man-made features – roads, culverts, outcrops, structures, etc.
- X Photo locations.
- X Location of important wildlife sign.

Maine Power Reliability Project
WETLAND SUMMARY FORM

Team F

Observers: MW, SE Date: 10/9/07
Town: Pownal Series: 1-25
Segment #: 16 CMP Section #: 375 CMP Pole #: 240 Wetland #: 3
Stream/Waterbody ID: Corps plot: ___ Yes X No

Dominant NWI Class: PSS1 Other NWI Classes:

Representative Wetland Vegetation (by Strata):

Red maple
BLACK WILLOW
Arrow wood
Spirea
Alnus

typha lat.
Juncus eff.
Juncus can.
blue flag

sol. mg.
Sen. fern
Carex lur.
Carex crin.

wool grass

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ___ Seasonally Flooded (approximate depth -) X Saturated

Hydrologic Indicators: ___ Silt Deposition X Water-Stained Leaves
___ Water Marks ___ Drift Lines ___ Surface Scouring
X Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:

Representative Wetland Soils:
X Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-4	O	–	–	ORG
4-17	Bg	5/5GY	7% 10YR 4/6	SiLo

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

DEER TRACKS

Notes:

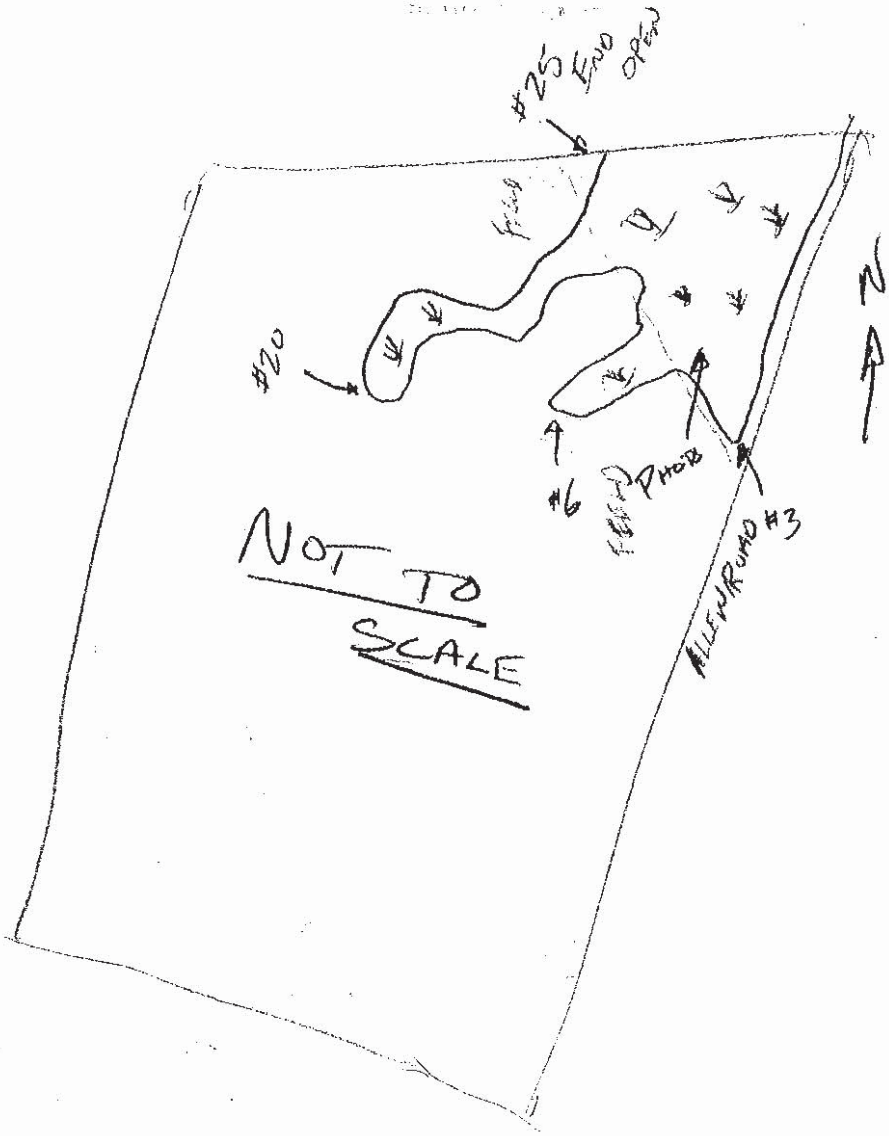
N/A

☐ Cedar Swamp ☐ Wetland of Special Significance

Photo # **SKETCH ON BACK**

WETLAND SKETCH

Line Flagging Series
1-25



Possible Functions and Values:

- X Groundwater Recharge/Discharge
- __ Fish and Shellfish Habitat
- __ Nutrient Removal
- __ Sediment/Shoreline Stabilization
- __ Recreation
- __ Uniqueness/Heritage
- __ Endangered Species Habitat
- __ Floodflow Alteration
- __ Sediment/Toxicant Retention
- X Production Export
- X Wildlife Habitat
- __ Educational/Scientific Value
- __ Visual Quality/Aesthetics
- __ Other

Checklist:

- X **Wetland ID#** F-16-375-240-3
- X North arrow.
- X Detailed sketch of wetland boundary and flagging sequence.
- X Natural and man-made features – roads, culverts, outcrops, structures, etc.
- X Photo locations.
- X Location of important wildlife sign.

Exhibit 9-4: USACE Data Plot Examples

USACE
Data Plot Examples

Segment 1

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: _____ Sampling Date: 4/13/17

Applicant/Owner: CMP State: ME Sampling Point: Plot-4-5-up

Investigator(s): SNH HSW Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): none

Slope (%): 3% Lat: 41258 75.78 FIN Long: 3072163.01 FIE Datum: NAD83

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

in cleared ROW

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): _____

Water Table Present? Yes ___ No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): _____

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

SOIL

Sampling Point: Plot-4-5-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/3	100					L	
13-18+	2.5Y 5/4	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: _____ Sampling Date: 4/13/17

Applicant/Owner: CMP State: ME Sampling Point: Plot 4-5-WET

Investigator(s): SNH HSW Section, Township, Range: _____

Landform (hillslope, terrace, etc.): valley Local relief (concave, convex, none): concave

Slope (%): 1% Lat: 425855.06 ft N Long: 3072277 ft E Datum: NAD83

Soil Map Unit Name: _____ NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?**	**Yes** ✓ **No** ____
Hydric Soil Present?	Yes ✓ No ____	If yes, optional Wetland Site ID: _____	
Wetland Hydrology Present?	Yes ✓ No ____		

Remarks: (Explain alternative procedures here or in a separate report.)

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HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-4-5-WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. —			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rosa multiflora	7		
2. Alnus incana	30	✓	FacW
3. Lyonia ligustrina	20	✓	FacW
4.			
5. Pastur rose!	3		
6.			
7.			
	60 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Onoclea sensibilis	15		
2. Carex lupulina	20	✓	Obl
3. Solidago rugosa	45	✓	Fac
4. Doellingeria umbellata	10		
5. Aquilegia gigantea	30	✓	FacW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120 = Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot 4-5-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 3/3	95	7.5YR4/3	5	C	PL	L	Oxidized Rhizospheres
2-8	2.5Y 4/2	95	7.5YR4/3	5	C	PL	L	Oxidized Rhizo
8-14	2.5Y 4/2	75	10YR5/6	20	C	M	L	
			2.5Y 5/1	5				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** _____

Remarks:

WET - 49-04

3763

Wetland ID: MGWHSW25 DP-UP

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Moxie Gore - Dirigo Partners City/County: Moxie Gore Sampling Date: 7-9-14

Applicant/Owner: CMP CO State: ME Sampling Point: UP-1

Investigator(s): HSW Section, Township, Range: Moxie gore

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): _____ Slope (%): 3

Subregion (LRR or MLRA): LRR Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches): _____
Water Table Present?	Yes _____	No _____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland ID: MGWHSW25

VEGETATION – Use scientific names of plants.

Sampling Point: _____

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Red maple	10		
2. Sugar maple	10		
3. Balsam fir	40		
4. White birch	10		
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15)			
1. Red Maple	10		
2. Balsam fir	5		
3. Am Hazelnut	1		
4. White birch	10		
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5)			
1. Starflower	75		
2. moss spp.	20		
3. Club moss	5		
4. Mia can	5		
5. Viola spp.	1		
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

Wetland ID: MGW HSW 25

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
1-0	10yr 3/2	100					organic	duff
0-5	7.5yr 3/4	100					silt loam	
								refusal @ 6"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** _____

Remarks:

Refusal @ 6"

WET-49-04

Wetland ID: MGWHSW25 DP-Wet

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Moxie Gore - Dirigo Partners City/County: Moxie Gore Sampling Date: 7-9-14

Applicant/Owner: CMPCO State: ME Sampling Point: Wet-1

Investigator(s): ASW JFM SMG Section, Township, Range: M6

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR or MLRA): LRR Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: MGWHSW25
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 1
Water Table Present?	Yes X	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland ID: MGWHSW25

VEGETATION – Use scientific names of plants.

Sampling Point: WCt-1

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Silver Maple	2		
2. Cedar	5		
3. Black Ash	5		
4. Red Spruce	5		
5. Balsam fir	20		
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15ft)			
1. Balsam fir	75		
2. Red Maple	1		
3. Un ID'd shrub	10		
4. Yellow birch	1		
5. White birch	1		
6. Cedar	1		
7. Red Spruce	1		
	= Total Cover		

Herb Stratum (Plot size: 5ft)			
1. Spagnum moss	98	Y	
2. Bunchberry	10		
3. Bidens	45	Y	
4. Jewelweed	2		
5. Sarsparilla	5		
6. Bristly dewberry	2		
7. Goldthread	2		
8. Ladyfern	>1		
9. Clearex	>1		
10. Carex Spp.	15		
11.			
12.			
	= Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

Wetland ID: MGWHSW25

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
16+	10yr 3/2	100	N/A				Organic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- X Histosol (A1)
- ___ Histic Epipedon (A2)
- X Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

USACE
Data Plot Examples

Segment 2

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: CMP - MREI City/County: Somerset County Sampling Date: 9/22/2015
Applicant/Owner: CMP State: ME Sampling Point: UPL-72-10
Investigator(s): M. Banaitis / K. Maloney Section, Township, Range: Moscow
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 2%
Subregion (LRR or MLRA): LRR R Lat: 45, 6, 18.502 Long: 69, 50, 18.890 Datum: WGS 84
Soil Map Unit Name Colonel-Dixfield-Pillsbury association, 3 to 15 percent slopes NWI Classification: N/A
Are climatic / hydrologic conditions of the site typical for this time of the year? **Yes** X **No** ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? **Yes** X **No** ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** ___ **No** X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	**Yes** ___ **No** X	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	**Yes** ___ **No** X	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ___	Depth (inches): ___
Water Table Present?	Yes ___	No ___	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants

Sampling Point: UPL-72-10

Tree Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	40	Y	FACU
2. *Betula papyrifera*	20	Y	FACU
3. *Betula populifolia*	20	Y	FAC
4. *Acer rubrum*	10	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	90	= Total Cover	

Sapling/Shrub Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Corylus cornuta*	30	Y	FACU
2. *Betula populifolia*	10	Y	FAC
3. *Populus tremuloides*	10	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50	= Total Cover	

Herb Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Eurybia macrophylla*	10	Y	UPL
2. *Aralia nudicaulis*	10	Y	FACU
3. *Rubus idaeus*	5	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
	25	= Total Cover	

Woody Vine Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 22.22% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	115	x 4 =	460
UPL species	10	x 5 =	50
Column Totals:	165 (A)		630 (B)

Prevalence Index = B/A = 3.82

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: UPL-72-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/4	100					sl	
4-16+	2.5Y 5/6	90					sl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B)**
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L)**
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: CMP - MREI City/County: Somerset County Sampling Date: 9/22/2015
Applicant/Owner: CMP State: ME Sampling Point: WET-72-10
Investigator(s): M. Banaitis / K. Maloney Section, Township, Range: Moscow
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Concave Slope (%): 0%
Subregion (LRR or MLRA): LRR R Lat: 45, 6, 17.802 Long: 69, 50, 19.188 Datum: WGS 84
Soil Map Unit Name Colonel-Dixfield-Pillsbury association, 3 to 15 percent slopes NWI Classification: PSS
Are climatic / hydrologic conditions of the site typical for this time of the year? **Yes** X **No** ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? **Yes** X **No** ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	**Yes** X **No** ___	**Is the Sampled Area within a Wetland?** **Yes** X **No** ___
Hydric Soil Present?	**Yes** X **No** ___	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	**Yes** X **No** ___	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes X	No ___	Depth (inches): 10
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 6

Wetland Hydrology Present? Yes X No ___

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION - Use scientific names of plants

Sampling Point: WET-72-10

Tree Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix bebbiana*	40	Y	FACW
2. *Fraxinus nigra*	15	Y	FACW
3. *Alnus incana*	10	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	65	= Total Cover	

Herb Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Osmundastrum cinnamomeum*	30	Y	FACW
2. *Epilobium ciliatum*	15	Y	FACW
3. *Persicaria sagittata*	10	N	OBL
4. *Equisetum fluviatile*	10	N	OBL
5. *Galium asprellum*	5	N	OBL
6. *Dryopteris intermedia*	5	N	FAC
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
	75	= Total Cover	

Woody Vine Stratum (Plot Size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	110	x 2 =	220
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	140 (A)		260 (B)

Prevalence Index = B/A = 1.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WET-72-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
4+	10YR 2/1	100					Saturated OM	
0-8	10YR 2/2	95	10YR 5/6	2	C	PL/M	sl	
8-16+	10YR 5/1	90	10YR 5/8	10	C	PL/M	sl	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histisol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
_X_ Depleted Below Dark Suface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B)**
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L)**
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and weltand hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _X_ **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: _____ Sampling Date: 5/17/17

Applicant/Owner: CMP State: IME Sampling Point: Plot - 71-102-UP

Investigator(s): SNH CJF Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): — Slope (%): 4%

Subregion (LRR or MLRA): _____ Lat: 829810.65 ftN Long: 3029929 ft E Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): _____
Water Table Present?	Yes ____	No ____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): _____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No Hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: Plot 71-102-UP

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fagus grandifolia	10	✓	FacU
2. Acer rubrum	20	✓	Fac
3. Fraxinus pennsylvanica	7		Fac
4.			
5.			
6.			
7.			
	37 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	15	✓	Fac
2. Acer rubrum	10	✓	Fac
3. Ostrya virginiana	5		FacU
4.			
5.			
6.			
7.			
	30 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Dennstaedtia punctilobula	2		FacU
2. Streptopus lanceolatus	3	✓	FacU
3. Menthum canadense	10	✓	FacU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15 = Total Cover		

Woody Vine Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. –			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	52	x 3 =	156
FACU species	30	x 4 =	120
UPL species		x 5 =	
Column Totals:	82 (A)		276 (B)

Prevalence Index = B/A = 3.36

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot 71-102-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					SiL	
2-16	2.5Y 5/4	100					SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: _____ Sampling Date: 5/17/17

Applicant/Owner: CMP State: ME Sampling Point: Plot 71-102-WET

Investigator(s): SNH CJF Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 2%

Subregion (LRR or MLRA): _____ Lat: 829669.413 ft Long: 3029818.93 ft Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)
Plot in PFO area near I-STR-102-2

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1"
Water Table Present?	Yes ✓	No _____	Depth (inches): 1"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): to surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: Plot 71-102-WET

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	50	✓	FACW
2. Acer rubrum	5		
3. Populus tremuloides	10		
4. Betula alleghaniensis	15		
5.			
6.			
7.			
	80 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	15	✓	FAC
2. Acer rub	10	✓	FACW
3. Ostrya virginiana	5		
4.			
5.			
6.			
7.			
	30 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Cinna latifolia	30	✓	FACW
2. Impatiens capensis	5		
3. Solidago gigantea	10		
4. Onoclea sensibilis	20	✓	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. –			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

Some mianthemum canadense on nearby or mound

SOIL

Sampling Point: Plot-71-102-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Sil	
Rock Refusal								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

USACE
Data Plot Examples

Segment 3

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: Concord, Somerset Co. Sampling Date: 5.22.17
Applicant/Owner: CMP State: ME Sampling Point: Plot-76-02-UP
Investigator(s): HSW JPB Section, Township, Range: Concord
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none
Slope (%): _____ Lat: N 810511.43 Long: E 3022075.93 Datum: CONUS
Soil Map Unit Name: _____ NWI classification: n/a
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

WOSS due to Stream

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches): _____
Water Table Present?	Yes _____	No _____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

no hydrology

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-76-OZ-UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Tsuga canadense	40		FACU
2. Acer pensylvanicum	10		FACU
3.			
4.			
5.			
6.			
7.			
	50 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. tsuga canadense	10		FACU
2. acer pensylvanicum	10		FACU
3. fagus grandifolia	5		FACU
4.			
5.			
6.			
7.			
	25 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Maianthemum Canadense	10		FACU
2. tsuga canadense	5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15 = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	7	x 4 =	28
UPL species	0	x 5 =	0
Column Totals:	7 (A)		28 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Pit-76-02-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	blk	100	—	—	—	—	organic	
2-3	7.5YR 4/4	100	—	—	—		SM	
3-7	5YR 3/3	100	—	—	—		LS	
7-16	7.5YR 4/4	100	—	—	—	—	LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: —

Depth (inches): —

Hydric Soil Present? Yes ___ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: Concord, Somerset Sampling Date: 5.22.17
Applicant/Owner: CMP State: ME Sampling Point: Plot-76-02-WET
Investigator(s): HSW JPB Section, Township, Range: Concord
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none
Slope (%): _____ Lat: N 810630.22 Long: E 3022118.46 Datum: CONUS
Soil Map Unit Name: _____ NWI classification: PSSIE
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____
Hydric Soil Present?	Yes X	No _____
Wetland Hydrology Present?	Yes X	No _____

Is the Sampled Area within a Wetland? Yes X No _____
If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

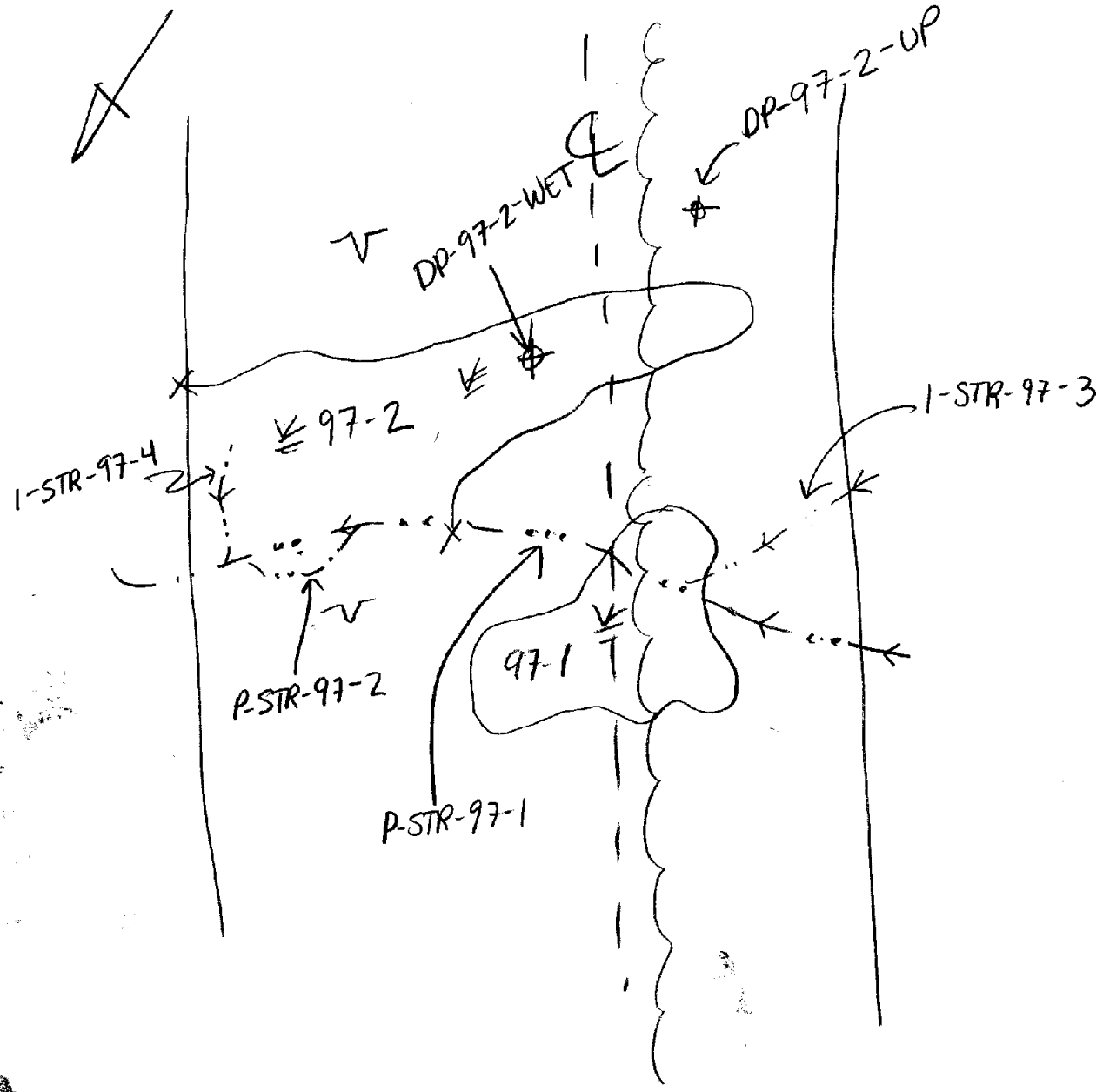
Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): _____
Water Table Present?	Yes X	No ___	Depth (inches): 4"
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): Surface

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:


DP-97-2-UP
DP-97-2-WET
97-2
1-STR-97-3
1-STR-97-4
97-1
P-STR-97-2
P-STR-97-1

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-76-02-WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	60		FACW
2.			
3.			
4.			
5.			
6.			
7.			
	60 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus pubescence	5		FACW
2. Osmundastrum cinnamomeum	2		FACW
3. Carex sp.	20		
4. Maianthemum Canadense	2		FACU
5. Thalictrum dioicum			FACU
6. abies balsamea	>1		FAC
7. Tiarella cordifolia	10		FACU
8.			
9.			
10.			
11.			
12.			
	40 = Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	6
FAC species	1	x 3 =	3
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	7 (A)		21 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot-76-02-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	95	10YR 4/4	5			org.	
4-16	10YR 3/3	85	10YR 4/4	15			Sil	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: Franklin Sampling Date: 5.17.17

Applicant/Owner: CMP State: ME Sampling Point: Plot 99-06-up

Investigator(s): HSW DHP Section, Township, Range: Starks

Landform (hillslope, terrace, etc.): pit and mound Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): Lat: 701351.60 Long: 3002361.85 Datum: NAD 83/CONUS

Soil Map Unit Name: NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No N/A	Depth (inches): ____
Water Table Present?	Yes ____	No N/A	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sampling Point: WET-99-06-UP

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	10%		FACU
2. abies balsamea	2%		FAC
3. populus tremuloides	20%		FACU
4. Acer spicatum	10%		FACU
5. Acer rubrum	15%		FAC
6. Tsuga canadense	10%		FACU
7.			
	67% = Total Cover		

Sapling/Shrub Stratum (Plot size: 15' R)			
1. Abies balsamea	10%		FAC
2. Acer spicatum	15%		FACU
3. Fagus grandifolia	1%		FACU
4.			
5.			
6.			
7.			
	26% = Total Cover		

Herb Stratum (Plot size: 5' R)			
1. Maianthemum canadense	3%		FACU
2. Erythronium rostratum.	<1%		—
3. Trientalis borealis	2%		FAC
4. Aralia nudicaulis	<1%		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	6% = Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	4	x 3 = 12
FACU species	8	x 4 = 32
UPL species	0	x 5 = 0
Column Totals:	12 (A)	44 (B)

Prevalence Index = B/A = 44/12 = 3.66

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot-99-06-up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	5YR 2.5/1	100	—	—	—	—	Organic	—
1-13	10YR 3/6	100	—	—	—	—	Sil	—
	refusal	@	13" - rock					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: rock

Depth (inches): 13"

Hydric Soil Present? Yes ___ No X

Remarks:

need to transfer notes to V plot

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: Franklin Sampling Date: 5.17.17

Applicant/Owner: CMP State: ME Sampling Point: Plot-99-06-WET

Investigator(s): HSW DHP Section, Township, Range: Starks

Landform (hillslope, terrace, etc.): flat basin Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): Lat: 701394.08' Long: 3002431.98' E Datum:

Soil Map Unit Name: NWI classification: PFO 1/4 E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation NO, Soil NO, or Hydrology NO naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___	**Is the Sampled Area within a Wetland?** Yes X No ___
Hydric Soil Present?	Yes X	No ___	If yes, optional Wetland Site ID: ___
Wetland Hydrology Present?	Yes X	No ___	

Remarks: (Explain alternative procedures here or in a separate report.)

morphological adaptations observed among over 50% tsuga + populus trem.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 4"
Water Table Present?	Yes X	No ___	Depth (inches): Surface
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks:

Pit + Mound micro-topo w/water in pits
free water in pit 1" below soil surface.

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-99-06-WET

Tree Stratum (Plot size: 30' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	20%		FAC*
2. Abies balsamea	2%		FAC
3. Tsuga canadensis	2%		FAC*
4. Acer rubrum	3%		FAC
5. Betula populifolia	<1%		FAC
6.			
7.			
	27% = Total Cover		

Sapling/Shrub Stratum (Plot size: 15' R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	5%		FAC
2. Viburnum dentatum	<1%		FAC
3. Spirea latifolia	<1%		FACW
4.			
5.			
6.			
7.			
	7% = Total Cover		

Herb Stratum (Plot size: 5' radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. Miamantheum canadense	15%		FACU
2. Cornus canadensis	8%		FAC
3. Dryopteris carthusiana	1%		FACW
4. abies balsamea	<1%		FAC
5. acer rubrum	1%		FAC
6. Pinus strobus	<1%		FACU
7. Betula alleghaniensis	<1%		FAC
8. Sphagnum			—
9.			
10.			
11.			
12.			
	27% = Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	2	x 2 =	4
FAC species	11	x 3 =	33
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	15 (A)		45 (B)

Prevalence Index = B/A = 45/15 = 3

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

*popu trem & tsu can have morphological adaptations status Δ'd to FAC.

SOIL

Sampling Point: Plot-99-06-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
1-0	blk.	100%	—	—	—	—	org.	
0-7	2.5Y 4/1	100%	—	—	—	—	SL	
7-11	2.5Y 4/1	85%	10YR 4/4	15%	C	M	LS	
11								Refusal @ 11"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

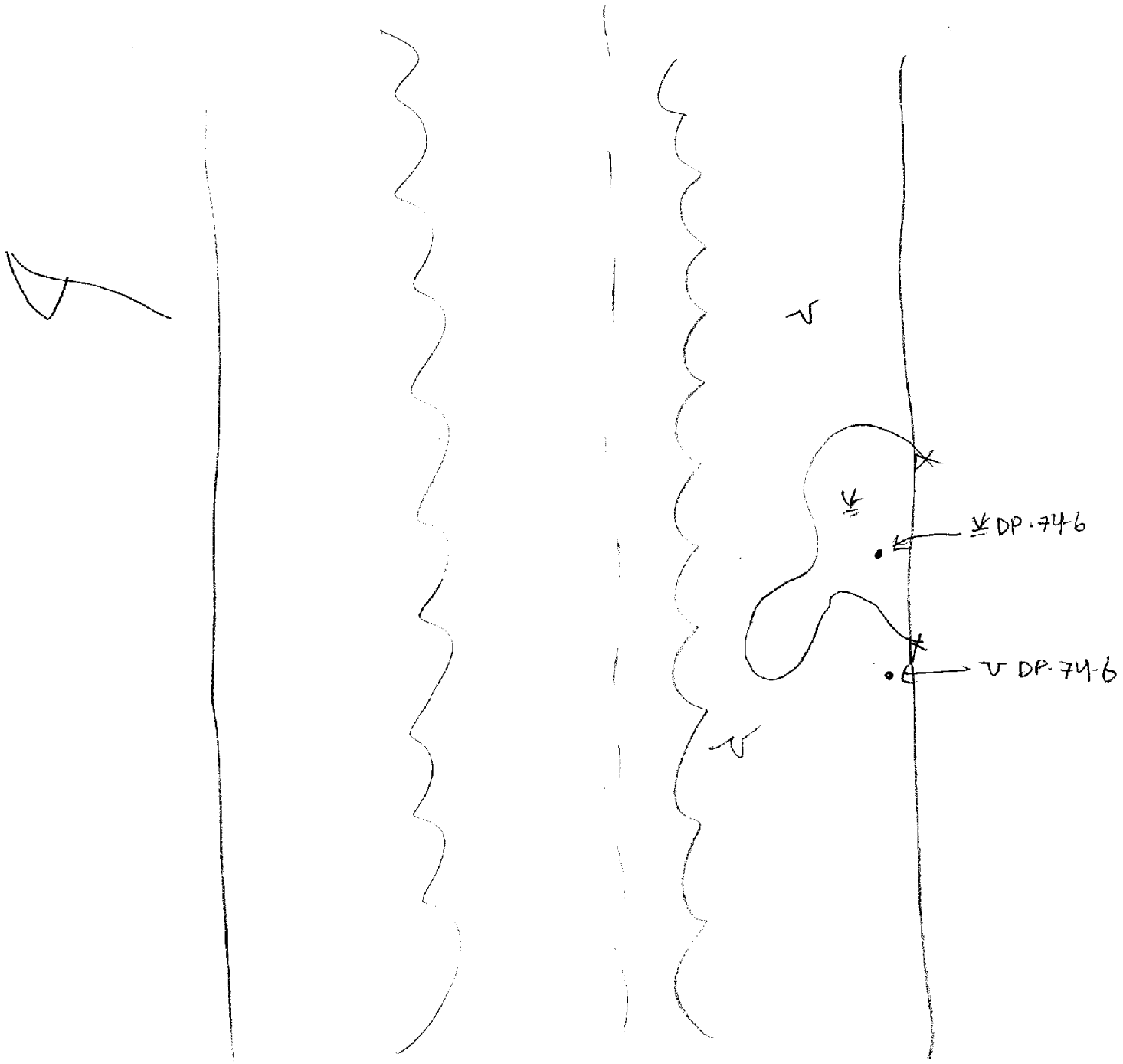
Restrictive Layer (if observed):

Type: rock @ 11"

Depth (inches): 11"

Hydric Soil Present? Yes X No ___

Remarks:


DP-74-6
DP-74-6

USACE
Data Plot Examples

Segment 4

Maine Power Reliability Project
WETLAND SUMMARY FORM 3798

Team ___

Observers: MP, AG, MC Date: 10-19-07
Town: Lewiston Series: WFR
Segment #: 17 CMP Section #: 64 CMP Pole #: 60 Wetland ID #: 1
Stream/Waterbody ID: CH1 Corps plot: ✓ Yes No

Dominant NWI Class: PSS1 Other NWI Classes: PFO1/4

Representative Wetland Vegetation (by Strata):

Shrub
Ilever
Vib den
Spi alba
Alu rug

osm cin
onoden
osm reg
thel pal

Acerub
Abibal
Pia stro

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ___ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ___ Silt Deposition ___ Water-Stained Leaves
___ Water Marks ___ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations:

Representative Wetland Soils:
✓ Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
0-8	A	10YR 6/6	—	Salo
8-16	Oa	10yr 2/1	—	Sap

Other Observations:
Meets NEIWPCC (2004) Criteria UNK problem soil Alluvial?

Stream # 1 Data:
Width (Bank-Bank): 3-4' Depth @ Center: 6-12" Peren. ✓ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ✓ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ✓ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):
Moose -
Beaver

Notes:

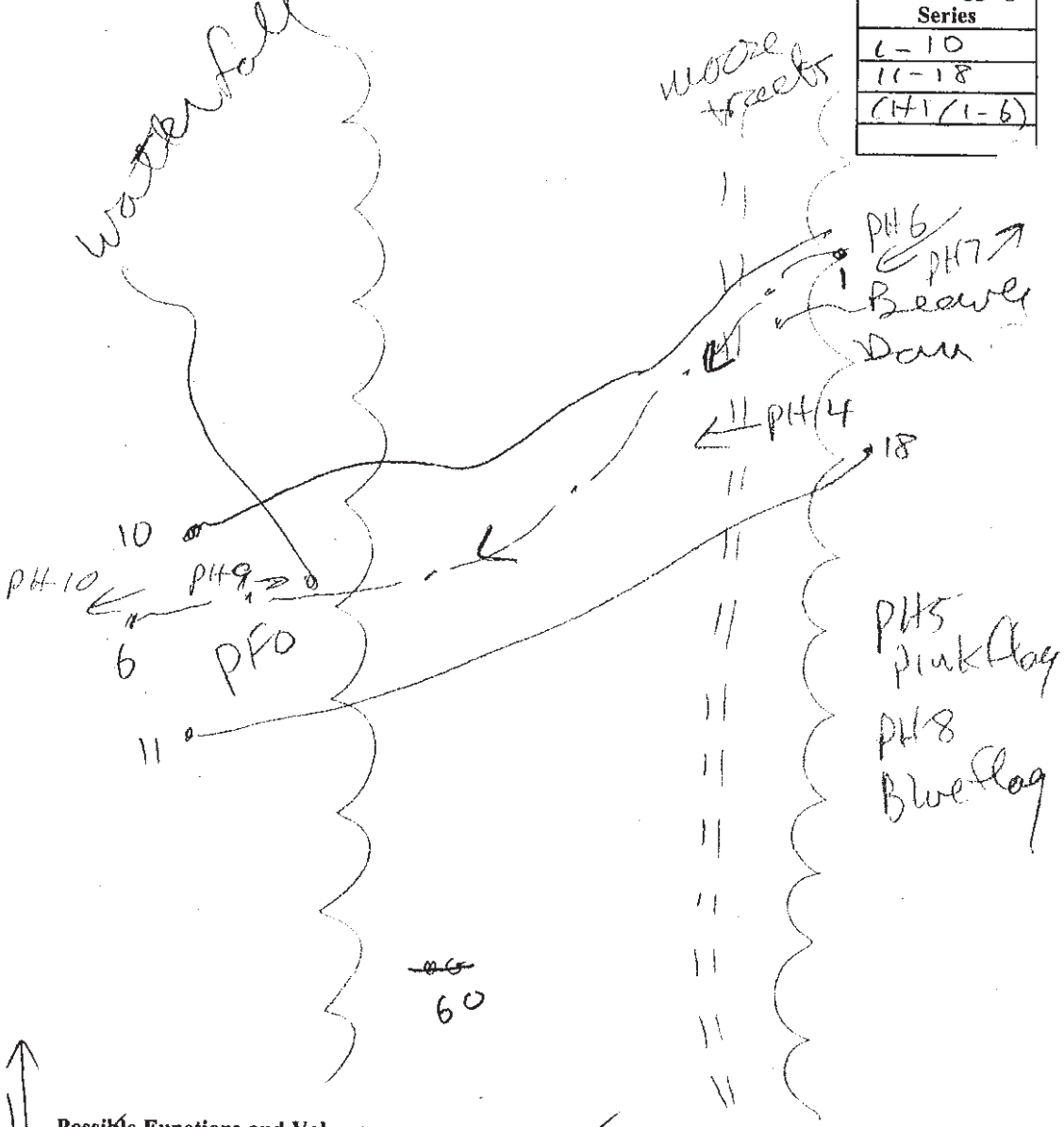
Streamside

☐ Cedar Swamp ☑ Wetland of Special Significance

Photo # 4/5 6/7/8 9/10 **SKETCH ON BACK**

WETLAND SKETCH

Line Flagging Series
1-10
11-18
(H1 (1-6)



N

Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ✓ Fish and Shellfish Habitat
- ✓ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** B17-64-60-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features -- roads, culverts, outcrops, structures, etc.
- ___ Photo locations.
- ___ Location of important wildlife sign.

PROJECT TITLE: MPRP TRANSECT: 3800 PLOT:

DELINEATOR(S): MP, AG, MC DATE: 10-19-07

VEGETATION Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Shrub					
Ilever	60	60/115	50	✓	FACW
Spi alb	40	40/115	32	✓	FAC+
Aln rug	5	5/115	4		
Vib dent	10	10/115	8		
Herb					
Osm cin	10	10/26	40	✓	FACW
Onto sens	3	3/26	12		
Thel pal	3	3/26	12		
Osm reg	10	10/26	40	✓	FACW

HYDROPHYTES

OBL	FACW	FAC	OTHER
	4	1	

Hydrophytes Subtotal (A): 5

NON-HYDROPHYTES

FAC-	FACU	UPL

Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 5/5 - 100%

HYDROLOGY

☐ RECORDED DATA
- Stream, lake, or tidal gage Identification:
- Aerial photography Identification:
- Other Identification:

☑ NO RECORDED DATA

☑ OBSERVATIONS:
- Depth to Free Water: ✓ @ surface
- Depth to Saturation (including capillary fringe):
- Altered Hydrology (explain):

☐ Inundated ☑ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☑ Drainage Patterns within Wetland

☐ OTHER (explain):

U soil soil

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A_1	10yR 6/6	—	yellow-brown coarse sand layered with 10yR 4/2 10yR 4/6
6-12+	Oa	10yR 2/1	—	above Sapric

HYDRIC SOIL INDICATOR(S): Alluvial layer above Oa

REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO
Hydrophytic vegetation criterion met?	☑	☐
Hydric soils criterion met?	☑	☐
Wetland hydrology criterion met?	☑	☐
IS THIS DATAPOINT IN A WETLAND?	☑	☐

REMARKS:

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: MPRP TRANSECT: PLOT:

B17-64-60-1-WGT

DTI 04-00-1-UPL

PROJECT TITLE: MPRP ~~TRANSECT:~~ 3802 ~~PLOT:~~

DELINEATOR(S): MP, AG, MC DATE: 10-19-07

VEGETATION Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Shrub					
Juv Com	65	65/75	87	✓	RACU
Spiedba	10	10/75	13		
Herb					
Ptr aqu	20	20/55	37	✓	RACU
Kal ang	5	5/55	10		
Cor can	15	15/55	29	✓	RAC-
Dog Bane	5	5/55	10		
Mit rep	10	10/55	19	✓	RACU

HYDROPHYTES

OBL FACW FAC *OTHER

Hydrophytes Subtotal (A): 0

NON-HYDROPHYTES

1 FAC- 3 FACU UPL

Non-hydrophytes Subtotal (B): 4

PERCENT HYDROPHYTES (100A/A+B): 0/4 = 0 %

HYDROLOGY Hillside above ⇒

☐ RECORDED DATA
Stream, lake, or tidal gage Identification:
Aerial photography Identification:
Other Identification:

☑ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water:
Depth to Saturation (including capillary fringe):
Altered Hydrology (explain):

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain): N/A

Soil Soil

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	1A	10YR 4/2	—	Sa Lo
6-15+	1B2	10YR 6/6	—	Sa Lo

HYDRIC SOIL INDICATOR(S): N/A

REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☐	☑	
Hydric soils criterion met?	☐	☑	
Wetland hydrology criterion met?	☐	☑	
IS THIS DATAPOINT IN A WETLAND?	☐	☑	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: MPRP TRANSECT: PLOT:

B17-64-60-1-DPT

Maine Power Reliability Project
WETLAND SUMMARY FORM

3804

Observers: Galasso / Pattaglia / Boothby Date: 10-25-07 68-95
Town: Durham Series: 1-15, 16-33, 34-37, 38-67
Segment #: 17 CMP Section #: 62 CMP Pole #: 60 Wetland #: D17-62-60-1
Stream/Waterbody ID: ~~N/A~~ D17-62-60-1-1 Corps plot: ✓ Yes ___ No

Dominant NWI Class: PSS | 70% Other NWI Classes: PEM | 20%

Representative Wetland Vegetation (by Strata):

PFO 10%

Herbs		Shrubs	Trees
Sci cyp	Car cri	Ile ver	Ace rub
Jun eff	car lur	Spi tom	Abi bal
Shagnum spp	ver has	Spi lat	
Typ lat		Aln inc	
Ono sen			

Representative Wetland Hydrology

___ Permanently Flooded (approximate depth -) ___ Seasonally Flooded (approximate depth -) ✓ Saturated

Hydrologic Indicators: ___ Silt Deposition ✓ Water-Stained Leaves
___ Water Marks ___ Drift Lines ___ Surface Scouring
✓ Drainage Patterns ___ Buttressed Trees ___ Elevated Roots

Other Observations: Floodplane wetland near pole 60

Representative Wetland Soils:
X Mineral
___ Organic

Depth	Horizon	Color	Redox Features	Texture
1-0	Oi	--	--	Mucky
0-4	A	10YR 4/1	7.5YR 3/4	SiC
4-20"	B	GZ 3/10Y		SiC

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): 2 Depth @ Center: 6 Peren. ✓ Intermittent ___
Bank Configuration: ___ Undercut ✓ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ✓ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Stream # 2 Data
Width (Bank-Bank): ___ Depth @ Center: ___ Peren. ___ Intermittent ___
Bank Configuration: ___ Undercut ___ Vertical ___ Gradual
Channel Substrate: ___ Peat-Muck ___ Silt-Mud ___ Sand ___ Gravel/Cobble ___ Boulder ___ Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

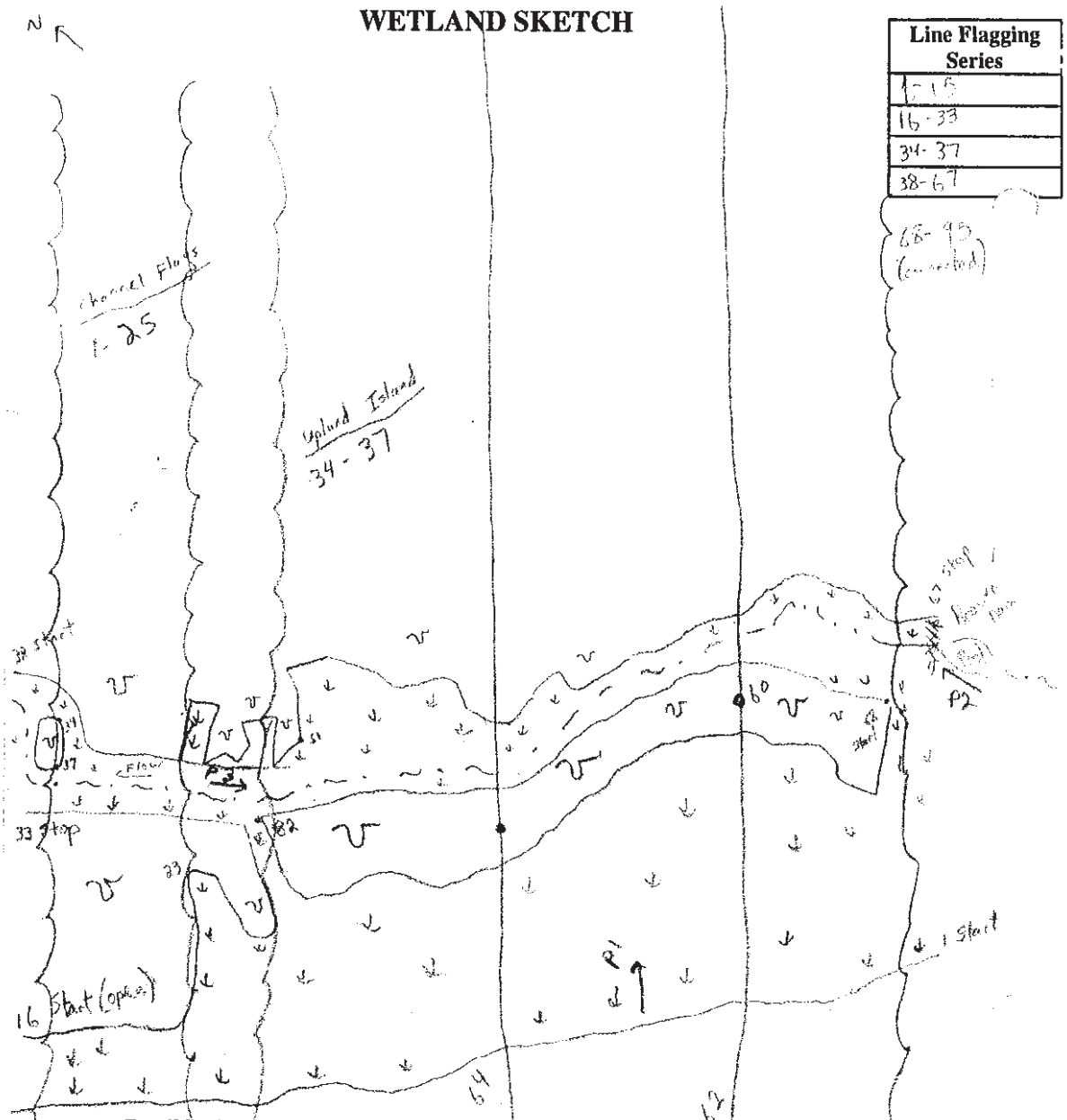
Deer trails
Beaver activity / Beaver Dam on eastern edge of ROW

Notes: ATV trail on M+N ROW crosses channel
Beaver Dam at edge of ROW
P 3 of waterbody upstream SE
P 4 of WL Flag

☐ Cedar Swamp ☒ Wetland of Special Significance

P 1 of WL NE
Photo # ___ P 2 of Beaver Dam/stream NW **SKETCH ON BACK**

WETLAND SKETCH



Possible Functions and Values:

- ___ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ✓ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ✓ Floodflow Alteration
- ✓ Sediment/Toxicant Retention
- ✓ Production Export
- ✓ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** D17-62-60-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features -- roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ✓ Location of important wildlife sign.

PROJECT TITLE: MPRP Project TRANSECT: 5806 D17-62-60-1 PLOT: wet Plot

DELINEATOR(S): Galasso/Battaglia/Boothby DATE: 10-25-07

VEGETATION Stratum and Species	Dominance Ratio	Percent Dominance	DOM	NWI Status
Seedlings/Herbs				
Phalaris	60/110	55	X	FACW+
Car lur	20/110	18		
Pol sag	15/110	14		
Car cri	10/110	9		
Spi lat	5/110	5		
Shrubs				
Salix spp	40/70	57	X	FAC or wetter
Abi bal	30/70	43	X	FAC
Saps				
Abi bal	40/70	57	X	FAC
Ace rub	30/70	43	X	FAC
Trees				
Abi bal	24"/44	55	X	FAC
Ace rub	20"/44	45	X	FAC

HYDROPHYTES

OBL	FACW	FAC	*OTHER
	1	6	

Hydrophytes Subtotal (A): 7

NON-HYDROPHYTES

FAC-	FACU	UPL

Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 100%

HYDROLOGY

☐ RECORDED DATA
Stream, lake, or tidal gage Identification: /
Aerial photography Identification:
Other Identification:

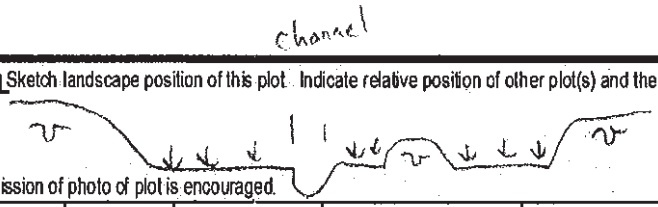
☐ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water: water in pit at 11"
Depth to Saturation (including capillary fringe): At surface
Altered Hydrology (explain): N/A

☑ Inundated ☑ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☑ Drainage Patterns within Wetland

☐ OTHER (explain): wetland associated w/ waterbody and located w/ in floodplane

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.



Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
1-0	Oi	--	--	Mucky
0-4	A	10YR 4/1	7.5YR 3/4 m 4D	SiC
4-20"+	B	G1 3/10Y	10YR 4/4 c 3P	SiC

HYDRIC SOIL INDICATOR(S): VI

REFERENCE(S): NEIWPCC 2004

OPTIONAL SOIL DATA

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

REFERENCE(S):

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☑	☐	
Hydric soils criterion met?	☑	☐	
Wetland hydrology criterion met?	☑	☐	
IS THIS DATAPOINT IN A WETLAND?	☑	☐	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: MPRP Project

TRANSECT: D17-62-60-1

PLOT: wet plot

PROJECT TITLE: MPRP Project TRANSECT: 3808 017-62-60-1 PLOT: Wp Plot

DELINEATOR(S): Galasso/Battaglia/Boothby DATE: 10-25-07

VEGETATION Stratum and Species	Dominance Ratio	Percent Dominance	DOM	NWI Status
Herbs/Seedlings				
Sal nig	40/90	44	X	FAC
Que rub	30/90	33	X	FACU
Chimmacu	10/90	11		
Tsu can	10/90	11		
Shrubs				
Tsu can	40/120	33	X	FACU
Que rub	30/120	25	X	FACU
Ace rub	30/120	25	X	FAC
Frag gra	20/120	17		
Saplings				
Tsu can	60/100	60	X	FACU
Pin str	20/100	20	X	FACU
Abi bal	20/100	20	X	FAC
Trees				
Tsu can	42/70	60	X	FACU
Abi bal	28/70	40	X	FAC

HYDROPHYTES

OBL	FACW	FAC	*OTHER
		4	

Hydrophytes Subtotal (A): 4

NON-HYDROPHYTES

FAC-	FACU	UPL
	6	

Non-hydrophytes Subtotal (B): 6

PERCENT HYDROPHYTES (100A/A+B): 40%

HYDROLOGY

☐ RECORDED DATA
Stream, lake, or tidal gage Identification: ____
Aerial photography Identification: ____
Other Identification: ____

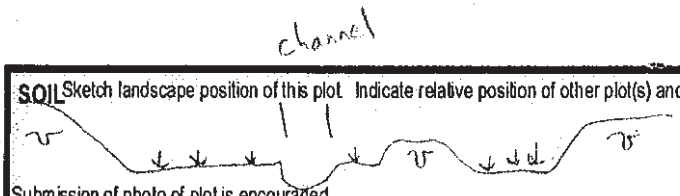
☐ NO RECORDED DATA

☐ OBSERVATIONS:
Depth to Free Water: ____
Depth to Saturation (including capillary fringe): ____
Altered Hydrology (explain): ____

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain):

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.



Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
1-0	Oi	--	--	Duff
0-2	A	10YR 3/4	--	SiL
2-18"	B	10YR 4/6	--	SiL

HYDRIC SOIL INDICATOR(S): REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☐	☑	
Hydric soils criterion met?	☐	☑	
Wetland hydrology criterion met?	☐	☑	
IS THIS DATAPOINT IN A WETLAND?	☐	☑	

CENAE-COR-PT Version 7/100 Page 2

PROJECT TITLE: MPRP Project TRANSECT: 017-62-60-1 PLOT: Up Plot

USACE
Data Plot Examples

Segment 5

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMR City/County: _____ Sampling Date: 4/26/17

Applicant/Owner: CMP State: ME Sampling Point: Plot-185-02-UP

Investigator(s): SNH DHP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none

Slope (%): 4% Lat: 429062.61 ftN Long: 3076124.36 ftE Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____	No X	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ____	No X	

Remarks: (Explain alternative procedures here or in a separate report.)

Data gathered during heavy rain event

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): _____
Water Table Present?	Yes ____	No ____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): surface

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

During normal conditions saturation would not be present

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-185-02-UP

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus strobus	70	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15'R)			
1. Abies balsamea	45	✓	FAC
2. Quercus grandifolia	20	✓	FACU
3. Corylus cornuta	7		
4.			
5.			
6.			
7.			
	72 = Total Cover		

Herb Stratum (Plot size: 5'R)			
1. –			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		

Woody Vine Stratum (Plot size: 30'R)			
1. –			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot-185-02-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/3	100					L	
4-8	10YR 4/4	80	2.5Y 5/2	20	D	m	L	
8-17+	5Y 5/3	95	10YR 4/4	5	C	m	L	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: _____ Sampling Date: 4/26/17

Applicant/Owner: CMP State: ME Sampling Point: Plot-184-05-WET

Investigator(s): SNH DHP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none

Slope (%): 2 Lat: 42888 9.53 ft N Long: 3075982.71 ft E Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: PFO1/4E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

Data for this plot taken during heavy rain event

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 1
Water Table Present?	Yes _____	No _____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Root buttressing observed on all trees in plot

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-184-05-WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	50	✓	Fac
2. Pinus strobus	10		
3. Abies balsamea	15	✓	Fac
4. Fraxinus pennsylvanica	5		
5.			
6.			
7.			
	65 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. –			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5'R)			
1. Dryopteris carthusiana	30	✓	Fac
2. Phalaris arundinacae	5		
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. –			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot-184-05-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/1	95	10YR 4/6	5	C	M	L	
4-9	10YR 4/1	75	10YR 4/6	15	C	M	L	
			Gley1 5/N	10		M		
9-20+	5Y 5/4	40	10YR 4/4	30	C	M	L	
			Gley2 5/5B	30		M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ✓ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: _____ Sampling Date: 4/26/17

Applicant/Owner: CMP State: ME Sampling Point: Plot-185-02-UP

Investigator(s): SWH DHP Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hill slope/shoulder Local relief (concave, convex, none): none

Slope (%): 4% Lat: 4241793.2 ft N Long: 3072245.57 ft E Datum: NAD 83

Soil Map Unit Name: _____ NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

Data for form recorded during rain event.

Plot within cleared ROW

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches): _____
Water Table Present?	Yes _____	No _____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No K

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Saturation present due to rain during survey. Saturation would not be present in normal circumstances

Sampling Point: Plot-185-02-WP

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. —			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pteridium aq.	30	✓	FACU
2. Ilex ver.	7		
3. Pinus strobus	2		
4.			
5.			
6.			
7.			
	39 = Total Cover		

Herb Stratum (Plot size: 5'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Solidago rugosa	45	✓	FAC
2. Aster sp.	40	✓	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		

Woody Vine Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. —			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot-185-02-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/3	100					SiL	
4-18+	5Y 5/3	95	2.5Y 4/3	5	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: QMI City/County: Sampling Date: 4/26/17

Applicant/Owner: CMP State: ME Sampling Point: Plot-185-02-WET

Investigator(s): SNH DHP Section, Township, Range:

Landform (hillslope, terrace, etc.): Valley Local relief (concave, convex, none): concave

Slope (%): 2% Lat: 424189.03 FN Long: 3072201.41 FE Datum: NAD 83

Soil Map Unit Name: NWI classification: PEM1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ✓

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	If yes, optional Wetland Site ID:
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks: (Explain alternative procedures here or in a separate report.)

Data for fauna collected in heavy rain.
Plot situated in cleared and maintained ROW

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ____	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Data collected during rain event.

VEGETATION – Use scientific names of plants.

Sampling Point: Plot-185-02-WET

Tree Stratum (Plot size: 30'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. —			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	7%	✓	FACW
2. Ilex verticillata	4%	✓	FACW
3.			
4.			
5.			
6.			
7.			
	11% = Total Cover		

Herb Stratum (Plot size: 5'R)	Absolute % Cover	Dominant Species?	Indicator Status
1. Agrostis gigantea	50%	✓	FACW
2. Typha latifolia	70%	✓	OBL
3. Carex sp.	20%		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	140% = Total Cover		

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: Plot-185-02-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 4/2	95	10YR 4/4	5	C	M	SiL	
6-30+	5Y 4/1	85	10YR 4/6	15	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

USACE
Data Plot Examples

Merrill Road Converter Station

Maine Power Reliability Project

Team VB

WETLAND SUMMARY FORM

Observers: KF, MC Date: 9/25/07
Town: Lewiston Series :
Segment # : 14 CMP Section #: 200 CMP Pole #: 299 Wetland #: 1
Stream/Waterbody ID: Corps plot : ✓ Yes No

Dominant NWI Class: PEM 1 Other NWI Classes: PSS1

Representative Wetland Vegetation (by Strata):

Calcan Sci cyp
Thy lat owo fen
Ast umb
Sol gig

Aln rug
vib dent
spi lat

Representative Wetland Hydrology

____ Permanently Flooded (approximate depth -)
✓ Seasonally Flooded (approximate depth - 4")
____ Saturated

Hydrologic Indicators: ____ Silt Deposition ____ Water-Stained Leaves
✓ Water Marks ____ Drift Lines ✓ Surface Scouring
✓ Drainage Patterns ____ Buttressed Trees ____ Elevated Roots
Other Observations:

Representative Wetland Soils:
✓ Mineral
____ Organic

Depth	Horizon	Color	Redox Features	Texture
2-0	Oi	10YR2/2		Fibric
0-6	Bi	5Y 4/1		SiLo
6-10	B2	5Y 5/1	10YR4/6	
			5Y 6/1	

Other Observations:
Meets NEIWPCC (2004) Criteria VI

Stream # 1 Data:
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____
Bank Configuration: ____Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___Bedrock

Stream # 2 Data
Width (Bank-Bank): _____ Depth @ Center: _____ Peren. _____ Intermittent _____
Bank Configuration: ____Undercut ___ Vertical ___ Gradual
Channel Substrate: ___Peat-Muck ___Silt-Mud ___Sand ___Gravel/Cobble ___Boulder ___Bedrock

Wildlife Observations/Sign (e.g., tracks/trails, droppings, dams/lodges, browse, dens, egg masses, potential VP):

Notes:

☐Cedar Swamp ☐Wetland of Special Significance

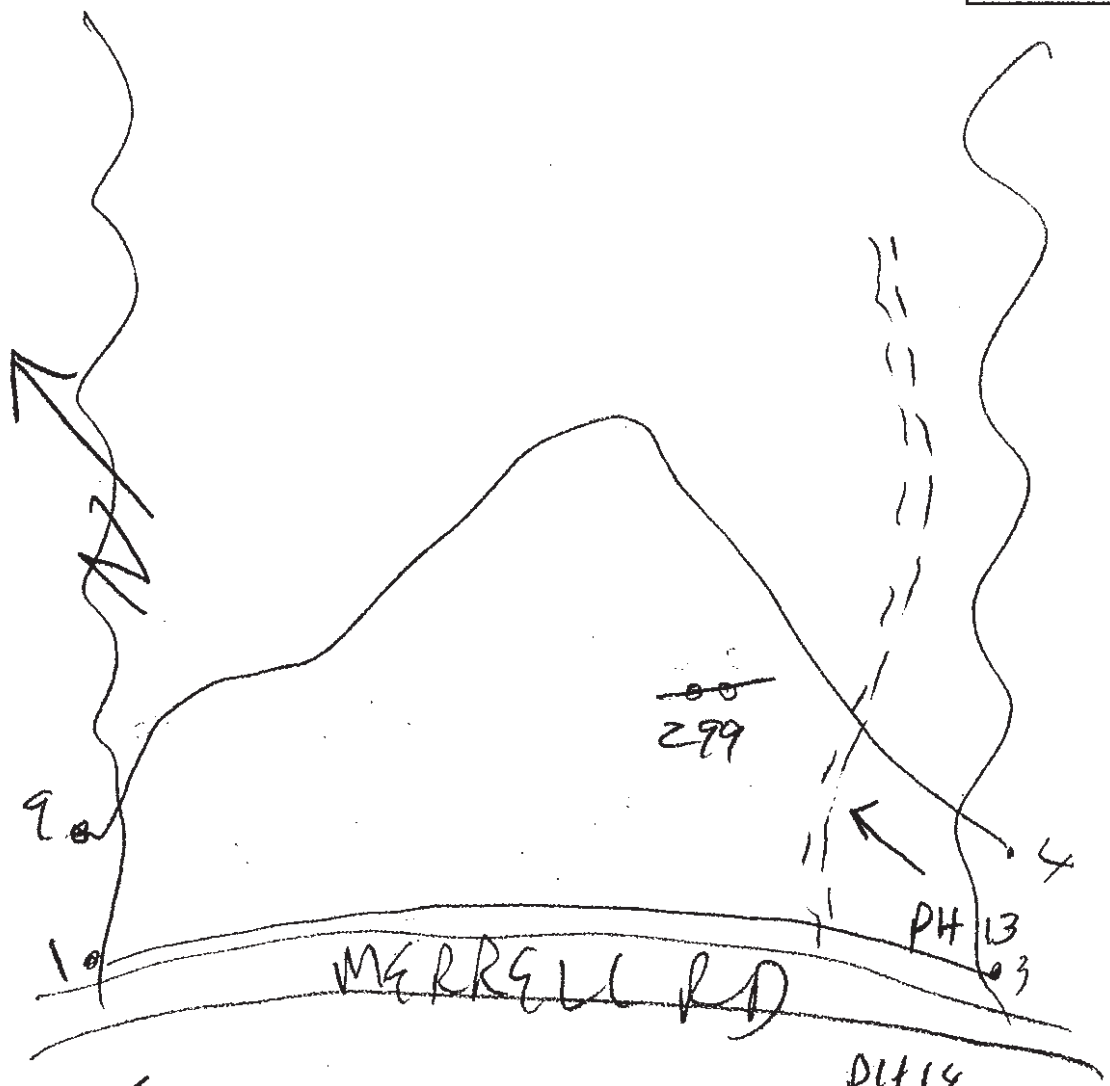
Photo # 13/14

SKETCH ON BACK

WETLAND SKETCH

3825

Line Flagging Series
1-3
4-9



Possible Functions and Values:

- ✓ Groundwater Recharge/Discharge
- ___ Fish and Shellfish Habitat
- ___ Nutrient Removal
- ___ Sediment/Shoreline Stabilization
- ___ Recreation
- ___ Uniqueness/Heritage
- ___ Endangered Species Habitat
- ___ Floodflow Alteration
- ___ Sediment/Toxicant Retention
- ___ Production Export
- ___ Wildlife Habitat
- ___ Educational/Scientific Value
- ___ Visual Quality/Aesthetics
- ___ Other

Checklist:

- ✓ **Wetland ID#** BLY-2D-299-1
- ✓ North arrow.
- ✓ Detailed sketch of wetland boundary and flagging sequence.
- ✓ Natural and man-made features – roads, culverts, outcrops, structures, etc.
- ✓ Photo locations.
- ___ Location of important wildlife sign.

B14-200-299-1-WGT

PROJECT TITLE: MPRP ~~TRANSECT:~~ ~~PLOT:~~

DELINEATOR(S): KF MC DATE: 9/25/07

VEGETATION

Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
PSS					
Alnrug	35	35/35	100	✓	FACW
PEM					
Calcan	30	30/100	30	✓	FACW
Anogeus	5	5/100			
Sci Cyp	15	15/100			
Thylat	50	50/100	50	✓	FACW

HYDROPHYTES: OBL ___ FACW 3 FAC ___ *OTHER ___

NON-HYDROPHYTES: FAC- ___ FACU ___ UPL ___

Hydrophytes Subtotal (A): 3 Non-hydrophytes Subtotal (B): 0

PERCENT HYDROPHYTES (100A/A+B): 3/3 = 100%

HYDROLOGY

☐ RECORDED DATA
Stream, lake, or tidal gage Identification: ___
Aerial photography Identification: ___
Other Identification: ___

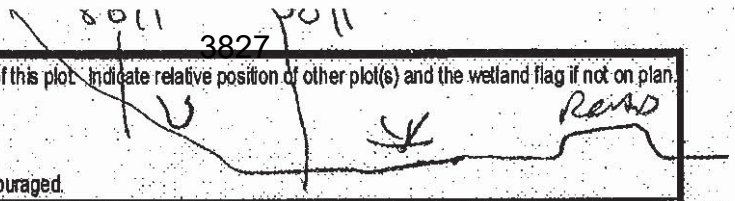
☑ NO RECORDED DATA

☑ OBSERVATIONS:
Depth to Free Water: ___
Depth to Saturation (including capillary fringe): ± 10"
Altered Hydrology (explain): ___

☐ Inundated ☑ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☑ Drainage Patterns within Wetland

☐ OTHER (explain):

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.



Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
2-0"	O_1	10YR 2/2	–	Fibric
0-6	B_1	5Y 4/1	–	Si Lo
6-10+	B_2 or B_g	5Y 5/1	10YR 4/6 5Y 6/1	Si Lo

HYDRIC SOIL INDICATOR(S): VI

REFERENCE(S): NE Hydric Soils

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☑	☐	
Hydric soils criterion met?	☑	☐	
Wetland hydrology criterion met?	☑	☐	
IS THIS DATAPOINT IN A WETLAND?	☑	☐	

CENAE-COR-PT Version 7/V00 Page 2

PROJECT TITLE: MPRP TRANSECT: PLOT:

B14-200-229-1-WGS

B14-200-299-1-upl

PROJECT TITLE: MPPR TRANSECT: PLOT:

DELINEATOR(S): KF, MC DATE: 9-25-07

VEGETATION

Stratum and Species		Dominance Ratio	Percent Dominance	DOM	NWI Status
Com per	20	20/75	27	✓	upl
Cal can	10	10/75	13		
Jun com	40	40/75	53	✓	FAC U
Spi lat	5	5/75	7		

HYDROPHYTES

___ OBL ___ FACW ___ FAC ___ *OTHER

Hydrophytes Subtotal (A): ___

NON-HYDROPHYTES

___ FAC- 1 FACU 1 UPL

Non-hydrophytes Subtotal (B): ___

PERCENT HYDROPHYTES (100A/A+B): _____

HYDROLOGY

☐ RECORDED DATA

Stream, lake, or tidal gage Identification: Hillside

Aerial photography Identification: _____

Other Identification: _____

☑ NO RECORDED DATA

☐ OBSERVATIONS:

Depth to Free Water: N/A

Depth to Saturation (including capillary fringe): _____

Altered Hydrology (explain): _____

☐ Inundated ☐ Saturated in upper 12" ☐ Water Marks ☐ Drift Lines ☐ Sediment Deposits ☐ Drainage Patterns within Wetland

☐ OTHER (explain):

3829 3011 3011

SOIL Sketch landscape position of this plot. Indicate relative position of other plot(s) and the wetland flag if not on plan.

Submission of photo of plot is encouraged.

DEPTH	HORIZON	MATRIX COLOR	REDOXIMORPHIC FEATURES (color, abundance, size, contrast)	COMMENTS (USDA texture, nodules, concretions, masses, pore linings, restrictive layers, root distribution, soil water, etc.)
0-6	A1	10YR 3/2		Sa Lo
6-8	B1	5YR 4/6		Sa Lo
Refusal				

HYDRIC SOIL INDICATOR(S): N/A

REFERENCE(S):

OPTIONAL SOIL DATA

REFERENCE(S):

Taxonomic subgroup:
Soil drainage class:
Depth to active water table:
NTCHS hydric soil criterion:

CONCLUSIONS

	YES	NO	REMARKS:
Hydrophytic vegetation criterion met?	☐	☑	
Hydric soils criterion met?	☐	☑	
Wetland hydrology criterion met?	☐	☑	
IS THIS DATAPOINT IN A WETLAND?	☐	☑	

CENAE-COR-PT Version 7/1/00 Page 2

PROJECT TITLE: MPRP TRANSECT: PLOT:

B14-200-299-1-UPL

10.0 PUBLIC NOTICE

For the public notice, refer to **Section 25** of the Site Law Application.

11.0 MAINE HISTORIC PRESERVATION COMMISSION AND OUTREACH TO INDIAN TRIBES

For information regarding historic, cultural, or archeological values, refer to **Section 8** of the Site Law Application.

12.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT

12.1 Introduction

This functions and values assessment ("FVA") is designed to evaluate all wetland areas under state or federal jurisdiction that may be impacted by the NECEC Project and demonstrate that wetland and surface water alterations or impacts that will result from construction and maintenance of the proposed NECEC facilities will not have an unreasonable adverse effect on existing uses, wildlife habitats, natural water flow, water quality, flooding, or outstanding river segments.

The area of wetland impacts associated with the NECEC Project will be minimized to the extent feasible during planning and construction. All stream and wetland crossings will be executed in accordance with *CMP's Environmental Guidelines for Construction and Maintenance Activities on Transmission Line and Substation Projects* (see Section 14 of the Site Law Application for a detailed description of erosion and sedimentation control best management practices that will be employed during construction of the NECEC Project).

Three general categories of wetland alteration will occur as a result of construction and maintenance of the NECEC Project; forested wetland conversion, permanent wetland fill, and temporary wetland fill. These impacts are based on the construction type of the project component. Habitat conversion (i.e., forested wetland conversion) will occur where forested wetlands are permanently converted to open, scrub-shrub, or emergent habitats to accommodate new transmission corridor or to widen the cleared expanse of existing transmission corridors.

Permanent wetland fill will occur where structure installation or substation development requires permanent fill in wetland areas.

Temporary wetland fill will occur during the use of temporary construction access roads and structure preparation areas, typically when equipment mats are placed in wetlands.

The ways in which the proposed NECEC Project may affect wetlands, via these activities, are further described below.

12.1.1 Habitat Conversion

Portions of the transmission components of the NECEC Project will require habitat cover type conversion in some wetland areas through the establishment of a new transmission corridor and from the widening of the cleared maintained portion of the existing transmission line corridors needed to accommodate the new

NECEC Project facilities. Forested wetlands that are within the area of newly cleared corridor will be permanently converted to emergent and shrub or scrub-shrub wetlands. Forested wetlands within the limits of clearing for the project will require initial trimming or removal of tree species and specimens that are capable of interfering with overhead transmission lines (so-called “capable species”). Further, transmission line operations and maintenance requires periodic control of capable species; this practice will result in the permanent maintenance of early successional plant communities and habitat.

This assessment provides a general comparison of the functions and values provided by existing forested wetlands versus scrub-shrub and emergent wetlands that will be maintained after construction of NECEC facilities.

12.1.2 Permanent Wetland Fill

Certain activities necessary to the development of the transmission and substation components of the NECEC will require fill. In some instances, areas that must be filled coincide with wetlands. In such instances, wetlands (or portions of wetlands) will be permanently filled and thereby, permanently transformed to uplands. Siting of the transmission line structures is designed to avoid permanent wetland fill to the maximum extent practicable. NECEC activities that will require permanent fill in wetland areas include transmission structure installation, including backfill, and, in some instances, concrete foundations and guy wire anchors, and, the development of new substations.

12.1.2.1 Structure Installation

Structure installation will require areas of permanent fill associated with the foundation of each structure. In instances where structures occur in wetlands, this fill will constitute a limited area of permanent wetland habitat loss. Permanent fill will consist of the structure itself and backfill materials, which may include native spoil, stone, concrete, or a combination thereof. Direct embed structures will typically have a cone of crushed stone around their base. Ground that is disturbed during direct-embed structure installation will be restored by replacing the topsoil; mulch will then be placed over the exposed soil and herbaceous vegetation will be allowed to establish naturally. For permitting assessment purposes, it is assumed that functions in wetlands associated with structure installations are lost within the entire area of disturbed soil, even though emergent wetland conditions are reestablished.

12.1.2.2 Substation Development

NECEC substation development will require fill. Permanent wetland fill will be required in locations where the proposed footprint of the substation development includes wetlands. The proposed NECEC

substations that will require fill in wetland areas, and the extent of wetland fill associated with each development is presented in **Table 12-1** below and discussed in further detail in Section 12.3.2.

Table 12-1: Wetland Impact Summary for Substations

Station	Wetland Impact Areas (Fill) (ac. & sq. ft.)
Fickett Road Substation	1.33 acres / 57,935 sq. ft.
Merrill Road Converter Station	3.16 acres / 137,650 sq. ft.
Total	**4.49 acres / 195,584 sq. ft.**

12.1.3 Temporary Wetland Fill

The establishment of temporary access ways and transmission structure preparation pads will require the placement of temporary fill in wetlands in order to accommodate construction equipment access for tree cutting and structure installation activities. This temporary fill will typically consist of equipment mats placed on the ground surface. On occasion, when very soft mineral or organic soils are encountered, it may be necessary to construct these access ways utilizing geo-textile fabric overlain with equipment mats or clean gravel. The purposes of using mats include (1) providing a flat safe surface upon which construction equipment can traverse and work from, (2) protecting vegetation and root zones, (3) minimizing the extent of disturbed soils, and (4) reducing excessive soil compaction and protecting soil horizons. For permitting assessment purposes, it is assumed that functions in wetlands associated with temporary fill are only temporarily unavailable and are not permanently lost (i.e., these areas will be fully restored following the completion of construction). Areas of temporary fill for access road placement will be comprised of relatively narrow (around 20 feet wide) linear areas . Areas of temporary fill for structure preparation pads will range in size from approximately 2,000 to 8,000 square feet, depending on structure type. Impacts from temporary fill associated with access road and structure preparation pad installation are relatively small and do not significantly, or permanently, impact wetland functions and values. These temporary fill areas will be found throughout the NECEC project area.

12.2 Methodology

Wetland functions and values were assessed in accordance with the Wetlands Functions and Values: Descriptive Approach as described in the U.S. Army Corps of Engineers (USACE) Highway Methodology Workbook. This is a qualitative descriptive approach currently used by the USACE New England Division for purposes of the Section 404 permit program. As part of this method, the evaluator examines a number of “Considerations/Qualifiers” that can be used as indicators or descriptors of particular functions and values. The Considerations/Qualifiers are assigned to wetlands based on the

judgment of the evaluator, using site observations and field data sheets. The USACE Highway Methodology Workbook ("Workbook") defines functions and values as follows:

Functions: *Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society. Functions result from both living and non-living components of a specific wetland. These include all processes necessary for the self-maintenance of the wetland ecosystem such as primary production and nutrient cycling, among others. Therefore, functions relate to the ecological significance of wetland properties without regard to subjective human values.*

Values: *Values are benefits to society that derive from one or more functions and the physical characteristics associated with a wetland. The value of a particular wetland function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions.*

Eight functions and five values, defined by the Workbook were considered during the FVA for the NECEC Project. They are as follows:

A. *Functions:*

1. *Groundwater Recharge/Discharge*

   This function describes a wetland's ability to act as a recharge site, such as its potential to provide water to an aquifer or its ability to act as an input site for groundwater to discharge to the surface (*i.e.*, springs and seeps).

2. *Floodflow Alteration*

   This function considers a wetland's ability to store and slowly release floodwaters over an extended period of time following storm events.

3. *Fish and Shellfish Habitat*

   This function considers the potential for a wetland and intermittent or perennial waterbodies associated with a wetland to provide habitat for fish and shellfish.

4. *Sediment/Toxicant Retention/Pathogen Retention*

   This function describes a wetland's effectiveness at trapping and retaining potentially harmful sediment, toxicants, and pathogens.

5. *Nutrient Removal/Retention/Transformation*

   This function considers a wetland's ability to remove nutrients such as phosphorus and nitrogen from runoff and prevent the nutrients from reaching surface and groundwater by retaining and transforming them.

6. *Production Export*

This function measures a wetland's effectiveness at producing foods for living creatures or other usable products such as timber for humans.

7. *Sediment/Shoreline Stabilization*

   This function considers a wetland's potential for stabilizing and protecting sediments and shorelines from erosion.

8. *Wildlife Habitat*

   This function relates to a wetland's ability to provide habitat for various species of wildlife generally associated with wetlands and adjacent uplands. This includes habitat for both non-migratory and migratory wildlife species.

B. Values:

1. *Recreation (Consumptive and Non-Consumptive)*

   This value describes a wetland's ability to provide opportunities for consumptive activities such as hunting and fishing, or non-consumptive activities such as boating, bird watching, and swimming.

2. *Educational/Scientific Value*

   This value considers a wetland's potential for providing teaching and learning possibilities and opportunities for scientific work and research.

3. *Uniqueness/Heritage*

   This value relates to a wetland's potential for providing special values such as possessing historically significant sites and unique natural areas.

4. *Visual Quality/Aesthetics*

   This value considers the aesthetic and visual quality associated with a wetland.

5. *Threatened or Endangered Species Habitat*

   This value pertains to a wetland's potential for harboring rare, threatened, and endangered species and their habitat.

Of the thirteen functions and values commonly attributed to wetlands, a total of nine functions and values are associated with wetlands in the project area. In general, the dominant natural wetland community types in the NECEC Project area are characterized as palustrine forested, emergent and scrub-shrub. The majority of the wetlands in the project area provide some groundwater recharge/discharge, nutrient removal and wildlife habitat.

The wetlands functions and values impacted by the NECEC Project depend on their ecological characteristics; some of the influencing factors can include: size and proximity of wetlands to industrial or commercial activity, plant diversity and height, hydrogeomorphology and soil type. The effects of any changes to these physical characteristics are evaluated in assessing whether the Project impacts will have a significant effect on wetland functions and values.

Each wetland was reviewed as part of a wetland delineation and field verification process performed during the 2015, 2016, and 2017 growing seasons. Wetland functions and values were recorded as part of that effort (and as part of the previous effort on the NECEC project, for those Project segments co-located with the MPRP Project. Functions and values were assessed as "Principal," "Secondary," or "Not Suitable" based on the criteria provided in the Workbook. Observations for each wetland type were recorded on evaluation forms; these forms are included in **Exhibits 12-1 to 12-5** of this report.

12.3 Results

12.3.1 Transmission Corridors

12.3.1.1 Habitat Conversion

As a result of the removal of vegetation to accommodate NECEC facilities, portions of forested wetlands will be permanently converted from forested to scrub-shrub or emergent communities. Some forested wetlands that meet the criteria to be wetlands of special significance (WOSS) will also be converted. For a definition and detailed descriptions regarding WOSS wetlands in the NECEC corridor, see Attachment 9 - Site Conditions, of this Application. Because WOSS represent areas of special significance, FVAs for forested WOSS and forested non-WOSS wetlands have been considered separately.

During field investigations, it was determined that all forested WOSS that will be converted during construction of the proposed NECEC facilities share similar functions and values. Likewise, all forested wetlands that are not (or do not contain) WOSS share similar functions and values. Furthermore, all scrub-shrub and emergent wetlands on the existing transmission corridors associated with the NECEC share similar functions and values. The scrub-shrub and emergent wetlands after conversion of forested wetlands are expected to be similar with respect to functions and values to the wetlands located in existing CMP corridors maintained as early successional habitat. For these reasons, this discussion provides a generic description of functions and values for forested WOSS, forested non-WOSS, and scrub- shrub/emergent wetlands. A discussion, which provides a comparison of functions and values between existing and expected future conditions and addresses overall impacts, is provided in Section 12.3.2 below.

Forested WOSS Functions and Values: Forested WOSS that will be converted as a result of the NECEC Project are generally similar to one another in overall tree composition. For those unique communities that may provide significant habitat (IWWH, DWA, SVP etc.) or that constitute an unusual natural community (MNAP focus area, MNAP exemplary natural community etc.) additional descriptions are provided in Section 7 and Section 9 of the Site Law Application.

Attachment 9 of the NRPA application provides detailed descriptions of the forested wetlands for each of the project segments. Dominant tree canopy species are likely to include red maple, green and black ash, balsam fir, black and red spruce, gray and yellow birch, eastern hemlock, and northern white-cedar. American elm and larch were also noted, but to a lesser degree. Several of these tree species are also present in the shrub and sapling strata. The understory is generally sparse in these wetlands with scattered occurrences of herbaceous species such as sensitive and cinnamon ferns, reed canary grass, and various sedge species.

The principal functions provided by forested WOSS are production export and wildlife habitat. Secondary functions are groundwater discharge, floodflow alteration, nutrient removal and transformation, and sediment/shoreline stabilization. WOSS associated with streams and rivers have functions that are associated with these resources such as floodflow alteration.

Some forested WOSS provide significant wildlife habitat features, while others consist of regionally significant wetlands having unique and more valuable functions and values. Within the northern portions of the project area, WOSS that are associated with larger tracts of conservation land, public reserve land and/or state identified MNAP focus areas, tend to have additional values that are associated with these designated areas. Values such as recreation, uniqueness/heritage, and visual quality/aesthetics are common values associated with these larger non-fragmented land tracts. In addition, one potential function, endangered species habitat, may be present in wetlands associated with larger tracts of undeveloped surrounding land in the northern portion of the project.

Groundwater discharge within forested WOSS in the NECEC Project conversion area is generally evidenced by the presence of seepages draining from the wetlands and into the streams. This typically occurs when there is a change in topography. Forested WOSS that will be converted by the NECEC provide limited floodflow alteration function. Most of the streams are small, with limited flow capacity; furthermore, floodplain areas are narrow with limited space to temporarily store floodwater.

Forested WOSS areas typically provide wildlife habitat values; specific values may include habitat for nesting passerines and winter cover for deer. In some cases, forested WOSS exhibiting pit and mound micro-topographic relief provide amphibian breeding habitat, and may function as vernal pool or significant vernal pool habitat. Most of the forested wetlands along streams provide indirect habitat value to fish and shellfish, by reducing insolation and thermal impacts through shading, reducing turbidity through erosion control and by providing general habitat value. Riparian areas are used as travel corridors by many wildlife species. Streams also support food resources for wildlife. Wetlands adjacent to streams

provide habitat for many avian species including waterfowl, wading birds, raptors, upland game birds, and passerines.

Forested WOSS that will be converted as a result of the NECEC Project provide production export by providing a potential source of timber and wildlife food sources, such as hard and soft mast and animal prey species. Nutrient removal and transformation as part of the food chain is a function generally provided by forested wetlands. Through conversion of forested lands to scrub-shrub, the food chain contribution is limited by the reduction of biomass annually produced in forested ecosystems.

Sediment/shoreline stabilization is typically provided by riparian wetlands such as those found in forested WOSS. This stabilization is provided by the roots of vegetation along the stream banks, which hold the soil together. This function is minimal along small streams, but is more valuable along larger streams and rivers especially near developments.

Values in forested WOSS that may be altered, but not lost, by the NECEC project could include recreation, such as hunting and wildlife viewing. Although no direct observation of recreation such as hunting or wildlife viewing occurred, evidence of hunting included the presence of multiple tree stands used for hunting, both in and adjacent to forested WOSS. For some species, the addition of a transmission line corridor adds habitat value, particularly to heavily forested areas of the state. Transmission line corridors add vegetative, structural, and habitat diversity to an area that is otherwise predominantly forested, providing edge habitat and generally, increasing biodiversity. Transmission lines can also serve as wildlife travel corridors and may be used as recreational corridors for activities including hunting, hiking, wildlife viewing and snowmobiling.

A summary of functions and values for forested WOSS is provided in **Table 12-2**, and an example of a Wetland Function-Value Evaluation Form is provided in **Exhibit 12-1**.

Forested non-WOSS Functions and Values: Forested non-WOSS wetlands that will be converted by the NECEC Project were documented to provide similar functions and values (**Exhibit 12-2**) to the forested WOSS described above, with one exception: functions associated with water bodies, such as floodflow alteration, are not provided (**Table 12-2**) because waterbodies are not located within non-WOSS areas. Wildlife habitat and associated food chain functions are generally less than for WOSS due to the lack of direct connectivity with a waterbody.

Scrub-Shrub and Emergent Wetland Functions and Values: Within the project area, scrub-shrub and emergent wetlands are dominated by early successional plant communities providing functions and values

associated with early succession (**Exhibit 12-3**). These wetland cover types are maintained permanently in the course of normal transmission line corridor maintenance. To a lesser degree, mature and stable ecosystems also classified as scrub-shrub and emergent wetlands are present. These naturally low-growing, stable plant communities include alder thickets, ericaceous peatlands and sedge meadows.

Groundwater discharge is a common function as evidenced by small seeps, especially on sloping ground. Shrub and emergent wetlands that are associated with waterbodies provide floodflow alteration, and food chain and habitat functions. The annual growth and decomposition of vegetation contributes to nutrient cycling and biomass production. Wildlife food production associated with food chain functions, wildlife movement and hydrologic flushing via tributary streams, result in production export. In the northern portions of the project area, peatlands dominated by low growing shrubs are more common. In some cases, these large emergent and/or scrub-shrub plant communities have the capacity to provide significant carbon sequestration; typically, these peatland wetlands attenuate nutrients thereby reducing the nutrient loading of waters that move through these wetland systems and improving water qualities. Values provided by these wetlands, particularly those situated in the northern portions of the project area, include recreation, visual quality/aesthetic and potential endangered species habitat.

Several tracts of conservation land are within the northern portions of the project areas. Some of these conservation lands are connected to adjacent conserved lands, both public and private. Several hunting stands were observed during field surveys, as were snowmobile and ATV trails, also having the potential to provide passive recreational opportunity.

12.3.1.2 Permanent Fill (Structure Installation)

Where avoidance is impossible, portions of some of the shrub and herbaceous wetlands will be impacted by the installation of new structures, which involves excavation, structure placement, and backfilling. The disturbed area is restored by replacing the topsoil, applying mulch, and allowing vegetation to grow essentially returning the disturbed areas to preconstruction conditions. Although these impacts are considered permanent, revegetation restores much of the preexisting functions. The full loss of functions is restricted to the small “footprint” of the structure.

12.3.1.3 Temporary Fill (Access Ways and Structure Preparation Pads)

To the extent possible, all proposed temporary access ways and structure preparation pads in wetlands will be sited in such a way to avoid and minimize impacts. As an example, whenever possible and where existing infrastructure and topography do not present safety concerns, access ways will be located through the narrowest portions of wetlands.

Based on field observations and application of the Highway Methodology, most of the wetlands that will be temporarily filled provide the following principal and secondary functions and values:

1. Principal functions: Groundwater discharge; floodflow alteration, sediment/shoreline stabilization and wildlife habitat
2. Secondary functions: Production export
3. Principal values: None
4. Secondary values: Recreation

A summary of typical functions and values associated with wetlands that will be subjected to temporary fill is provided in **Table 12-2** and an example of a Wetland Function Value Evaluation Form is provided in **Exhibit 12-5**.

Many of these wetland areas are currently composed of the scrub-shrub and emergent cover types. The exception is when proposed access ways are planned in areas that are currently forested wetland, but will be converted to accommodate additional transmission line corridor. All areas of temporary fill will be restored to preconstruction conditions. Denuded soils will be seeded, mulched and, if necessary, further stabilized. As a result, no permanent loss of wetland functions and values is anticipated.

12.3.2 Substations

The NECEC Project will include construction of two substations; a new converter station north of Merrill Road in Lewiston, and a STATCOM substation at the intersection of Fickett Road and Allen Road in Pownal, as well as facility upgrades at six existing substations (Larrabee Road, Crowleys, Surowiec, Raven Farm, Coopers Mills, and Maine Yankee). There are no mapped wetlands within the footprint of the six existing substations and therefore no impacts to wetland functions and values.

There will be no wetland conversion associated with the converter station and substation construction; all wetland impacts associated with these activities will be the result of fill. The area (in both acres and square feet) of wetland fill that will be required for development of each substation is presented in **Table 12-1** above. Functions and values of wetlands that will be filled at each substation site are described in detail, below.

12.3.2.1 Merrill Road Converter Station

CMP completed field delineations of wetlands and water resources within the proposed footprint of the converter station in 2017. The parcel contains a mix of forested uplands and wetlands, plus herbaceous

wetlands that lie within the existing transmission line corridor (Section 9.4.1). The surrounding and nearby land uses include forested uplands and wetlands, agricultural fields, single-family residential development, and a roadway. The forested canopy is characterized by second or third growth. Three different wetlands are found in the parcel slated for the substation. However, only two of the wetlands will be partially impacted due to the development. There is also a small stream that flows through the northern corner of the parcel, but it does not extend into the proposed development area.

A forested, small finger of wetland 145-1 extends into the western side of the proposed development area. However, this forested finger is part of a larger, mostly shrub and emergent wetland that lies within the existing transmission line corridor. The small stream that flows through the northern corner of the parcel is also connected to this larger wetland. Wetland areas within 25 feet of the stream are WOSS. The primary functions of the larger wetland complex are groundwater recharge/discharge and wildlife habitat. Wetland 145-1 drains toward tributaries associated with Stetson Brook. Groundwater discharged into the wetland eventually flows toward the drainage basin for Stetson Brook. In addition to groundwater discharge, wildlife habitat functions are provided by wetland 145-1. The wetland contains structural diversity, as it consists of emergent, scrub-shrub and forested components. Wetland within the transmission line corridor contains four shallow, natural vernal pools, which did not contain egg mass numbers high enough to trigger significance status. Also observed were three, low quality, man-made ruts that also function as amphibian breeding areas. The forested finger of this wetland provides cover for wildlife such as deer and passerines. Secondary functions include sediment retention and floodflow alteration. The vast nature of wetland 145-1 and its constricted outlet provide the conditions for floodflow alteration function. During rain events, this wetland has the ability to store large quantities of water before draining into the Stetson Brook watershed. Dovetailing on floodflow alteration, is the wetland's ability to provide sediment and toxicant retention. Local ATV use and tree harvesting activity have the potential to leave soils exposed and at risk for mobilization within runoff. The relatively flat nature of wetland 145-1 can provide the opportunity for sediment trapping before runoff is discharged into local watercourses.

The second wetland that will be impacted by the project is wetland 145-2, a PFO wetland, characterized by deep organic soils. The basin of this wetland contains a natural vernal pool and a SVP, and is therefore a WOSS. The SVP is a relatively large vernal pool that contained at least 75 wood frog egg masses and 25 spotted salamander egg masses during spring 2017 field studies. Both vernal pools are positioned in the northern portion of the wetland, the portion that will likely be impacted by site development. However, the vernal pool depressions are located outside of the limits of disturbance for the substation site development.

The primary function of the wetland is wildlife habitat as indicated by the presence of the two vernal pools. Secondary functions provided by this wetland include groundwater recharge/discharge and production export. During field investigations, several areas of ledge and resulting seeps were observed surrounding the basin shaped wetland. Wetland 145-2 has the capacity to produce a significant source of biomass, through vegetative production as well as amphibian production. As amphibians are consumed by predators or disperse naturally, the biomass produced by the wetland is exported to adjacent uplands.

12.3.2.2 Fickett Road Substation

The NECEC Project will include the construction of a new substation facility on approximately 6.12 acres near the intersection of Allen Road and Fickett Road in Pownal. The land area sited for development is a mixture of agricultural fields, open and forested uplands, and shrub and emergent wetlands.

A portion of wetland 161-16 will be impacted as a result of site development. However, the agricultural field component of the site has been impacted by prior agricultural practices of mowing and ditching. Wetland 161-16 is associated with Runaround Brook, therefore, wetland areas within 25 feet of the brook are classified as WOSS.

The primary functions of this wetland are groundwater discharge and floodflow alteration. Wetland 161-16 provides groundwater discharge by draining groundwater into the associated stream channel of Runaround Brook. As mentioned above, historically this wetland has been altered by anthropogenic activity, including mowing and ditching. Ditches can be seen from aerial photography and tend to expedite the groundwater discharge function of the wetland. Floodflow alteration is also a primary function of wetland 161-16. The large, flat composition of this wetland in combination with thick herbaceous cover create the conditions suitable for floodwater storage. During significant rain events, this wetland has the capacity to store and slowly release surface water to the adjacent Runaround Brook and its tributaries. Slow release of floodwaters reduces runoff velocity and results in less erosion. Secondary functions of wetland 161-16 include sediment and toxicant retention, nutrient removal and wildlife habitat. As often is found with flood storage, sediment and toxicant retention is a function that could be provided by this wetland. Broadly and gently sloping topography and thick herbaceous cover provide the conditions for sediment and toxicant retention. While opportunity for sediment and toxicant retention are available, currently there are minimal sources of excess sediment. This wetland may provide this function, however, during high velocity runoff events, particularly during local construction activity. Nutrient removal is also a secondary function provided by wetland 161-16. Nutrients dissolved in the surface water from local animal pasturing and agricultural fields can be absorbed by the thick herbaceous

wetland vegetation. Wildlife habitat functions are limited to general habitat values for deer, passerines, raptors, small mammals and small predators.

12.4 Discussion

12.4.1 Transmission Corridors

12.4.1.1 Habitat Conversion

Table 12-2 summarizes changes to wetland functions and values that could result from converting forested wetlands to shrub and emergent wetlands. The removal of capable tree, sapling, and shrub species and specimens, coupled with maintenance, creates and maintains permanent early successional communities with different functions and values. Some functions are enhanced and others are diminished. Habitat functions are altered with some species or aspects of their life cycle benefiting and others not. Generally, the growth of shrub and emergent vegetation promotes species diversity, stem density, annual growth and decomposition, and increased layering of vegetation. Forage, cover, and habitat values for wildlife species are different in early successional communities with increased herbaceous forage, soft mast, grass and sedge seeds, tubers, and flowering plants and increased cover. The removal of capable species reduces shading and hard mast production and loss of winter cover for some species. Overall in a densely forested region, converting forested areas to shrub and emergent communities can increase habitat diversity.

Improved wetland functions are summarized as follows:

1. Increasing groundwater discharge;
2. Slowing and constricting floodwater
3. Retaining sediments and nutrients;
4. Increasing nutrient cycling and building up of organic matter;
5. Increasing ecological production including wildlife food sources;
6. Producing merchantable timber; and
7. Increasing habitat for early successional species.

Diminished wetland functions are summarized as follows:

1. Decreasing shading along small streams;
2. Eliminating recurring timber harvests; and
3. Reducing habitat for arboreal species.

Enhanced functions include an increased amount of groundwater discharge that noticeably results within transmission line corridors. The removal of capable species creates permanent early successional conductions which often develop well vegetated and diverse communities. Dense shrub and herbaceous vegetation can slow the flow of water in streams and increase floodflow alteration functions, slowing and retaining sediments and nutrients.

For wetlands found along streams, the production export and cycling of nutrients to the stream ecosystem via detritus may be enhanced by conversion. Ecological productions, diversity, stem density, annual growth, and decomposition will increase. This is a contribution to the local food chain and supports habitat values. Often early successional habitats produce more soft mast and insects as wildlife food sources. Harvesting timber for sale as lumber, cord wood, and pulp is provided by the initial conversion of forested wetlands to shrub and emergent wetlands. The conversion of forested wetland to shrub or herbaceous wetland will favor species that require and/or use early successional habitat. This will also reduce the habitat value to arboreal species; however, similar habitat is abundant in contiguous and adjacent forested wetlands. Hunting value will remain after clearing as habitat for game species will still be present.

None of the functions or values provided by forested wetlands that will be converted as a result of the construction of the transmission lines will be completely lost or severely diminished by the conversion of forested wetlands to scrub-shrub and emergent wetlands. Removal of trees will decrease cover and shading provided to streams from these wetlands; however, streams in electrical transmission corridors are generally protected to allow development of dense shrub buffers which provide shading to smaller streams. Conversion eliminates forest management land practices and recurring timber harvests. Wildlife habitat functions are altered with a reduction in habitat for arboreal species. On balance, there is a positive net benefit with regard to functions and values. This is particularly true, given that approximately 90 percent of the State of Maine is forested. A comparison of functions and values provided by forested, shrub and emergent wetlands is provided in **Table 12-2**.

Table 12-2: Comparison of Wetland Functions and Values for Forested Wetlands Converted to Shrub and Emergent Wetlands in Transmission Line Rights-of-Way

Function/Value	Considerations Improved	Considerations Diminished	Considerations Not Changed
Groundwater Recharge/Discharge	13: Signs of groundwater discharge increase, especially on slopes with poorly draining soils, and wetland extents often expand	None	1-12; 14-16
Floodflow Alteration	18: Removal of canopy will create favorable conditions for emergent and shrub vegetation growth that can slow water flow	None	1-17
Fish/Shellfish Habitat Freshwater	None	8: Decreased shading values along small coldwater streams. Shading can be maintained by increased shrub density	1-7; 9-17
Sediment/Toxicant/Pathogen Retention	15: Water and vegetation interspersion can increase 16: Vegetation density can increase	None	1-14
Nutrient Removal/Retention/ Transformation	8: Vegetation density can increase 9: Aquatic vegetation diversity and abundance increases 11: Decomposing organic matter can increase 13: Increased shrub and emergent vegetation can constrict and slow water flow leaving the wetland	None	1-7; 10; 12; 14
Production Export	1: Forage, soft mast, and seed food sources can increase 2: Detritus development can increase 3: Commercially valuable timber is removed 4: Wildlife use changes 5: Higher trophic level consumer use changes 7: Vegetation density can increase 8: Vegetation diversity can increase 9: Aquatic vegetation can increase 12: Density of flowering plants can increase	1: hard mast food sources can decrease 3: Future timber production is eliminated 4: Wildlife use changes 5: Higher trophic level consumer use changes	6; 10; 11; 13; 14

Function/Value	Considerations Improved	Considerations Diminished	Considerations Not Changed
Sediment/Shoreline Stabilization	12: Shrub and herbaceous vegetation can increase 13: Emergent vegetation 15: A dense resilient herbaceous vegetation layer can develop	14: Larger trees and shrubs are removed	1-11
Wildlife Habitat	8: Forage, soft mast, and seed food sources can increase 9 & 13: Shrub and emergent vegetation can increase 14: Plant species diversity increases as shrub and emergent species grow 15: Shrub, emergent and vine growth increases 21: Increase of habitat for ground and shrub dwelling avian species and mammalian species that need dense cover	8: Hard mast food sources can decrease 15: Loss of canopy results in a decrease in diversity of woody vegetation 21: Loss of habitat for arboreal avian and mammalian species	1-7; 10-12; 16-20; 22; 23
Recreation	None	None	1-12
Education/Scientific Value	None	None	1-16
Uniqueness/Heritage	None	None	1-31
Visual Quality/Aesthetics	None	None	1-12
Endangered Species Habitat	Site and Species Specific	Site and Species Specific	1-2

12.4.1.2 Permanent Fill (Pole Installation)

Pole installation creates permanent wetland impacts and the negligible loss of wetland functions. The area of permanent fill encompasses 30 to 195 per structure depending on structure type, although much of this area is restored and grows back into an herbaceous wetland community. The actual permanent loss of functions and habitat is restricted to the pole diameter or structure foundation. The small physical loss of wetland equates to a negligible loss of wetland functions and values relative to the remaining wetland area. For example, structure installation in a wetland would not diminish the habitat functions and value to hunting, but there would be very minor, i.e., *de minimis* loss of food chain contribution and groundwater discharge.

12.4.1.3 Temporary Fill (Access Ways and Structure Preparation Pads)

The placement of temporary fill to construct access ways and structure preparation pads results in temporary wetland impacts and a minor temporary loss of wetland functions and values. After the access ways and structure preparation pads are no longer needed, the temporary fill (typically equipment mats) is removed and the affected areas are restored. The restoration effort may involve seeding, if necessary (wetland seed mix can be added to areas that have been denuded), and mulched with a layer of straw. If necessary, compacted soils will be scarified with an excavator bucket to loosen the surface of the soil, then seeded and mulched as needed. In addition, all ruts in wetlands will be smoothed out and graded to match pre-construction contours to the extent practicable. All temporarily affected wetlands are expected to exhibit preconstruction-level functions and values within one to two years following the completion of construction activities.

12.4.2 Substations

Table 12-3 summarizes the functions that will be affected by the development of the new substations. Most of the wetlands that will be impacted provide groundwater discharge and wildlife habitat functions. Food chain contribution through production export and nutrient removal are functions provided by the larger and interconnected wetlands, especially those with diverse and dense emergent vegetation. These wetlands often have greater biomass production and annual decomposition than forested wetlands, which tend to provide less food chain functions.

The construction of the Merrill Road Converter Station will require fill impacts to two wetlands. One wetland contains significant habitat values associated with a SVP. Fill impacts will also reduce the groundwater discharge function, while clearing will alter habitat values favoring species that use early successional shrub habitat.

Impacts to wetlands on the Fickett Road Substation site will likely affect habitat and groundwater functions provided by shrub and emergent wetland. Nutrient removal and floodflow functions will also be diminished.

Table 12-3: Summary of Wetland Functions and Values for the Wetlands Impacted by Substation Construction

Wetland ID Area	Impact Area (ac. & sq. ft.)	Functions and Values	
		Principal	Secondary
Fickett Road Substation			
WET 161-16	1.33ac / 57,935 sq. ft.	Floodflow alteration; Groundwater recharge/discharge	Sediment toxicant/retention; nutrient removal; wildlife habitat
Merrill Road Converter Station			
WET 145-01	3.05 ac / 132,858 sq. ft.	Groundwater discharge/recharge; wildlife habitat	Sediment/toxicant retention; floodflow alteration
WET 145-02	.03 ac / 1,307 sq. ft.	Wildlife habitat	Groundwater recharge/discharge; production export

Exhibit 12-1: Wetland Function- Value Evaluation Form for Forested Wetlands of Special (WOSS) Transmission Line Impacts

Exhibit 12-1: Wetland Function - Value Evaluation Form for Forested Wetlands of Special Significance (WOSS) Transmission Line Impacts

Human made? NO. Is wetland part of a wildlife corridor? NO, or a "habitat island"? NO. Wetland ID Forested WOSS. Adjacent land use Transmission line and forests. Distance to nearest roadway or other development? Generally 0.5 mile average. Dominant wetland systems present. Palustrine forested broad-leaved deciduous. Contiguous undeveloped buffer zone present. YES, upland/wetland forest. Prepared by Burns & McDonnell/Boyle Associates Date: September 2017. Is the wetland a separate hydraulic system? NO, if not, where does the wetland lie in the drainage basin? Generally along 3rd or 4th order streams. Impact: Type Conversion Area **Table 9-10**. How many tributaries contribute to the wetland? Generally 2 or 3. Wildlife & vegetation diversity/abundance (see Routine Form). Field Evaluation with Delineation Completed.

Function/Value	Suitability		Rationale Reference #	Principal or Secondary	Comments
	Y	N			
Groundwater Recharge/Discharge	X		1; 7; 13	Secondary	Seepage discharge into streams/floodplain
Floodflow Alteration	X		2; 10; 13	Secondary	Upper end of watersheds, small size
Fish and Shellfish Habitat		X			
Production Export	X		1; 3; 4; 5; 14	Principal	Veg prod/decomp, wildlife food sources
Sediment/Toxicant Retention		X			
Nutrient Removal	X		5; 7; 8; 10; 12; 13	Secondary	Veg production/decomposition: food chain
Sediment/Shoreline Stabilization	X		6; 7; 9; 14	Secondary	Found along streams and roots hold soil
Wildlife Habitat	X		1-4; 5; 6; 7; 8; 9; 13-15; 17-22	Principal	General habitat values, large tracts of undeveloped land/habitat blocks, vernal pool habitat
Education/Scientific Value		X			
Recreation	X		1-7	Secondary	Potential for hunting/trapping/hiking/ATV/snowmobile/wildlife viewing
Uniqueness/Heritage	X		4-7; 10-14	Secondary	Areas near the Cold Stream Forest identified by large-scale regional conservation planning groups as primary lands of biological significance.
Visual Quality/Aesthetics	X		5; 7-8; 10-12	Secondary	Some wetlands located within state identified MNAP Focus Areas; other wetland areas situated within conservation areas/large habitat blocks/public reserve land
Endangered Species Habitat	X		2	Secondary	Some wetlands may provide habitat for RTE species
Other					
Notes: Several wetland areas associated with deer wintering areas, potential RTE species habitat, IWWH, conservation land, public reserve lands, MNAP focus areas (Cold Stream Focus Area & Attean Pond - Moose River Focus Area)					

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10.0 BUFFERS

10.1 Introduction

This section describes the proposed natural resource buffers and clearing guidelines for the NECEC Project. Visual buffers are addressed in **Section 6**, Visual Quality, of this Site Law application. The use of vegetative buffers and mitigative construction techniques will minimize the potential for soil erosion and sedimentation into waterbodies and wetlands, minimize water temperature increase due to insolation, and protect riparian and other significant habitat values.

All NECEC Project transmission line corridors will be continuously vegetated with herbaceous plants and shrubs, but restrictions on clearing and maintenance within and immediately adjacent to protected and sensitive resources will allow a greater density of non-capable vegetation to remain. CMP will avoid disturbance of vegetation within these areas to the greatest extent practicable. Buffers bordering streams and rivers will be protected and maintained by selective clearing during construction and reduced cutting of vegetation during transmission line maintenance. All tree species capable of growing into the conductor safety zone must be removed from the buffers during construction, and prevented from re-establishing during periodic scheduled vegetation maintenance operations. These species are known as "capable species" and include, but are not limited to, fir, spruce, oaks, pines, maples, birches, poplar, elm, beech, and basswood.

Selective transmission line corridor management techniques are discussed below, and have also been incorporated into the NECEC Construction Vegetation Clearing Plan (**Exhibit 10-1**) and CMP's Post-Construction Vegetation Management Plan (**Exhibit 10-2)**.

Maps depicting the locations of all streams and rivers and other sensitive natural resources are provided in **Attachment 2** of the Site Law Application. These streams and rivers are also referenced in Section 7 – Wildlife and Fisheries.

10.2 Objectives

The objective of managing vegetative buffers is to maintain ecological values of resources without sacrificing the operational safety of the electric transmission line and associated conductors. Riparian vegetative buffers provide ecological benefits such as riparian habitat value and soil stabilization, and help protect aquatic habitat from the effects of insolation (the warming effect of sunlight). Maintaining buffers can also prevent indirect impacts to adjacent waterbodies and wetlands. Mechanized equipment will be used during the initial clearing effort to

prepare the corridor for construction. However, mechanized clearing is generally unnecessary during periodic corridor maintenance.

10.3 Buffer and Resource Protection Concepts

Paragraph text begins here Buffers and other construction mitigation measures are typically designed to provide one or more of the following functions:

a. Prevent soil erosion and sedimentation of surface waters;
b. Slow the velocity, increase the infiltration, and otherwise remove sediment and other contaminants in runoff before it enters surface waters;
c. Reduce access of all-terrain vehicles to streams;
d. Provide shade, to reduce the warming effect of sunlight (insolation) on water; and
e. Provide cover and habitat for wildlife that use riparian and significant habitats.

Critical factors considered during while determining NECEC clearing and construction mitigation measures included:

a. CMP has a responsibility to provide reliable electric service, in accordance with mandatory reliability and safety standards;
b. CMP has a responsibility to avoid and minimize impacts to protected natural resources;
c. The vegetation clearing and management plans must be feasible. Specifically, CMP must have the ability to safely and successfully implement and comply with vegetation clearing and maintenance requirements;
d. CMP will utilize the accepted transmission line construction and maintenance practices as conducted throughout the industry;
e. Recommendations and performance standards for work in sensitive habitats received from regulatory agencies; and
f. The need for flexibility in determining how a cleared area can best be revegetated.[12]

[12] CMP's experience with respect to transmission line corridor vegetation management in Maine is that natural regeneration provides the best long-term protection for ROW habitat. As such, CMP does not propose the planting of nursery stock as a routine practice. In remote locations, as commonly found on transmission ROWs, the survival rate for planted nursery stock is very low. Nursery stock is generally grown with irrigation and fertilizer, and without weed competition. These conditions are very different from the conditions encountered on a ROW. Plantings therefore require significant ongoing maintenance to achieve even a marginal success rate. This maintenance could include fertilizing, watering, mulching, and other activities, all at locations that may be several miles from the nearest road and therefore difficult to access. The cost of initial planting and ongoing maintenance, combined with follow-up replacement plantings, makes planting with nursery stock neither effective nor cost-effective. Moreover, even with this specialized care, the long-term survival rate will not

Exhibit 10-1

New England Clean Energy Connect
Plan for Protection of Sensitive Natural Resources
During Initial Vegetation Clearing

Prepared by:

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Revised January 2019

CENTRAL MAINE POWER

Introduction

This Construction Vegetation Clearing Plan (VCP) applies to construction of the new transmission lines associated with Central Maine Power Company's (CMP) New England Clean Energy Connect (NECEC) project. The VCP describes restrictive and protective management practices required for work within and adjacent to protected natural resources during vegetation clearing associated with NECEC project construction. The requirements described in this VCP apply to initial project construction and are not intended to apply to planned or emergency maintenance or repair actions.

The goal of the VCP is to provide construction personnel with a cohesive set of vegetation management specifications and performance standards for work within and adjacent to protected natural resources during transmission line construction.

The protected natural resources subject to restrictive vegetation management requirements include:

- Wetlands and streams (intermittent and perennial);
- Perennial streams within Segment 1 (greenfield) portion of the NECEC project;
- Perennial streams within designated Atlantic salmon (*Salmo salar*) habitat;
- Outstanding river segments, rivers, streams or brooks containing threatened or endangered species;
- Gold Brook and Mountain Brook containing State Threatened (*Epeorus frisoni*) and / or State Special Concern (*Gyrinophilus porphyriticus*) species;
- State Special Concern Species Habitat: Rusty blackbird (*Euphagus carolinus*);
- Significant Vernal Pools (SVP);
- Inland Waterfowl and Wading Bird Habitat (IWWH);
- Deer Wintering Areas (DWA);
- Rare plant locations; and
- Locations over mapped significant sand and gravel aquifers.

In locations where individual restrictions or procedures overlap, or multiple restrictions apply, the more stringent restrictions and all applicable procedures will be followed by construction personnel.

1.0 Right-of-Way Vegetation Management Procedures

1.1 Arboricultural Management Practices

Capable vegetation will be removed and controlled within the footprint of the NECEC development, including within the new (greenfield) and co-located transmission line corridors. Capable vegetation is defined as woody plant species and individual specimens that are capable of growing to a height that would reach the conductor safety zone, as illustrated in Figure 1 attached to this exhibit. Removal of capable species beneath the conductors within transmission line corridors is intended to meet the following goals:

- Facilitate construction;
- Maintain the integrity and functionality of the line;
- Facilitate the safe operation of the line;
- Maintain access in case of emergency repairs; and
- Facilitate safety inspections.

Therefore, the objective of this VCP will be to remove woody vegetation capable of encroaching into the Minimum Vegetation Clearance Distance (MVCD) of the new transmission lines to facilitate construction and maintain the integrity and safe operation of the transmission line consistent with the standards of North American Electric Reliability Corporation's (NERC) Transmission Vegetation Management[1]. This will be accomplished by practicing an integrated vegetation management strategy using a combination of mechanical cutting, hand-cutting, and selective herbicide applications. Mechanical mowing may also be used along access roads or in unusual circumstances, should the typical procedures not suffice.

Throughout clearing and construction, shrub and herbaceous vegetation will remain in place to the extent practicable. Capable vegetation, dead trees, "hazard trees" and all vegetation over 10 feet in height will be removed during initial transmission line corridor clearing prior to construction of the new transmission lines. Due to the sag of the electric transmission lines between the structures, which varies with topography, the distance between structures, tension on the wire, electrical load, air temperature and other variables, the required clearance is typically achieved by removing all capable species from the transmission line corridor. Hazard trees are those trees typically on the edge of the transmission line corridor that pose an imminent threat of violating the minimum separation standard or are at risk of contacting the transmission lines themselves due to disease, configuration or potential instability. Hazard trees are typically removed immediately upon identification.

The following procedures will be implemented during vegetation management activities to protect sensitive natural resources:

[1] North American Electric Reliability Corporation Transmission Vegetation Management, Standard FAC 003 – 3 Technical Reference, July 1, 2014.

a. Protected natural resources and their associated buffers will be flagged or located with a Global Positioning System (GPS) prior to all construction and clearing activities;

b. When and if terrain conditions permit (e.g., certain ravines and narrow valleys) capable vegetation will be permitted to grow within and adjacent to protected natural resources or critical habitats where maximum growing height can be expected to remain well below the conductor safety zone. Narrow valleys are those that are spanned by a single section of transmission line, structure-to-structure.

c. Hand cutting with chainsaws will be the preferred method of vegetation clearing within protected natural resource buffers and sensitive areas, where reasonable and practicable and with the appropriate protective measures. However, mechanized equipment may be used during frozen conditions, or when matted travel lanes and the reach-in technique are implemented.;

d. Equipment access through wetlands or over streams will be avoided as much as practicable by utilizing existing public or private access roads, with landowner approval where required;

e. Equipment access in upland areas with saturated soils will be minimized to the extent practicable, or these areas will be matted to avoid excessive rutting or other unnecessary ground disturbance;

f. Significant damage to wetland or stream bank vegetation, if any, will be repaired following completion of clearing activities in the area;

g. Areas of significant soil disturbance will be stabilized and reseeded following completion of clearing activities in the area.

h. When capable vegetation within and adjacent to a protected natural resource or identified critical habitat will be removed for the purpose of constructing the development, the natural regeneration of non-capable woody vegetation will be allowed within all protected resources. At a minimum, the natural regeneration of non-capable woody vegetation will be allowed. To facilitate the regeneration of natural vegetation within and adjacent to (generally, within 75 feet of) protected natural resources and special habitats, the contractor will separate the topsoil from the mineral soil when excavating during project construction. The excavated topsoil will be returned to its original place and position in the landscape and appropriate erosion control methods will be utilized.

i. Locations within the NECEC that contain any of the invasive plant species listed in Table 1 below, will be identified prior to the start of construction of the project or the start of construction on any individual segment of the project at the discretion of CMP or its contractor. CMP will develop an invasive species vegetation monitoring plan and submit it to the Department for review and approval prior to the start of construction on the project. This plan will have a stated objective of preventing the introduction and spread of

invasive species as a result of construction. Herbicide application is an acceptable method of controlling invasive growth when hand removal or other non-chemical methods will not be effective, including in protected natural resources and other sensitive areas.

Table 1 – Invasive Plant Species[1]

Species	Common Name
1. Alliara petiolata	Garlic mustard
2. Berberis thunbergii	Japanese barberry
3. Celastrus orbiculatus	Oriental bittersweet
4. Cynanchum louiseae	Black swallowwort
5. Elaeagnus umbellata	Autumn olive
6. Fallopia japonica	Japanese knotweed
7. Frangula alnus	Glossy buckthorn
8. Impatiens glandulifera	Ornamental jewelweed
9. Lonicera morrowii	Morrow's honeysuckle
10. Lonicera tatarica	Tatarian honeysuckle
11. Lythrum salicaria	Purple loosestrife
12. Phragmites australis	Common reed
13. Poa nemoralis	Wood blue grass
14. Rhamnus cathartica	Common buckthorn
15. Rosa multiflora	Multiflora rose

1-MNAP's list of "Currently considered invasive in Maine" excluding aquatic plant species.

2.0 Vegetation Management Methods – All Transmission Line Corridor Areas

2.1 Mechanical Methods

During construction, vegetative clearing of capable species will be completed primarily with mechanical equipment, including motorized equipment. All capable species and any dead or hazard trees will be cut at ground level except in designated buffer zones, as described below. Large vegetation cut during construction will be handled in accordance with the Maine Slash Law[2].

Access roads and travel lanes will be located to protect sensitive and protected natural resources to the maximum extent practicable and construction matting will be used in accordance with CMP's environmental guidelines and per the timber mat performance standards provided below.

Timber mats or matting used for construction:

2 12 MRSA §9331 et. Seq.

- shall not be made from wood from ash trees (Fraxinus sp);
- unfinished timbers used in the construction of the mats must be free of bark, unless produced by a firm certified by the Maine Forest Service (MFS) for production of mats with incidental bark for this project. Such mats must be marked as outlined in the supplier's agreement. Applicant shall maintain a copy of the MFS compliance agreement including a representation of the accepted mark in the records;
- before entering the State of Maine, mats used for the project shall be cleaned of soil and vegetative material by pressure washing;
- shall not have been used in, or made from lumber from, Federally Quarantined areas as set out in 7 CFR 301 unless accompanied by the appropriate USDA certificate of treatment required for interstate transport. Said certificates will be maintained in a central filing location available for review by appropriate Agency personnel for a period of three (3) years after project completion, as determined by CMP; and,
- must have shipping information sufficient to identify the shipper and number and shipping origin of the mats.

The Maine Forest Service and U. S. Department of Agriculture reserve the right to inspect all timber mats and matting material used for the project for compliance with these standards.

2.2 Herbicide Application

Herbicide applications will likely begin after clearing is completed to gain control of vegetation growth. When control is achieved, treatment will typically occur as part of scheduled maintenance on a 4-year cycle or as needed. By using selective herbicides and a variety of application methods, desired vegetation along the transmission line corridor will eventually consist of a dense, low-growing plant community that will discourage the establishment of capable tree species. Therefore, fewer capable woody species and specimens will require treatment in future applications.

The following procedures will be implemented during herbicide applications:

a. Herbicides will be used in strict accordance with the manufacturer's EPA-approved labeling and will not be applied directly to waterbodies or areas where surface water is present;

b. In the new corridor (greenfield) no foliar herbicides will be applied within a 100-foot buffer on perennial and coldwater fishery streams and within a 75-foot buffer on intermittent streams that do not contain coldwater fisheries.

c. In the co-located sections, no foliar herbicides will be applied within 75 feet of rivers, streams, brooks, lakes, ponds, or within 25 feet of wetlands that have water present at the surface at the time of the application.

d. For stream and rivers classified as outstanding river segments, as well as those containing threatened or endangered species and coldwater fisheries, no foliar herbicides will be applied within a 100-foot buffer.

e. Herbicides will not be applied to stumps (cut stump treatment) within areas of standing water.

f. Herbicides will not be mixed, transferred or stored within 100 feet of any wetland or surface water. On public access roads, herbicide mixing, transfer or storage may be done within 100 feet of wetlands or surface waters;

g. Herbicides will not be mixed, transferred or stored within 100 feet of Significant Vernal Pool depressions. On public access roads, herbicide mixing, transfer or storage may be done within 100 feet of Significant Vernal Pool depressions;

h. Unless performed on public access roads, herbicides will not be mixed, transferred or stored over mapped significant sand and gravel aquifers;

i. Herbicides will not be applied, mixed, transferred or stored within 100 feet of any known private well or spring or within 200 feet of any known public water supply well. On public access roads, herbicide mixing, transfer or storage may be done within 200 feet of known public water supply wells;

j. When herbicide applications are performed in wetlands without standing water, only herbicides approved for use in wetland environments will be used;

k. Herbicides will not be applied to any area when it is raining or when wind speed exceeds 15 miles per hour as measured on-site at the time of application. When wind speeds are below 3 miles per hour, applicators should be aware whether a temperature inversion is present, and should consult the herbicide label to determine whether application should proceed under these conditions;

l. The foreman or licensed applicator on each herbicide application crew will be licensed by the Maine BPC and will remain in eye contact and within earshot of all persons on his/her crew applying herbicides. At least one individual from any company applying herbicides will also hold a Commercial Master Applicator License issued by the BPC. This Master Applicator must have the ability to be on-site to assist persons applying herbicides within six hours driving time. If an out-of-state company is conducting the herbicide application, the company will have a Master Applicator in Maine during any application. Application of herbicides will be in accordance with applicable regulations promulgated under the Maine Pesticides Control Act, including those regulations to minimize drift, to maintain setbacks from sensitive areas during application, and to maintain setbacks from surface waters during the storing/mixing/loading of herbicides; and

m. Herbicides will typically be mixed in a truck-mounted tank that remains on public access roads. Herbicide application is done by personnel with low-volume, hand-pressurized (manual) backpacks with appropriate nozzles, to minimize drift, who travel along the transmission line corridor by foot or by all-terrain vehicle and spot-treat target species and specimens.

The location of all streams, wetlands, significant vernal pools, rare plant locations, known wells, and mapped significant sand and gravel aquifers crossed by the transmission line corridor will be provided to construction personnel.

2.3 Petroleum Product & Hazardous Materials Management

Any petroleum products or other hazardous material within the transmission line corridor during construction will be managed in accordance with CMP's Environmental Control Requirements (**see Exhibit 15-1**) and will include the following setbacks unless CMP can demonstrate that, due to special circumstances at specified locations, these setbacks are impractical at those locations.

(a) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 100 feet of a protected wetland or other waterbody, unless no practicable alternative exists and secondary containment with 110% capacity is provided for any fuel storage containers or tanks, or if it occurs on a paved road.

(b) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 200 feet of a known private water supply.

(c) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 400 feet of a known public water supply.

(d) No fuel storage, vehicle/equipment parking and maintenance and refueling activity may occur within 25 feet minimum of the following:

(i) An area listed in Maine's biological conservation data system, Biotics, of the Maine Natural Areas Program, including rare natural communities and ecosystems (state rarity rank of S1 through S3 and habitats supporting Endangered or Threatened plant species). Boundaries and locations are as determined by the Maine Natural Areas Program of the Department of Agriculture, Conservation and Forestry.

(ii) Habitat of any species declared rare, threatened or endangered by the Maine Department of Inland Fisheries and Wildlife, Maine Department of Marine Resources, or the Director of the U.S. Fish and Wildlife Service.

3.0 Vegetation Management within Freshwater Wetlands

Transmission line corridor wetlands range in type from small, emergent wetlands formed in ruts from logging equipment to large forested wetland systems.

3.1 Vegetation Clearing Restrictions within and Adjacent to Freshwater Wetlands

The following restrictions apply to vegetation clearing within freshwater wetlands and their buffers:

a. Unless frozen, heavy equipment travel in wetlands will be performed on construction matting, or other approved alternative protective measures will be implemented.

b. If initial clearing or other construction activities result in areas of bare soil or minimally vegetated cover, the areas of bare soil will be allowed to revegetate naturally, where practicable. If areas are sufficiently large to warrant planting, a native seed designed to provide short term cover will be applied, and the area will be allowed to return to non-capable native woody and perennial herbaceous vegetation naturally.

c. No accumulation of slash will be left within wetlands.

4.0 Vegetation Clearing within Stream Buffers

Stream buffers, as measured horizontally from the top of each stream bank, will be established for vegetation removal along streams within the transmission line corridor. A "stream buffer" is a buffer on a stream, river, or brook. In no case may the stream buffer be reduced to less than 75 feet. Additional restrictions will be applied within 100 feet of streams meeting certain criteria, as described in 4.1a, below.

This section describes the restrictions related to vegetation removal within these stream buffers. All vegetation clearing procedures and restrictions that apply to vegetation management for transmission line corridor construction also apply within the stream buffers.

4.1 Additional Vegetation Clearing Restrictions within Stream Buffers

The following additional restrictions apply to vegetation clearing within stream buffers:

a. Riparian natural buffers (or "stream" buffers) will be retained within 100 feet of all perennial and coldwater fishery streams within the greenfield (Segment 1) portion of the Project, outstanding river segments, or rivers, streams, or brooks containing Threatened or Endangered species unless the Department determines that the functions and values of the stream buffer will not be impacted by the removal of vegetation and approves an alternative minimum buffer.

b. For streams in areas where the new transmission line will be co-located within existing rights-of-way, CMP proposes to maintain a 75 foot buffer, unless meeting any of the above criteria, since the corridor is currently being maintained in an early successional state according to the guidelines set forth in CMP's Vegetation Management Plan (Exhibit 10-2), and the effect of the additional clearing (typically less than 75 feet) to accommodate the new line has been minimized.

c. The boundary of each stream buffer will have unique flagging installed to distinguish between the applicable 75 foot or 100 foot stream buffer prior to clearing. Flagging will be maintained throughout construction.

d. Foliar herbicides will be prohibited within the stream buffer, and all refueling/maintenance of equipment will be excluded from the buffer unless it occurs on an existing paved road or if secondary containment is used with oversight from an environmental inspector.

e. All stream crossings by heavy equipment will be performed through the installation of equipment spans with no in-stream disturbances. Streams will not be forded by heavy equipment.

f. Initial tree clearing will be performed during frozen ground conditions whenever practicable, and if not practicable, the recommendations of the environmental inspector will be followed regarding the appropriate techniques to minimize disturbance such as the use of selectively placed travel lanes within the stream buffer. CMP will not place any transmission line structures within the stream buffer, unless specifically authorized by the MDEP and accompanied by a site specific erosion control plan. No structures will be placed within 25 feet of any stream regardless of its classification.

g. Within that portion of the appropriate stream buffer that is within the wire zone (i.e., within 15 feet, horizontally, of any conductor; see Figure 1), all woody vegetation over 10 feet in height, whether capable or non-capable, will be cut back to ground level and resulting slash will be managed in accordance with Maine's Slash Law. No other vegetation, other than dead or hazard trees, will be removed. Within the stream buffer and outside of the wire zone, non-capable species may be allowed to exceed 10 feet in height unless it is determined that they may encroach into the conductor safety zone prior to the next four year maintenance cycle;

h. Removal of capable species, dead or hazard trees within the appropriate stream buffer will typically be accomplished by hand-cutting. Use of mechanized harvesting equipment is allowed if supported by construction matting or during frozen conditions in a manner (i.e., use of travel lanes and reach-in techniques) that preserves non-capable vegetation less than 10 feet in height to the greatest extent practicable;

i. No slash will be left within 50 feet of any stream.

Allowing non-capable vegetation to remain as described above within the appropriate stream buffer will provide shading and reduce the warming effect of direct sunlight (insolation). Low ground cover vegetation will also remain to filter any sediment in surface runoff. These restrictions will allow the stream buffers to provide functions and values similar to those provided prior to transmission line construction.

4.2 Vegetation Management within the Roaring Brook Mayfly and Northern Spring Salamander Conservation Management Areas of Mountain Brook and Gold Brook

During consultation with Maine Department of Inland Fisheries and Wildlife (MDIFW) for the NECEC project, MDIFW identified Gold Brook (PSTR 15-06, PSTR 16-07, PSTR 16-10 and PSTR 16-15) and Mountain Brook (PSTR-33-01, PSTR-EM-34-01, PSTR-EM-34-01) as high priority resources in which full height vegetation should be retained within the 250-foot conservation management areas to protect the habitat of Roaring Brook Mayfly (*Epeorus frisoni*) and Northern Spring Salamander (*Gyrinophilus porphyriticus)*. Gold Brook in Appleton Twp contains Roaring Brook Mayfly habitat, while Mountain Brook in Johnson Mountain Twp contains both Roaring Brook Mayfly and Northern Spring Salamander habitat.

During construction, vegetation will be cleared only in areas required for access and construction of the NECEC project; all other areas will be retained as full height vegetation, as shown on Figure 2 and Figure 3 of this exhibit. The access roads and structure preparation areas will be maintained as scrub-shrub habitat to allow for post-construction maintenance, repair and/or emergency access during operation of the line.

5.0 Vegetation Clearing within Significant Vernal Pool Habitat (SVPH)

Vegetated buffers of 250 feet, as measured from the edge of the pool depression, will be established for SVPs crossed by the transmission line corridor. The SVP depression and buffer area together comprise the SVPH. Vegetation clearing within the SVPH will be subject to the same procedures and prohibitions, as applicable, which are required in the typical transmission line corridor, as well as to the additional measures below.

5.1 Additional Vegetation Management Restrictions within SPVH

The following additional restrictions apply to vegetation clearing within SVPH:

a. Mechanized equipment will not be allowed within the vernal pool depression, unless the depression encompasses the entire width of the transmission line corridor. Mechanized equipment will only be allowed to cross the vernal pool depressions during frozen or dry conditions or with the use of mats;

b. Initial clearing within a SVPH will occur during frozen ground conditions. If not practicable, hand cutting or reach in techniques will be used. If that is not adequate, travel lanes to accommodate mechanical equipment in the 250-foot buffer may be used with approval of the MDEP.

c. Between April 1 and June 30, no vegetation removal using tracked or wheeled equipment will be performed within the 250-foot SVPH buffer;

d. No refueling or maintenance of equipment, including chainsaws, will occur within 250 feet of SVP depressions, unless done so on a public access road;

e. No herbicide use is permitted within 25 feet of the SVP pool depression; and

f. No accumulation of slash will be left within 50 feet of the edge of the SVP depression and slash piles will not exceed 18 inches tall.

6.0 Vegetation Clearing within Moderate or High Value Inland Waterfowl and Wading Bird Habitat

Inland Waterfowl and Wading Bird Habitats (IWWH) are habitats mapped by the MDIFW that contain an inland wetland complex used by waterfowl and wading birds, plus a 250-foot nesting habitat area surrounding the wetland. The nesting habitat is considered to be part of the mapped IWWH. No additional buffers are proposed for IWWHs beyond this mapped habitat, and as such the vegetation maintenance restrictions apply to the mapped habitat only.

Vegetation clearing within the IWWH will be subject to the same procedures and prohibitions, as applicable, which are required in the typical transmission line corridor and for stream buffers.

6.1 Additional Vegetation Clearing Restrictions within Inland Waterfowl and Wading Bird Habitat

The following additional restrictions apply to vegetation clearing within mapped IWWH:

a. If practicable, vegetation clearing will take place during frozen ground conditions. If not practicable, vegetation within IWWH will be removed using hand cutting or reach-in techniques and appropriate techniques to minimize disturbance to the maximum extent practicable, such as the use of travel lanes to accommodate mechanical equipment use in the IWWH.

b. Between April 15 and July 15, use of motorized vehicles (e.g., all-terrain vehicles) and mechanized equipment (e.g., chainsaws or brush cutters) within IWWH is prohibited. Use of non-mechanized hand tools is allowed during this time period;

c. No refueling or maintenance of equipment, including chainsaws, will occur within the IWWH, unless done so on a public access road; and

d. No herbicide use is permitted within 25 feet of any wetland within the mapped IWWH.

e. Where overhead transmission lines cross an IWWH area, CMP will install bird diverters or aviation marker balls according to the manufacturer's guidelines and applicable transmission line codes unless otherwise determined to be

impracticable by the Maine Department of Environmental Protection (MDEP) in consultation with MDIFW.

f. Provided they do not present a safety hazard and are naturally present, CMP will leave undisturbed a minimum of 2-3 snags per acre to provide nesting habitat for waterfowl. Where appropriate, to mitigate habitat impacts due to the development, and as approved by the MDEP, capable species will be topped, girdled, and/or treated with herbicides to prevent re-growth to create snags. Snags will be 12-16 inch in diameter or the largest size available from the existing stand of vegetation.

g. No accumulation of slash will be left within the IWWH.

h. Impacts to scrub-shrub and herbaceous vegetation within the IWWH will be minimized to the maximum extent practicable.

7.0 Vegetation Clearing within Mapped Deer Wintering Areas

Deer Wintering Areas (DWA) provide important refuge for white-tailed deer (*Odocoileus virginianus*) during the winter months in northern climates and are typically characterized by an extensive stand of mature softwood species with a dense forest canopy.

During construction, impacts to scrub-shrub and herbaceous vegetation and other non-capable species will be minimized to the maximum extent practicable. No additional vegetation clearing restrictions are proposed within mapped DWAs in the co-located portions of the Project, as all capable species will be removed from these and other areas within the transmission line corridor in order to comply with NERC Transmission Vegetation Management standards. Clearing restrictions within the Upper Kennebec DWA are provided below.

7.1 Additional Clearing Restrictions within the Upper Kennebec Deer Wintering Area

In consultation with MDIFW for the NECEC Project, CMP has identified and designated ten deer travel corridors within the Upper Kennebec River DWA (Map ID 060065), as shown in Figure 4 of this exhibit, which will be managed as softwood stands to promote deer movement across the transmission line corridor during the winter months when snow depths have the potential to inhibit deer travel. The NECEC transmission line corridor traverses this DWA from a point in The West Forks Plantation to a point in Moxie Gore. CMP has agreed to manage these deer travel corridors, designated and labeled Corridors 1 through 8 in Figure 4, as softwood stands and will allow for the maximum tree height that can practically be maintained without encroaching into the conductor safety zone or into the necessary cleared area adjacent to structures. Tree heights will vary based on structure height, conductor sag, and topography, but will generally range from 25 to 35 feet. Vegetation within Corridors 9 and 10, which are located where the transmission line will be buried using horizontal directional drilling, will be allowed to grow to its full height.

Within designated deer travel corridors 1 through 8, during the initial vegetation clearing for construction all capable hardwood species and individual softwood specimens will be cut to heights necessary so that they do not intrude into the conductor safety zone and are not at risk of growing into the conductor safety zone prior to the next scheduled vegetation maintenance. Softwood specimens that are not intruding into the conductor safety zone and are not at risk of growing into the conductor safety zone prior to the next scheduled vegetation maintenance will be retained. Access roads and structure preparation and installation areas will be cleared of all capable and non-capable species and maintained as scrub-shrub habitat to allow for post-construction maintenance, repair and/or emergency access during operation of the line. The designated deer travel corridors will be flagged prior to construction and identified in a database maintained by CMP, further described in Section 11.0.

8.0 Vegetation Clearing within State-mapped Rusty Blackbird Habitat

In consultation with MDIFW for the NECEC Project, CMP agreed to allow for the retention of 15-foot tall softwood species within the Rusty Blackbird (Euphagus carolinus) habitat, shown in Figure 5. The additional height will avoid project impacts to habitat of this State Species of Special Concern.

During the initial vegetation clearing for construction activities, all capable hardwood species and softwood specimens over 15 feet in height, as well as those anticipated to grow taller than 15 feet in height prior to the next scheduled vegetation maintenance, will be cut at ground level and removed. Softwood specimens up to 15 feet in height will be retained. The access roads and structure preparation areas within the Rusty Blackbird habitat will be cleared of all capable and non-capable species and maintained as scrub-shrub habitat to allow for post-construction maintenance, repair and/or emergency access during operation of the line. The habitat will be flagged prior to construction and identified in a database maintained by CMP, further described in Section 11.0.

9.0 Vegetation Clearing within Rare Plant Locations

Vegetation clearing of the transmission line corridor has the potential to impact rare plants and/or alter their habitat. The following additional vegetative clearing restrictions will minimize impacts to rare plants. The additional restrictions will apply only to the demarcated locations of the identified rare plants. No additional buffers will be established surrounding rare plant locations. These restrictions are intended to maintain existing hydrology and limit soil disturbance within rare plant locations.

9.1 Additional Vegetation Clearing Restrictions within Rare Plant Locations

The following additional restrictions will apply to vegetation clearing for rare plant species in the identified location:

a. Unless rare plant locations encompass the entire width of the transmission line corridor, mechanized equipment will only be allowed to cross rare plant locations during frozen conditions, on established travel paths/crossings, or with the use of mats.

b. Initial clearing within rare plant communities will be undertaken during frozen ground conditions whenever practicable, and if not practicable selective mat placement and reach-in techniques will be used to minimize disturbance to the rare plant communities to the maximum extent practicable.

c. If initial clearing or other construction activities result in areas of bare soil or minimally vegetated cover, where practicable, these areas will be allowed to revegetate naturally. If areas are sufficiently large to warrant planting, a native seed mix designed to provide short term cover will be applied and the area will be allowed to return to native woody and perennial herbaceous vegetation naturally.

d. Heavy equipment travel within rare plant communities will be minimized to the maximum extent practicable. Hand cutting or "reach-in" techniques to cut and remove capable tree species and vegetation over 10 feet tall within the wire zone, or other techniques as agreed upon in consultation with the MDEP and Maine Natural Areas Program (MNAP), will be used. When equipment access is necessary, activity will be restricted to a few narrow travel lanes that have been clearly marked prior to clearing activity.

e. No refueling or maintenance of equipment, including chain saws, will occur within demarcated rare plant locations, unless done on a public access road.

f. No foliar herbicide use is permitted within the demarcated rare plant locations, however cut surface herbicides may be used on capable species and specimens.

10.0 Vegetation Clearing Procedures over Mapped Significant Sand and Gravel Aquifers

Transmission lines located over mapped significant sand and gravel aquifers are subject to the typical transmission line corridor clearing procedures, except that no refueling or maintenance of equipment, and no herbicides may be mixed, transferred or stored, over the mapped significant sand and gravel aquifers, unless done so on a public access road.

11.0 Vegetation Clearing Procedures in Tapered Vegetation Management Areas

In consultation with MDEP and the LUPC, CMP determined that management of vegetation in a tapered configuration and manner was appropriate in order to minimize the visual impact from

viewpoints on the summit of Coburn Mountain in Upper Enchanted Township and from Rock Pond looking towards Three Slide Mountain in T5 R6 BKP WKR. These areas include the following coordinates:

Coburn Mountain – From: 45°25'45.01"N, 70° 6'8.22"W To: 45°27'37.45"N, 70° 6'51.44"W

Rock Pond – From: 45°27'48.24"N, 70°25'31.82"W To: 45°27'54.92"N, 70°26'3.11"W

During initial clearing of the Project in these areas, CMP will retain capable vegetation outside of the wire zone up to 15 feet tall to facilitate future tapering that will allow capable vegetation up to 35 feet tall in areas outside of the wire zone.

12.0 Locating and Marking Buffers and Habitats

A database will be maintained, including maps and GIS shapefiles, of the buffers, restricted habitats, and sensitive areas and their locations relative to the nearest structure (pole) or road location. The distance and direction from the nearest structure to the sensitive area will be included with the name of the area and the structure number. All structures along the transmission line corridor will be numbered at the time of construction.

To aid in identifying restricted areas, buffers and restricted habitats will be located and demarcated in the field using brightly colored flagging or signage prior to the initiation of clearing and construction activities along the transmission line corridor. Alternatively, use of GIS data and GPS equipment may be used to provide accurate location of resources and associated buffers. If desired, personnel may permanently demarcate restricted habitats to aid in construction activities. Personnel working on the transmission line corridor will be provided a copy of this VCP. Use of the VCP in conjunction with the natural resource maps and Plan & Profile drawings will enable construction contractors to locate and mark restricted areas in the field.

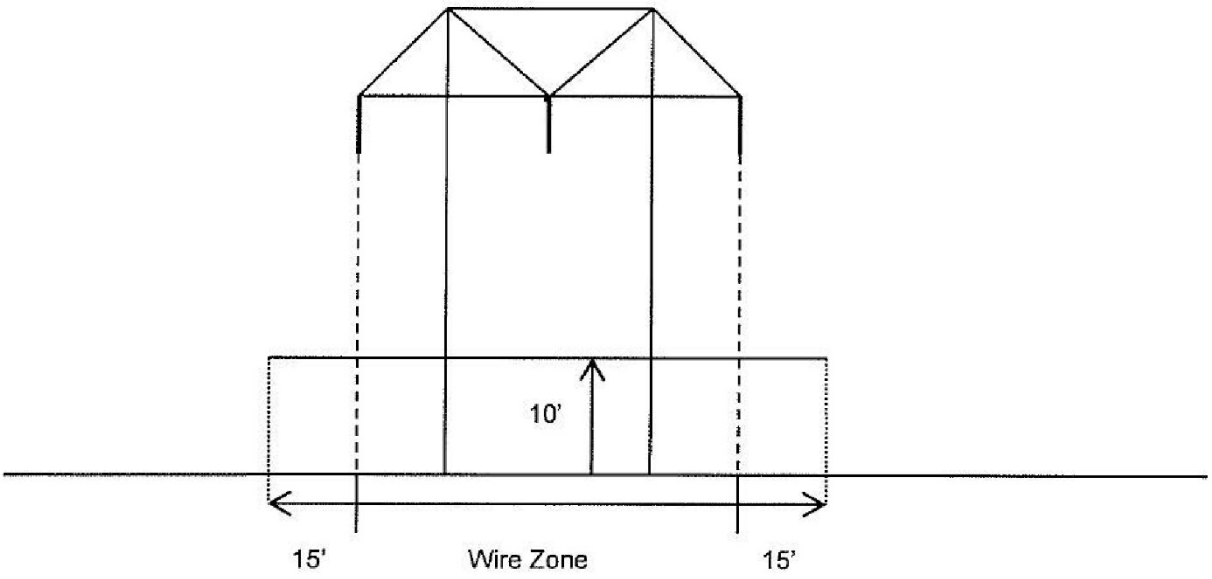
13.0 Personnel Training

Personnel who will conduct vegetation clearing on the transmission line corridor will receive appropriate environmental training before being allowed access to the transmission line corridor. Construction and clearing personnel will be required to review this VCP prior to the training and before conducting any clearing or construction activities. The level of training will be dependent on the duties of the personnel. The training will be given prior to the start of clearing or construction activities. Replacement or new clearing or construction personnel that did not receive the initial training will receive similar training prior to performing any activities on the transmission line corridor.

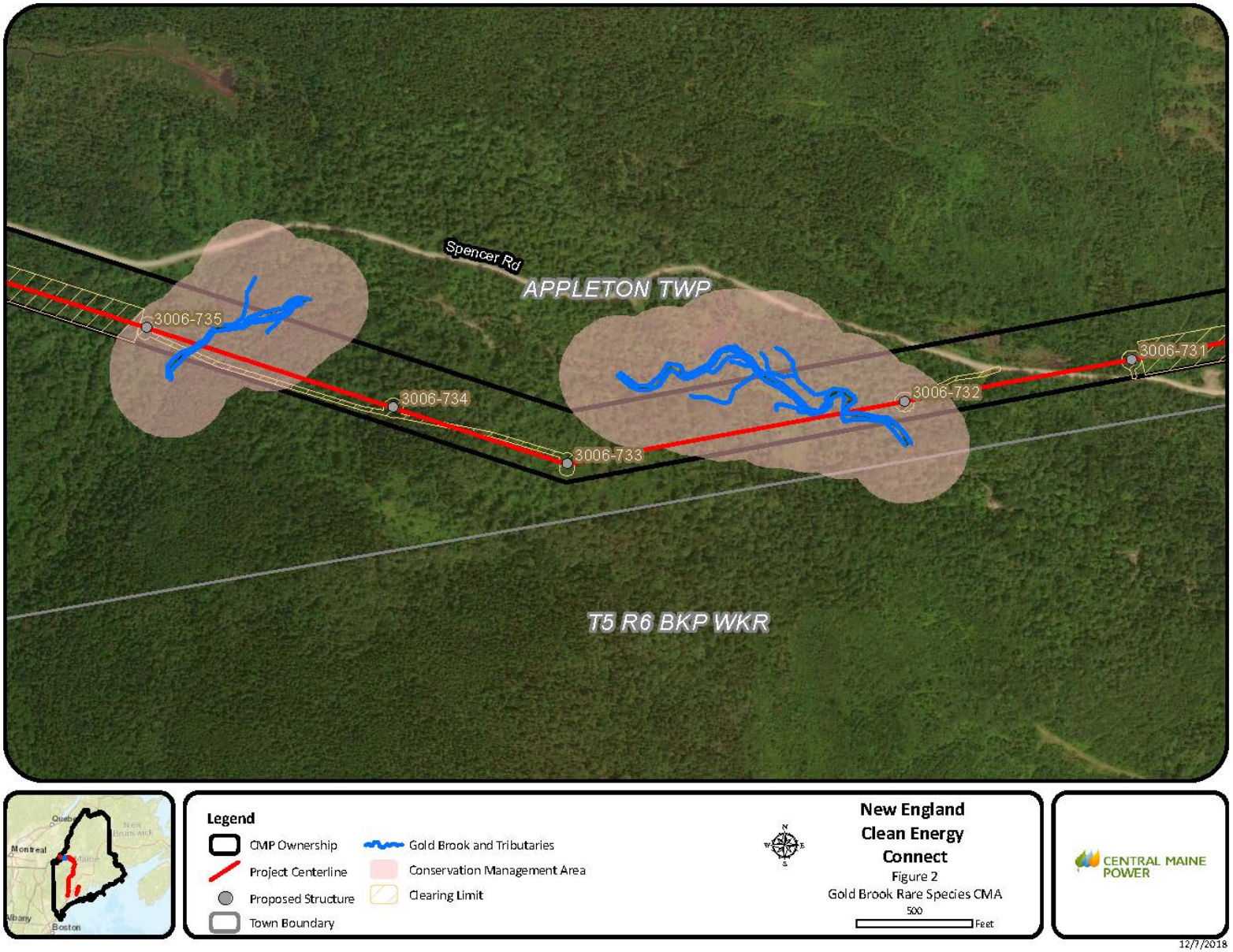
The training session will consist of a review of the buffers and restricted habitats, the respective vegetation clearing requirements and restrictions for each, and a review of how these areas and resources can be located in the field. Training will include familiarization with and use of GIS

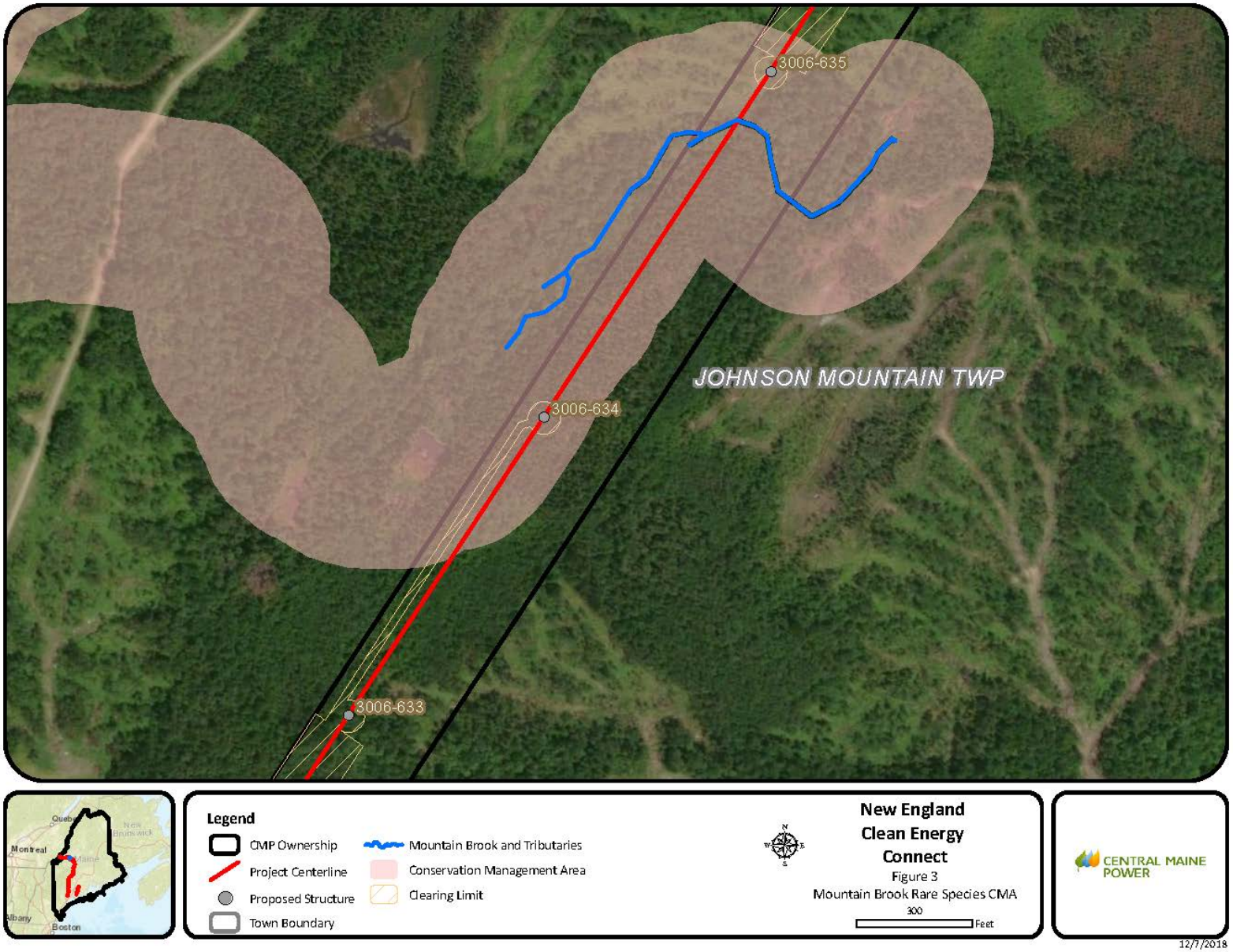
information and sensitive natural resource identification in conjunction with the contents of this VCP, as well as basic causes, preventive and remedial measures for contamination, and erosion and sedimentation of water resources.

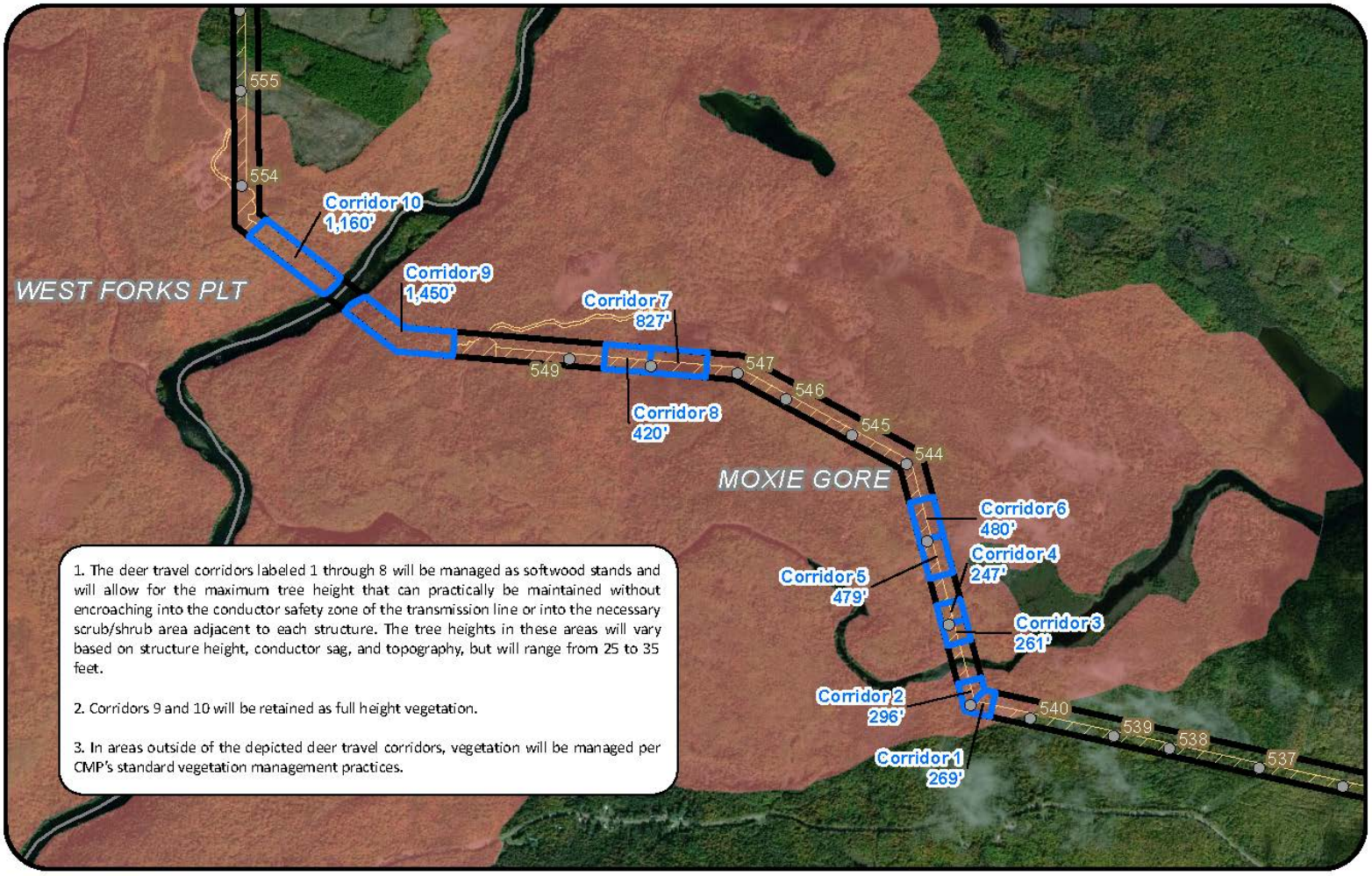
Figure 1



1. Capable species, regardless of height, are cut back to ground level or treated with herbicides within the entire length and width of the transmission line corridor during scheduled vegetation maintenance (every 4 years). However, within stream buffers, only capable specimens over 10 feet tall may be cut or treated (specimens at or above this height are likely to grow into the conductor safety zone prior to the next scheduled vegetation maintenance cycle).
2. All woody vegetation over 10 feet in height and inside the wire zone, whether capable or non-capable, is cut back to ground level.


Spencer Rd
APPLETON TWP
3006-735
3006-734
3006-733
3006-732
3006-731
T5 R6 BKP WKR
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Gold Brook and Tributaries
Conservation Management Area
Clearing Limit
New England
Clean Energy
Connect
Figure 2
Gold Brook Rare Species CMA
500
Feet
CENTRAL MAINE POWER
12/7/2018


3006-635
3006-634
3006-633
JOHNSON MOUNTAIN TWP
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Mountain Brook and Tributaries
Conservation Management Area
Clearing Limit
New England
Clean Energy
Connect
Figure 3
Mountain Brook Rare Species CMA
300
Feet
CENTRAL MAINE POWER
12/7/2018



Legend

- CMP Ownership
- Proposed Structure
- Town Boundary
- Clearing Limit
- Deer Travel Corridor
- Deer Wintering Area

New England Clean Energy Connect

Figure 4

Upper Kennebec Deer Travel Corridors

1,500 Feet

CENTRAL MAINE POWER

12/7/2018

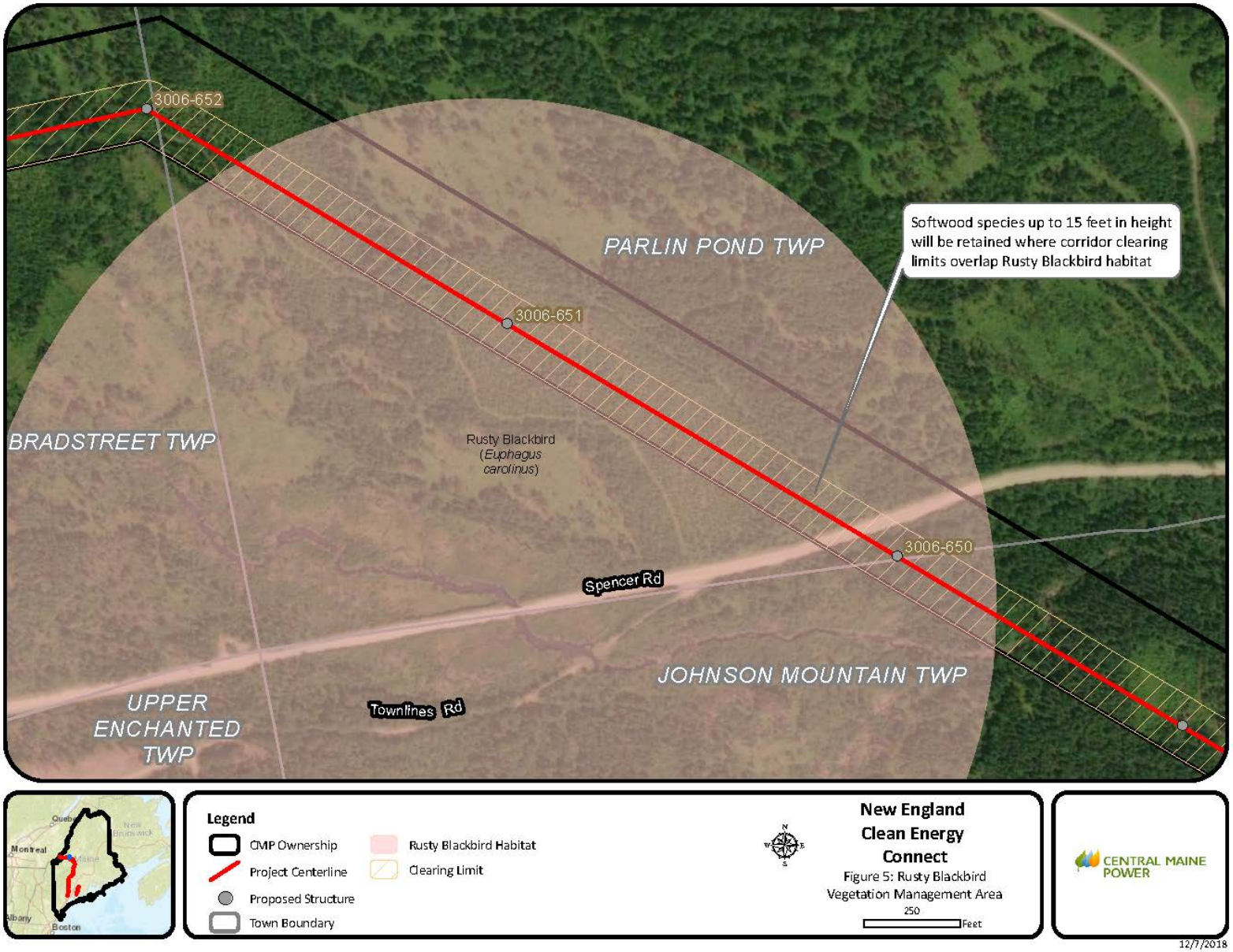

3006-652
3006-651
3006-650
PARLIN POND TWP
BRADSTREET TWP
UPPER ENCHANTED TWP
JOHNSON MOUNTAIN TWP
Rusty Blackbird (Euphagus carolinus)
Softwood species up to 15 feet in height will be retained where corridor clearing limits overlap Rusty Blackbird habitat
Spencer Rd
Townlines Rd
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Rusty Blackbird Habitat
Clearing Limit
New England Clean Energy Connect
Figure 5: Rusty Blackbird Vegetation Management Area
250
Feet
CENTRAL MAINE POWER
12/7/2018

Exhibit 10-2

New England Clean Energy Connect
Post-Construction Vegetation Maintenance Plan

Prepared by:

Central Maine Power Company
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Revised January 2019

CENTRAL MAINE POWER

Introduction

This Post-Construction Vegetation Maintenance Plan (VMP) describes the restrictive maintenance requirements for protected natural resources within Central Maine Power Company's (CMP) New England Clean Energy Connect (NECEC) project transmission line corridors. The requirements described in this VMP apply to routine maintenance and are not intended to apply to emergency maintenance and/or repair actions.

The goal of this VMP is to provide maintenance personnel and contractors with a cohesive set of vegetation maintenance specifications for transmission line corridors. This VMP is intended to be used in conjunction with project As-Built Plan & Profile drawings to locate the areas where maintenance restrictions apply.

The protected natural resources and visually sensitive areas subject to restrictive and protective maintenance requirements include:

- Wetlands and streams (intermittent and perennial);
- Perennial streams within Segment 1 (greenfield) portion of the NECEC project and all coldwater fishery streams
- Perennial streams within designated Atlantic salmon (Salmo salar) habitat;
- Outstanding river segments, rivers, streams or brooks containing threatened or endangered species;
- Gold Brook and Mountain Brook containing State Threatened (*Epeorus frisoni*) and/or State Special Concern (*Gyrinophilus porphyriticus*) species;
- State Special Concern Species Habitat: Rusty blackbird (*Euphagus carolinus*);
- Significant Vernal Pools (SVP);
- Inland Waterfowl and Wading Bird Habitat (IWWH);
- Deer Wintering Areas (DWA);
- Rare plant locations; and
- Locations over mapped significant sand and gravel aquifers.
- Viewpoints from Coburn Mountain and Rock Pond

In locations where individual restrictions or procedures overlap or multiple restrictions apply, the more stringent restrictions and all applicable procedures will be followed by maintenance personnel and contractors.

Right-of-Way Vegetation Maintenance Procedures

Typical Maintenance Procedures

Routine vegetation maintenance for transmission line corridors is intended to meet the following goals:

1. Maintain the integrity and functionality of the line
2. Maintain access in case of emergency repairs
3. Facilitate safety inspections.

Therefore, the objectives of this VMP will be to control the growth of woody vegetation capable of encroaching into the Minimum Vegetation Clearance Distance (MVCD) of the transmission line to ensure the integrity and safe operation of the transmission line consistent with the standards of North American Electric Reliability Corporation's (NERC) Transmission Vegetation Management[1]. This will be accomplished by practicing an integrated vegetation management strategy using a combination of hand-cutting and selective herbicide applications. Mechanical mowing may be used in unusual circumstances to regain control of vegetation, should the typical procedures not suffice.

Throughout clearing and construction, shrub and herbaceous vegetation will remain in place to the extent possible. Removing capable vegetation will be done during initial transmission line corridor clearing prior to construction of the new transmission line. Follow-up maintenance activities during operation of the line require the removal of "capable species," dead trees, and "hazard trees." Capable trees are those plant species and individual specimens that are capable of growing tall enough to violate the required clearance between the conductors and vegetation established by NERC. Due to the sag of the electric transmission lines between the poles, which varies with the distance between poles, tension on the wire, electrical load, air temperature and other variables, the required clearance is typically achieved by removing all capable species during each maintenance cycle. Removing capable species vegetation allows for the maintenance of 25 feet of separation between vegetation and the lines, thereby adhering to NERC standards. Hazard trees are those trees typically on the edge of the transmission line corridor that pose an imminent threat to violating the minimum separation standard or are at risk of contacting the lines themselves. Hazard trees are typically removed immediately upon identification.

More frequent vegetation management may be required within the first 3 to 4 years following construction in order to bring the vegetation under control. After this initial management period, maintenance practices are typically carried out on a 4-year cycle depending on growth, weather, geographic location, and corridor width. Maintenance may be required less frequently in the long-term as vegetation within the corridor becomes dominated by shrub and herbaceous species. Large branches that overhang the transmission line corridor and any hazard trees on the edge of,

[1] North American Electric Reliability Corporation Transmission Vegetation Management, Standard FAC 003 – 3 Technical Reference, July 1, 2014.

or outside of, the transmission line corridor that could contact the electrical lines or come within 15 feet of a conductor may be removed as soon as they are identified.

The following procedures will be implemented during vegetation maintenance activities to protect sensitive natural resources:

- Protected resources and their associated buffers will be flagged or located with a Global Positioning System (GPS) prior to all maintenance operations;
- Hand-cutting will be the preferred method of vegetation maintenance within buffers and sensitive areas, where reasonable and practicable;
- Equipment access through wetlands or over streams will be avoided as much as practicable by utilizing existing public or private access roads, with landowner approval where required;
- Equipment access in upland areas with saturated soils will be minimized to the extent practicable to avoid rutting or other ground disturbance;
- Significant damage to wetland or stream bank vegetation, if any, will be repaired following completion of maintenance activities in the area; and
- Areas of significant soil disturbance will be stabilized and reseeded following completion of maintenance activity in the area.

Vegetation Maintenance Methods – All Transmission Line Corridor Areas

Mechanical Methods

During routine vegetation maintenance after construction, mechanical methods of maintaining the height of vegetation on the transmission line corridor will consist primarily of cutting with hand tools, with occasional use of chainsaws and limited use of motorized equipment in areas directly accessible from public or private access roads.

Maintenance procedures will be to cut all capable species and any dead or hazard trees at ground level except in designated areas, as described below. Large vegetation cut during routine maintenance will be handled in accordance with the Maine Slash Law[2].

Herbicide Application

Herbicide application will be used in conjunction with the mechanical methods of vegetation maintenance. The herbicide application program is consistent with most New England utilities and consists of direct application to targeted species and specimens along the transmission line corridor with a low-volume foliar herbicide or application of herbicides to cut stumps and surfaces of larger trees. Direct application to individual plant species, as opposed to a broadcast spray, will control only the targeted woody vegetation allowing low-growing plant communities

2 12 MRSA §9331 et. Seq.

(the desired shrub and herbaceous species) to thrive. Selective herbicides will also be used to minimize the impacts to non-target species. Aerial application will not be used. Only herbicides which are registered with and approved by the U.S. Environmental Protection Agency (EPA-approved) and registered with the Maine Board of Pesticides Control (BPC) will be used.

Herbicide applications will likely begin the first year after construction is completed to gain control of vegetation growth. When control is achieved, treatment will typically occur on a 4-year cycle or as needed. By using selective herbicides and a variety of application methods, vegetation along the transmission line corridor will eventually consist of a dense, low-growing plant community that will discourage the establishment of tree species. Therefore, fewer woody species will require treatment in future applications.

The following procedures will be implemented during herbicide applications:

- Herbicides will be used in strict accordance with the manufacturer's EPA-approved labeling and will not be applied directly to waterbodies or areas where surface water is present.
- In the new (greenfield) corridor no foliar herbicides will be applied within a 100-foot buffer on all perennial streams.
- Throughout the Project corridor no foliar herbicides will be applied within a 100-foot buffer on all coldwater fishery[3] streams, or within a 75-foot buffer on intermittent streams.
- In co-located sections, foliar herbicides will not be applied within 75 feet of rivers, streams, brooks, lakes, ponds, or wetlands that have water present at the surface at the time of the application.
- In co-located sections, if a stream is classified as a coldwater fishery, an outstanding river segment or contains threatened or endangered species, foliar herbicides will not be applied within 100 feet of such streams;
- Herbicides will not be mixed, transferred or stored within 100 feet of any wetland or surface water, unless done so on a public access road;
- Herbicides will not be mixed, transferred or stored within 100 feet of Significant Vernal Pool depressions, unless done so on a public access road;
- Herbicides will not be mixed, transferred or stored over mapped significant sand and gravel aquifers unless done so on a public access road;
- Herbicides will not be applied, mixed, transferred or stored within 100 feet of any known private well or spring or within 200 feet of any known public water supply well, unless done so on a public access road

[3] The term coldwater fishery, as used in this document, pertains to streams that are known to contain brook trout as designated by the Maine Department of Inland Fisheries and Wildlife.

- When herbicide applications are performed in wetlands without standing water, only herbicides approved for use in wetland environments will be used;
- Herbicides will not be applied to any area when it is raining or when wind speed exceeds 15 miles per hour as measured on-site at the time of application. When wind speeds are below 3 miles per hour, applicators should be aware whether a temperature inversion is present, and should consult the herbicide label to determine whether application should proceed under these conditions;
- The foreman or licensed applicator on each herbicide application crew will be licensed by the Maine BPC and will remain in eye contact and within earshot of all persons on his/her crew applying herbicides. At least one individual from any company applying herbicides must also hold a Commercial Master Applicator License issued by the BPC. This Master Applicator must have the ability to be on-site to assist persons applying herbicides within six hours driving time. If an out-of-state company is conducting the herbicide application, the company must have a Master Applicator in Maine during any application. Application of herbicides will be in accordance with applicable regulations promulgated under the Maine Pesticides Control Act, including those regulations to minimize drift, to maintain setbacks from sensitive areas during application, and to maintain setbacks from surface waters during the storing/mixing/loading of herbicides; and
- Herbicides will typically be mixed in a truck-mounted tank that remains on public access roads. Herbicide application is done by personnel with low-volume, hand-pressurized (manual) backpacks with appropriate nozzles, to minimize drift, who travel along the transmission line corridor by foot or by all-terrain vehicle and spot-treat target species and specimens.

The location of all streams, wetlands, significant vernal pools, rare plant locations, known wells, and mapped significant sand and gravel aquifers crossed by the transmission line corridor will be shown on the As-Built Plan & Profile drawings. GIS shapefiles will also be maintained with the location of these resources and will be provided to maintenance personnel. The presence of surface water will be determined prior to herbicide use in any wetland or waterbody. Crew leaders will assure that resources and buffers are clearly marked in the field, or that locations of resources and buffers are provided as GIS/GPS data prior to initiation of an herbicide application for clear identification by the applicators.

Petroleum Products & Hazardous Materials Management

Any petroleum products or other hazardous material within the transmission line corridor during construction will be managed in accordance with CMP's Environmental Control Requirements (**see Exhibit 15-1**) and will include the following setbacks unless CMP can demonstrate that, due to special circumstances at specified locations, these setbacks are impractical at those locations:

(a) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 100 feet of a protected wetland or other waterbody, unless no practicable

alternative exists and secondary containment with 110% capacity is provided for any fuel storage containers or tanks, or if it occurs on a paved road.

(b) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 200 feet of a known private water supply.

(c) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 400 feet of a known public water supply.

(d) No fuel storage, vehicle/equipment parking and maintenance and refueling activity may occur within 25 feet minimum of the following:

(i) An area listed in Maine's biological conservation data system, Biotics, of the Maine Natural Areas Program, including rare natural communities and ecosystems (state rarity rank of S1 through S3 and habitats supporting Endangered or Threatened plant species). Boundaries and locations are as determined by the Maine Natural Areas Program of the Department of Agriculture, Conservation and Forestry.

(ii) Habitat of any species declared rare, threatened or endangered by the Maine Department of Inland Fisheries and Wildlife, Maine Department of Marine Resources, or the Director of the U.S. Fish and Wildlife Service.

Vegetation Maintenance within Freshwater Wetlands

Transmission line corridor wetlands range in type from small, emergent wetlands formed in ruts from logging equipment to large forested wetland systems. No specific buffers are proposed for the wetlands identified within the transmission line corridor.

Additional Vegetation Maintenance Restrictions within and Adjacent to Freshwater Wetlands

Vegetation maintenance within, and within 25 feet of, freshwater wetlands with standing water will be conducted only by hand cutting with hand tools or chainsaws. Herbicide use is permitted in wetlands only when no standing water is present in the wetland at the time of the application. Herbicides will not be stored, mixed, transferred between containers, and no refueling of chain saws or other equipment will be allowed, within 100 feet of freshwater wetlands, unless done so on a public access road.

Vegetation Maintenance within Stream Buffers

A 75-foot buffer, as measured from the top of each stream bank, will be established for vegetation maintenance along perennial and intermittent streams not designated as coldwater fisheries, within the transmission line corridor. Additional restrictions will be applied within 100 feet of streams

meeting certain criteria, as described below. Special restrictions will apply within these stream buffers during vegetation maintenance.

This section describes the restrictions related to vegetation cutting and maintenance within these stream buffers. All vegetation maintenance procedures and restrictions that apply to typical transmission line corridor maintenance also apply within stream buffers.

Additional Vegetation Maintenance Restrictions within Stream Buffers

The following additional restrictions apply to vegetation maintenance within stream buffers:

- 100-foot buffers will be established for all perennial streams within Segment 1 (greenfield portion) of the Project.
- 100-foot buffers will be established for all coldwater fishery streams, outstanding river segments, and rivers, streams, or brooks containing threatened or endangered species, unless the Department determines that the functions and values of the buffer will not be impacted by the removal of vegetation and approves an alternative minimum buffer. In no case may this buffer be reduced to less than 25 feet.
- The boundary of each stream buffer will have unique flagging installed to distinguish between the applicable 75 foot or 100 foot stream buffer prior to vegetation management activities.
- Within that portion of the appropriate stream buffer that is within the wire zone (i.e., within 15 feet, horizontally, of any conductor; see Figure 1), all woody vegetation over 10 feet in height, whether capable or non-capable, will be cut back to ground level and resulting slash will be managed in accordance with Maine's Slash Law. No other vegetation, other than dead or hazard trees, will be removed;
- Removal of capable species, dead or hazard trees within the appropriate stream buffer will be accomplished by hand-cutting only. Mechanized harvesting equipment will not be used;
- Herbicides will not be applied within 75-foot or 100-foot stream buffers;
- Herbicides will not be stored, mixed or transferred between containers within 100 feet of streams, unless done so on a paved public access road;
- No refueling or maintenance of equipment, including chainsaws, will occur within 100 feet of streams, unless done so on a paved public access road; and
- No slash will be left within 50 feet of the edge of any stream.

These additional restrictions will allow for taller vegetation within the appropriate stream buffer to provide shading and to reduce the warming effect of direct sunlight (insolation). Low ground cover vegetation will also remain to filter any sediment in surface runoff. The restrictions are also intended to minimize ground disturbance and prevent or minimize the surface transport of

herbicides and petroleum products to streams. These restrictions will allow the stream buffers to provide functions and values similar to those provided prior to transmission line construction.

Vegetation Maintenance within the Roaring Brook Mayfly and Northern Spring Salamander Conservation Management Areas of Mountain Brook and Gold Brook

During consultation with the Maine Department of Inland Fisheries and Wildlife (MDIFW) for the NECEC project, MDIFW identified Gold Brook (PSTR 15-06, PSTR 16-07, PSTR 16-10 and PSTR 16-15) and Mountain Brook (PSTR-33-01, PSTR-EM-34-01, PSTR-EM-34-01) as high priority resources in which full height vegetation should be retained within the 250 foot conservation management areas (CMA) to protect habitat for Roaring Brook Mayfly (*Epeorus frisoni*) and Northern Spring Salamander (*Gyrinophilus porphyriticus)*. Mountain Brook contains both Roaring Brook Mayfly and Northern Spring Salamander habitat, while field survey results concluded that Gold Brook only contains Roaring Brook Mayfly habitat.

Installation of taller structures will facilitate the retention of full height vegetation within these CMAs. Although CMP will retain full height vegetation within these CMAs, CMP will selectively cut at ground level and remove any trees within these CMAs that are intruding into the conductor safety zone or are at risk of growing into the conductor safety zone prior to the next scheduled vegetation maintenance.

Access roads and structure preparation/installation areas within these conservation management areas will be maintained as scrub-shrub habitat to allow for maintenance, repair and/or emergency access. All other areas depicted on Figure 2 and Figure 3 will be retained as full height vegetation.

Vegetation Maintenance within Significant Vernal Pool Buffers

Vegetated buffers of 100 feet, as measured from the edge of the pool depression, will be established for SVPs crossed by the transmission line corridor. Vegetation maintenance within the SVP buffers will be subject to the same procedures and prohibitions, as applicable, which are required in the typical transmission line corridor, as well as to the additional measures below.

Additional Vegetation Maintenance Restrictions within Significant Vernal Pool Buffer

The following additional restrictions apply to vegetation maintenance within SVP buffers:

- Mechanized equipment will not be allowed within the vernal pool depression, unless the depression encompasses the entire width of the transmission line corridor. Mechanized equipment will only be allowed to cross the vernal pool depressions during frozen or dry conditions or with the use of mats;
- Between April 1 and June 30, no vegetation maintenance using tracked or wheeled equipment will be performed within the 100-foot buffer. Maintenance will be performed using only hand tools during this period;

- Between April 1 and June 30, no vegetation maintenance will occur within 25 feet of the SVP pool depression;
- No refueling or maintenance of equipment, including chainsaws, will occur within 100 feet of SVP pool depression, unless done so on a public access road; and
- No herbicide use is permitted within 25 feet of the SVP pool depression.

Vegetation Maintenance within Inland Waterfowl and Wading Bird Habitat

Inland Waterfowl and Wading Bird Habitats (IWWH) are habitats mapped by the MDIFW that contain an inland wetland complex used by waterfowl and wading birds, plus a 250-foot nesting habitat area surrounding the wetland. The nesting habitat is considered to be part of the mapped IWWH. No additional buffers are proposed for IWWHs beyond this mapped habitat, and as such the vegetation maintenance restrictions apply to the mapped habitat only.

Vegetation maintenance within the IWWH will be subject to the same procedures and prohibitions, as applicable, which are required in the typical transmission line corridor and for stream buffers.

Additional Vegetation Maintenance Restrictions within Inland Waterfowl and Wading Bird Habitat

The following additional restrictions would apply to vegetation maintenance within mapped IWWH:

- Between April 15 and July 15, use of motorized vehicles (e.g., all-terrain vehicles) and mechanized equipment (e.g., chainsaws or brush cutters) within IWWH is prohibited. Use of non-mechanized hand tools is allowed during this time period;
- No refueling or maintenance of equipment, including chainsaws, will occur within the IWWH, unless done so on a public access road; and
- No herbicide use is permitted within 25 feet of any wetland within the mapped IWWH.

Vegetation Maintenance within Mapped Deer Wintering Areas

Deer Wintering Areas (DWA) provide important refuge for white-tailed deer (*Odocoileus virginianus*) during the winter months in northern climates and are typically characterized by an extensive stand of mature softwood species with a dense forest canopy.

With the exception of the Upper Kennebec DWA, described below, no additional vegetation maintenance restrictions are proposed within mapped DWAs, as all capable species must be removed from these and other areas within the transmission line corridor in order to comply with NERC Transmission Vegetation Management standards.

Additional Vegetation Maintenance Restrictions within the Upper Kennebec Deer Wintering Area

As a result of consultation with MDIFW for the NECEC Project, CMP has identified and designated ten deer travel corridors within the Upper Kennebec River DWA (Map ID 060065), as shown in Figure 4 of this exhibit, which will be managed as softwood stands to promote deer movement across the transmission line corridor during the winter months when snow depths have the potential to inhibit deer travel. The NECEC transmission line corridor traverses this DWA from a point in The West Forks Plantation to a point in Moxie Gore. CMP has agreed to manage these deer travel corridors, designated and labeled Corridors 1 through 8 in Figure 4, as softwood stands and will allow for the maximum tree height that can be practically maintained without encroaching into the conductor safety zone of the transmission line or into the necessary scrub/shrub area adjacent to each structure. Tree heights in these areas will vary based on structure height, conductor sag, and topography, but will generally range from 25 to 35 feet. Vegetation within Corridors 9 and 10, which are located where the transmission line will be buried using horizontal directional drilling, will be allowed to grow to its full height.

Within designated deer travel corridors 1 through 8, during routine vegetation maintenance, hardwood and softwood species that are intruding into the conductor safety zone or are at risk of growing into the conductor safety zone prior to the next scheduled vegetation maintenance will be cut at ground level and removed. Softwood specimens that are not intruding into the conductor safety zone, and are not at risk of growing into the conductor safety zone prior to the next scheduled maintenance, will be retained. Access roads and structure preparation and installation areas will be maintained as scrub-shrub habitat to allow for maintenance, repair, and/or emergency access. The designated deer travel corridors will be flagged prior to maintenance activities and identified in a database maintained by CMP, further described below in Locating and Marking Buffers and Habitats.

Vegetation Maintenance within State mapped Rusty Blackbird Habitat

In consultation with MDIFW for the NECEC project, CMP agreed to allow for the retention of 15-foot tall softwood species within the Rusty Blackbird (Euphagus carolinus) habitat, shown in Figure 5. The additional height will avoid project impacts to the habitat of this State Species of Special Concern.

During routine vegetation maintenance, hardwood and softwood specimens that are taller than 15 feet or are anticipated to grow taller than 15 feet prior to the next scheduled vegetation maintenance, will be cut at ground level. Softwood specimens up to 15 feet in height will be retained. The access roads and structure preparation areas within the Rusty Blackbird habitat will be maintained as scrub-shrub habitat to allow for maintenance, repair and/or emergency access. The habitat will be flagged prior to construction and identified in a database maintained by CMP, further described below in *Locating and Marking Buffers and Habitats*.

Vegetation Maintenance within Rare Plant Locations

Vegetation maintenance of the transmission line corridor has the potential to impact rare plants and/or alter their habitat. The following additional vegetative maintenance restrictions will minimize impacts to rare plants. The additional restrictions will apply only to the demarcated locations of the identified rare plants. No additional buffers will be established surrounding rare plant locations. These restrictions are intended to maintain existing hydrology and limit soil disturbance within rare plant locations.

Additional Vegetation Maintenance Restrictions within Rare Plant Locations

The following additional restrictions will apply to vegetation maintenance for the species listed above in the identified location:

- All capable tree species will be cut by hand (chainsaws, hand saws or axes). No other mechanized cutting equipment shall be used within these habitats;
- Unless rare plant locations encompass the entire width of the transmission line corridor, mechanized equipment will only be allowed to cross rare plant locations during frozen conditions or with the use of mats;
- No refueling or maintenance of equipment, including chainsaws, will occur within demarcated rare plant locations, unless done on a public access road; and
- No foliar herbicide use is permitted within the demarcated rare plant locations, however cut surface herbicides may be used on capable species and specimens.
- Crossing of rare plant locations with mechanized equipment:

  <u>All-Terrain Vehicles (ATVs)</u>

  - Due to small footprint, relatively light weight, and infrequency of use, ATV impact is minimal, therefore crane mats will not be used.
  - If rare plants do not encompass entire ROW width, ATVs will avoid/travel around rare plants.
  - If rare plants encompass entire ROW width:
    - ATVs will utilize existing rare plant travel path/crossing if one exists.
    - If no rare plant crossing exists, ATVs will cross at narrowest point of the rare plants and will restrict this crossing to a single travel lane.

  <u>Heavy Equipment/Vehicles</u>

  - During emergency repair & maintenance work, crane mats will not be used. Heavy equipment/vehicles will utilize existing rare plant crossings if available.
  - During planned repair & maintenance work:
    - If rare plants do not encompass entire ROW width, heavy equipment/vehicles will avoid/travel around rare plants. Crane mats will not be used.

- If rare plants encompass entire ROW width, and there is an established travel path/crossing through the rare plants, heavy equipment/vehicles will utilize this crossing, and crane mats will not be used.
- If rare plants encompass entire ROW width, but there is no established travel path through the rare plants, heavy equipment/vehicles will cross rare plants using crane mats.

Maintenance Procedures for Mapped Significant Sand and Gravel Aquifers

Transmission lines located over mapped significant sand and gravel aquifers are subject to the typical transmission line corridor maintenance procedures, except that no refueling or maintenance of equipment, and no herbicides may be mixed, transferred or stored, over the mapped significant sand and gravel aquifers, unless done so on a public access road.

Maintenance Procedures in Tapered Vegetation Management Areas

In consultation with MDEP and the LUPC, CMP determined that management of vegetation in a tapered configuration and manner was appropriate in order to minimize the visual impact from viewpoints on the summit of Coburn Mountain in Upper Enchanted Township and from Rock Pond looking towards Three Slide Mountain in T5 R6 BKP WKR. These areas include the following coordinates:

Coburn Mountain – From: 45°25'45.01"N, 70° 6'8.22"W To: 45°27'37.45"N, 70° 6'51.44"W

Rock Pond – From: 45°27'48.24"N, 70°25'31.82"W To: 45°27'54.92"N , 70°26'3.11"W

Vegetation outside of the wire zone in these locations will be managed such that capable vegetation will be maintained in a tapered configuration to the extent practicable, with heights ranging from 15 feet (from the outer edges of the wire zone toward the corridor edges for a distance of approximately 20 feet on each side), to 25 feet (from the outer edges of the 15 foot tall areas, for a distance of approximately 20 feet on each side), to 35 feet (from the outer edges of the 25 foot tall areas to the edges of the maintained right of way, for a distance of approximately 20 feet on each side). Capable vegetation will be selectively cut during periodic (every 4 years) routine maintenance cycles to remove individual specimens likely to either grow into the conductor safety zone prior to the next scheduled maintenance cycle, or likely to grow taller than the above target heights prior to the next scheduled maintenance cycle.

Locating and Marking Buffers and Habitats

A database will be maintained, including maps and GIS shapefiles, of the buffers, restricted habitats, and sensitive areas and their locations relative to the nearest structure (pole) or road location. The distance and direction from the nearest structure to the sensitive area will be included with the name of the area and the structure number. All structures along the transmission line corridor will be numbered at the time of construction.

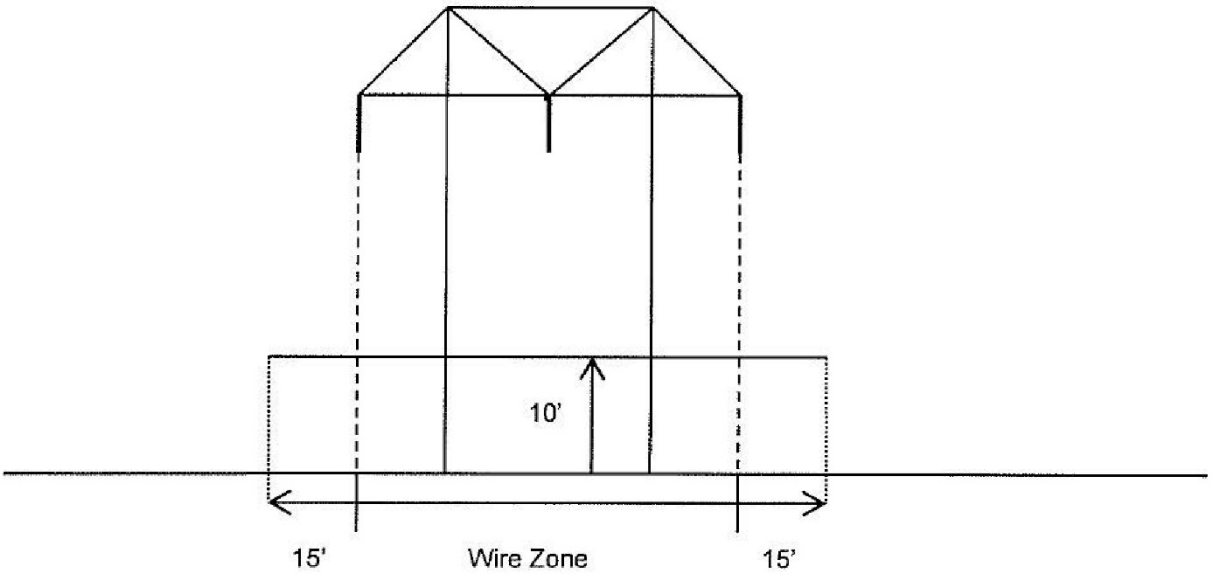
To aid in identifying restricted areas, buffers and restricted habitats may be located and demarcated in the field using brightly colored flagging or signage prior to the initiation of maintenance activities along the transmission line corridor. Alternatively, use of GIS data and GPS equipment may be used to provide accurate location of resources and associated buffers during maintenance activities. If desired, maintenance personnel may permanently demarcate restricted habitats to aid in long-term maintenance activities. Maintenance contractors working on the transmission line corridor will be provided a copy of this VMP. Use of this VMP in conjunction with the As-Built Plan & Profile drawings will enable maintenance contractors to locate and mark restricted areas in the field.

Maintenance Personnel Training

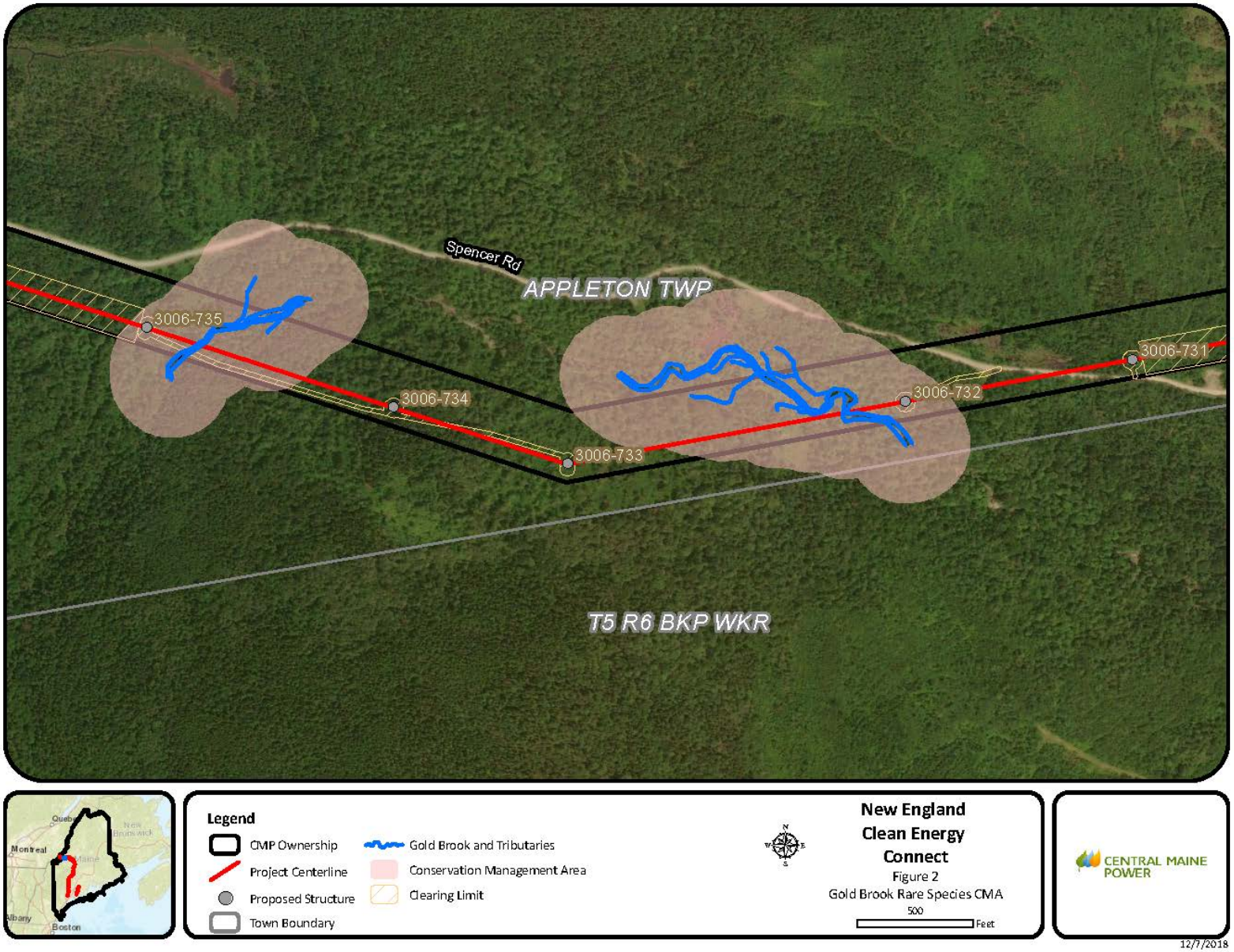
Personnel who will conduct vegetation maintenance activities on the transmission line corridor will receive appropriate environmental training before being allowed access to the transmission line corridor. Maintenance personnel will be required to review this VMP prior to the training and before conducting any maintenance activities. The level of training will be dependent on the duties of the personnel. The training will be given prior to the start of maintenance activities. Replacement or new maintenance personnel that did not receive the initial training will receive similar training prior to performing any maintenance activities on the transmission line corridor.

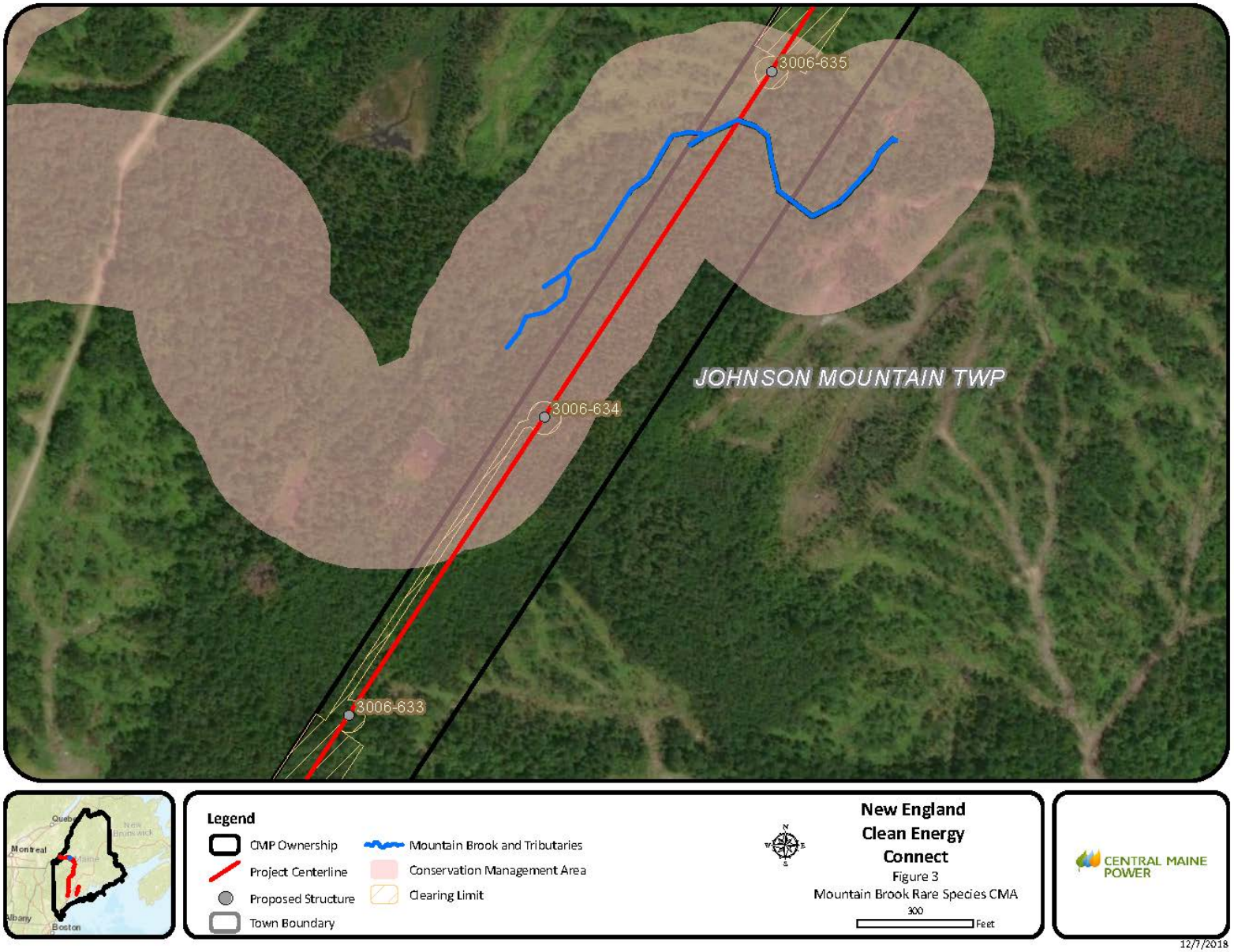
The training session will consist of a review of the buffers and restricted habitats, the respective maintenance requirements and restrictions for each, and a review of how these areas and resources can be located in the field. Training will include familiarization with and use of GIS information and sensitive natural resource identification in conjunction with the contents of this VMP, as well as basic causes, preventive and remedial measures for contamination, and erosion and sedimentation of water resources. Training will also include a review of safety and the proper use of appropriate maintenance tools.

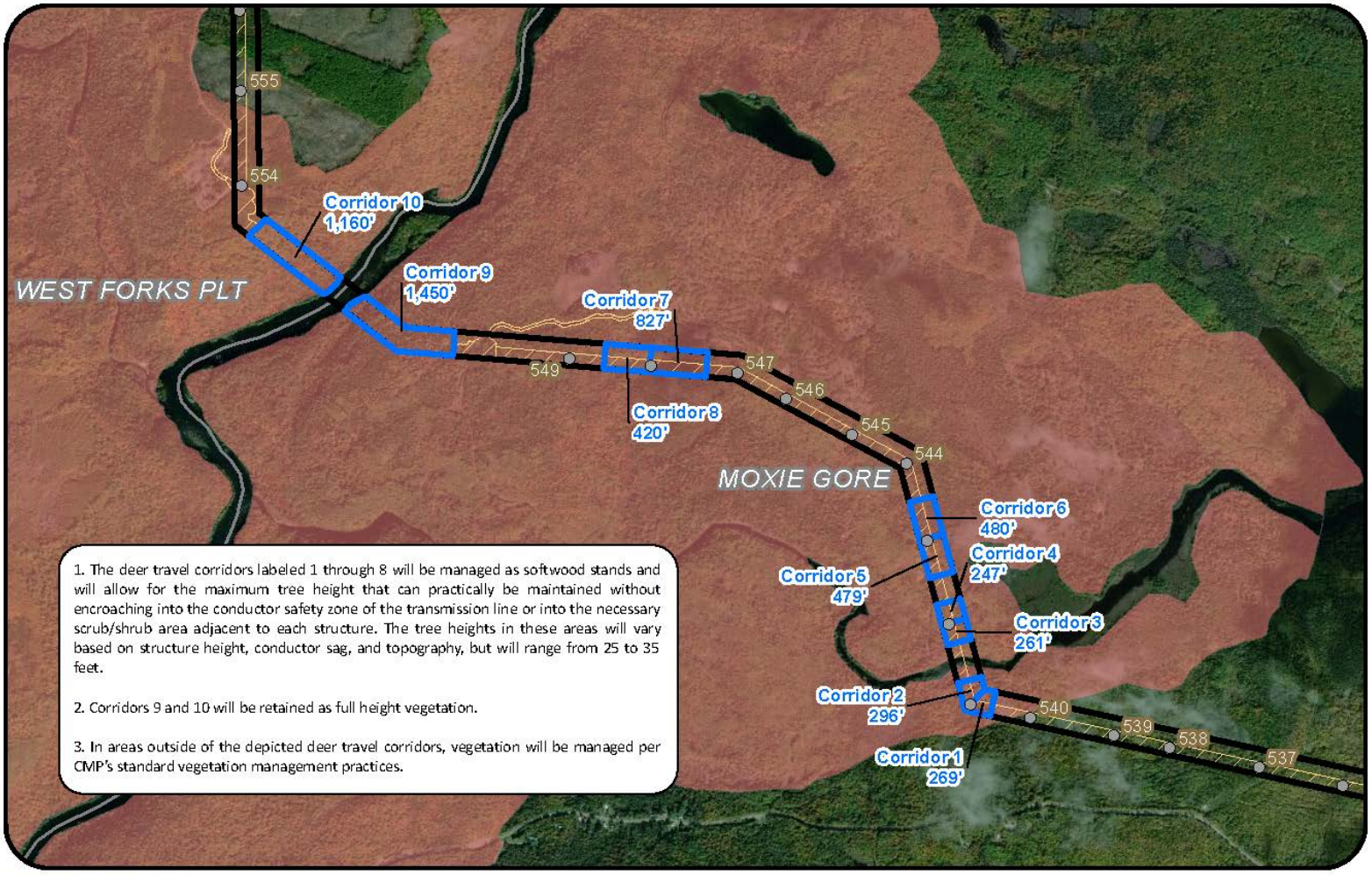
Figure 1



1. Capable species, regardless of height, are cut back to ground level or treated with herbicides within the entire length and width of the transmission line corridor during scheduled vegetation maintenance (every 4 years). However, within stream buffers, only capable specimens over 10 feet tall may be cut or treated (specimens at or above this height are likely to grow into the conductor safety zone prior to the next scheduled vegetation maintenance cycle).
2. All woody vegetation over 10 feet in height and inside the wire zone, whether capable or non-capable, is cut back to ground level during scheduled vegetation maintenance.


Spencer Rd
APPLETON TWP
3006-735
3006-734
3006-733
3006-732
3006-731
T5 R6 BKP WKR
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Gold Brook and Tributaries
Conservation Management Area
Clearing Limit
New England
Clean Energy
Connect
Figure 2
Gold Brook Rare Species CMA
500
Feet
CENTRAL MAINE POWER
12/7/2018


3006-635
JOHNSON MOUNTAIN TWP
3006-634
3006-633
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Mountain Brook and Tributaries
Conservation Management Area
Clearing Limit
New England
Clean Energy
Connect
Figure 3
Mountain Brook Rare Species CMA
300
Feet
CENTRAL MAINE
POWER
12/7/2018



Legend

- CMP Ownership
- Proposed Structure
- Town Boundary
- Clearing Limit
- Deer Travel Corridor
- Deer Wintering Area

New England Clean Energy Connect

Figure 4

Upper Kennebec Deer Travel Corridors

1,500 Feet

CENTRAL MAINE POWER

12/7/2018

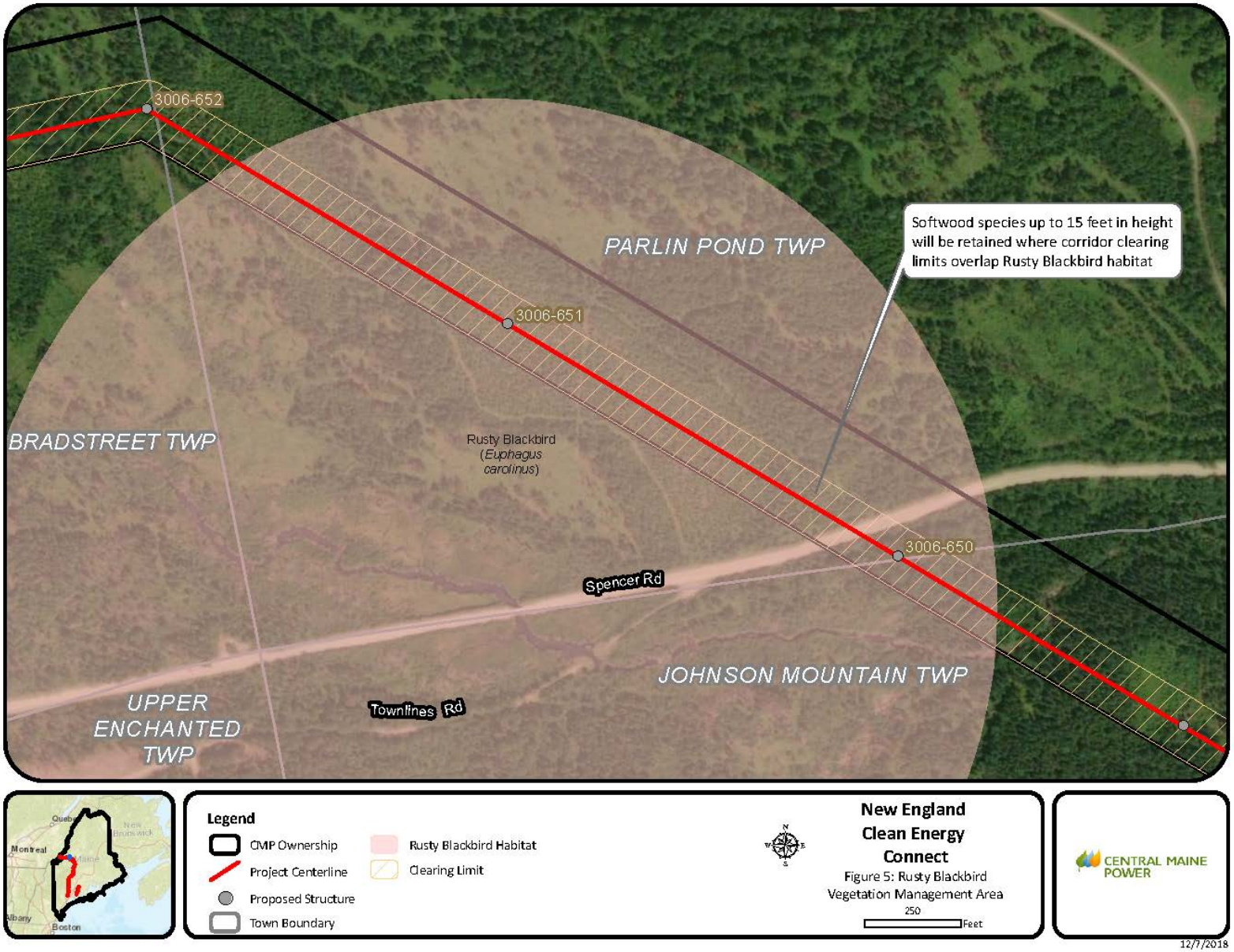

3006-652
3006-651
3006-650
PARLIN POND TWP
Softwood species up to 15 feet in height will be retained where corridor clearing limits overlap Rusty Blackbird habitat
BRADSTREET TWP
Rusty Blackbird (Euphagus carolinus)
Spencer Rd
JOHNSON MOUNTAIN TWP
UPPER ENCHANTED TWP
Townlines Rd
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Rusty Blackbird Habitat
Clearing Limit
New England Clean Energy Connect
Figure 5: Rusty Blackbird Vegetation Management Area
250
Feet
CENTRAL MAINE POWER
12/7/2018

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Exhibit 10-2

New England Clean Energy Connect
Post-Construction Vegetation Maintenance Plan

Prepared by:

Central Maine Power Company
83 Edison Drive
Augusta, Maine 04336

Revised January 2019

CENTRAL MAINE POWER

Introduction

This Post-Construction Vegetation Maintenance Plan (VMP) describes the restrictive maintenance requirements for protected natural resources within Central Maine Power Company's (CMP) New England Clean Energy Connect (NECEC) project transmission line corridors. The requirements described in this VMP apply to routine maintenance and are not intended to apply to emergency maintenance and/or repair actions.

The goal of this VMP is to provide maintenance personnel and contractors with a cohesive set of vegetation maintenance specifications for transmission line corridors. This VMP is intended to be used in conjunction with project As-Built Plan & Profile drawings to locate the areas where maintenance restrictions apply.

The protected natural resources and visually sensitive areas subject to restrictive and protective maintenance requirements include:

- Wetlands and streams (intermittent and perennial);
- Perennial streams within Segment 1 (greenfield) portion of the NECEC project and all coldwater fishery streams
- Perennial streams within designated Atlantic salmon (Salmo salar) habitat;
- Outstanding river segments, rivers, streams or brooks containing threatened or endangered species;
- Gold Brook and Mountain Brook containing State Threatened (*Epeorus frisoni*) and/or State Special Concern (*Gyrinophilus porphyriticus*) species;
- State Special Concern Species Habitat: Rusty blackbird (*Euphagus carolinus*);
- Significant Vernal Pools (SVP);
- Inland Waterfowl and Wading Bird Habitat (IWWH);
- Deer Wintering Areas (DWA);
- Rare plant locations; and
- Locations over mapped significant sand and gravel aquifers.
- Viewpoints from Coburn Mountain and Rock Pond

In locations where individual restrictions or procedures overlap or multiple restrictions apply, the more stringent restrictions and all applicable procedures will be followed by maintenance personnel and contractors.

Right-of-Way Vegetation Maintenance Procedures

Typical Maintenance Procedures

Routine vegetation maintenance for transmission line corridors is intended to meet the following goals:

1. Maintain the integrity and functionality of the line
2. Maintain access in case of emergency repairs
3. Facilitate safety inspections.

Therefore, the objectives of this VMP will be to control the growth of woody vegetation capable of encroaching into the Minimum Vegetation Clearance Distance (MVCD) of the transmission line to ensure the integrity and safe operation of the transmission line consistent with the standards of North American Electric Reliability Corporation's (NERC) Transmission Vegetation Management[1]. This will be accomplished by practicing an integrated vegetation management strategy using a combination of hand-cutting and selective herbicide applications. Mechanical mowing may be used in unusual circumstances to regain control of vegetation, should the typical procedures not suffice.

Throughout clearing and construction, shrub and herbaceous vegetation will remain in place to the extent possible. Removing capable vegetation will be done during initial transmission line corridor clearing prior to construction of the new transmission line. Follow-up maintenance activities during operation of the line require the removal of "capable species," dead trees, and "hazard trees." Capable trees are those plant species and individual specimens that are capable of growing tall enough to violate the required clearance between the conductors and vegetation established by NERC. Due to the sag of the electric transmission lines between the poles, which varies with the distance between poles, tension on the wire, electrical load, air temperature and other variables, the required clearance is typically achieved by removing all capable species during each maintenance cycle. Removing capable species vegetation allows for the maintenance of 25 feet of separation between vegetation and the lines, thereby adhering to NERC standards. Hazard trees are those trees typically on the edge of the transmission line corridor that pose an imminent threat to violating the minimum separation standard or are at risk of contacting the lines themselves. Hazard trees are typically removed immediately upon identification.

More frequent vegetation management may be required within the first 3 to 4 years following construction in order to bring the vegetation under control. After this initial management period, maintenance practices are typically carried out on a 4-year cycle depending on growth, weather, geographic location, and corridor width. Maintenance may be required less frequently in the long-term as vegetation within the corridor becomes dominated by shrub and herbaceous species. Large branches that overhang the transmission line corridor and any hazard trees on the edge of,

[1] North American Electric Reliability Corporation Transmission Vegetation Management, Standard FAC 003 – 3 Technical Reference, July 1, 2014.

or outside of, the transmission line corridor that could contact the electrical lines or come within 15 feet of a conductor may be removed as soon as they are identified.

The following procedures will be implemented during vegetation maintenance activities to protect sensitive natural resources:

- Protected resources and their associated buffers will be flagged or located with a Global Positioning System (GPS) prior to all maintenance operations;
- Hand-cutting will be the preferred method of vegetation maintenance within buffers and sensitive areas, where reasonable and practicable;
- Equipment access through wetlands or over streams will be avoided as much as practicable by utilizing existing public or private access roads, with landowner approval where required;
- Equipment access in upland areas with saturated soils will be minimized to the extent practicable to avoid rutting or other ground disturbance;
- Significant damage to wetland or stream bank vegetation, if any, will be repaired following completion of maintenance activities in the area; and
- Areas of significant soil disturbance will be stabilized and reseeded following completion of maintenance activity in the area.

Vegetation Maintenance Methods – All Transmission Line Corridor Areas

Mechanical Methods

During routine vegetation maintenance after construction, mechanical methods of maintaining the height of vegetation on the transmission line corridor will consist primarily of cutting with hand tools, with occasional use of chainsaws and limited use of motorized equipment in areas directly accessible from public or private access roads.

Maintenance procedures will be to cut all capable species and any dead or hazard trees at ground level except in designated areas, as described below. Large vegetation cut during routine maintenance will be handled in accordance with the Maine Slash Law[2].

Herbicide Application

Herbicide application will be used in conjunction with the mechanical methods of vegetation maintenance. The herbicide application program is consistent with most New England utilities and consists of direct application to targeted species and specimens along the transmission line corridor with a low-volume foliar herbicide or application of herbicides to cut stumps and surfaces of larger trees. Direct application to individual plant species, as opposed to a broadcast spray, will control only the targeted woody vegetation allowing low-growing plant communities

2 12 MRSA §9331 et. Seq.

(the desired shrub and herbaceous species) to thrive. Selective herbicides will also be used to minimize the impacts to non-target species. Aerial application will not be used. Only herbicides which are registered with and approved by the U.S. Environmental Protection Agency (EPA-approved) and registered with the Maine Board of Pesticides Control (BPC) will be used.

Herbicide applications will likely begin the first year after construction is completed to gain control of vegetation growth. When control is achieved, treatment will typically occur on a 4-year cycle or as needed. By using selective herbicides and a variety of application methods, vegetation along the transmission line corridor will eventually consist of a dense, low-growing plant community that will discourage the establishment of tree species. Therefore, fewer woody species will require treatment in future applications.

The following procedures will be implemented during herbicide applications:

- Herbicides will be used in strict accordance with the manufacturer's EPA-approved labeling and will not be applied directly to waterbodies or areas where surface water is present.
- In the new (greenfield) corridor no foliar herbicides will be applied within a 100-foot buffer on all perennial streams.
- Throughout the Project corridor no foliar herbicides will be applied within a 100-foot buffer on all coldwater fishery[3] streams, or within a 75-foot buffer on intermittent streams.
- In co-located sections, foliar herbicides will not be applied within 75 feet of rivers, streams, brooks, lakes, ponds, or wetlands that have water present at the surface at the time of the application.
- In co-located sections, if a stream is classified as a coldwater fishery, an outstanding river segment or contains threatened or endangered species, foliar herbicides will not be applied within 100 feet of such streams;
- Herbicides will not be mixed, transferred or stored within 100 feet of any wetland or surface water, unless done so on a public access road;
- Herbicides will not be mixed, transferred or stored within 100 feet of Significant Vernal Pool depressions, unless done so on a public access road;
- Herbicides will not be mixed, transferred or stored over mapped significant sand and gravel aquifers unless done so on a public access road;
- Herbicides will not be applied, mixed, transferred or stored within 100 feet of any known private well or spring or within 200 feet of any known public water supply well, unless done so on a public access road

[3] The term coldwater fishery, as used in this document, pertains to streams that are known to contain brook trout as designated by the Maine Department of Inland Fisheries and Wildlife.

- When herbicide applications are performed in wetlands without standing water, only herbicides approved for use in wetland environments will be used;
- Herbicides will not be applied to any area when it is raining or when wind speed exceeds 15 miles per hour as measured on-site at the time of application. When wind speeds are below 3 miles per hour, applicators should be aware whether a temperature inversion is present, and should consult the herbicide label to determine whether application should proceed under these conditions;
- The foreman or licensed applicator on each herbicide application crew will be licensed by the Maine BPC and will remain in eye contact and within earshot of all persons on his/her crew applying herbicides. At least one individual from any company applying herbicides must also hold a Commercial Master Applicator License issued by the BPC. This Master Applicator must have the ability to be on-site to assist persons applying herbicides within six hours driving time. If an out-of-state company is conducting the herbicide application, the company must have a Master Applicator in Maine during any application. Application of herbicides will be in accordance with applicable regulations promulgated under the Maine Pesticides Control Act, including those regulations to minimize drift, to maintain setbacks from sensitive areas during application, and to maintain setbacks from surface waters during the storing/mixing/loading of herbicides; and
- Herbicides will typically be mixed in a truck-mounted tank that remains on public access roads. Herbicide application is done by personnel with low-volume, hand-pressurized (manual) backpacks with appropriate nozzles, to minimize drift, who travel along the transmission line corridor by foot or by all-terrain vehicle and spot-treat target species and specimens.

The location of all streams, wetlands, significant vernal pools, rare plant locations, known wells, and mapped significant sand and gravel aquifers crossed by the transmission line corridor will be shown on the As-Built Plan & Profile drawings. GIS shapefiles will also be maintained with the location of these resources and will be provided to maintenance personnel. The presence of surface water will be determined prior to herbicide use in any wetland or waterbody. Crew leaders will assure that resources and buffers are clearly marked in the field, or that locations of resources and buffers are provided as GIS/GPS data prior to initiation of an herbicide application for clear identification by the applicators.

Petroleum Products & Hazardous Materials Management

Any petroleum products or other hazardous material within the transmission line corridor during construction will be managed in accordance with CMP's Environmental Control Requirements (**see Exhibit 15-1**) and will include the following setbacks unless CMP can demonstrate that, due to special circumstances at specified locations, these setbacks are impractical at those locations:

(a) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 100 feet of a protected wetland or other waterbody, unless no practicable

alternative exists and secondary containment with 110% capacity is provided for any fuel storage containers or tanks, or if it occurs on a paved road.

(b) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 200 feet of a known private water supply.

(c) No fuel storage, vehicle/equipment parking and maintenance, and refueling activity may occur within 400 feet of a known public water supply.

(d) No fuel storage, vehicle/equipment parking and maintenance and refueling activity may occur within 25 feet minimum of the following:

(i) An area listed in Maine's biological conservation data system, Biotics, of the Maine Natural Areas Program, including rare natural communities and ecosystems (state rarity rank of S1 through S3 and habitats supporting Endangered or Threatened plant species). Boundaries and locations are as determined by the Maine Natural Areas Program of the Department of Agriculture, Conservation and Forestry.

(ii) Habitat of any species declared rare, threatened or endangered by the Maine Department of Inland Fisheries and Wildlife, Maine Department of Marine Resources, or the Director of the U.S. Fish and Wildlife Service.

Vegetation Maintenance within Freshwater Wetlands

Transmission line corridor wetlands range in type from small, emergent wetlands formed in ruts from logging equipment to large forested wetland systems. No specific buffers are proposed for the wetlands identified within the transmission line corridor.

Additional Vegetation Maintenance Restrictions within and Adjacent to Freshwater Wetlands

Vegetation maintenance within, and within 25 feet of, freshwater wetlands with standing water will be conducted only by hand cutting with hand tools or chainsaws. Herbicide use is permitted in wetlands only when no standing water is present in the wetland at the time of the application. Herbicides will not be stored, mixed, transferred between containers, and no refueling of chain saws or other equipment will be allowed, within 100 feet of freshwater wetlands, unless done so on a public access road.

Vegetation Maintenance within Stream Buffers

A 75-foot buffer, as measured from the top of each stream bank, will be established for vegetation maintenance along perennial and intermittent streams not designated as coldwater fisheries, within the transmission line corridor. Additional restrictions will be applied within 100 feet of streams

meeting certain criteria, as described below. Special restrictions will apply within these stream buffers during vegetation maintenance.

This section describes the restrictions related to vegetation cutting and maintenance within these stream buffers. All vegetation maintenance procedures and restrictions that apply to typical transmission line corridor maintenance also apply within stream buffers.

Additional Vegetation Maintenance Restrictions within Stream Buffers

The following additional restrictions apply to vegetation maintenance within stream buffers:

- 100-foot buffers will be established for all perennial streams within Segment 1 (greenfield portion) of the Project.
- 100-foot buffers will be established for all coldwater fishery streams, outstanding river segments, and rivers, streams, or brooks containing threatened or endangered species, unless the Department determines that the functions and values of the buffer will not be impacted by the removal of vegetation and approves an alternative minimum buffer. In no case may this buffer be reduced to less than 25 feet.
- The boundary of each stream buffer will have unique flagging installed to distinguish between the applicable 75 foot or 100 foot stream buffer prior to vegetation management activities.
- Within that portion of the appropriate stream buffer that is within the wire zone (i.e., within 15 feet, horizontally, of any conductor; see Figure 1), all woody vegetation over 10 feet in height, whether capable or non-capable, will be cut back to ground level and resulting slash will be managed in accordance with Maine's Slash Law. No other vegetation, other than dead or hazard trees, will be removed;
- Removal of capable species, dead or hazard trees within the appropriate stream buffer will be accomplished by hand-cutting only. Mechanized harvesting equipment will not be used;
- Herbicides will not be applied within 75-foot or 100-foot stream buffers;
- Herbicides will not be stored, mixed or transferred between containers within 100 feet of streams, unless done so on a paved public access road;
- No refueling or maintenance of equipment, including chainsaws, will occur within 100 feet of streams, unless done so on a paved public access road; and
- No slash will be left within 50 feet of the edge of any stream.

These additional restrictions will allow for taller vegetation within the appropriate stream buffer to provide shading and to reduce the warming effect of direct sunlight (insolation). Low ground cover vegetation will also remain to filter any sediment in surface runoff. The restrictions are also intended to minimize ground disturbance and prevent or minimize the surface transport of

herbicides and petroleum products to streams. These restrictions will allow the stream buffers to provide functions and values similar to those provided prior to transmission line construction.

Vegetation Maintenance within the Roaring Brook Mayfly and Northern Spring Salamander Conservation Management Areas of Mountain Brook and Gold Brook

During consultation with the Maine Department of Inland Fisheries and Wildlife (MDIFW) for the NECEC project, MDIFW identified Gold Brook (PSTR 15-06, PSTR 16-07, PSTR 16-10 and PSTR 16-15) and Mountain Brook (PSTR-33-01, PSTR-EM-34-01, PSTR-EM-34-01) as high priority resources in which full height vegetation should be retained within the 250 foot conservation management areas (CMA) to protect habitat for Roaring Brook Mayfly (*Epeorus frisoni*) and Northern Spring Salamander (*Gyrinophilus porphyriticus)*. Mountain Brook contains both Roaring Brook Mayfly and Northern Spring Salamander habitat, while field survey results concluded that Gold Brook only contains Roaring Brook Mayfly habitat.

Installation of taller structures will facilitate the retention of full height vegetation within these CMAs. Although CMP will retain full height vegetation within these CMAs, CMP will selectively cut at ground level and remove any trees within these CMAs that are intruding into the conductor safety zone or are at risk of growing into the conductor safety zone prior to the next scheduled vegetation maintenance.

Access roads and structure preparation/installation areas within these conservation management areas will be maintained as scrub-shrub habitat to allow for maintenance, repair and/or emergency access. All other areas depicted on Figure 2 and Figure 3 will be retained as full height vegetation.

Vegetation Maintenance within Significant Vernal Pool Buffers

Vegetated buffers of 100 feet, as measured from the edge of the pool depression, will be established for SVPs crossed by the transmission line corridor. Vegetation maintenance within the SVP buffers will be subject to the same procedures and prohibitions, as applicable, which are required in the typical transmission line corridor, as well as to the additional measures below.

Additional Vegetation Maintenance Restrictions within Significant Vernal Pool Buffer

The following additional restrictions apply to vegetation maintenance within SVP buffers:

- Mechanized equipment will not be allowed within the vernal pool depression, unless the depression encompasses the entire width of the transmission line corridor. Mechanized equipment will only be allowed to cross the vernal pool depressions during frozen or dry conditions or with the use of mats;
- Between April 1 and June 30, no vegetation maintenance using tracked or wheeled equipment will be performed within the 100-foot buffer. Maintenance will be performed using only hand tools during this period;

- Between April 1 and June 30, no vegetation maintenance will occur within 25 feet of the SVP pool depression;
- No refueling or maintenance of equipment, including chainsaws, will occur within 100 feet of SVP pool depression, unless done so on a public access road; and
- No herbicide use is permitted within 25 feet of the SVP pool depression.

Vegetation Maintenance within Inland Waterfowl and Wading Bird Habitat

Inland Waterfowl and Wading Bird Habitats (IWWH) are habitats mapped by the MDIFW that contain an inland wetland complex used by waterfowl and wading birds, plus a 250-foot nesting habitat area surrounding the wetland. The nesting habitat is considered to be part of the mapped IWWH. No additional buffers are proposed for IWWHs beyond this mapped habitat, and as such the vegetation maintenance restrictions apply to the mapped habitat only.

Vegetation maintenance within the IWWH will be subject to the same procedures and prohibitions, as applicable, which are required in the typical transmission line corridor and for stream buffers.

Additional Vegetation Maintenance Restrictions within Inland Waterfowl and Wading Bird Habitat

The following additional restrictions would apply to vegetation maintenance within mapped IWWH:

- Between April 15 and July 15, use of motorized vehicles (e.g., all-terrain vehicles) and mechanized equipment (e.g., chainsaws or brush cutters) within IWWH is prohibited. Use of non-mechanized hand tools is allowed during this time period;
- No refueling or maintenance of equipment, including chainsaws, will occur within the IWWH, unless done so on a public access road; and
- No herbicide use is permitted within 25 feet of any wetland within the mapped IWWH.

Vegetation Maintenance within Mapped Deer Wintering Areas

Deer Wintering Areas (DWA) provide important refuge for white-tailed deer (*Odocoileus virginianus*) during the winter months in northern climates and are typically characterized by an extensive stand of mature softwood species with a dense forest canopy.

With the exception of the Upper Kennebec DWA, described below, no additional vegetation maintenance restrictions are proposed within mapped DWAs, as all capable species must be removed from these and other areas within the transmission line corridor in order to comply with NERC Transmission Vegetation Management standards.

Additional Vegetation Maintenance Restrictions within the Upper Kennebec Deer Wintering Area

As a result of consultation with MDIFW for the NECEC Project, CMP has identified and designated ten deer travel corridors within the Upper Kennebec River DWA (Map ID 060065), as shown in Figure 4 of this exhibit, which will be managed as softwood stands to promote deer movement across the transmission line corridor during the winter months when snow depths have the potential to inhibit deer travel. The NECEC transmission line corridor traverses this DWA from a point in The West Forks Plantation to a point in Moxie Gore. CMP has agreed to manage these deer travel corridors, designated and labeled Corridors 1 through 8 in Figure 4, as softwood stands and will allow for the maximum tree height that can be practically maintained without encroaching into the conductor safety zone of the transmission line or into the necessary scrub/shrub area adjacent to each structure. Tree heights in these areas will vary based on structure height, conductor sag, and topography, but will generally range from 25 to 35 feet. Vegetation within Corridors 9 and 10, which are located where the transmission line will be buried using horizontal directional drilling, will be allowed to grow to its full height.

Within designated deer travel corridors 1 through 8, during routine vegetation maintenance, hardwood and softwood species that are intruding into the conductor safety zone or are at risk of growing into the conductor safety zone prior to the next scheduled vegetation maintenance will be cut at ground level and removed. Softwood specimens that are not intruding into the conductor safety zone, and are not at risk of growing into the conductor safety zone prior to the next scheduled maintenance, will be retained. Access roads and structure preparation and installation areas will be maintained as scrub-shrub habitat to allow for maintenance, repair, and/or emergency access. The designated deer travel corridors will be flagged prior to maintenance activities and identified in a database maintained by CMP, further described below in Locating and Marking Buffers and Habitats.

Vegetation Maintenance within State mapped Rusty Blackbird Habitat

In consultation with MDIFW for the NECEC project, CMP agreed to allow for the retention of 15-foot tall softwood species within the Rusty Blackbird (Euphagus carolinus) habitat, shown in Figure 5. The additional height will avoid project impacts to the habitat of this State Species of Special Concern.

During routine vegetation maintenance, hardwood and softwood specimens that are taller than 15 feet or are anticipated to grow taller than 15 feet prior to the next scheduled vegetation maintenance, will be cut at ground level. Softwood specimens up to 15 feet in height will be retained. The access roads and structure preparation areas within the Rusty Blackbird habitat will be maintained as scrub-shrub habitat to allow for maintenance, repair and/or emergency access. The habitat will be flagged prior to construction and identified in a database maintained by CMP, further described below in *Locating and Marking Buffers and Habitats*.

Vegetation Maintenance within Rare Plant Locations

Vegetation maintenance of the transmission line corridor has the potential to impact rare plants and/or alter their habitat. The following additional vegetative maintenance restrictions will minimize impacts to rare plants. The additional restrictions will apply only to the demarcated locations of the identified rare plants. No additional buffers will be established surrounding rare plant locations. These restrictions are intended to maintain existing hydrology and limit soil disturbance within rare plant locations.

Additional Vegetation Maintenance Restrictions within Rare Plant Locations

The following additional restrictions will apply to vegetation maintenance for the species listed above in the identified location:

- All capable tree species will be cut by hand (chainsaws, hand saws or axes). No other mechanized cutting equipment shall be used within these habitats;
- Unless rare plant locations encompass the entire width of the transmission line corridor, mechanized equipment will only be allowed to cross rare plant locations during frozen conditions or with the use of mats;
- No refueling or maintenance of equipment, including chainsaws, will occur within demarcated rare plant locations, unless done on a public access road; and
- No foliar herbicide use is permitted within the demarcated rare plant locations, however cut surface herbicides may be used on capable species and specimens.
- Crossing of rare plant locations with mechanized equipment:

  <u>All-Terrain Vehicles (ATVs)</u>

  - Due to small footprint, relatively light weight, and infrequency of use, ATV impact is minimal, therefore crane mats will not be used.
  - If rare plants do not encompass entire ROW width, ATVs will avoid/travel around rare plants.
  - If rare plants encompass entire ROW width:
    - ATVs will utilize existing rare plant travel path/crossing if one exists.
    - If no rare plant crossing exists, ATVs will cross at narrowest point of the rare plants and will restrict this crossing to a single travel lane.

  <u>Heavy Equipment/Vehicles</u>

  - During emergency repair & maintenance work, crane mats will not be used. Heavy equipment/vehicles will utilize existing rare plant crossings if available.
  - During planned repair & maintenance work:
    - If rare plants do not encompass entire ROW width, heavy equipment/vehicles will avoid/travel around rare plants. Crane mats will not be used.

- If rare plants encompass entire ROW width, and there is an established travel path/crossing through the rare plants, heavy equipment/vehicles will utilize this crossing, and crane mats will not be used.
- If rare plants encompass entire ROW width, but there is no established travel path through the rare plants, heavy equipment/vehicles will cross rare plants using crane mats.

Maintenance Procedures for Mapped Significant Sand and Gravel Aquifers

Transmission lines located over mapped significant sand and gravel aquifers are subject to the typical transmission line corridor maintenance procedures, except that no refueling or maintenance of equipment, and no herbicides may be mixed, transferred or stored, over the mapped significant sand and gravel aquifers, unless done so on a public access road.

Maintenance Procedures in Tapered Vegetation Management Areas

In consultation with MDEP and the LUPC, CMP determined that management of vegetation in a tapered configuration and manner was appropriate in order to minimize the visual impact from viewpoints on the summit of Coburn Mountain in Upper Enchanted Township and from Rock Pond looking towards Three Slide Mountain in T5 R6 BKP WKR. These areas include the following coordinates:

Coburn Mountain – From: 45°25'45.01"N, 70° 6'8.22"W To: 45°27'37.45"N, 70° 6'51.44"W

Rock Pond – From: 45°27'48.24"N, 70°25'31.82"W To: 45°27'54.92"N , 70°26'3.11"W

Vegetation outside of the wire zone in these locations will be managed such that capable vegetation will be maintained in a tapered configuration to the extent practicable, with heights ranging from 15 feet (from the outer edges of the wire zone toward the corridor edges for a distance of approximately 20 feet on each side), to 25 feet (from the outer edges of the 15 foot tall areas, for a distance of approximately 20 feet on each side), to 35 feet (from the outer edges of the 25 foot tall areas to the edges of the maintained right of way, for a distance of approximately 20 feet on each side). Capable vegetation will be selectively cut during periodic (every 4 years) routine maintenance cycles to remove individual specimens likely to either grow into the conductor safety zone prior to the next scheduled maintenance cycle, or likely to grow taller than the above target heights prior to the next scheduled maintenance cycle.

Locating and Marking Buffers and Habitats

A database will be maintained, including maps and GIS shapefiles, of the buffers, restricted habitats, and sensitive areas and their locations relative to the nearest structure (pole) or road location. The distance and direction from the nearest structure to the sensitive area will be included with the name of the area and the structure number. All structures along the transmission line corridor will be numbered at the time of construction.

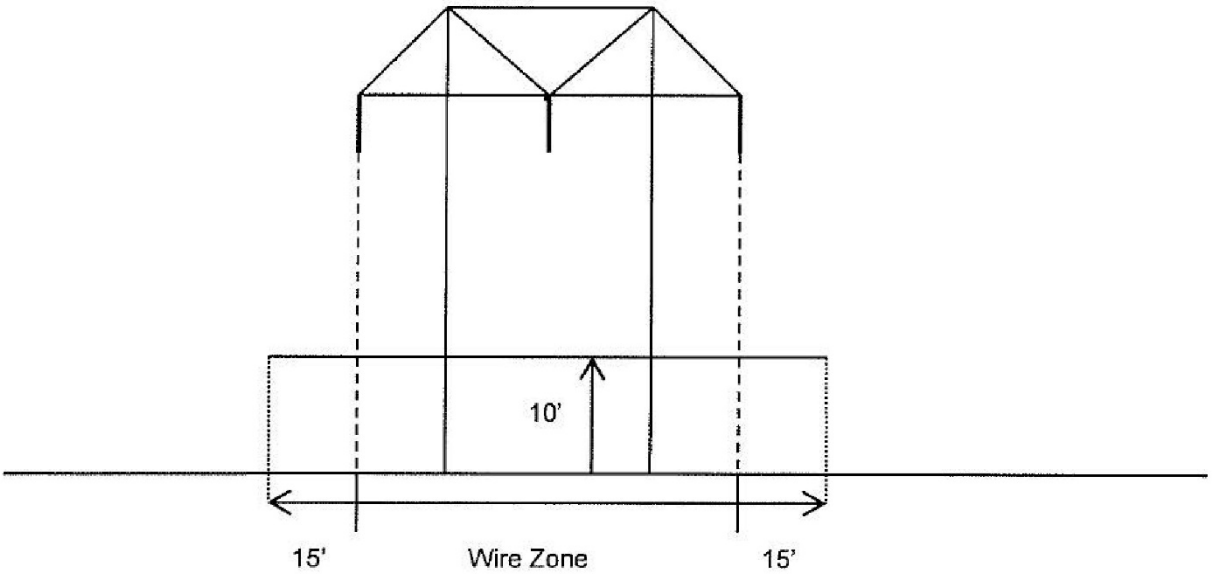
To aid in identifying restricted areas, buffers and restricted habitats may be located and demarcated in the field using brightly colored flagging or signage prior to the initiation of maintenance activities along the transmission line corridor. Alternatively, use of GIS data and GPS equipment may be used to provide accurate location of resources and associated buffers during maintenance activities. If desired, maintenance personnel may permanently demarcate restricted habitats to aid in long-term maintenance activities. Maintenance contractors working on the transmission line corridor will be provided a copy of this VMP. Use of this VMP in conjunction with the As-Built Plan & Profile drawings will enable maintenance contractors to locate and mark restricted areas in the field.

Maintenance Personnel Training

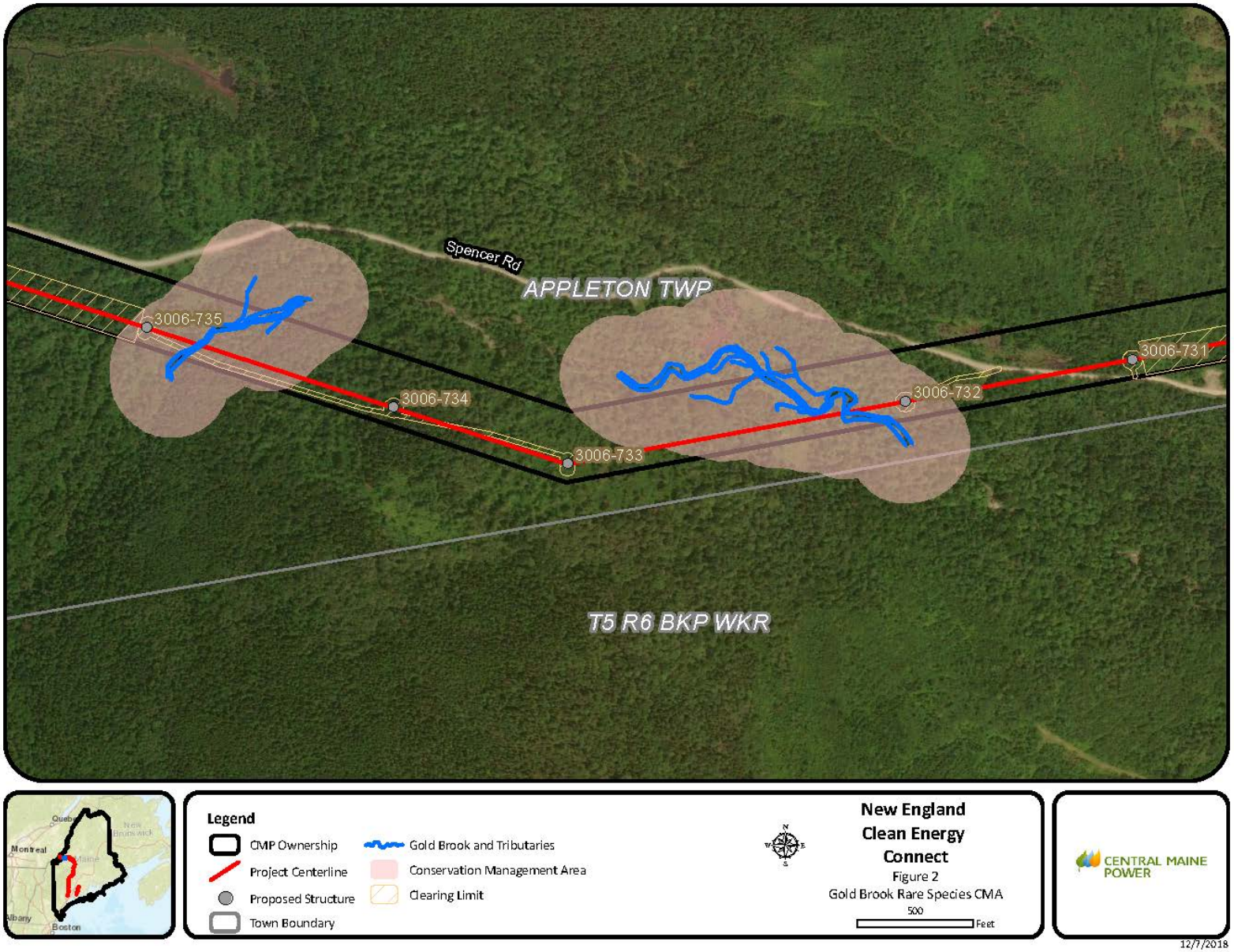
Personnel who will conduct vegetation maintenance activities on the transmission line corridor will receive appropriate environmental training before being allowed access to the transmission line corridor. Maintenance personnel will be required to review this VMP prior to the training and before conducting any maintenance activities. The level of training will be dependent on the duties of the personnel. The training will be given prior to the start of maintenance activities. Replacement or new maintenance personnel that did not receive the initial training will receive similar training prior to performing any maintenance activities on the transmission line corridor.

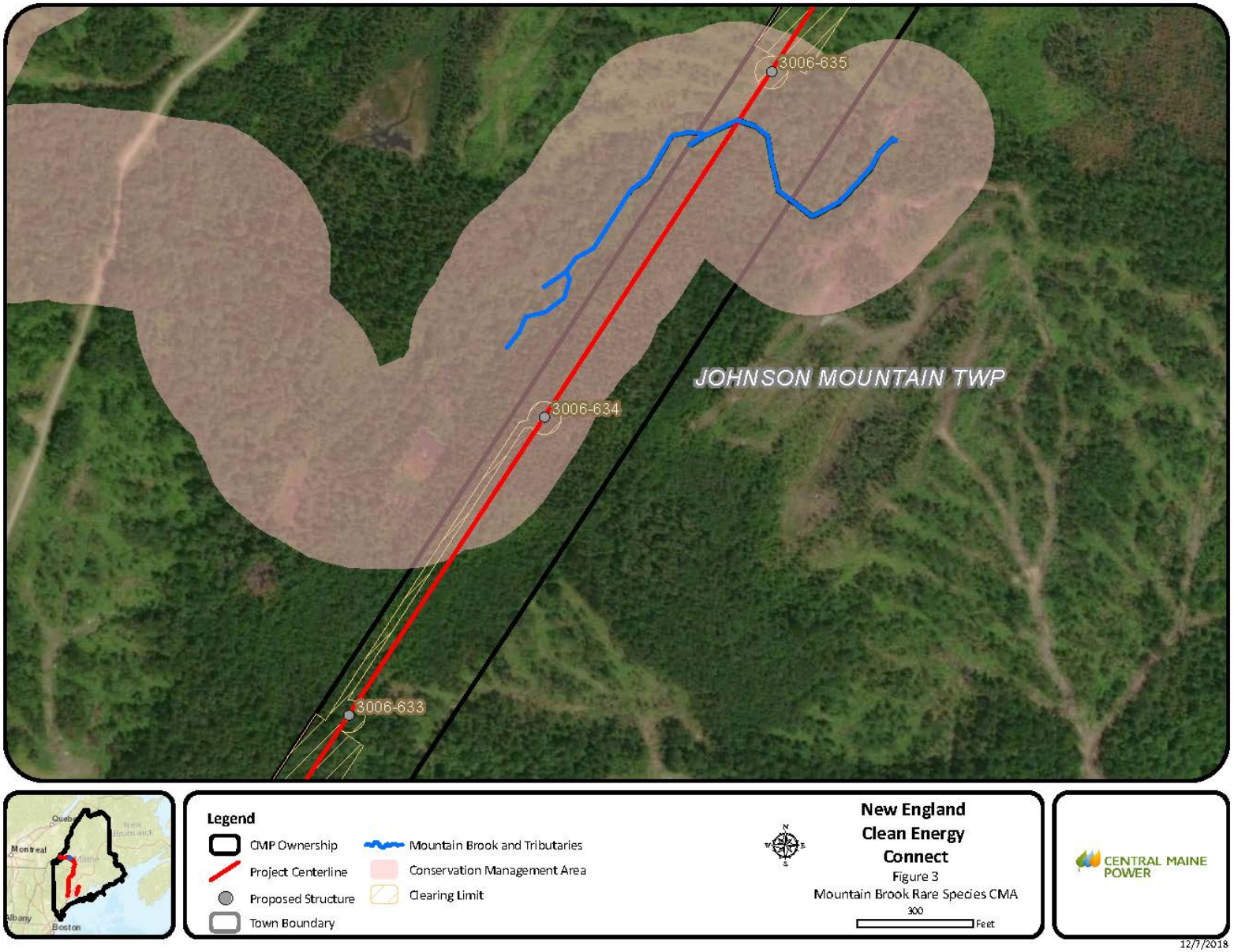
The training session will consist of a review of the buffers and restricted habitats, the respective maintenance requirements and restrictions for each, and a review of how these areas and resources can be located in the field. Training will include familiarization with and use of GIS information and sensitive natural resource identification in conjunction with the contents of this VMP, as well as basic causes, preventive and remedial measures for contamination, and erosion and sedimentation of water resources. Training will also include a review of safety and the proper use of appropriate maintenance tools.

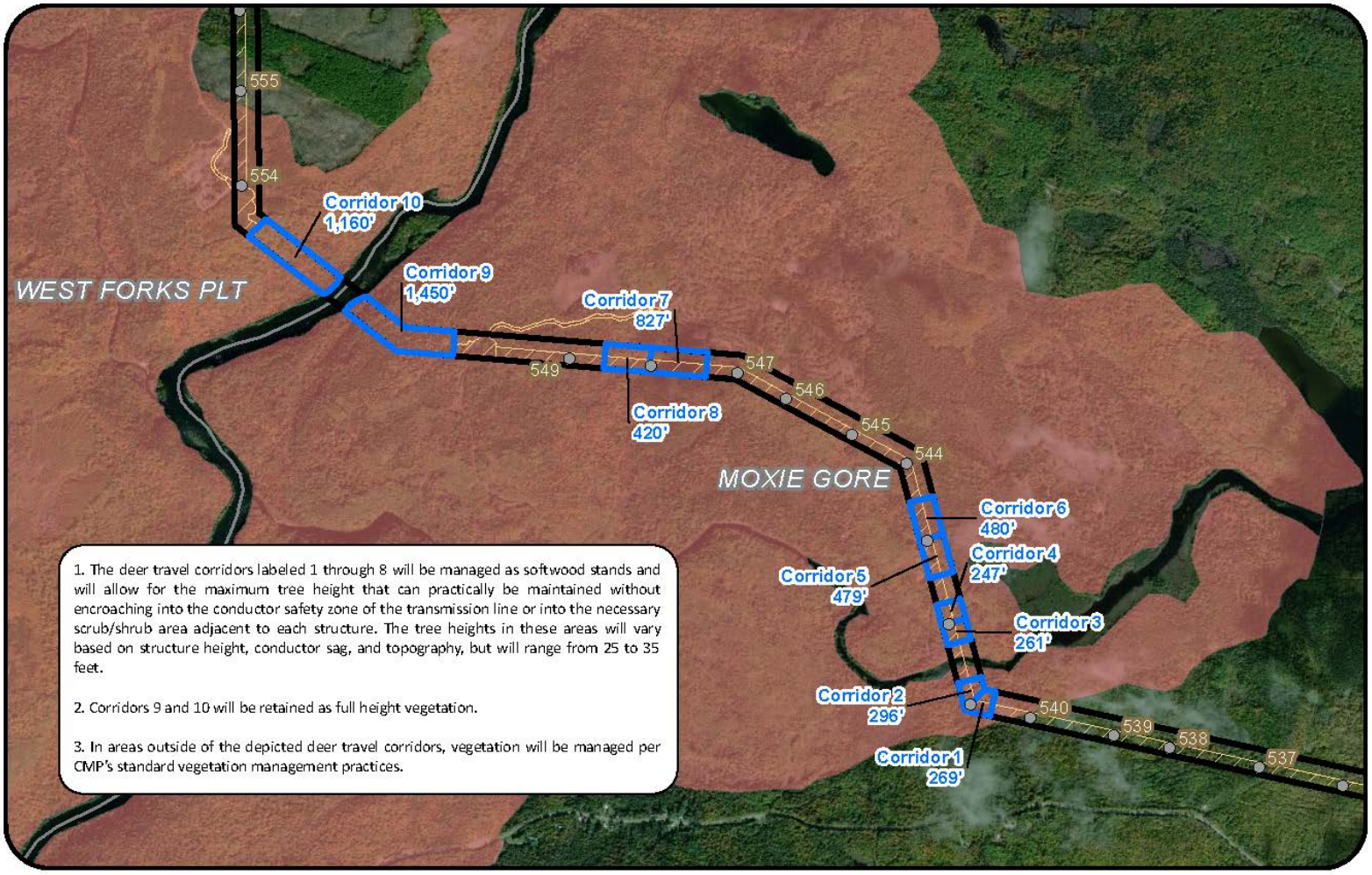
Figure 1



1. Capable species, regardless of height, are cut back to ground level or treated with herbicides within the entire length and width of the transmission line corridor during scheduled vegetation maintenance (every 4 years). However, within stream buffers, only capable specimens over 10 feet tall may be cut or treated (specimens at or above this height are likely to grow into the conductor safety zone prior to the next scheduled vegetation maintenance cycle).
2. All woody vegetation over 10 feet in height and inside the wire zone, whether capable or non-capable, is cut back to ground level during scheduled vegetation maintenance.


Spencer Rd
APPLETON TWP
3006-735
3006-734
3006-733
3006-732
3006-731
T5 R6 BKP WKR
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Gold Brook and Tributaries
Conservation Management Area
Clearing Limit
New England
Clean Energy
Connect
Figure 2
Gold Brook Rare Species CMA
500
Feet
CENTRAL MAINE POWER
12/7/2018


3006-635
JOHNSON MOUNTAIN TWP
3006-634
3006-633
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Mountain Brook and Tributaries
Conservation Management Area
Clearing Limit
New England
Clean Energy
Connect
Figure 3
Mountain Brook Rare Species CMA
300
Feet
CENTRAL MAINE
POWER
12/7/2018



Legend

- CMP Ownership
- Proposed Structure
- Town Boundary
- Clearing Limit
- Deer Travel Corridor
- Deer Wintering Area

New England Clean Energy Connect

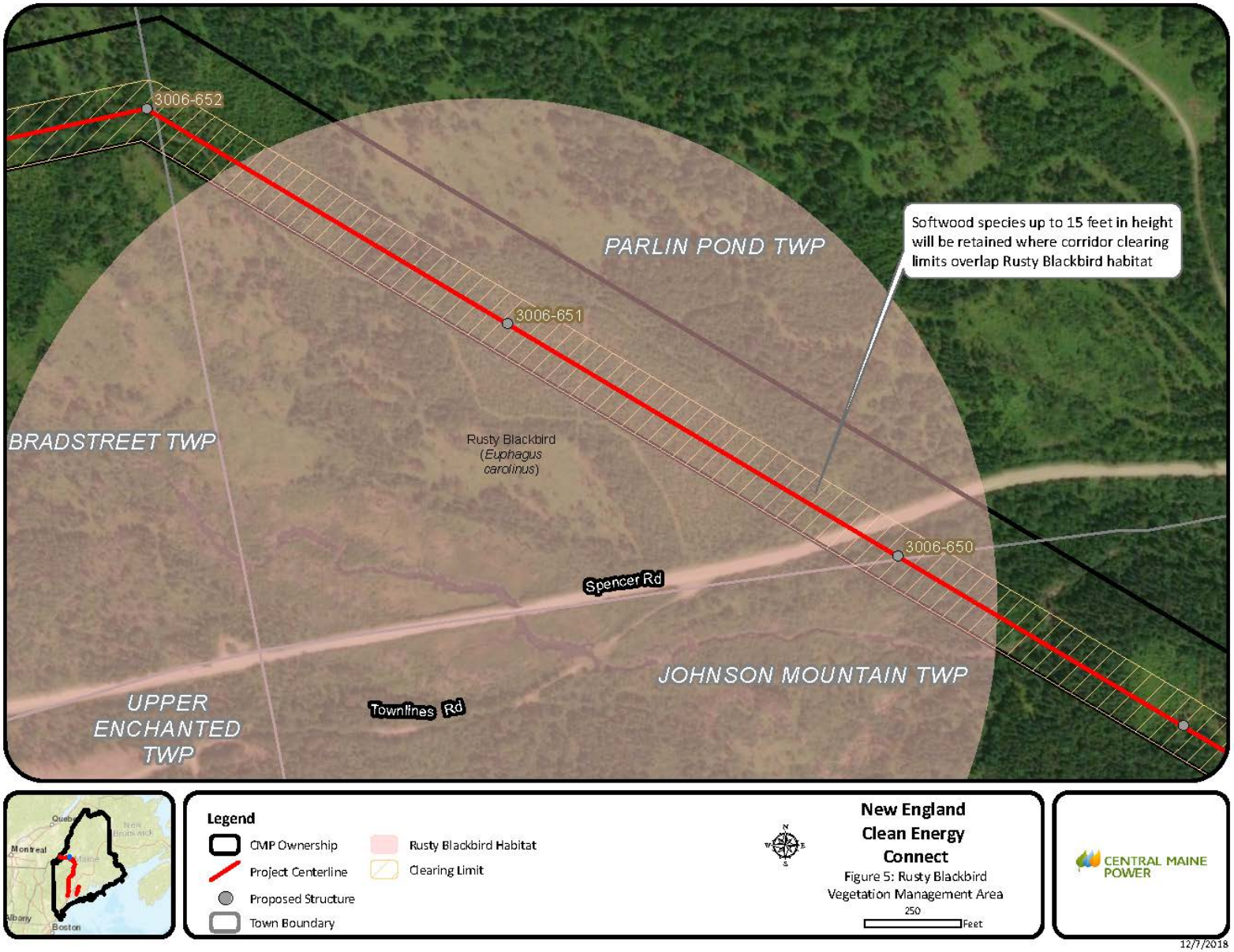
Figure 4

Upper Kennebec Deer Travel Corridors

1,500 Feet

CENTRAL MAINE POWER

12/7/2018


3006-652
3006-651
3006-650
PARLIN POND TWP
Softwood species up to 15 feet in height will be retained where corridor clearing limits overlap Rusty Blackbird habitat
BRADSTREET TWP
Rusty Blackbird (Euphagus carolinus)
Spencer Rd
JOHNSON MOUNTAIN TWP
UPPER ENCHANTED TWP
Townlines Rd
Legend
CMP Ownership
Project Centerline
Proposed Structure
Town Boundary
Rusty Blackbird Habitat
Clearing Limit
New England Clean Energy Connect
Figure 5: Rusty Blackbird Vegetation Management Area
250
Feet
CENTRAL MAINE POWER
12/7/2018

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Beyer, Jim R

From: Stratton, Robert D
Sent: Friday, December 07, 2018 4:52 PM
To: Mirabile, Gerry J.; Matt Manahan; Peabody, Timothy E; Beyer, Jim R
Subject: RE: Kennebec Deer Wintering Area Preservation Land Tracts & Deer Travel Corridors
Attachments: CMP Property within IF&W Area of Interest.pptx; Kennebec DWA Vegetation Clearing & Management 12-7-2018.docx; Figure_04_Kennebec_DWA_DTC_2018_12_07.pdf

Importance: High

Good afternoon Gerry,

Thank you for our recent discussions and for providing the commitments described herein. MDIFW recognizes and appreciates the significant amount of work done in a relatively short period of time. To further assist this effort, MDIFW offers the following reminders of issues that we previously discussed and which also need to be incorporated:

1. In addition to the flagging and database recording of designated deer travel corridors, these areas also need to be physically marked with land markers/signs to inform future maintenance crews of their existence and specific maintenance provisions.
2. Designated deer travel corridors 1-8 need to have varying maintenance schedules so that significant cutting of mature trees is not conducted at the same time for all corridors, to enable deer to always have viable crossing opportunities in proximity.
3. The proposed recreational trail to be located on the three Forks Plantation preservation parcels needs to be located as far west toward Rt. 201 as possible. Please provide further details on this.
4. Of 22 Northern Spring Salamander / Roaring Book Mayfly areas, MDIFW has identified 2 very high priority streams where full forest canopy height and closure needs to be maintained. MDIFW is appreciative that CMP has agreed to utilize structures and practices that will maintain full forest canopy in these areas.

Kmz pin #	Stream	Species	Pole #s for Full Forest Canopy
50	Gold Brook	NSS, RBMF	735; 733-732
44, 51, 8	Mountain Brook	NSS, RBMF	635-633

5. As noted, in addition to the items above, there are additional issues that we have previously discussed and will continue to discuss with CMP toward their resolution. We can resume those discussions at your convenience.

One new request, MDIFW staff would like to be informed of and, if schedules permit, present during initial and maintenance clearing activities of the deer travel corridors to observe and help facilitate these provisions.

Thank you again for your efforts on these important resource issues. MDIFW offers its preliminary acceptance of these efforts toward mitigating project impacts, subject to further agency review. Thank you, Bob.

Bob Stratton
Environmental Program Manager
Fisheries and Wildlife Program Support Section Supervisor
Maine Department of Inland Fisheries & Wildlife
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From: Mirabile, Gerry J. [mailto:Gerry.Mirabile@cmpco.com]
Sent: Friday, December 07, 2018 3:10 PM
To: Camuso, Judy <Judy.Camuso@maine.gov>; Cordes, Robert <Robert.Cordes@maine.gov>; Stratton, Robert D <Robert.D.Stratton@maine.gov>; Robicheau, Ryan <Ryan.Robicheau@maine.gov>; Perry, John <John.Perry@maine.gov>
Cc: Matt Manahan <mmanahan@pierceatwood.com>; Lisa A. Gilbreath <lgilbreath@PierceAtwood.com>; Mark Goodwin <magoodwin@burnsmcd.com>; Lauren Johnston <lajohnston@burnsmcd.com>
Subject: [EXTERNAL SENDER] NECEC - Kennebec Deer Wintering Area Preservation Land Tracts & Deer Travel Corridors
Importance: High

Judy and others,

Attached are images depicting land owned by CMP within the Kennebec deer wintering area which we are offering to preserve. This includes three tracts offered by email dated November 30, 2018 from Lauren Johnston to MDIFW, as well as 4 additional tracts. Total acreage being offered for this purpose is 717 +/-. Summary of tracts (acreages are approximate):

Map ID	Total Acres	Acreage Outside of DWA	Net Acreage Within DWA
The Forks Plantation, 11/9	130	4	126
The Forks Plantation, 11/2	109	7	102
The Forks Plantation, 8/11	233	5	228
Moxie Gore/Carry Brook	43	0	43
Moxie Gore/Moxie Stream Lower	29	0	29
Squaretown	164	0	164
Indian Stream	25	0	25
Total			**717**

These tracts, totaling 717 acres, represent a ratio of more than 18:1 based on 39.3 acres of forest conversion within this deer wintering area; this significantly exceeds the recommended and customary 8:1 ratio. CMP is willing to convey these tracts to the State of Maine Bureau of Parks and Lands.

We also propose to maintain the deer travel corridors as we have discussed, according to the attached narratives from the construction vegetation clearing plan and the post-construction vegetation management plan. These plans will apply to the areas depicted on the attached Figure 4, with the exception of Corridors 9 and 10, within which vegetation will be allowed to grow to its full height. Taken together, these 10 travel corridors within the Kennebec DWA total 5,889+/- linear feet.

Please let us know ASAP if you have any comments so we can submit these proposals to MDEP by the end of the day today. As we said, we want to be sure we have addressed MDIFW's concerns before we submit this to

MDEP. We can, of course, continue to refine the details with you next week, but we need to at least get the general proposal in to MDEP by today's deadline.

Again, thanks very much for all your work in getting us to this point.

CENTRAL MAINE POWER

Gerry J. Mirabile
Manager – Environmental Projects
AVANGRID Networks, Inc.
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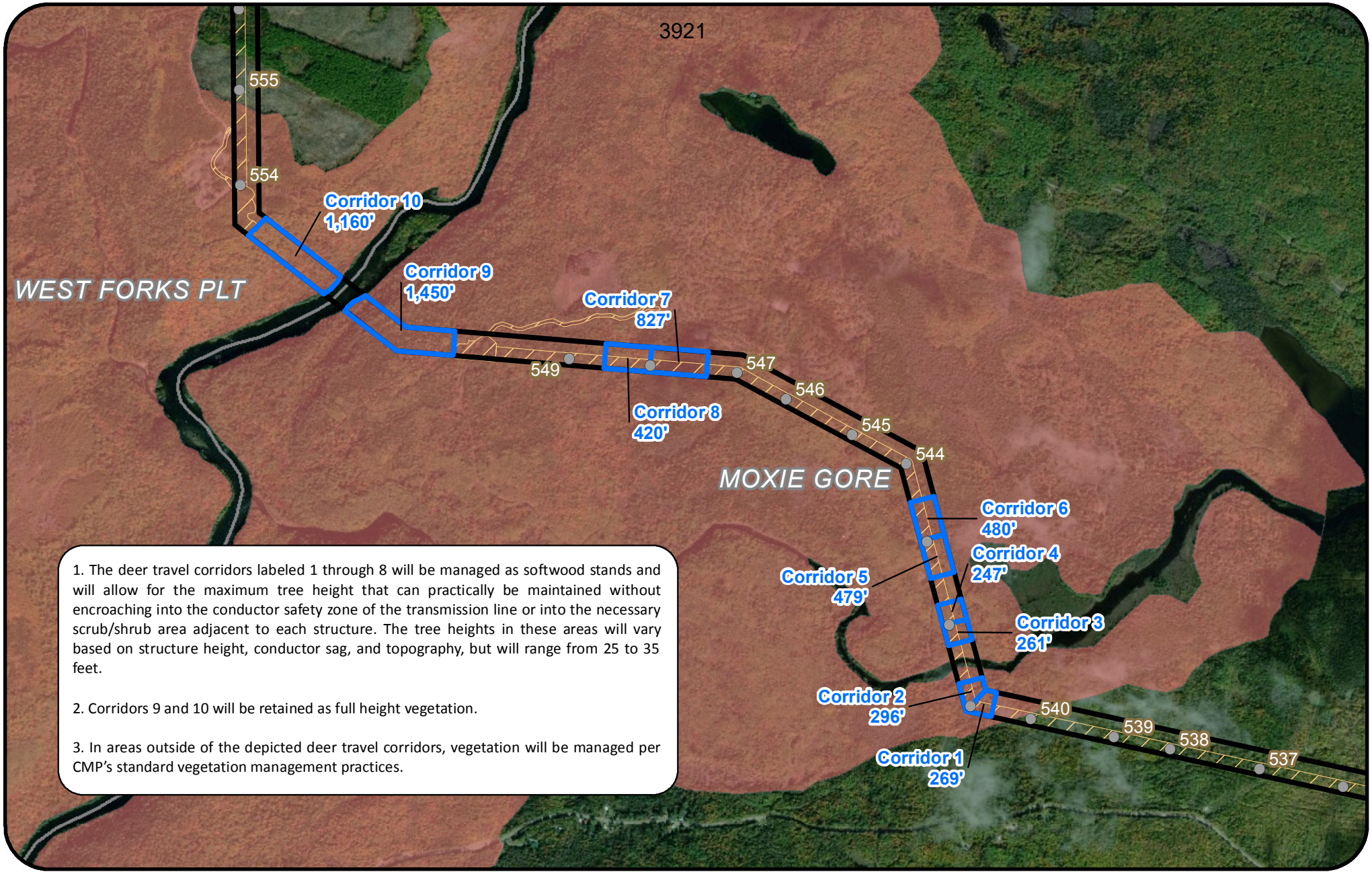
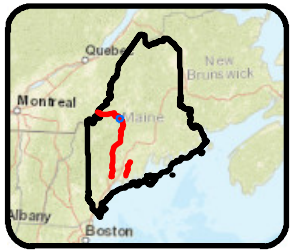


1. The deer travel corridors labeled 1 through 8 will be managed as softwood stands and will allow for the maximum tree height that can practically be maintained without encroaching into the conductor safety zone of the transmission line or into the necessary scrub/shrub area adjacent to each structure. The tree heights in these areas will vary based on structure height, conductor sag, and topography, but will range from 25 to 35 feet.

2. Corridors 9 and 10 will be retained as full height vegetation.

3. In areas outside of the depicted deer travel corridors, vegetation will be managed per CMP's standard vegetation management practices.



Legend

- CMP Ownership
- Proposed Structure
- Town Boundary
- Clearing Limit
- Deer Travel Corridor
- Deer Wintering Area

New England Clean Energy Connect

Figure 4

Upper Kennebec Deer Travel Corridors

1,500 Feet

CENTRAL MAINE POWER

12/7/2018

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Responses to MDIFW Remaining Issues from December 21, 2018 MDIFW email and Clarification Regarding January 30, 2019 Compensation Plan
March 11, 2019

Issue 1

MDIFW is reviewing and verifying available spatial and numerical data that was used to calculate totals related to natural resource impact areas for assessing mitigation needs. The data provided and the details in the compensation plan have allowed MDIFW to concur with your compensation for deer wintering areas. We are still verifying the impact areas on the following resources to assess appropriate compensation. We look forward to your assistance in finalizing any questions that may arise.

a. Perennial and Intermittent Stream Buffers.

b. IWWH

c. RBMF/NSS

d. RTE and SC Species

e. SVP

Issue 1 Resolution

CMP verified and updated impact areas for all of the above resources, recalculated and reconsidered in-lieu fees and other compensation measures for these resources, and incorporated updated impact areas and associated updated compensation in its January 30, 2019 Compensation Plan, submitted to MDIFW and other parties.

Issue 2

The discussion of Cold Stream, 3 Significant Vernal Pools (SVPs) and their Critical Terrestrial Habitats needs to be finalized. In previous discussions CMP indicated that a portion of an abandoned road in proximity will be removed and that another portion is currently revegetating with alder. To resolve this MDIFW staff will review the photographs of the regenerating area that you have provided to determine if further plantings are necessary. MDIFW looks forward to reviewing these materials to bring this issue to completion.

Issue 2 Resolution

It is our understanding that after reviewing the photos of the regenerating area and the other information contained in Matt Manahan's December 21, 2018 email to you, MDIFW agrees that further plantings are not necessary.

Issue 3

MDIFW and CMP agreed to evaluate all riparian areas post-construction and assess the need to augment the natural regrowth of vegetation within the respective buffers. As part of the

post construction assessment MDIFW requests that the five streams labeled as PSTR-44-01, 44-01, 45-03, 44-06, 44-07 (kmz pin 12) receive a higher level of consideration for potential plantings as they have elevated value as stream resources. MDIFW does request that CMP provide additional planting plans during this phase of the project for the resources listed below.

a. Sheepscot River where Brook Floaters are present

b. Montsweag Book where Brook Floaters are present

Issue 3 Resolution

The statement that "CMP agreed to evaluate all riparian areas post-construction and assess the need to augment the natural regrowth of vegetation with the respective buffers" was inaccurate, and has been clarified, as discussed below.

In consultation meetings, one stream complex, PSTR-44-01, 44-01, 45-03, 44-06, 44-07 (kmz pin 12), known as Tomhegan Stream, was discussed and CMP agreed to revisit these areas with MDIFW following construction to determine if plantings were warranted. It was also discussed in the course of these consultation meetings that plantings of non-capable species in stream buffers, particularly in this area of the Project where soils are rocky, may not succeed, and that natural revegetation is likely to out-compete plantings.

After this discussion MDIFW requested that CMP propose planting plans for the West Branch of the Sheepscot River and Montsweag Brook because of the documented presence of the Brook Floater, a State-threatened freshwater mussel. CMP has proposed additional protections for Tomhegan Stream by implementing an expanded 100-foot buffer, which will minimize impact to the riparian area during construction and will allow the natural revegetation and re-establishment of non-capable vegetation, consistent with the VCP and VMP.

In email correspondence on 1/8/2019, Bob Stratton indicated that "brook floaters are present in the Sheepscot River, but are not known to occur in Montsweag Brook. Though Montsweag Brook is a valuable resource, recent communications have incorrectly included it as a resource for this mussel species." Gerry Mirabile responded on 1/8/2019 via email, "now that MDIFW has determined that the Brook Floater mussel is not known to occur in Montsweag Brook, CMP does not intend to provide a buffer planting plan for Montsweag Brook (we will provide a planting plan for the Sheepscot in the near future)."

The planting plan for the West Branch of the Sheepscot River was provided to MDIFW and MDEP on 1/9/2019. See MDEP web link: 2019-01-09 WEST BRANCH SHEEPSCOT PLANTING.pdf

Issue 4

MDIFW requests CMP provide easement language and any other encumbrances against preservation properties that have been offered as mitigation to impacted resources. We are

assuming no further easements will be placed on the properties once we receive that documentation.

Issue 4 Resolution

CMP provided the requested information on the 7 proposed preservation tracts within the upper Kennebec deer wintering area by email to you and others on January 8, 2019, 8:00 pm. CMP provided this same information for the original 6 offered compensation tracts by email to you and others on January 11, 2019, 6:06 pm.

Brook Trout – Capable Vegetation

Bob Stratton's email of January 24, 2019 4:16 pm regarding NECEC brook trout resources states as follows: "This opinion is based on CMP's plan to allow capable vegetation within the ROW to attain heights of up to approximately 10-feet, and higher as conditions allow." To clarify, CMP's plan is that where terrain conditions permit (e.g., ravines and narrow valleys) capable vegetation will be permitted to grow within and adjacent to protected natural resources or critical habitats where maximum heights are expected to remain well below the conductor safety zone.

Stream Buffers

- **Does the VMP reflect changes in the Compensation Plan? If not, need to update.**

Yes, Exhibit 10-1 VCP (Section 4.0) and Exhibit 10-2 VMP (pages 6-7) submitted on January 30, 2019, reflect the expanded stream buffers recommended as a result of the CMP, MDEP, and MDIFW January 22, 2019 meeting.
MDEP web links for revised plans:
2019-1-30 NECEC Site Law Exhibit 10-1 (Revised).pdf
2019-1-30 NECEC Site Law Exhibit 10-2 (Revised).pdf

- **Confirm that 100' buffers will be maintained for streams in compensation tracts.**

This is not necessary. The compensation tracts are proposed for preservation and will be placed in conservation using the MDEP Declaration of Covenants and Restrictions (DOCR) template to be recorded prior to the start of construction activities (see Section 1.2.2 of January 30, 2019 NECEC Compensation Plan). No "work" or impact to stream buffers is proposed or can occur with the DOCR in place. Note that invasive species control is proposed for the Little Jimmie Pond-Harwood Tract (Manchester), but that work will not affect protections afforded to stream buffers. (See 1.2.2.2 of the NECEC Compensation Plan).
MDEP web link: 2019-01-30 NECEC Compensation Plan_final.pdf

- **Quantify stream lengths and stream buffer areas in Grand Falls, Lower Enchanted, and Basin parcels.**

Please refer to Table 8-2 of the NECEC Compensation Parcels Natural Resource Surveys Report (Exhibit 1-9 of the January 30, 2019 NECEC Compensation Plan), summarized here:

Tract	Linear feet/miles
Grand Falls	5,610 ft / 1.06 mi
Lower Enchanted	22,620 ft / 4.28 mi
Basin	35,210 ft / 6.67 mi

CMP quantified the total stream linear length on the compensation parcels, as discussed in the January 22, 2019 meeting with CMP, MDEP, and MDIFW. Quantifying the buffer area was also discussed, but MDEP instructed CMP to quantify streams by linear length to serve as the comparison between project impacts and the compensation offered.

IWWH

- **Provide 25' buffer for herbicide application from wetlands within IWWH.**

See Exhibit 10-1 VCP Section 6.1.d, which states: "No herbicide use is permitted within 25 feet of any wetland within the mapped IWWH."

- **Specify that spot herbicide spraying (vs. broadcast spraying) will be done.**

Please refer to Exhibit 10-1 VCP, Section 2.2.m, which states "Herbicide application is done by personnel with low-volume, hand-pressurized (manual) backpacks with appropriate nozzles, to minimize drift, who travel along the transmission line corridor by foot or by all-terrain vehicle and spot treat target specimens."

Additionally, please refer to Exhibit 10-2 VMP, pages 3-4: "Direct application to individual plant species, as opposed to broadcast spray, will control the targeted woody vegetation allowing low-growing plant communities (the desired shrub and herbaceous species) to thrive….Aerial application will not be used."

These restrictions apply globally within all habitat types.

- **Exhibit 10-1 VCP, Section 6.d and Exhibit 10-2 VMP-related section, note herbicide setback of 25' for IWWH. Verify spot-spraying.**

See Exhibit 10-1 VCP, Section 6.1.d: "No herbicide use is permitted within 25 feet of any wetland within the mapped IWWH."
See Exhibit 10-2 VMP, page 9: "No herbicide use is permitted within 25 feet of any wetland within the mapped IWWH."
See Exhibit 10-1 VCP, Section 2.2.m and Exhibit 10-2 VMP, pages 3-4, regarding spot spraying (also noted above).

These restrictions apply globally within all habitat types.

Freshwater Wetlands

- **Table 1-1 (57 acres, 440.29 acres), Exhibit 1-4, discrepancy between compensation acreages in Musson Report, and Power report (510.75 acres). Verify and correct as needed.**

The Musson Report (8/10/17), prepared for the USACE for their consideration of the proposed compensation parcels pursuant to 33 C.F.R § 332.3(h), relied on preliminary data contained in Power Engineers' natural resource survey results. The NECEC Potential Compensation Tracts Natural Resources Survey Results Report (8/13/2017) further refined the acreages based on the survey results utilizing GPS data. The Power Engineers Report is the superseding document and a correction to the Musson report is not necessary.

There is no discrepancy between the Compensation Plan Table 1-1, Exhibit 1-4, and the Power Engineers Report. While the preservation parcels contain 510.75 acres of wetlands to be used for wetland preservation, only 497.30 acres of wetland preservation were required to offset permanent fill in wetlands (WOSS and non-WOSS), temporary wetland fill in PSS, and permanent forested wetland conversion impacts. This required compensation amount was determined using the appropriate compensation ratios and adjustments. There was an excess of 13.45 acres provided by the three compensation tracts (FLT, LJPT, PPT). This is described in Exhibit 1-4.

Table 1-1 notes that 57.01 acres of wetland preservation will be used to offset temporary wetland fill (in PSS) and 440.29 acres will be used to offset permanent fill in wetlands (WOSS and non-WOSS) and permanent forested wetland conversion, for a total of 497.30 acres, which is the total acreage required to compensate for wetland impacts.

SVPs

- **Exhibit 7-5, discrepancies between manual totals and "cumulative" totals (31,606 vs. 31,370) – due to rounding? Verify which is correct; check all columns for same issue.**

The "manual totals" (i.e., summation of the columns) are not represented in the Cumulative Impacts section of Exhibit 7-5 and are not intended to be. See *Footnote 4: Cumulative Impacts are calculated by dissolving overlapping polygon areas.* In other words, the summation of the column sums each individual SVPH impact, while the Cumulative Impact portion of the table removes the overlapping buffer areas, thereby avoiding counting twice for an impact in the same location. This issue was discussed in the January 22, 2019 meeting with MDEP and MDIFW, and MDEP agreed this was the appropriate method to calculate impacts to SVPH.

- **Exhibit 10-1 (VCP) 250' buffers vs. Exhibit 10-2 (VMP) 100' buffers. Verify which is correct (or explain rationale for difference).**

Both are correct.

Exhibit 10-1, the Construction Vegetation Clearing Plan (VCP), applies to construction of the NECEC project. The 250-foot buffer, measured from the SVP depression, is intended to offer additional protections to these resources during construction, which is a more intensive management period, with the primary concern being tree clearing. During construction, vegetation clearing of capable species will be completed primarily with mechanical equipment, including motorized equipment. As such, CMP has incorporated expanded protections for SVPs by proposing a 250-foot buffer. Mechanized equipment will not be allowed in the pool depression and hand-cutting will be the preferred method of vegetation clearing within the SVP including its 250-foot critical terrestrial habitat or buffer. Mechanized equipment may be used in certain instances, specifically during frozen conditions or when matted travel lanes and reach-in techniques are implemented. Between April 1 and June 30, no vegetation removal using tracked or wheeled equipment will be performed within the 250-foot buffer. Additionally, no refueling or equipment maintenance will be allowed in these areas, unless done on a public access road.

Exhibit 10-2, the Post-Construction Vegetation Maintenance Plan (VMP), applies to the routine vegetation maintenance requirements within the NECEC transmission line corridors. While providing similar protections to SVPs as the VCP (please refer to exhibits 10-1 and 10-2 for a detailed description of the applicable restrictions), routine vegetation maintenance is a significantly less intensive activity and uses a combination of hand-cutting and selective herbicide applications, typically on a 4-year cycle. Personnel will travel along the transmission line corridor by foot or by all-terrain vehicles (ATVs) and spot-treat target species and specimens with approved herbicides and application methods. In some cases, hand tools (e.g., chain saws) may be used, but typically no heavy logging equipment is necessary because vegetation within the corridor will be younger and smaller, and so will already be controlled.

The activities that will occur during construction of the NECEC and during the post-construction vegetation maintenance cycles are quite different, so additional restrictions within a 250-foot buffer during construction are warranted while a 100-foot buffer is appropriate to protect these resources during post-construction routine vegetation maintenance.

- **Verify and reiterate spot herbicide application vs. broadcast in vicinity of vernal pools.**

See Exhibit 10-1 VCP, Section 2.2.m and Exhibit 10-2 VMP, pages 3-4, regarding spot spraying (also noted above). These restrictions apply globally to all habitat types.

- **Verify 25-foot setback of herbicides from pool depression.**

See Exhibit 10-1 VCP, Section 5.1.e: “No herbicide use is permitted within 25 feet of the SVP pool depression.”
See Exhibit 10-2 VMP, page 9: “No herbicide use is permitted within 25 feet of the SVP pool depression.”

Roaring Brook Mayfly

- **VMP and compensation plan erroneously state that both Gold and Mountain Brook contain RBM – correct this.**

This is not erroneous, because they both contain RBM. Please refer to the NECEC Roaring Brook Mayfly and Northern Spring Salamander Survey Results, submitted to MDEP and MDIFW on October 19, 2018, pages 2-3: "RBM was confirmed as present in Mountain Brook (Johnson Mtn Twp) and Gold Brook (Appleton Twp)."
MDEP web link: 9.4 AIR Attachment F RBM and NSS Survey Results.pdf

This report documents, though, that NSS was discovered in Mountain Brook, and not Gold Brook (page 3).

The results of the survey report submitted on October 19, 2018 are consistent with the January 30, 2019 Compensation Plan, VCP and VMP.

- **Calculations of tributary to Bog Brook has not been updated; IFW calculated 3.13 acres, CMP calculated 1.9 acres. Which is correct?**

The clearing impact within the management area of Tributary to Bog Brook (PSTR-12-07) is 1.9 acres. This is the forested area within the mapped management area polygon. The remainder of this management area is devoid of trees.

The following shapefiles were used to arrive at this result:
NECEC_RBM_and_Salamander_250_area_2018_11.29.shp
NECEC_RBM_and_Salamander_water_feature_area_2018_11.29.shp
Clearing_Limits.shp
Forest_Area.shp

Supporting files can be accessed at the MDEP Web link: Shapefiles_01_30_2019.

RTE Species

- **CMP agreed in writing to April 20 to June 30 (Rusty Blackbird?) as a no cut period - should be included in VCP and VMP.**

For the Rusty blackbird, CMP agreed in writing in its September 27, 2017 Site Law Application Section 7.4.4.8 "To avoid impacts during the breeding season, the NECEC will avoid clearing activities within the mapped polygon associated with the documented occurrence, as shown on the Natural Resources Maps (Attachment 2) during the nesting season (April 30 through June 30)." This commitment was reiterated in CMP's response to MDIFW's 6/29/2018 review comments and again in several consultation meetings with MDIFW. This commitment has not been incorporated into the VCP or VMP, but incorporation into those plans is not necessary because it is part of the MDEP record and CMP will be bound by it.

For the Bicknell's Thrush, in Site Law Application Section 7.4.4.7, CMP committed to "avoid impacts during construction within the Bicknell's thrush habitat, as shown on the Natural Resources Maps (Attachment 2), during the nesting and fledging periods (June 1 through August 15)." Again, this commitment has not been incorporated into the VCP or VMP, but it is part of the MDEP record and CMP will be bound by it.

These time of year restrictions have been incorporated into documents provided to the construction contract bidders as part of the NECEC request for proposals. Further, the granting of a permit by the MDEP will be dependent upon the proposals and plans and supporting documentation submitted by CMP during the application process. CMP will incorporate these restrictions into the VCP and VMP prior to construction.

- **CMP agreed in writing to providing written reports to MDIFW & MDEP - should be in VCP and VMP.**

For the Northern Bog Lemming, CMP agreed to conduct preliminary surveys for suitable habitat conditions and provide those results to MDIFW. CMP conducted surveys in a 1.5-mile survey area identified by MDIFW and determined that the survey area did not contain potential habitat for the Northern Bog Lemming. CMP provided those results to MDIFW on August 9, 2018.
MDEP web link: 2018-08-09 NECEC RBM NBL Habitat Survey Results.pdf.

For the Roaring Brook Mayfly and Northern Spring Salamander, CMP agreed to conduct presence/absence surveys in the Project area. CMP worked closely with MDIFW to identify potential habitat for these species. The results of the stream characterization surveys were provided to MDIFW on August 9, 2018. Based on survey results and with guidance provided by MDIFW, CMP conducted presence/absence surveys in September 2018. The results of the presence/absence surveys were provided to MDEP and MDIFW on October 19, 2018 (see weblink above).

Additionally, CMP made the following commitments to survey or provide reports to the MDEP:

- Bald Eagles, Site Law Application Section 7.4.3.1: "CMP will perform an aerial survey each spring prior to construction. These surveys will be used to determine if any new bald eagle nests have been established near the NECEC transmission line corridors and substations. "
- Great Blue Heron colonies, Site Law Application Section 7.4.4.9: "prior to initial transmission line clearing, CMP will complete surveys for heron colonies within or immediately adjacent (within 75-feet) to existing IWWH's within the NECEC Project, between April 20 and May 31 prior to each year of construction. If discovered, CMP will notify and consult with MDIFW biologist."
- Invasive Plant Species, NECEC Compensation Plan (1/30/2019), page 28: "Prior to construction CMP will submit to the MDEP and USACE, for approval, an invasive species plan for the survey, control, and treatment of invasive species on the Project, including the Little Jimmie Pond-Harwood Tract. CMP will implement the control measures approved by the MDEP and the USACE during

the first full growing season following permit issuance and will submit a report by December 31 of that year by documenting the efficacy of the treatment."

CMP will provide evidence and/or the results of these surveys as they occur.

These commitments to survey and/or provide results of those surveys are part of the MDEP record and it is not necessary to incorporate them into the VCM or VMP because CMP will be bound by them.

DWAs

- **12/7/18 email item -- Include in compensation plan and VMP proposal to install land markers at limits of deer winter travel corridors for benefit of vegetation management crews.**
- **12/7/18 email item -- Include in VMP proposal to offset / vary maintenance schedule for 8 deer winter travel corridors.**
- **Include in VMP proposal to inform MDIFW in advance of planned maintenance of deer winter travel corridors so MDIFW can be present for that work.**

CMP hereby commits to undertake these actions, and will incorporate them into the VCP and VMP prior to construction.

Compensation / Preservation Tracts

- **Provide method of conveyances (fee, easement, lease, MOU, verbal permission, etc.) for snowmobile / ATV trails or any other permissions to use the land. Encumbrance documentation provided by CMP on 1/8/19 (7 DWA tracts) and 1/11/19 (6 original tracts) is not sufficiently clear.**

Attached please find the two spreadsheets from January 8 and 11, updated to provide additional clarity relating to the encumbrances for (1) the six compensation parcels ("Original 6 Comp parcels") and (2) the seven DWA preservation parcels ("Additional Com parcels"). Also attached are the relevant encumbrance agreements, which apply to the parcels noted below and are further summarized on the attached Word document (Encumbrance Agreements Summary):

- Brookfield White Pine Hydro indenture (Lower Enchanted), SOM 5152-29
- Oxford Paper Co. easements (Lower Enchanted), SOM 2166-1
- Western Mountains Charitable Foundation trail lease (multiple parcels), SOM 3990-137
- State of Maine/DOC, trail use agreement (multiple parcels)
- Forks Area Chamber of Commerce license (multiple parcels)
- Weyerhaeuser/CMP Easement (multiple parcels)
- State of Maine/DOC license (Moxie Stream)

Generally, trails are granted by license on CMP land. Terms and conditions may vary between licenses but they are not permanent encumbrances. Trails will be excluded from the Declaration of Covenants and Restrictions (DOCR) to allow continued use of these trails

without conflicting with the DOCR. If the qualified holder is not the same entity that administers the trail, CMP may grant an easement for the trail to the trail administrator.

Existing easements are permanent encumbrances and therefore will be excluded from the DOCR. However, the fee interest under the easement would be conveyed to the qualified holder if the tract is being conveyed and not retained by CMP (as with the DWA tracts).

Recreational and commercial leases (i.e., camp lots and Maine Huts and Trails land) were excluded from acreage calculations, will not be subject to the DOCR, and will not be conveyed to a qualified holder. CMP will either retain ownership or convey these leased areas to the lessees.

CMP will work with qualified holders before a DOCR is placed on mitigation tracts to ensure traditional recreation uses can continue on the land and that neither the DOCR nor the recreational uses conflict with the qualified holder's management plan.

- **Are backup owners needed if fee not conveyed to BPL or MDIFW, to assure preservation?**

This is not necessary. As CMP stated in the January 30, 2019 supplemental materials, "Per chapter 310.6(F)(2), CMP will use the MDEP DOCR template (Attachment D), tailored for existing uses and encumbrances, and reserving the appropriate rights to CMP to manage vegetation [i.e. invasive species management], and intends to maintain fee ownership of these tracts and to manage them in compliance with the DOCR and associated restrictions (i.e., undeveloped in perpetuity) until such time that the tracts are transferred to (a) qualified holder, i.e., an entity or entities with experience and demonstrated stewardship capabilities." MDEP's DOCR form provides protection because it provides for MDEP enforcer no matter the identity of the owner.

See CMP's response to MDEP's December 28, 2018 Compensation Review Comments, submitted on 1/30/2019. MDEP web link: 2019-01-30 NECEC Response to MDEP Compensation Review Comments.pdf.

Sheepscot River Vegetation Planting Plan

- **Verify that plan uses only native species and non-ornamentals (species names included sub-species).**

The plan only uses native species. This was confirmed using the USDA NRCS PLANTS Database (https://plants.sc.egov.usda.gov/java/).

Comments - Environmental Permit Review Maine Department of Inland Fisheries and Wildlife	
Inland Fisheries and Wildlife Division Comments **Bureau of Resource Management Comments**	
Applicant's Name: Central Maine Power Company	
Project #:	**Regulatory Agency:** MDEP
Project Type: New England Clean Energy Connect Project	**Project Manager:** James Beyer
Comments Due Date: ---	**Date Comments Sent:** 3-15-2018
Biologists (review coordinators): John Perry, Bob Stratton **Biologists (Fisheries Division):** Tim Obrey, Jason Seiders, Liz Thorndike **Biologists (Wildlife Division):** Phillip deMaynadier, Chuck Hulsey, Doug Kane, Keel Kemper, Cory Mosby, Bob Stratton, Beth Swartz, Charlie Todd, Derek Yorks	

After review of the application and consideration of the proposal's probable effect on the environment, and on our agency's programs and responsibilities, we provide the following comments:

Project Description: Central Maine Power Company ("CMP", the Applicant) proposes to construct the New England Clean Energy Connect ("NECEC"), a High Voltage Direct Current ("HVDC") transmission line and related facilities capable of delivering up to 1,200 MW of electric generation from the Canadian border to the New England Control Area in response to the Request for Proposals for Long-Term Contracts for Clean Energy Projects issued by the Massachusetts Department of Energy Resources and the Electric Distribution Companies of Massachusetts. The proposed NECEC Project is composed of the following components:

<u>Segments 1, 2, & 3 – HVDC Components and Associated Upgrades</u>

- New 145.3-mile +/-320kV HVDC Transmission Line from the Canadian border to a new converter substation located north of Merrill Road in Lewiston;
- New 1.2-mile 345kV to +/-320kV Transmission Line from the new Merrill Road Converter Station to the existing Larrabee Road Substation;
- Partial rebuild of 0.8 miles of 34.5kV Section 72 AC Transmission Line outside of the Larrabee Road Substation to make room in the corridor for the 1.2 mile 345kV Transmission Line;
- New 345kV to +/-320kV HVDC 1200MW Merrill Road Converter Station;
- Addition of 345kV Transmission Line Terminal at the existing Larrabee Road Substation;

<u>Segment 4 – 345kV STATCOM Substation and 115kV Rebuilds</u>

- New 345kV +/-200MVAR STATCOM Fickett Road Substation;
- New 0.3-mile 345kV AC Transmission Line from the existing Surowiec Substation in Pownal to a new substation on Fickett Road in Pownal;
- Rebuild 16.1 miles of 115kV Section 64 AC Transmission Line from the existing Larrabee Road Substation to the existing Surowiec Substation;
- Rebuild 9.3 miles of 115kV Section 62 AC Transmission Line from the existing Crowley Road

Substation in Lewiston to the existing Surowiec Substation;

Segment 5 – New 345kV Transmission Line and Associated Rebuilds

- New 26.5-mile 345kV AC Transmission Line from the existing Coopers Mills Substation in Windsor to the existing Maine Yankee Substation in Wiscasset;
- Partial rebuild of 0.3 mile of 345kV Section 3025 between Larrabee Road Substation and Coopers Mills Substation;
- Partial rebuild of 0.8 mile of 345kV Section 392 between Maine Yankee Substation and Coopers Mills Substation; and,
- Partial rebuild of 0.8 mile each of 115kV Section 60/88 outside of Coopers Mills Substation.

Consultation summary: MDIFW first learned of the details of this project during a State and Federal Interagency Meeting on May 23, 2017 when the Applicant and their consultant (Burns & McDonnell, also considered the "Applicant" for purposes of this review) formally introduced the Project. It was explained at that time that the Project was initiated two years prior at which time baseline environmental studies were initiated and ongoing (namely wetland mapping and vernal pool surveys). The general concept of the current Project proposal was described and there were general discussions, as well as concerns raised by both State and Federal agencies regarding the expedited permitting schedule of the Project and the need to update and collect further field data. At that time, MDIFW provided very preliminary comments on the scope and provided our Agency's list of recommended pre-construction studies. On June 5, 2017, MDIFW responded to Applicant's Environmental Review request. As attachments to the response, MDIFW also included Final Performance Standards for Overhead Utility ROW Projects for Deer Wintering Areas, Inland Waterfowl and Wading Bird Habitats, Significant Vernal Pools, and Riparian Buffers. In addition, a shapefile of the project layout with ***known*** and mapped MDIFW species and habitat resources of concern was also sent to the Applicant and their consultant. On June 7, 2017, MDIFW, USFWS, and the Maine Natural Areas Program met with the applicant to specifically discuss concerns and needs related to natural resources. Several subsequent related correspondences have ensued.

The majority of MDIFW's review has been focused on the "new" section of the proposal, a 53.5-mile long transmission corridor which will enter Maine in Beattie Township before it joins with an existing transmission line in West Forks. It is our Agency's understanding that the Applicant has indicated that it will follow the same techniques for the co-location portions of the NECEC Project that were utilized for the Maine Power Reliability Program (MPRP) Project, including employing lessons learned from that 5-year-long construction experience. While MDEP previously adopted those measures for the permitting of the MPRP Project, our Agency has some concerns and recommendations for the major portion of the NECEC Project (49%) proposed to be co-located in existing corridors that will be widened. As noted in the June 7, 2017 meeting, the MPRP was unique in its proposal, site conditions, and circumstances. It included mitigation based on demonstrated unavoidable impacts, prescribed timing constraints, materials and methods. It consisted of an existing, previously impacted route and not an uncut right of way. Given the scale of the Project, most of our recommendations specifically address the new impacts of the newly proposed corridor, though the same concerns are relevant for new impact areas on existing corridors.

Consistent with our Agency's reviews of construction of new transmission line corridors, MDIFW provides the following comments and recommendations.

Wildlife Concerns

MDIFW makes note that in several instances, pertaining to particular State-listed Endangered, Threatened, or Special Concern species, the application states that

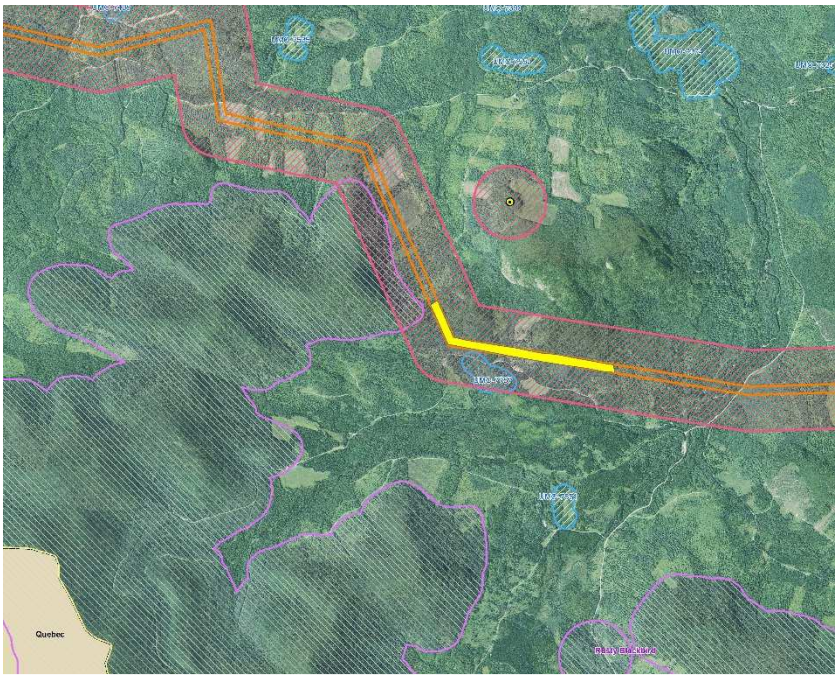
> *Based on information provided by MDIFW, there are no documented occurrences of* {species type} *within the Project corridor.*
>
> Or
>
> …*no occurrences of the* {species type} *have been documented within the Project vicinity.*

It should be emphasized that while MDIFW databases may not indicate the presence of a particular State-listed Endangered, Threatened, or Special Concern Species within the 53.5-mile long transmission corridor Project area, it is because, to our knowledge, no formal surveys have been conducted. MDIFW reiterates that it is likely that State-listed Endangered, Threatened, or Special Concern Species are resident or transient in the Project area based on location, habitats present, and life history requirements of the individual species present. MDIFW's recommendations are made accordingly.

<u>Northern bog lemming</u>

Northern bog lemming, a State Threatened species, are afforded special protection under Maine's Endangered Species Act (MESA, 12 M.R.S §12801 et seq.). MDIFW has had several discussions with the Applicant regarding the potential for northern bog lemming to occur in the Project area. As staff have indicated, the habitats of interest for northern bog lemming are alpine sedge meadows, krummholz, spruce-fir forest with dense herbaceous and mossy understories, wet meadows, and mossy stream-sides, that are $\geq$ 1,000 feet MSL (above Mean Sea Level) in western mountain and northern areas of Maine. Northern bog lemmings are presumed to be present in these habitats and, to protect this species, MDIFW recommends that these areas be avoided.

MDIFW staff have reviewed the entire Project shapefile through desktop analysis and identified one area along the corridor that potentially contains habitat features that are suitable for northern bog lemming, located south and west of Moose Mountain in Skinner Township. Refer to yellow delineation in the figure below.



MDIFW recommends that the Applicant conduct a review of the land within this area for the habitat features suitable for northern bog lemming. If those habitat features are present, and the applicant wishes to verify presence, we recommend the Applicant perform surveys to document presence/probable absence. Surveys can be conducted in one of two ways.

1) Transects can be walked through NBL habitat and document any presence of run-ways, latrines, and green scat; or

2) If a more definitive method of NBL identification is desired on the part of the applicant, scats can be collected and genetically analyzed to identify if they are NBL, or other species of rodents. For a full description of the methods to conduct this level of genetic work please contact the MDIFW Small Mammal Biologist (207-941-4473). If evidence of lemmings is present either in the form of green scats, latrines, runways, and/or genetic confirmation, MDIFW will consider the area as occupied and recommendations will be to avoid these wetlands.

Alternatively, in consultation with MDIFW, the applicant may elect to forgo field surveys along this reach and avoid direct and indirect impacts to any suitable habitat areas, including no clearing or use of construction-related equipment (i.e. cranes, crane mats, etc.) within these areas.

Brook Floater

There are two locations where the project footprint intersects a mapped habitat polygon for this species of State-Threatened freshwater mussel: the West Branch Sheepscot River in Windsor (Segment 5, Maps 414-416) and the Carrabassett River in Anson (Segment 3, Map 199). Because the applicant is not proposing any in-stream construction or new forest clearing within these mapped habitats, MDIFW does not anticipate new impacts to the Brook Floater as a result of project activities.

However, at both of these sites, a riparian buffer along significant stretches of the river is either entirely lacking or has been diminished to a thin strip as a result of past clearing for transmission line ROW, agriculture, and other uses. The Brook Floater, which is one of the most endangered freshwater mussels in the Northeast and currently under review for potential Federal listing, is a species that requires free-flowing streams and rivers of high water quality. Protecting stream integrity through maintenance of an effective riparian buffer is a valuable conservation tool for this species. As such, on lands within 100 feet of the shores of both rivers, or the upland edge of contiguous wetlands, that are owned or controlled by the applicant, MDIFW recommends that Central Maine Power improve the riparian buffer integrity by allowing woody vegetation to regrow to the greatest height possible.

Roaring Brook Mayfly

The Roaring Brook Mayfly is a State-Threatened species that is restricted to clean, cold, high elevation perennial streams along the northern Appalachian Mountain range and may be New England's only endemic mayfly. It is currently known from only 14 streams in Maine and one site each in New Hampshire and Vermont. The project footprint intersects a mapped habitat polygon for this State-Threatened mayfly on an unnamed tributary of Mountain Brook in Johnson Mountain Twp. (Segment 1, Maps 76-77). The applicant proposes to clear approximately 1,100 linear feet of currently forested right-of-way through the riparian management zone associated with this occurrence-- permanently converting a significant portion of forested riparian buffer to non-forested vegetation. MDIFW believes this activity will have a permanent adverse effect by significantly degrading habitat quality for Roaring Brook Mayfly along this stretch of the stream.

Additionally, as there have been extremely few other projects in this region of the state, our data on species occurrence in this area is sparse. Because the northernmost segment of the Project runs through the known distribution of the Roaring Brook Mayfly and this region has not been comprehensively surveyed, the potential exists for project activities to impact undiscovered populations of this globally rare mayfly. Given the geographic range of this species, as well as the elevation of the project and presumed cold water/excellent water quality of most of the streams, the assumption is that this species is present in other portions of the Project search area. All known occurrences of this species are in streams draining off slopes above 1,000 feet elevation MSL with coarse substrates (rocks, cobble, boulders) and bordered by relatively undisturbed mixed or hardwood forest. To protect this species, MDIFW recommends a 250-foot riparian management zone for streams meeting these location preferences, extending from each bank. Alternatively, if an applicant wishes to verify presence, MDIFW recommends that--within the project segment running from the Quebec/Maine border through Johnson Mountain Township--pre-construction surveys be conducted during the appropriate timing window (September) in suitable streams where forest clearing or other permanent project impacts are proposed within a 250-foot riparian management zone on either side of the stream or the upland edge of contiguous wetlands. To identify high priority survey sites and plan an effective survey effort following MDIFW's recommended survey protocols, the applicant should consult with the Department before initiating any surveys for Roaring Brook Mayfly (contact Beth Swartz at beth.swartz@maine.gov).

Alternatively, in consultation with MDIFW, the applicant may elect to forgo surveys on any or all potentially suitable streams as long as the Department's "Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Northern Spring Salamander Habitat" are implemented (Attachment 1).

Golden and Bald Eagles

Golden eagles are listed as Endangered under MESA. While most documented golden eagle sightings have occurred in northwestern Maine, smaller numbers of transients have been documented elsewhere in the State at various times of the year. In Maine, golden eagle activity typically peaks during fall and spring migrations, although a few golden eagles have been documented to overwinter in Maine. In addition, both resident and transient bald eagles utilize the Project area. Bald eagles have gone through a remarkable recovery in Maine and, as such, the formal status of the population has changed. Until recently, bald eagles were classified as Species of Special Concern, but no longer. Bald eagles continue to be protected under the federal Bald Eagle and Golden Eagle Protection Act (Eagle Act), as well as other federal laws. It is recommended that the Applicant contact the US Fish and Wildlife Service (Maine Field Office, Orland) for guidance.

The entire upper Kennebec River provides year-round foraging opportunity for eagles due to open water in the winter. Eagles likely use the river for navigation or are attracted to carcasses. Additionally, the River also likely serves as a movement corridor for north/south migrations of waterfowl. Therefore, we recommend that some form of markers/diverters be installed along the proposed transmission line crossing of the upper Kennebec River as they have been shown to reduce/prevent bird collisions. Because more visible markers are more effective at reducing collisions, our Agency recommends markers/diverters with that are yellow with stripes to make them more visible to birds. These should be installed in conjunction with the typical aviation marker balls (if required). The Applicant would need to make sure the markers/diverters remain in place for life of project. MDIFW is open to further discussions regarding the best types that will not only be visible to birds but also those that will remain securely in place.

Wood Turtle

The wood turtle is categorized as a Species of Special Concern[1]. The project footprint intersects a documented occurrence for the wood turtle on the Sheepscot River in Alna and Whitefield (Segment 5, Maps 386-388). As part of its review for potential impacts to Wood Turtles, MDIFW conducted a desktop habitat analysis and identified an additional 15 streams that intersect or parallel the project footprint and have a high potential to be occupied by wood turtles. Due to the scale, the polygons representing these 16 streams buffered by a 300-foot riparian management zone were unable to be attached to this document; however, they are available from MDIFW (contact Derek Yorks at derek.yorks@maine.gov).

While for much of the year wood turtles confine their activities to slow-moving, clear-water rivers and streams, during late spring and summer they extensively utilize the surrounding uplands including forests, floodplains, meadows, and hayfields. The patchily-vegetated, sunny openings of powerline rights-of-way can also provide good habitat for wood turtles during these times. However, construction activities conducted by motorized vehicles and heavy machinery pose a significant threat to wood turtles present in the uplands. In order to avoid direct mortality, MDIFW recommends restricting all harvest

[1] Special Concern species are defined by MDIFW as species that do not meet the criteria as Endangered or Threatened, but are particularly vulnerable and could easily become Endangered, Threatened, or Extirpated due to restricted distribution, low or declining numbers, specialized habitat needs or limits, or other factors.

and construction activity within the 16 mapped habitats to the time of year when wood turtles are inactive and confined to the stream channel: specifically, October 15 to April 15. Where stream crossings are proposed, temporary bridges should be built prior to any motorized equipment crossing. Cleared openings within the mapped habitats should be allowed to regrow to high shrubs and other non-capable woody vegetation, rather than be maintained in a vegetative state that would require periodic mowing which can be lethal to wood turtles. The Department's "Forest Management Recommendations for the Wood Turtle" is included as Attachment 2 and provides other specific guidelines to avoid and minimize harm to this rare turtle. All observations of wood turtles during project construction should be reported to MDIFW (contact Derek Yorks at derek.yorks@maine.gov).

Northern Spring Salamander

The northern spring salamander is categorized as a Species of Special Concern. The project footprint does not intersect any currently mapped known occurrences of the northern spring salamander. However, because the northern half of the project overlaps with the species' core distribution in the foothills and mountains of central and western Maine, there is high potential for the project to impact undocumented occurrences. Furthermore, as there have been extremely few other projects in this region of the state, our data on species occurrence in this area is sparse. That said, given the geographic range of these species, as well as the elevation of the project and presumed cold water/excellent water quality of most of the streams, the assumption is that these species are present in the Project search area. Most occurrences in Maine are known from elevations ranging between 500 and 2,000 feet MSL in relatively steep gradient, first or second order streams underlain by coarse substrates (rock, cobble, gravel) and bordered by hardwood or mixed forest. This species can also be found in larger third-order streams and rivers if the habitat is appropriate as described above. To protect this species, MDIFW recommends a 250-foot riparian management zone for streams meeting these location preferences, extending from each bank. To effectively target streams with the highest potential for spring salamander, MDIFW recommends that the applicant simultaneously conduct surveys for this species at the same sites to be surveyed for Roaring Brook mayfly. Surveys should be conducted following the Department's recommended survey protocols (contact Phillip deMaynadier at phillip.deMaynadier@maine.gov).

Alternately, the applicant may elect to forgo surveys at potentially suitable streams where the Department's "Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Northern Spring Salamander Habitat" (Attachment 1) are implemented.

Great blue heron

The great blue heron is a State Species of Special Concern due to a 64% decline in the coastal breeding population observed from 1983 to 2009. Since 2009, MDIFW has been monitoring the statewide population to determine if the decline seen along the coast is also occurring statewide. Not all great blue heron colonies have been mapped in Maine.

MDIFW agrees with the Applicant's proposal described in Section 7.4.4.9 of the application. Section 7.4.4.9 states that if a heron colony is discovered near or within the transmission Project, the Applicant will contact an MDIFW biologist for confirmation and under guidance from MDIFW, mitigation efforts may be developed and implemented. Based on recommendations from MDIFW, prior to initial transmission line clearing, CMP will complete surveys for heron colonies within or immediately

adjacent (within 75-feet) to existing IWWH's within the NECEC Project, between April 20 and May 31 prior to each year of construction.

MDIFW stresses that surveyors should be aware that heron colonies can also be found in upland areas in live trees.

Bats

Of the eight species of bats that occur in Maine, the three *Myotis* species are protected under MESA. The three *Myotis* species include little brown bat (State Endangered), northern long-eared bat (State Endangered), and eastern small-footed bat (State Threatened). The five remaining bat species are listed as Special Concern: big brown bat, red bat, hoary bat, silver-haired bat, and tri-colored bat.

While a comprehensive statewide inventory for bats has not been completed, based on historical evidence it is likely that several of these species occur within the project area during migration and/or the breeding season. However, as the project is not located near known hibernaculum or known maternity roosts, our Agency does not anticipate significant impacts to any of the bat species as a result of this project.

Significant Vernal Pools

MDIFW provided comments requesting additional information on Significant Vernal Pools to MDEP on December 20, 2017, for forwarding to the Applicant. To date, we have not received a response. As explained in the email, our questions, comments, and information needs were preliminary. The contents of the email are reproduced below:

> The vernal pool portion of this review is complex and time consuming, given the number of pools intersecting with the project footprint (approximately 150). The applications appear to provide only minimal documentation of proposed impacts to and mitigation for SVPs, so we are asking for additional information from the applicant before we can complete a thorough review. The applications were also submitted prior to MDEP notifying the applicant of the official pool statuses - consequently there are discrepancies that the applicant will need to address.
>
> The following is a summary of issues needing to be addressed before a comprehensive review of the vernal pool impacts can be completed:
>
> 1. The applicant needs to update the status of pools where MDIFW's official determination differs from the consultant's pre-application assessment. These discrepancies should be addressed by **a)** proposing strategies to avoid or minimize impacts to "Significant" or "Potentially Significant" pools that were not treated as such in the application; **b)** updating documentation of impacts to individual pools; and **c)** updating the determination of total impacts to vernal pools and the associated compensatory mitigation proposal. The following is a list of discrepancies noted by MDIFW during a review of the Natural Resource Maps for the entire project footprint. The MDEP pool status and IFW Pool ID are noted in parentheses after the applicant's pool ID (that was recorded on the maps). Pools where the discrepancy in

status was between SVP and PSVP are **NOT** noted below, since these pools would be treated the same. [To help the applicant update its pool statuses, we will create an Excel spreadsheet listing the official MDIFW status of each pool by the NECEC pool ID. We'll send this in a separate email.]

a. **VP-161-11** (**SVP** #353) – Segment 4, Map 356; not considered in application as SVP; the applicant did not submit a data form for this pool, however it was previously surveyed in 2007 as part of the Maine Power Reliability Project and determined to be Significant; it is currently mapped incorrectly in MDIFW/MDEP database but photos and drawings for the original survey match the location and shapefile submitted by NECEC

b. **VP-81-05** (**PSVP** #3336) – Segment 3, Map 179; not considered in application as PSVP (inappropriate survey timing)

c. **PSVP-83-05** (NSP/straddle pool #3341) - Segment 3, Maps 183-184; considered in application as PSVP and buffer mapped in combination with adjacent SVP

d. **PSVP-86-10** (NSP/straddle pool #3355) - Segment 3, Map 190; considered in application as PSVP and buffer mapped in combination with adjacent SVP

e. **PSVP-86-07** (NSP #3353) - Segment 3, Map 191; considered in application as PSVP and buffer mapped in combination with adjacent SVPs (pool likely unnatural in origin and permanent in hydrology, but does provide significant habitat for indicator species)

f. **PSVP-90-01** (NSP #3358) - Segment 3, Map 200; considered in application as PSVP

g. **VP-111-03** (**PSVP** #3377) – Segment 3, Map 246; not considered in application as PSVP (origin is uncertain but pool provides significant habitat for indicator species)

h. **VP-119-02** (**PSVP** #3410) – Segment 3, Map 264; not considered in application as PSVP (inappropriate survey timing)

i. **VP-135-03** (**SVP** #441) – Segment 3, Maps 298-299; not considered in application as SVP

j. **VP-135-05** (**SVP** #327) – Segment 3, Maps 299; not considered in application as SVP

k. **PSVP-222-09** (NSP/straddle pool #3407) - Segment 2, Map 152; considered in application as PSVP

l. **PSVP-20-3** (NSP #3284) - Segment 1, Maps 46-47; considered in application as PSVP; pool and buffer appear to be entirely outside project area

m. **PSVP-39-3** (NSP #3285) - Segment 1, Map 89; considered in application as PSVP (pool likely unnatural in origin and permanent in hydrology, but does provide significant habitat for indicator species)

An updated copy of the Natural Resource Map should be provided to MDIFW for all SVPs or PSVPs where proposed impacts are altered as a result of the above status changes.

2. In order to expedite completion of MDIFW's review of proposed impacts to vernal pools, we request that the applicant provide a table that summarizes the impacts to each formally designated SVP and PSVP that intersects the project area. A good example of a summary table for a similar large scale project is attached. At a minimum, this table should include:

- **a.** Pool ID
- **b.** MDIFW Pool Status
- **c.** Segment and Natural Resource Map # pool is found on
- **d.** Proposed Permanent Impacts to Pool
- **e.** Total area of Critical Terrestrial Habitat (CTH) buffer (within applicant's ownership or control)
- **f.** Existing (i.e., pre-project) impacts to CTH buffer (within applicant's ownership or control)
- **g.** Proposed impacts to CTH buffer (within applicant's ownership or control)
- **h.** Total (i.e., post-project) area and percent CTH impacted (within applicant's ownership or control)
- **i.** Type(s) of impacts to CTH

The applicant should take note of the following when constructing a vernal pool impact summary table:

- Existing and proposed impacts and clearings to the CTH should include all non-forested footprints such as fields, roads, development, transmission line ROWs, etc. that are of unnatural origin. Temporary cleared openings and existing forest management roads that will not be widened or made unavailable to future forest management use are exempt.

- All impacts should be calculated on a ***per landowner basis*****.** MDIFW and DEP implement the SVP habitat management standard of maintaining ≥75% of the Critical Terrestrial Habitat in forested condition on a per owner basis – i.e., on lands within the 250 foot buffer that the applicant owns or controls (e.g., via management rights, lease agreement, easement, deeded right-of-way, etc.).

- Calculate all impacts on an ***individual pool basis*** **–** do not combine calculations for SVPs or PSVPs with overlapping Critical Terrestrial Habitat buffers. There are numerous instances on the Natural Resource Maps in the application where overlapping buffers for adjacent pools are combined into a single buffer. The percent of

existing and proposed habitat impact needs to be calculated based on the buffer around **each individual pool**.

- Calculate the Total percent impact to the CTH to include both existing and proposed impacts.

3. **Clarification needed from DEP/the applicant:** we could not locate in the application a summary of impacts to and compensation for permanent clearing of forested uplands (or wetlands) within the Critical Terrestrial Habitat of SVPs and PSVPs. The application appears to only address the impact of permanent fill in an SVP (i.e., pole placement), while acknowledging that where clearing will occur, vegetation will be maintained in functionally beneficial shrub-scrub vegetation. However, it's MDIFW's understanding that the applicant still has to compensate for forest clearing in the CTH buffer, just at a discounted ratio that recognizes the partial habitat value that is conserved following conversion of forest to shrub-scrub (vs. forest to pavement or development, etc). Unless we've missed it – which is possible given the application materials are so voluminous – we are not seeing documentation where the applicant has measured this specific impact and associated compensatory mitigation at all. Ideally, a summary table will be created that would shed some light on the forest clearing impact.

4. **Clarification needed from DEP/the applicant:** Has the applicant applied for and received a Permit By Rule for any of the vernal pool impacts? We have seen applicants of ROW projects receive PBRs in the past based on incorrect calculations of percent impact (i.e., they calculated % impact using the total area of the CTH buffer vs. the area in their ownership or control, which is how it's supposed to be done). Our concern is that this could lead to inappropriate issuance of PBRs and significant miscalculation of compensation due on a large ROW project.

As soon as the applicant updates their SVP resource layer and provides the requested information above, MDIFW will strive to complete the SVP component of the review as quickly as possible.

Fisheries Concerns

Impacts to coldwater fisheries

Not surprisingly for a Project of this magnitude, numerous streams were delineated within the Project area, including both perennial and intermittent streams. Section 7.5.1 of the application states that field survey data identified 724 waterbodies as being intersected by the NECEC transmission line corridor, of which the majority are currently spanned by existing transmission lines. Of those 724 waterbodies, 184 will spanned by construction access roads. Regardless of whether the stream is currently spanned or not, it is clear that there will be a tremendous amount of clearing associated with the Project, not only for the new 53.5-mile long transmission corridor but for the remainder of the Project as well, where existing cleared corridors will be expanded.

Many of the streams in the new 53.5-mile long transmission corridor Project area are characterized as intermittent, and likely first-order streams. In the description of the streams in the NECEC Waterbody Table (Exhibit 7-7), the notation for brook trout under streams designated as intermittent, is "N/A". Please address what the "N/A" designation refers to and how these streams were classified as "intermittent". Regardless of whether they are perennial or intermittent in nature, these waters provide critical linkages to downstream resources for many species, including wild brook trout. Movement by instream migrants links headwaters with downstream and terrestrial ecosystems, as do exports such as emerging and drifting insects. Evidence suggests that headwater streams are critically important to downstream ecosystems and that small streams, including intermittent streams, can provide crucial rearing habitat, cold water for thermal refugia, and abundant food for juvenile salmonids on a seasonal basis and therefore should be protected. Maintaining adequate buffers along coldwater streams is critical to the protection of water temperatures, water quality, and inputs of coarse woody debris necessary to support conditions required by brook trout and other aquatic life.

The application and the accompanying NECEC Construction Vegetation Clearing Plan (Exhibit 10-1) proposes to provide a 25-foot buffer around all streams along the Project. It is MDIFW's position that this minimal buffer will not be adequate to protect coldwater resources. Moreover, it was unclear from the application where avoidance or minimization efforts were considered during the Project design, such as evaluating the utilization of taller structures and closer spacing of taller poles that would reduce canopy disruption and allow much taller capable vegetation to grow, thus maintaining necessary shading and allowing more functional riparian buffers. To minimize impacts to these systems, MDIFW recommends adherence to our comments provided to the Applicant on June 5, 2017, including our 2012 Recommended Performance Standards for Riparian Buffers in Overhead Utility ROW Projects. To reiterate, MDIFW recommends that the previously recommended 100-foot buffer be maintained along *all* streams, including perennial, intermittent, and ephemeral streams, within the Project area. To be effective, these 100-foot buffers should be measured from the upland edge of stream or associated fringe and floodplain wetlands. As proposed, without the protection of 100-foot buffers at all streams, the quality of fisheries and habitat in these watersheds will be impaired. This is also critically important for the other stream-dependent species of concern noted earlier in this document.

If the Applicant is unable to minimize impacts to riparian corridors per our previously submitted recommendations and our 2012 Recommended Performance Standards for Riparian Buffers in Overhead Utility ROW Projects, it is our Agency's position that impacts to riparian buffers of 100 feet extending from each streambank and, where present, the upland edge of contiguous wetlands, merit mitigation.

Road crossings and proposed culvert mitigation sites

To the Applicant's credit, the use of existing logging roads has drastically minimized the amount of linear impacts to streams. As proposed, there will be no instream construction associated with this Project--all temporary crossings will completely span each stream and will be constructed and maintained in a manner that will prevent sediment from entering waterbodies.

That said, should the need arise that existing roads and associated culverts built during previous forestry operations need to be modified or replaced for construction of this Project, MDIFW recommends that culverts be replaced with appropriately-sized structures that will restore lost stream connectivity and

significantly enhance life history requirements in these streams. MDIFW recommends that any new, modified, and replacement stream crossings, including temporary crossings, be sized to span 1.2 times the bankfull width of the stream. In addition, we recommend that stream crossings be open bottomed (i.e. natural bottom). Any proposed permanent replacement structures should be reviewed and approved by MDIFW fisheries staff prior to installation.

Work Window

For the protection of coldwater fisheries, any instream work that should arise during construction should occur during the standard summer work window of between July 15 and September 30. Finally, all riparian vegetation should be allowed to grow back to the maximum extent possible.

Unconditional Access to Project Site for MDIFW Staff

As a condition of the permit, we request that MDIFW staff be allowed unconditional access to the Project area, specifically including but not limited to the new 53.5-mile long transmission corridor, to ensure the adequacy and appropriateness of recommended species and habitat conservation measures. As an Agency, we are seeking to include similar language for other projects with listed species and significant resource concerns as a way for evaluation and continual improvement of our recommendations for the protection and enhancement of affected species.

Attachment 1: Recommended Management Guidelines for Land Use in or Adjacent to Roaring Brook Mayfly and Northern Spring Salamander Habitat

RECOMMENDED MANAGEMENT GUIDELINES
FOR LAND USE IN OR ADJACENT TO
ROARING BROOK MAYFLY AND NORTHERN SPRING SALAMANDER HABITAT

To protect the integrity of stream habitats with documented or potential occurrences of Roaring Brook Mayfly (Threatened) or Northern Spring Salamander (Special Concern), MDIFW recommends the following guidelines for development and/or forestry activities proposed in or near the stream channel. These management guidelines are based on the best professional judgment of MDIFW Wildlife Biologists and modeled after previously published standards for protecting rare aquatic and stream-side fauna (Carlson and Sweeney 1999, Elliott 1999, Mitchell et al. 2006, deMaynadier et al. 2007). The goal of these recommendations is to avoid or minimize impacts to these rare species and their habitat. If impacts are unavoidable and could lead to Take of the Roaring Brook Mayfly, MDIFW may recommend an Incidental Take Plan be developed to ensure compliance with Maine's Endangered Species Act [12MRSA, Chpt. 925, §12808].

Streams having potentially suitable habitat should be surveyed for the presence of Roaring Brook Mayfly or Spring Salamander prior to any disturbance of the streambed or riparian vegetation in preparation for development projects, using survey protocols recommended and approved by MDIFW. In the absence of surveys, suitable stream habitat should be considered as potentially occupied and protected using the following guidelines:

Management Guidelines

- No construction activities, use of machinery, or other disturbances should occur within the stream channel except as necessary to place stream crossing structures per the standards below.

- Maintain a riparian management zone of 250 feet on both sides of the stream, within which the first 25 feet from the stream be retained as a no-cut and no-disturbance zone; and the remaining 25-250 feet be maintained with no less than 60-70% forest canopy cover in an evenly distributed stand.

- On slopes facing the stream, maintain an unscarified filter strip of at least the width indicated below between the normal highwater mark of the stream and any exposed mineral soil created by management activities. These recommendations follow minimum performance standards for timber harvest as defined in the Maine Land Use Regulation Commission's Rules and Regulations (Chapter 10.27E)[1].

Average Slope of Land (%)	**Width of Strip** (Feet Along Surface of Ground)
0	25
10	45
20	65
30	85
40	105
50	125
60	145
70	165

- No development or permanent land use conversion should occur within the 250 foot riparian management zone. Permanent land use conversion includes any alteration that prevents succession of riparian vegetation to its formerly natural state (e.g., roads, turbine pads and laydown areas, buildings, transmission line ROWs).

- Stream-crossings should be avoided. If crossings are unavoidable, they should be minimized to a narrow trail with forest canopy cover maintained to the greatest extent possible. Crossing structures should span at least 1.5 times the bankfull width of the stream channel and provide an openness ratio[2] of at least 0.60 meters. In the case of permanent crossings, a spanning arch or bridge structure is recommended. Current, published Best Management Practices (e.g., Moesswilde 2004) for stream crossings should be followed in order to prevent erosion, sedimentation, alteration of stream flow, or other impacts to stream habitat.

- Avoid the use of herbicides or pesticides within the 250 foot riparian management zone. Exceptions may be considered depending on product and circumstance following consultation with MDIFW biologists.

References Cited:

Carlson, B.D. and J.M. Sweeney. 1999. Threatened and Endangered Species in Forests of Maine: A Guide to Assist with Forestry Activities. A cooperative publication of Champion International Corp., U.S. Fish and Wildlife Service, Maine Department of Inland Fisheries and Wildlife, Maine Natural Areas Program, and the University of Maine Cooperative Extension Service.

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[1] text available at http://www.maine.gov/doc/lurc/reference/rulechapters/chapter10_1-20-09.pdf

[2] The openness aspect or "ratio" of a structure is defined as the width times the height of the structure, which is then divided by the total length of the structure (Maine DOT publication "Waterway and Wildlife Crossing Policy and Design Guide", 3rd edition, July 2008)

version 12/29/2017

Attachment 2: Forest Management Recommendations for the Wood Turtle

MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

Forest Management Recommendations for the Wood Turtle (*Glyptemys insculpta*)

Photos: Derek Yorks MDIFW

Background

The wood turtle (*Glyptemys insculpta*) is one of the state's rarest turtles, listed as Special Concern. It is a medium sized turtle (5 – 8 inches) with a distinct sculpted shell and orange coloration on the neck and legs. They are a handsome and long-lived species that is known to live to at least 58 years of age.

No other Maine turtle species makes such extensive use of both aquatic and terrestrial habitats. For much of the year, wood turtles are found in slow-moving clear-water streams with a predominantly sand or gravel substrate. During late spring and summer they utilize the surrounding upland areas including forests, floodplains, meadows, and hayfields. From late fall to early spring, wood turtles hibernate underwater in sheltered areas of rivers, including pool bottoms, under riverbanks, or under woody debris.

In a given year, wood turtles can cover a lot of ground. Radio-telemetry work in Maine and elsewhere confirms that individual wood turtles move long distances up and down stream (median = 2.3 mi; 95th percentile = 4.0 mi; n=32) during their active period from early spring through fall. During this time, wood turtles also move substantial distances away from streams into the surrounding uplands (straight-line average = 623 ft; Max =3041 ft; n = 53). Females typically travel farthest from streams during the early summer when they seek out nesting sites. If suitable nesting conditions are not found close to the stream they will travel considerable distances to nest in in sunny places with bare soil, sand, or gravel such as gravel pits, agricultural fields, and forest clearings.

Wood turtles have experienced declines throughout their range in eastern North America. The principal threats are direct mortality by vehicles on roads, encounters with motorized equipment in agricultural, forestry, and haying operations, as well as collection as pets. These problems are exacerbated when combined with widespread fragmentation, and loss of their upland habitat associated with development. Like many turtle

species, wood turtles are long-lived and slow to mature, making them particularly vulnerable to adult mortality. It can take years to replace adult turtles when they are killed and even a small number of annual deaths can be devastating to a population. To thrive, wood turtles require an intact matrix of riverine and upland habitat that is free of intensive human activity.

Forest management can be a compatible land use for wood turtles if precautions are made. Timing considerations are critical. Their activity period begins in early spring and continues into the fall so a late fall or winter harvest is preferable.

Management Recommendations

A high diversity of Maine's wildlife species require or make use of intact riparian forest habitat. The following practices, adapted from "Threatened and Endangered Species in Forests of Maine: A guide to Assist with Forestry Activities" (1999), are recommended for the wood turtle to protect the riparian and upland habitats this species requires.

Extent: Maintain a forested riparian management zone within 300 ft of the banks of streams and rivers hosting documented wood turtle occurrences, and for 2.0 miles upstream and 2.0 miles downstream.

Activity within the Riparian Management Zone (0 to 300 ft):

- Refrain from active cutting operations and motorized vehicle access between April 15th and October 15th
- Avoid any motorized harvest activity within 50 ft of the high water shoreline
- Manage with single-tree or small group-selection cuts that maintain 60-70% canopy cover within 100 ft and a forested condition within 300 ft of the stream bank
- Harvest only during dry or frozen ground conditions
- Avoid or minimize the construction of permanent roads or openings.
- Build temporary bridges across all perennial streams prior to any motorized equipment crossing

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Compensation Plan

New England Clean Energy Connect (NECEC)

Prepared for:

Maine Department of Environmental Protection and United States Army Corps of Engineers

Revised January 30, 2019

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Exhibit 1-8: Vernal Pool Occurrence and Species Distribution within Electrical Transmission Rights-of-Ways in Maine, TRC Environmental, April 2011
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1.1 Overview

Central Maine Power Company ("CMP") is pleased to provide a Compensation Plan ("Plan") which addresses a variety of natural resource impacts from the proposed construction and operation of the New England Clean Energy Connect ("NECEC") Project. This Plan achieves a *no-net-loss* of ecological functions and values through a combination of: use of the In-Lieu-Fee ("ILF") Program by the Maine Department of Environmental Protection ("MDEP") and US Army Corps of Engineers-New England District ("USACE") as a compensatory mitigation option for permit applicants; preservation of regionally significant natural resources; and implementation of a number of wildlife habitat enhancement projects. This Plan meets the compensation requirements of the MDEP, pursuant to the Natural Resources Protection Act ("NRPA"), 38 M.R.S. §480-A *et seq.*, and of the USACE pursuant to Section 404 of the CWA (33.U.S.C. §1344).

As described in CMP's NRPA application, submitted on September 27, 2017, CMP first sought to avoid and then minimize impacts wherever practicable through a thorough alternatives analysis (NRPA Attachment 2) and engineering design. However, where impacts cannot be avoided, a number of mitigation measures will be employed prior to and during construction to minimize impacts. These include measures such as: erosion and sedimentation controls, the use of equipment mats, consultation with third-party inspectors, construction timing restrictions, installation of avian avoidance markers where applicable, and winter condition clearing and construction, where practicable. Areas of temporary impact will be restored and revegetated as per the restoration measures described in CMP's Environmental Guidelines for Construction and Maintenance Activities on Transmission Line and Substation Projects ("Environmental Guidelines") (*see* CMP's Site Law Application, Exhibit 14-1).

In this Plan, CMP will compensate for temporary and indirect natural resource impacts (i.e., impacts not directly associated with the placement of fill, such as conversion of habitat or tree clearing) and permanent alteration of protected natural resources. All temporary impacts will be of short duration, i.e., less than 18 months, and typically much shorter than 18 months. Permanent impacts requiring compensation are limited to either cover type conversion of protected natural resources or placement of fill resulting in loss of protected natural resource area.

CMP developed this compensation plan with input and participation from the MDEP and USACE. CMP held a working session with both agencies in April 2018, with the goal to define those compensable impacts and determine the compensation rates or ratios each agency would require. While each agency's requirements differed slightly, CMP's has developed a comprehensive compensation package that

satisfies the requirements of both the MDEP and USACE. In the NRPA Application, CMP proposed to offset unavoidable impacts to natural resources, which are not fully addressed through CMP's avoidance and mitigation measures, through a contribution to the MDEP ILF Program. While USACE specified that full compensation via ILF was acceptable, the MDEP indicated that ILF cannot be used as the sole source of compensation for the Project. The MDEP requires a compensation package that consists of a combination of preservation, enhancement, and/or ILF to offset the variety of project impacts including those impacts that are outside the purview of the ILF Program (38 M.R.S § 480-Z, e.g. indirect impact to rivers, streams or brooks, indirect impact to local and/or regional recreational values and outstanding river segments and wildlife habitat). The Compensation Plan set forth here is robust, fully accounts for and, in fact, provides more than the required compensation amounts for unavoidable Project impacts.

In consultation with MDEP and USACE, CMP defined the protected natural resource impacts that will result from construction of the NECEC and which will be addressed in the Compensation Plan. Additionally, the compensation ratios at which CMP must offset those impacts were determined by working directly with MDEP and USACE. Those rates can be found in Exhibit 1-1, NECEC Mitigation Guidance: Compensation Ratios and Adjustments per Agency.

CMP's Compensation Plan addresses the following unavoidable impacts:

- Temporary Wetland Fill
- Permanent Cover Type Conversion of Forested Wetlands
- Permanent Cover Type Conversion of Inland Waterfowl and Wading Bird Habitat (IWWH)
- Permanent Cover Type Conversion in Significant Vernal Pool Habitat (SVPH)
- Permanent Cover Type Conversion in Deer Wintering Areas (DWAs)
- Permanent Fill in IWWH
- Permanent Fill in SVPH
- Direct and Secondary Impact to USACE Jurisdictional Vernal Pools
- Other Impacts:
    - Impacts to recreational uses of outstanding river segments
    - Indirect impacts to coldwater fisheries
    - Impacts to wildlife habitat, including rare species
    - Impacts to rare plants and unique natural communities

1.2 NECEC Compensation Components

1.2.1 Compensation Summary

The NRPA Wetlands and Waterbodies Protection Rules provide that "compensation is the offsetting of a lost wetland function with a function of equal or greater value," and sets as a goal "no-net loss of wetland functions and values" (NRPA Wetlands and Waterbodies Protection Rules, Chapter 310 § 5C). This goal supports the federal goal of *no net loss* stated in a February 6, 1990 Memorandum of Agreement ("MOA") between USEPA and USACE titled *The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines.*

Compensation amounts, or ratios of compensation to impact, are established by the Wetlands and Waterbodies Protection Rules, Chapter 310, and the Significant Wildlife Habitat Rules, Chapter 335. For example, compensation by restoration, enhancement, or creation is to be at least at a ratio of 1:1 for wetlands that are not of special significance and 2:1 for impacts to Wetlands of Special Significance ("WOSS"; (Chapter 310 §4). The ratio is set at 8:1 for preservation, which can include adjacent upland areas (Chapter 310 § 5C5(a-c). For those impacts offset through the ILF Program, resource compensation fees are calculated using resource-specific formulas, resource compensation rates and resource multipliers, as provided in the DEP Fact Sheet – In Lieu Fee Compensation Program (2017) ("ILF Program"). Resource multipliers take into consideration the significance of specific resources.

Compensation ratios established by the USACE's 2016 New England District Compensatory Mitigation Guidance ("Mitigation Guidance") are based on complexity of the wetland system, likelihood of compensation success, degree to which functions are replaced, and temporal losses for certain functions. The USACE has developed standard compensatory mitigation ratios (multipliers), provided as guidance allowing for "flexibility," and suggested multipliers, which are a starting point for developing a compensation plan. The guidance also suggests that while the ILF Program is "considered preferable," preservation as mitigation can support the goal of "no net loss of wetland functions." Preservation parcels used for mitigation must meet certain criteria to be considered for this purpose (33 CFR 332.3(h)). The USACE generally follows the MDEP's ILF Program resource compensation rates and resource multipliers.

Both agencies recognize that, for some resources, the temporary or secondary impact associated with transmission line construction and long-term operation does not equate to a full loss of resource functions and values, and therefore allows for adjustments to the standard ratios and multipliers depending upon the

resource and activity type. The USACE defines these adjustments, as a percentage of the standard amount by resource type, within Table C2 Recommended Compensatory Mitigation for Temporary and/or Secondary Impacts to Wetlands of the 2016 Mitigation Guidance. The MDEP provided correspondence to CMP dated April 25, 2017, in which Michael Mullin, former Director of Land Division, Bureau of Land Resources, allowed for a compensation adjustment of 60% for permanent cover type conversion impacts within significant vernal pool habitat, as defined by 38 M.R.S. § 480-B(10). CMP interpreted this adjustment to apply to all significant wildlife habitat and as such is applying a 60% adjustment to permanent cover type conversion impacts within IWWH. CMP confirmed with the MDEP, during a compensation plan working session with the MDEP and USACE on April 3, 2018, that application of the 60% adjustment for cover type conversion impacts in IWWH was appropriate. *See* Exhibit 1-1, NECEC Mitigation Guidance: Compensation Ratios and Adjustments Per Agency; Exhibit 1-2 MDEP Letter Re: Compensation for significant vernal pool habitats within transmission line corridors (Apr.25, 2017).

Compensation planning for the NECEC included a review of existing and potential compensation tracts already in CMP's ownership. CMP looked for compensation opportunities based on the criteria set forth in the USACE's Mitigation Rule, 33 CFR 332.3(h). Properties which were not considered as part of this final plan did not provide sufficient ecological or regional value to merit preservation. After a comprehensive GIS evaluation, the most viable tracts were field surveyed for the presence of natural resources. CMP considers the compensation parcels presented in this Plan as eligible for this use, as demonstrated in Section 1.2.2.2 and within the letter report from the Musson Group dated August 10, 2018, which evaluated the preservation parcels for purposes of meeting the USACE mitigation requirements and which is provided as Exhibit 1-3.

For impacts that require compensation from both the MDEP and USACE, CMP used the higher USACE ratios in determining required compensation amounts. For resource impacts for which only one agency required compensation, NRPA or USACE guidance was followed. The Compensation Package Summary, Exhibit 1-4, details the preservation parcels and the Project impacts they are proposed to offset. The In-Lieu Fee Summary, Exhibit 1-5A, presents the calculated fees by resource type with the standard formulas, and appropriate multipliers and adjustments. Table 1-1 below summarizes the results of those Exhibits. Exhibit 1-5B, Summary of Compensation Resulting from Consultation with Resource Agencies, presents the results of consultation with MDEP, Maine Department of Inland Fisheries and Wildlife ("MDIFW"), and Maine Natural Areas Program ("MNAP") to provide adequate compensation for resources which require compensation but are outside the purview of the MDEP and/or USACE mitigation guidance. Table 1-2 below summarizes the results of this exhibit.

Table 1-1: Summary of Compensation as Required by NRPA and/or USACE

Resource Type & Impact	Agency Requiring	Form of Compensation	Type and Amount of Compensation
47.687 acres of Temporary Wetland Fill	USACE	Preservation and In-Lieu Fee	Preservation of 57.01 acres of wetlands. $154,535.04
105.548 acres of Permanent Cover Type Conversion of Forested Wetlands[1]	USACE and MDEP	Preservation	Preservation of 440.29 acres of wetlands.
3.814 acres of Permanent Fill in Wetlands of Special Significance (WOSS)[2]			
0.307 acres of Permanent Fill in Wetland (Non-WOSS)			
0.743 acres of Permanent Wetland Fill in SVP Habitat	MDEP	In-Lieu Fee	$641,653.12
3.895 acres of Permanent Forested Wetland Conversion in SVPH			
0.720 acres of Permanent Upland Fill in SVP Habitat			
29.607 acres of Permanent Upland Conversion in SVPH			
Direct and Indirect Impact to USACE Jurisdictional Vernal Pools	USACE	In-Lieu Fee	$2,024,875.37
0.003 acres of Permanent Wetland Fill in IWWH	MDEP	In-Lieu Fee	$253,352.53
2.622 acres of Permanent Forested Wetland Conversion in IWWH			
0.014 acres of Permanent Upland Fill in IWWH			
12.387 acres of Permanent Upland Conversion in IWWH			
	In-Lieu Fee		$3,074,416.06
	Land Preservation		1022.4 acres of preservation containing 510.75 acres of wetland.

[1]The USACE requires compensation for Permanent Cover Type Conversion of Forested Wetlands. The MDEP requires compensation for Permanent Cover Type Conversion of significant wildlife habitat. Compensation for wetlands within significant wildlife habitat, IWWH and SVPH, are not included within the Permanent Cover Type Conversion of Forested Wetlands calculation and are calculated separately within their respective categories. Cover type conversion within upland areas of IWWH and SVPH are compensated separately as well.
[2]Permanent fill in WOSS excludes fill in IWWH and SVPH, which are calculated separately, in their respective categories.

Table 1-2: Summary of Compensation Resulting from Consultation with Resource Agencies

Resource Type & Impact	Agency Requiring	Form of Compensation	Amount of Compensation
9.229 acres of forested conversion in Unique Natural Communities	MNAP	Fee Contribution to Maine Natural Areas Conservation Fund	$1,224,526.82
Forested conversion to the Goldie's Wood Fern	MNAP	Funding for rare plant surveys to the Maine Natural Areas Conservation Fund	$10,000
26.416 acres of forest conversion in Roaring Brook Mayfly and Northern Spring Salamander Conservation Management Areas	MDIFW	Fee Contribution to Maine Endangered and Nongame Wildlife Fund	$469,771.95
39.209 acres of forest conversion in the Upper Kennebec Deer Wintering Area	MDIFW	Preservation	Seven parcels, totaling 717 acres of land in the Upper Kennebec DWA
11.02 linear miles of forested conversion in riparian buffers	MDEP and MDIFW	Preservation	Three preservation parcels, totaling 1053.5 acres, containing 12.02 linear miles of stream
		Fee contribution to Maine Endangered and Nongame Wildlife Fund	$180,000
		Funding for Culvert Replacements	$200,000
Impact to Outstanding River Segments	MDEP	Preservation	Three preservation parcels, offering 7.9 miles of frontage on the Dead River, an Outstanding River Segment
	Total Additional Monetary Contribution		**$2,084,298.76**
	Total Additional Land Preservation		**1770.5 Acres**

1.2.1.1 Temporary Wetland Fill

Temporary wetland fill impacts are primarily associated with the construction of short term access ways required for clearing and construction activities. Temporary fill associated with access way construction was conservatively calculated assuming non-frozen ground conditions. As a result, temporary fill or the use of protective matting (e.g. timber mats) for heavy equipment set up and travel was included in the calculation for access ways and structure preparation areas in all wetlands. Access ways have been designed to avoid, and when avoidance is not possible, to minimize disturbance to protected natural resources to the greatest extent practicable. For example, wetlands and streams will be crossed at their narrowest point if other conditions and construction access requirements allow this. Access ways will be removed as soon as it is safe and feasible to do so and when access ways are no longer needed for the Project. Fill needed for temporary access ways will not cause a net loss in wetland acreage or functionality. These small, scattered impacts will have a de minimis effect on the overall functions and values in the areas in which they occur, and there will be no permanent loss of wetland functions and values or wetland area. Temporary wetland fill will be in place significantly less than 18 months, and typically for a period of 12 months.

Compensation for temporary wetland fill, in place less than 18 months, is only required by the USACE, and is not required by MDEP. CMP has elected to offset impact for temporary fill in wetlands using a combination of land preservation and ILF. Three compensation parcels -- Flagstaff Lake Tract, Little Jimmie Pond-Harwood Tract, and Pooler Pond Tract, further detailed in Section 1.2.2.2 -- contain 510.75 acres of wetland to offset impacts to temporary wetland fill in scrub-shrub wetlands, as well as other wetland impact types, at the required ratios and adjustments. For scrub-shrub wetlands, the ratio for preservation is 20:1 with an adjustment of 10%, as set forth in the USACE Mitigation Guidance. An adjustment developed by the USACE for temporary and secondary impacts is applied to temporary impacts to emergent wetlands (5%) and temporary impacts to scrub-shrub wetlands (10%).

The ILF is used to compensate for temporary wetland fill in emergent wetlands. For the purposes of determining the appropriate ILF, the USACE follows the guidance defined in the MDEP Fact Sheet-In Lieu Fee Compensation Program (rev. 8/18/2017). The compensation fee for temporary fill to emergent wetlands was calculated using the resource-specific formula with a resource multiplier of one and an adjustment of 5%.

There are approximately 19.180 acres of temporary wetland fill impact to emergent wetlands. A payment of $154,535.04 will be contributed to the ILF Program to offset Temporary Wetland Fill Impacts to emergent wetlands.

There are approximately 28.507 acres of temporary wetland fill impact to scrub-shrub wetlands. For temporary wetland fill to scrub-shrub wetlands, the USACE's standard of 20:1 with a ratio adjustment of 10% was used to calculate the total required preservation amount of 57.01 acres. The three proposed compensation parcels -- Flagstaff Lake Tract, Little Jimmie Pond-Harwood Tract, and Pooler Pond Tract -- contain 510.75 acres of wetland, a portion of which will be used to offset the 57.01 acres of Temporary Wetland Fill in scrub-shrub wetlands.

1.2.1.2 Permanent Cover Type Conversion of Forested Wetlands

The majority (73%) of the NECEC Project will be located within or immediately adjacent to existing transmission line corridors. Clearing of tree species capable of growing into the conductors (referred to as "capable species") will be required to expand, typically by 75 feet, the width of the portion of the corridor where the Project will be co-located with existing transmission lines, and to create the 150-foot wide section of the new corridor located between The Forks Plt. and Beattie Twp. Tree removal from wetlands does not result in a net loss of any wetland area, and only potentially shifts or alters, but does not reduce, certain wetland functions and values. This type of cover type alteration, i.e., conversion of forested wetlands to early successional cover type wetlands, will result in the largest cumulative wetland alteration.

Compensation for forested wetland conversion is not required by the MDEP but is required by the USACE. The MDEP requires compensation for permanent cover type conversion of significant wildlife habitat. Compensation for wetlands within significant wildlife habitat, i.e. IWWH and SVPH, are not included within the Permanent Cover Type Conversion of Forested Wetlands calculation and are calculated and compensated for separately within their respective categories.

Conversion of forested wetlands to scrub-shrub wetlands accounts for approximately 105.548 acres. Even though there is no-net-loss of wetland functions or acreage resulting from clearing of forested wetland CMP will offset conversion of this habitat with the permanent preservation of lands which provide

comparable habitat. For forested wetland conversion, the USACE's standard of 20:1 with a ratio adjustment of 15% was used to calculate the total required preservation amount of 316.64 acres.

The three proposed preservation parcels -- Flagstaff Lake Tract, Little Jimmie Pond-Harwood Tract, and Pooler Pond Tract -- contain 510.75 acres of wetland, a portion of which will be used to offset the 105.548 acres of Permanent Forested Wetland Conversion.

1.2.1.3 Permanent Cover Type Conversion of IWWH

High quality IWWHs are typically composed of deep emergent marshes with high levels of interspersion of shrubs, open water, emergent wetland vegetation, and floating leaf, aquatic plants. As such, these habitats are typically not heavily forested and can be crossed by transmission line corridors without being significantly or adversely affected.

There will be approximately 15.009 acres of permanent cover type conversion in moderate and high value IWWH. Of the 15.009 acres, 2.622 consist of forested wetland and 12.387 acres are upland areas. Compensation for cover type conversion of upland areas of IWWH is only required by the MDEP, and not the USACE; compensation for wetland areas of IWWH is required by both agencies. Clearing and construction in IWWHs will take place in accordance with the time of year restrictions for work within IWWHs, as described in Section 7 of the Site Law Application. CMP will compensate for unavoidable impact to IWWH through a payment to the ILF Program. The compensation fee for cover type conversion within wetland areas of IWWH was calculated using the Natural Resource Enhancement & Restoration Cost and the average assessed land value per square foot of impact. For upland areas of IWWH, the fee was calculated using the average assessed land value per square foot of impact. During the April 3, 2018 compensation working session, MDEP (Jim Beyer) indicated that impacts to upland areas within Significant Wildlife Habitat (e.g. IWWH and SVPH) do not require a Natural Resource Enhancement & Restoration Cost factor, which is intended for the restoration of wetland areas. Mr. Beyer also indicated that a 60% adjustment would apply to IWWH. This is consistent with compensation for other significant wildlife habitat areas where the adjusted ILF has been determined to be sufficient to offset the partial loss of functions and values resulting from cover type conversion only, which (like SVPH conversion) has less of an environmental impact. The basis of a 60% adjustment is further supported by the acknowledgement in Chapter 305 of the MDEP Rules that certain activities *"will not significantly affect the environment and generally has less of an impact on the environment than an activity requiring an individual permit"*. One such activity allowed by Chapter 305 is the cutting or removal of vegetation within high or moderate

value inland waterfowl and wading bird habitat, or shorebird feeding or roosting buffer. As such, an adjustment of 60% to the standard calculation for ILF payment was applied. A payment of $252,130.55 will be contributed to the ILF Program to offset Permanent Cover Type Conversion within IWWH.

1.2.1.4 Permanent Cover Type Conversion of Significant Vernal Pool Habitat

The NECEC Project contains approximately 62 vernal pools which meet the definition of significant vernal pool under the Maine NRPA Chapter 335 significant vernal pool habitat identification criteria (DEP Reg 335.9B). The vernal pool habitat (also referred to as "vernal pool critical terrestrial habitat") includes the pool basin or depression plus a 250-foot buffer around the pool. Within the NECEC Project, permanent conversion from forested to non-forested cover in significant vernal pool habitats totals approximately 33.502 acres. Of the 33.502 acres, 3.895 are forested wetland and 29.607 acres are upland areas.

CMP will compensate for this unavoidable impact through a payment to the ILF Program. The compensation fee for cover type conversion within wetland portions of SVPH was calculated using the Natural Resource Enhancement & Restoration Cost and the average assessed land value per square foot of impact. For upland areas of SVPH, the fee was calculated using the average assessed land value per square foot of impact. An adjustment of 60% to the standard calculation for ILF payment, as prescribed by MDEP, was applied. A payment of $391,689.22 will be contributed to the ILF Program to offset Permanent Cover Type Conversion within SVPH.

1.2.1.5 Permanent Fill in Wetlands

There will be permanent fill impact from structures placed in wetlands. Fill will result from structures, soil mounding associated with pole placement, and, where necessary, concrete foundations. The area of disturbance for each pole varies based on structure type. Installations will range from approximately 30 to 185 square feet of permanent fill per structure, depending on structure type (e.g., steel monopole or wood H-frame). Following installation, the areas around each structure will naturally revegetate to herbaceous or shrub wetland communities. The small loss of wetland area from the structure fill equates to a negligible loss of wetlands functions and values relative to the remaining wetland area at each structure site. Taken individually, impacts from structures will have a negligible permanent impact on their particular installation locations.

The Merrill Road Converter Station, Fickett Road Substation and HDD Terminations Stations will have permanent wetland impacts from fill of approximately 3.130 acres, 1.328 acres and 0.259 acres, respectively. Permanent fill impact from transmission line structures total approximately 0.150 acre. CMP will provide compensation for the cumulative permanent wetland impacts associated with structure installation and substation site development, which total approximately 4.867 acres, including wetland areas in SVPH and IWWH.

Wetlands within NECEC segments and substations were classified as either wetlands that are not of special significance or as WOSS, as defined in DEP Reg. Chapter 310.4, and discussed at CMP's Site Law Application Section 9.2.3. Habitats reviewed to determine freshwater WOSS include:

- mapped habitats for state and federally listed T&E species;
- high and moderate value IWWH;
- presence of significant vernal pool habitat;
- areas within 250 feet of a great pond;
- wetland containing more than 20,000 square feet of open water or aquatic or emergent marsh;
- located within a flood plain;
- designated as a peatland; or
- located within 25 feet of a river stream or brook.

Of the 4.868 acres of permanent wetland fill, fill in Non-WOSS and WOSS wetlands totals 0.307 acres and 4.561 acre, respectively. The 4.561 acres of direct fill in WOSS, include wetland areas in SVPH and IWWH. CMP will offset permanent fill within wetlands with the preservation of lands that provide comparable habitat. For wetlands within SVPH and IWWH, CMP will offset permanent fill using the ILF. Permanent fill in WOSS, excluding SVPH and IWWH, is 3.814 acres.

CMP offered to USACE a ratio of 30:1 for permanent fill in wetlands, which is above the 20:1 required for land preservation of the compensation parcels offered as part of this plan. When applying 30:1 to both WOSS (excluding SVPH and IWWH) and non-WOSS, it yielded a total required preservation amount of 123.65 acres. The three proposed preservation parcels -- Flagstaff Lake Tract, Little Jimmie Pond-Harwood Tract, and Pooler Pond Tract -- contain 510.75 acres of wetland, a portion of which will be used to offset the 4.122 acres[1] of Permanent Fill in Wetlands.

[1] The 4.122 acres of permanent fill in wetlands include 0.307 acre of non-WOSS and 3.814 acres of WOSS, excluding wetland areas within SVPH and IWWH, which are compensated through ILF.

1.2.1.6 Permanent Fill in IWWH

Where unavoidable, direct impact to IWWH will result from the placement of transmission line structures. Direct impacts to IWWH total approximately 0.017 acre (747 square feet). Of the 0.017 acre, 0.003 acre (149 square feet) are wetland and 0.014 acre (598 square feet) are upland areas.

CMP will compensate for this unavoidable impact through a payment to the ILF Program. Permanent fill in wetland areas located within IWWH requires 100% compensation with a resource multiplier of two. The fee for wetlands within IWWH was calculated using the Natural Resource Enhancement & Restoration Cost and the average assessed land value per square foot of impact. For upland areas of IWWH, the fee was calculated using the average assessed land value per square foot of impact. A payment of $1,221.98 will be contributed to the ILF Program to offset Permanent Fill in IWWH.

1.2.1.7 Permanent Fill in Significant Vernal Pool Habitat

Permanent fill in SVP habitat will result from pole placement in both wetlands and uplands located within the 250 foot critical terrestrial habitat located around the pool depression, as well as from site development associated with the Merrill Road Converter Station. Potentially significant vernal pools that have not yet been determined as “significant” by MDIFW will be included in this calculation. There will be no direct impact to any significant vernal pool depressions.

Direct impacts to SVPH total approximately 1.463 acres. Of the 1.463 acres, 0.743 acre are wetland and 0.720 acre are upland areas. CMP will compensate for this unavoidable impact through a payment to the ILF Program. Permanent fill in wetland areas located within SVP critical terrestrial habitat requires 100% compensation with a resource multiplier of two. The fee for SVPH wetlands was calculated using the Natural Resource Enhancement & Restoration Cost and the average assessed land value per square foot of impact. For upland areas of SVPH, the fee was calculated using the average assessed land value per square foot of impact. A payment of $249,963.90 will be contributed to the ILF Program to offset permanent fill in significant vernal pool habitat.

1.2.1.8 Direct and Indirect Impacts to USACE Jurisdictional Vernal Pools

Under the provisions of Section 404 of the federal Clean Water Act, the USACE regulates activities in “waters of the United States,” which include vernal pools. Vernal pools are defined by the New England District of the USACE in the General Permit (GP) for the State of Maine reissued on October 13, 2015. The USACE definition, while very similar to the MDEP’s, does not reference “natural” and does not

recognize or differentiate significant vernal pools based on number of indicator species egg masses. Instead, the GP definition indicates: "the presence of any of the following species in any life stage in any abundance level/quantity would designate the waterbody as a vernal pool: fairy shrimp, blue spotted salamanders, spotted salamanders or wood frogs. The USACE may determine during a Category 2 Review that a waterbody should not be regulated as a vernal pool based on available evidence." Furthermore, under the Maine GP the USACE regulates activities within a distance of 750 feet from vernal pool depression, also referred to as the "vernal pool management area," which includes the pool depression, the envelope (area within 0 to100 feet of the vernal pool depression edge), and the critical terrestrial habitat (area within 100 to 750 feet of the vernal pool depressions edge).

In September 2016, the USACE New England District issued its updated Mitigation Guidance document. Within this document, the USACE provides the following guidance: "to determine the appropriate mitigation for vernal pool impacts, the pools to be impacted must be evaluated using the USACE Vernal Pool Characterization Form. This form documents both the quality of the vernal pool and its surrounding landscape to determine overall level of function of the pool." This "DRAFT Vernal Pool Characterization Form (9-7-16)," included within the guidance, is designed to characterize vernal pools and provide a valuation based on a point system for features of the pool and surrounding habitat for regulatory purposes, impact and compensatory mitigation assessment. The pools are scored or valued based on vernal pool characteristics, vernal pool envelope (100 ft) and critical terrestrial habitat area (100-750 ft) characteristics, and species present within the pool. Pools are then classified as having high, medium or low levels of functions, as determined by the scoring system on the form.

When the 2016 USACE Mitigation Guidance was issued, the NECEC natural resources survey effort was well underway. As such, CMP's consultants recorded field observations and pool characteristic data on the MDEP's Maine State Vernal Pool Assessment forms (DEPLW0897-82008) if the pool was potentially significant as defined in NRPA. For those pools which were not potentially significant as defined in NRPA, but were USACE-jurisdictional, data was collected on a consultant-created form that documented the survey efforts, which were conducted in accordance with a long-standing, broadly vetted, rigorous methodology accepted by the regulatory agencies. Nonetheless, the form did not utilize the scoring or classification contained in the 2016 guidance.

To evaluate the pools based upon the classification of high, medium, or low, and to provide the appropriate level of compensation for each resource, CMP proposed evaluation criteria based on the

existing level of information collected using the 2016 guidance as a framework. CMP worked with the USACE to determine the evaluation methods and received feedback on its proposal. *See* Exhibit 1-6.

Following the examination of all vernal pool features within the project area, CMP determined that 49 high value pools, 122 medium value pools, and 71 low value pools will be impacted by the Project and will require compensation.

The 2016 Guidance defines the amount of mitigation credit necessary to compensate for vernal pool impacts. The USACE uses the following ratio pattern for determining amount of preservation necessary to offset project impacts:

- For the loss of a low value pool, one medium or high value pool and its associated critical terrestrial habitat ("CTH") should be preserved.
- For the loss of one medium value pool, three pools of medium or high value and its associated CTH should be preserved.
- For the loss of one high value pool, five pools of medium or high value and its associated CTH should be preserved.

For calculating ILF, the applicant is to provide an ILF for direct fill to the pool depression or 100-foot envelope at the regular wetland rate and, in addition, the same ratio pattern is applied using a standard of 13,000 square feet for each vernal pool habitat, regardless of pool size. For example, the applicant will pay the equivalent of 13,000 square feet for a low value pool to protect one vernal pool and CTH, plus any direct fill impacts to the depression or envelope. Similarly, for medium value pools this value would be multiplied by three, 13,000 x 3 = 39,000 square feet; for a high value pool this value would be multiplied by five, 13,000 x 5 = 65,000 square feet.

Thus, for direct fill of USACE-jurisdictional vernal pools, CMP calculated the payment at the regular wetland rate. For secondary impacts as defined in the 2016 Guidance, which do not cause loss of the resource,[2] CMP applied a 5% adjustment[3] to the standard amount, which for vernal pools is set forth on page 95 of the 2016 Guidance (based on the value of the vernal pool). CMP determined the percent of

[2] The Guidance treats conversion of forest cover as a secondary impact, specifically for utility transmission lines. See page 15, referring to "the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way." See also page 91, stating that "In instances where there are primary impacts to aquatic resources, additional impacts to the canopy cover may be considered secondary impacts to the vernal pool and should be documented."
[3] On page 15 the 2016 Guidance states that "Suggestions for mitigation for . . . secondary impacts are expressed as percentages or ranges of percentages of the mitigation recommended for direct, permanent impacts."

this adjustment based on Table C2 (page 58), which provides suggested multipliers for secondary impacts to wetlands; that table applies here because the 2016 Guidance does not include anything more specific for vernal pools. These multipliers are percentages of "Standard Amount," where "Standard" refers to "amount of compensation that would be . . . required in ILF payments using the standard calculation" (on page 95 for vernal pools).

The applicable category in Table C2 is "Removal of forested wetland cover for new corridor," which states that the multiplier is "Project specific," and states in a footnote that "This should also take into account fragmentation impacts as part of the secondary impacts." Further, "Percentages may be reduced if appropriate project-specific BMPs are incorporated into the project." The most closely analogous percentage is 15%, which applies to "Permanent conversion of forested wetlands to scrub-shrub wetlands."

The 2016 Guidance further provides that compensatory mitigation may not be needed at all, or may be reduced below the stated percentages, if the considerations on pp. 15-16 support such a reduction. For vernal pools, the key consideration is "Vernal pool envelope and critical terrestrial habitat impacts: original aerial cover, relationship to other vernal pools, etc."

Regarding original aerial cover, based on aerial photographs the existing average forested cover within the 750 foot CTH of NECEC project USACE-jurisdictional vernal pools is 73.6%. The NECEC project would reduce this average forested cover to 68.9%, a reduction of forested cover of 4.7% within the CTH of USACE-jurisdictional vernal pools.

Regarding relationship to other vernal pools, 610 of the 700 USACE-jurisdictional vernal pools identified in the NECEC project corridor are within 1,000 feet or less of other vernal pools, and are thus cluster pools. The 2016 Guidance documents the value of cluster pools and notes, in part, "Clusters of vernal pools that vary in size, hydroperiod, and spatial proximity, provide each resident species with a variety of potential breeding sites. This allows adults to seek out high quality habitat with low densities of predators, provides a safety net in the event that one or more pools become uninhabitable due to disease, and increases the potential for genetic diversity" (see page 93 of the 2016 Guidance).

Based on the above provisions and considerations, CMP applied a 5% adjustment to the standard amounts set forth for vernal pools on page 95 of the 2016 Guidance.

The 2016 Guidance recognizes the need for flexibility in determining reasonable compensatory mitigation in circumstances such as this. For vernal pool resources, the 2016 Guidance briefly mentions "secondary impacts to the vernal pool due to loss or disturbance of the envelope and/or critical habitat," and references the Vernal Pool Characterization Form as the basis for determining compensatory mitigation. However, this form can only be completed for a given vernal pool in its current state; estimating pool functions post-development is therefore speculative and unreliable as a method to forecast shifts in functions and values due to indirect impacts such as conversion of vernal pool CTH from forested to scrub-shrub.

CMP worked with the USACE to develop and employ project-specific criteria for the valuation of USACE-jurisdictional vernal pools. Specifically, CMP proposed vernal pool value evaluation criteria based on the available information collected during 2015-2017 field surveys and using the principles of the 2016 Guidance as a framework. CMP worked with the USACE to develop this evaluation method and received feedback from USACE on its proposal. CMP utilized these criteria to classify NECEC vernal pools as high, medium, or low value.

CMP then developed and proposed a significant, reasonable, and proportional mitigation in lieu fee of $2,024,875.37 ($1,642,543.50 for secondary impacts + $382,331.87 for direct fill); this fee is based on both these vernal pools' values, and on potential NECEC impacts on their functions, values and productivity. The proposed 5% multiplier and resulting mitigation fee is premised on data demonstrating that indirect impacts such as tree clearing do not result in significant degradation of these pools' ecological functions, productivity, or value, as explained below.

Clear throughout the Guidance is its inherent flexibility in determining the amount of compensatory mitigation. Accordingly, the standard compensatory mitigation ratios, expressed as multipliers in the Guidance, "are the starting point for developing appropriate compensatory mitigation, [and] <u>there continues to be flexibility on a project-by-project basis in order to achieve the most appropriate mitigation for a specific project</u>. This flexibility may lead to a determination by the Corps of an amount and type of compensatory mitigation that differs from that included here" (emphasis in original) (see page 12 of the Guidance). It is therefore appropriate in this case that the Guidance document's applicable compensation multiplier is, as noted above, "project specific," allowing consideration of the studies and project specific conditions described below.

Data gathered and evaluated by TRC Engineers, LLC (TRC) based on a large MPRP vernal pool data set (presented in TRC's Position Paper on the Presence of Significant Vernal Pools in or Adjacent to

Transmission Line Corridors in Maine (TRC Report) attached as Exhibits 1-7 and 1-8), demonstrate the likelihood that the majority of these vernal pools will retain their productivity and functions following construction of a transmission line. TRC's study of vernal pools within "soft" land use developments such as CMP transmission line corridors found that the reduction in forested canopy does not result in a significant loss of functions, and the data demonstrate that the highest value pools (i.e., significant vernal pools) continue to function without loss or significant degradation of their ecological functions after the forest canopy within their CTH has been removed.

TRC cites the Maine Department of Inland Fisheries and Wildlife's finding that "approximately 40 to 50 percent of the natural vernal pools on the landscape were expected to meet the Chapter 335 Significant Wildlife Habitat Rules vernal pool significance criteria. The occurrence of significant natural vernal pools along the transmission corridors surveyed as part of the MPRP (44 percent) falls in the middle of that 40 to 50 range and compares well with regulatory expectations." TRC Report, Exhibit 1-7, page 10. TRC cites further evidence and concludes "that conversion of forest cover types to utility corridor can support and maintain viable and healthy populations of vernal pool breeding amphibians, even after time periods spanning multiple amphibian generations." TRC Report, Exhibit 1-7, page 11 ("Of note, 87.5 percent of significant vernal pools within the surveyed corridors contained less than 25 percent forested cover types within their CTH (within 250 feet of the pool depression). The transmission corridors that the pools are located within or along have been in existence and managed as non-forested, early-successional habitat for nearly half a century or more.").

TRC concludes, "no measurable loss of vernal pool functions is apparent in and along electric utility transmission corridors; in fact, significant vernal pools remain abundant and highly productive in the typical scrub/shrub habitat found in most transmission line corridors, even after multiple decades." TRC Report, Exhibit 1-7, page 1.

Thus, the TRC study results support the expectation that vernal pools impacted by a transmission line project will remain productive and abundant; as such, compensation for conversion from forested to scrub-shrub should recognize, and be commensurate with, this observed and likely retention of functions, values and productivity.

It should be noted that CMP developed the proposed $2,024,875.37 in lieu fee despite the fact that the functions and values of these vernal pools will not be negatively impacted, and the majority of these pools will retain their productivity and functions following construction of the NECEC transmission line. For this reason, CMP reserves the right to argue that the Corps does not have jurisdiction over these vernal

pools, and that secondary impacts should not be considered by the USACE, because for most of these impacts there is no associated direct fill (permanent or temporary) of a jurisdictional aquatic resource (including wetlands) requiring a section 404 permit. Nonetheless, CMP has proposed this in lieu fee in an effort to resolve this issue to the satisfaction of the USACE, and in recognition that there may be minor (though unobserved in the MPRP dataset) impacts to these vernal pools' functions and values.

It also is noteworthy that CMP has already included compensation for conversion of forested wetlands in its Compensation Plan, including those that are within USACE-jurisdictional vernal pool CTH, with a 15% adjustment. In other words, for those wetlands located within the 750 foot USACE CTH, these impacts were already compensated for via a proposed in lieu fee. Thus the proposed $1,642,543.50 in lieu fee is reasonable and appropriate to compensate for forested upland conversion impacts within the vernal pool CTH, which is the only impact not otherwise compensated for.

As noted above, 49 high value USACE-jurisdictional vernal pools will be impacted by the Project. The proposed fee, which is calculated based on the fee structure outlined in the 2016 Guidance, is offered in addition the fee for direct fill. CMP applied the ratio of five (5) multiplied by 13,000 square feet to the resource-specific ILF formula and then applied a 5% adjustment to this calculation to develop the ILF to compensate for potential secondary impacts to upland portions of the CTH. Thus, for high value USACE-jurisdictional vernal pools, a payment to the ILF Program of $586,592.50 will be made.

For medium value vernal pools, the standard of 13,000 square feet was multiplied by three (3) and then a 5% adjustment was applied to the resource-specific formula for wetland impacts. For low value vernal pools, the standard of 13,000 square feet is multiplied by one (1) and then a 5% adjustment was applied to the resource-specific formula. There are 122 medium value vernal pools and 71 low value vernal pools which require compensation. When applying these formulas, CMP calculated that the ILF is $889,219.50 and $166,731.50, respectively.

In total, CMP will provide $2,024,875.37 to the ILF Program for compensation of direct and indirect impacts to USACE jurisdictional vernal pools.

1.2.1.9 Compensation of Other Impacts

In its December 12, 2017 Environmental Information Request, the MDEP requested that CMP provide a mitigation package to compensate for impacts to cold water fisheries and recreational uses of the outstanding river segments. The MDEP notes, "The Department envisions this mitigation package will be

the responsibility of CMP to implement, not simply providing ILF monies." In its response, CMP committed to reach agreement on the terms of compensation for Project impacts with the MDEP and USACE, which will avoid, minimize or mitigate those impacts through design, location, construction practices, ILF contribution and/or compensatory mitigation parcels.

On April 3, 2018, CMP, MDEP, and USACE held a working session to discuss the NECEC Compensation Plan. MDEP (Jim Beyer), maintained that the compensation package must include a combination of compensation components: ILF, preservation, and/or enhancement, to account for all Project impacts (most notably, impact to recreational uses of outstanding river segment and indirect impact to coldwater fisheries). CMP proposes a number of methods to offset impact to these resources, including land preservation, a culvert replacement program, and incorporation of construction practices to protect coldwater fisheries habitat and enhancement, described within Sections 1.2.2.3 through 1.2.2.6. This plan, in combination with the ILF and the compensation parcels used to offset natural resource impacts, described in Sections 1.2.2.1 and 1.2.2.2, exceeds the minimum compensation amounts required and provides long term protection of protected natural resources in Maine.

1. Existing Recreational Uses of Outstanding River Segments

The Maine legislature protects certain rivers, "because of their unparalleled natural and recreational values, provide irreplaceable social and economic benefits to the people in their existing state." 12 M.R.S. § 403. The NECEC crosses the following five locations which are afforded special protection as outstanding river segments, as identified in 38 M.R.S. § 480-P and 12 M.R.S § 403:

- Upper Kennebec River
- Kennebec River below Wyman Dam
- Carrabassett River
- Sandy River
- West Branch of the Sheepscot River

The NRPA further governs proposed activities that cross any outstanding river segment as identified in section 480-P and provides that "the applicant shall demonstrate that no reasonable alternative exists which would have less adverse effect upon the natural and recreational features of the river segment." 38 M.R.S. § 480-D(8). CMP provided an alternatives analyses demonstrating that "no reasonable alternative exists" for each river segment the transmission line crosses. *See* NRPA Application, Chapter 2

(submitted September 27, 2017); Responses to Data Requests Letter (submitted March 29, 2018); NECEC Overhead Crossing of the Kennebec River Letter (submitted July 26, 2018).

As demonstrated by CMP, "no reasonable alternative exists which would have less adverse effect upon the natural and recreational features of this river segment." CMP has therefore taken measures to minimize the Project impact to these resources. In the locations where the HVDC line is to be co-located within existing rights-of-way, CMP has minimized additional clearing to an average additional width of 75 feet, and minimized additional natural resources impacts by proposing crossing locations in existing, developed transmission line corridors. CMP has proposed to cross under the upper Kennebec River using horizontal directional drilling (HDD) in order to preserve the aesthetic value of this river segment and to prevent visual impacts to recreational and other river users. Additionally, in response to MDIFW's Environmental Review Comments (submitted July 13, 2018), CMP committed to retaining 100 foot riparian buffers at all outstanding river segments.

Approximately 425 linear feet or 850 feet of river frontage (each bank) designated as outstanding river segments will be permanently impacted by forested conversion during construction of the NECEC. As discussed in detail in Section 1.2.2.3, to offset impact to existing recreational uses of outstanding river segments, CMP is including land preservation of three tracts along the Dead River which collectively will add 1,053.5 acres to Maine's conserved lands and provide protection in perpetuity of 7.9 miles of river frontage along the Dead River, an outstanding river segment. In addition to the wealth of recreational opportunities (which are not limited to hiking, fishing, whitewater rafting, canoeing, snowmobiling, wildlife viewing and hunting), these tracts include the protection of Grand Falls waterfall, the largest horseshoe waterfall in the State, in perpetuity. Impacts to outstanding river segments will not unreasonably impact existing recreational uses of these rivers.

2. Indirect Impacts to Coldwater Fisheries

In its December 12, 2017 Environmental Information Request, MDEP notes that "the project crosses 67 river, streams, or brooks, which contain brook trout habitat." The MDIFW's March 15, 2018 NECEC application review comments stated that "CMP's proposed 25 foot riparian buffer will not be adequate for the protection of water temperatures, water quality, and inputs of coarse woody debris necessary to support conditions required by brook trout and other aquatic life." As referenced by CMP's July 13, 2018

response to the MDIFW, a study by Gleason[4] on the impacts of powerline rights-of-way ("ROW") on forested stream habitat found that despite the open canopy condition, water temperatures were slightly lower than in off-ROW areas and that none of the water quality parameters were significantly different between the on-ROW and off-ROW study areas. Gleason's study also found no correlation between percent canopy cover and mean percentage of fines and found no significant difference in the Benthic Index of Biotic Integrity scores between on-ROW and upstream areas. Similarly, a study conducted by Peterson[5] on the effects of electric transmission line ROWs on trout in forested headwater streams in upstate New York found that stream reaches in electric transmission ROWs were exposed to more light, had denser stream bank vegetation, were deeper and narrower, and had a greater area composed of pools. Peterson's study found that trout were more abundant in stream reaches within ROWs and concluded that the increase in incident sunshine resulted in a denser forb and shrub root mass which further stabilized stream banks, resulting in less stream bank erosion, deeper channels, and higher populations of trout. Peterson concluded that electric transmission ROWs need not constitute an adverse effect on headwater trout population densities in forested basins.

Nevertheless, in consideration of both MDEP's and MDIFW's expressed concern of indirect Project impacts from clearing of the transmission line ROW, CMP has revised its NECEC Plan for Protection of Sensitive Natural Resources During Initial Vegetation Clearing and Post-Construction Vegetation Maintenance Plan (Exhibits 10-1 and 10-2) to expand the buffers for vegetation management and maintenance restrictions, as described below.

CMP will retain riparian natural buffers (or "riparian buffers") and implement restrictions, consistent with those described in Exhibits 10-1 and 10-2, within 100 feet of all rivers, streams or brooks which meet the following criteria:

- Presence of Special Concern, Threatened or Endangered species,
- Coldwater fisheries,
- Outstanding River Segments, as identified in 38 M.R.S. § 480-P and 12 M.R.S § 403,
- All perennial streams within the Segment 1 portion of the Project.

[4] Gleason, N.C. 2008. Impacts of Power Line Rights-of-Way on Forested Stream Habitat in Western Washington. Environmental Symposium in Rights-of-Way Management, 8th International Symposium, pages 665-678.
[5] Peterson, A.M. 1993. Effects of Electric Transmission Rights-of-Way on Trout in Forested Headwater Streams in New York. North American Journal of Fisheries Management, vol. 13 pp. 581-585.

For all other streams that do not meet the above criteria, CMP will apply a 75-foot buffer.

Extending the buffer to 100 feet for those streams which meet the above criteria will adequately protect coldwater fisheries. CMP also intends to replace improperly installed or non-functioning culverts to improve habitat connectivity as further described in Section 1.2.2.6.

Additionally, the Grand Falls Tract, Basin Tract, and Lower Enchanted Tract, located within an area of the State with an abundance of valuable coldwater fisheries and, collectively contain 63,440 linear feet or 12.02 miles of streams, including frontage on the Dead River and Enchanted Stream, which will be protected under a deed restriction or conservation easement.

3. Impact to Deer Wintering Areas

According to data provided by the MDIFW, a total of 22 deer wintering areas ("DWA") are crossed by the NECEC transmission line corridor. All DWAs crossed by the Project are classified by the MDIFW as indeterminate in value, which means that they are recognized as candidate Significant Wildlife Habitat under the NRPA, but currently have no formal value rating. No DWAs are impacted by the Merrill Road Converter Station or Fickett Road Substation.

Of the 22 DWAs crossed, 11 will be subjected to some conversion of forested habitat to shrub and herbaceous cover types. Additional DWAs intersected by Segment 4 of the Project will not be affected as there will be no clearing within DWAs along this segment.

One DWA, located near the Upper Kennebec River, is crossed by the Project in Segment 1. This resource is "non-regulatory, but still important for consideration in planning to accommodate needs of wintering deer" according to Bob Cordes, MDIFW (email correspondence 8/15/17). Project impacts within the HDD project modification area include 5.75 acres of tree clearing, and 0.84 acres of permanent impact from construction of the HDD termination stations. The underground HDD crossing beneath the Kennebec River minimizes impact to the DWA by retaining approximately 1,450 feet and 1,160 feet of forested buffer on the east and west sides of the Kennebec River, respectively. Intact, mature riparian buffers or vegetation bridges provide good travel corridors for wintering deer and are particularly valuable in this area of Maine, which experiences high winter snow depths. A total of 39.209 acres of tree clearing is proposed within the Upper Kennebec DWA. Through consultation with MDIFW, to mitigate impact to this DWA, CMP is proposing a combination of preservation of lands within the larger Upper Kennebec DWA and the implementation of deer travel corridors in the proposed ROW as further described in Section 1.2.2.5.

Construction and maintenance of Segments 2, 3, and 5 will not significantly affect the habitat functional attributes of the DWAs intersected by the Project for the following reasons:

- Corridor construction will only widen existing, non-forested transmission line corridors by an average of approximately 75 feet. As such, functional effects on these DWAs are expected to be indiscernible. It is expected that after construction has been completed, these DWAs will function similarly to the way they currently do.

- CMP will maintain its transmission line corridors in a manner that encourages the growth of non-capable shrub species that can provide important winter browse for over-wintering deer and in accordance with the CMP Post-Construction Vegetation Management Plan (Site Law Application Exhibit 10-2, revised January 2019 as described above) and CMP's Environmental Guidelines (Site Law Application Exhibit 14-1, revised June 2018).

CMP has avoided and minimized direct and temporary impact through adjusting pole placement where possible and minimizing temporary access roads through these areas. CMP proposes to enhance wildlife habitat in the Project corridor adjacent to DWA by revegetating disturbed soils in upland areas with a wildlife seed mix promoted and developed by the Sportsman's Alliance of Maine ("SAM") and the Maine Seed Company.

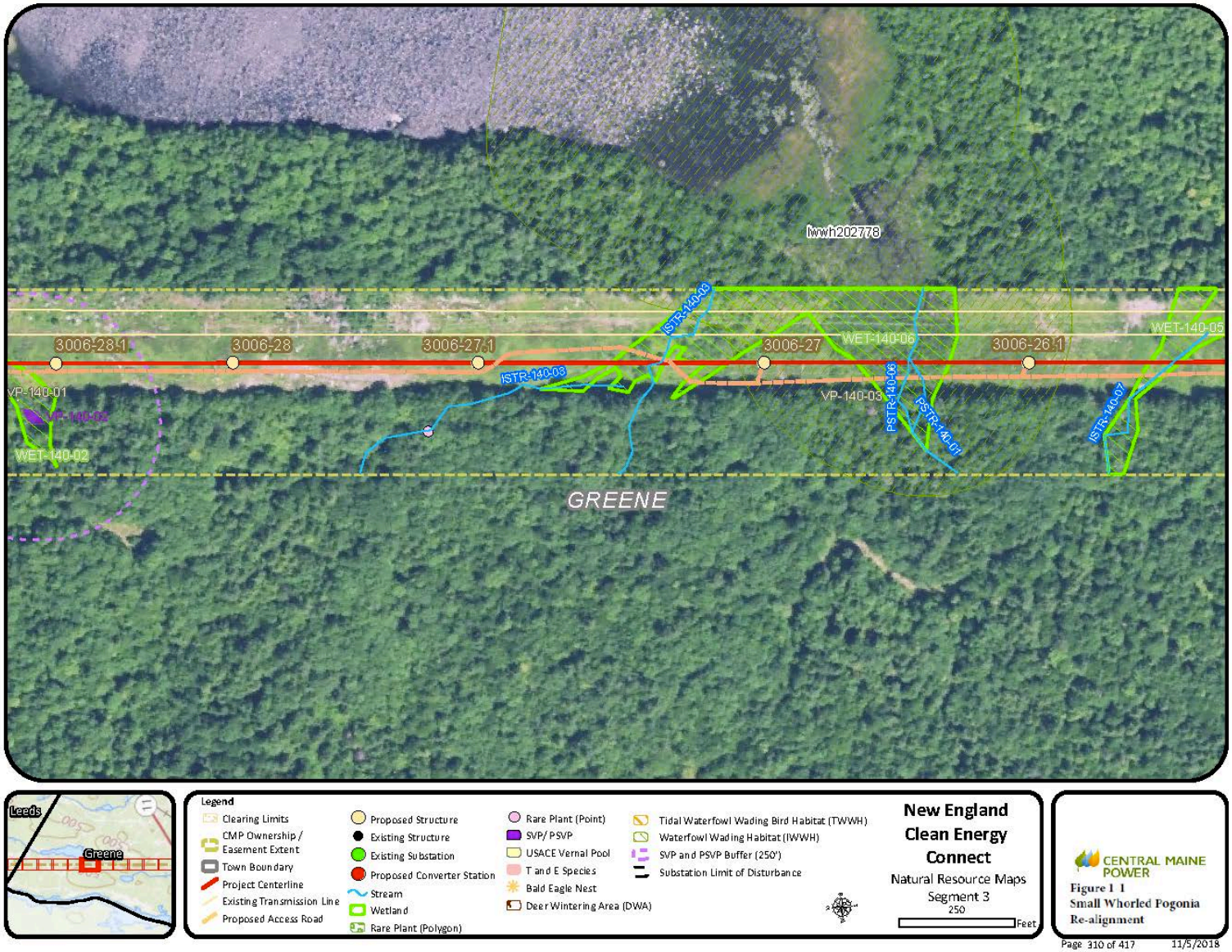
4. Impacts to Rare Plant and Unusual Natural Communities

CMP conducted field surveys for rare plants and unique natural communities within the project area in July 2018. As a result of the surveys, 15 rare plant occurrences and 5 unique natural communities were identified within or immediately adjacent to the project right-of-way. Through consultation with MNAP and the United States Fish and Wildlife Service ("USFWS"), CMP has addressed agency concerns for the rare plant occurrences through a combination of avoidance, minimization and construction best practices as detailed in Table 1-3, below.

Table 1-3: NECEC Rare Plant Avoidance, Minimization, and Mitigation Summary Table

Description	Common Name	Feature ID	Rank	Proposed Impact Based on Original Design	CMP Proposed Avoidance, Minimization, or Mitigation
Isotria medeoloides	Small whorled pogonia	ISME01AR	S1	Indirect impact, clearing	CMP proposes to avoid impact (additional clearing in proximity to this plant) by re-aligning the infrastructure within the existing corridor and eliminating tree clearing (See Figure 1-1). CMP will implement yearly monitoring for the first three (3) years following construction and once every three years thereafter.
Gentiana rubricaulis	Red stemmed gentian	GERU02AR	S1	No impact	CMP will flag the populations prior to construction, clearing should be done during frozen ground conditions or on matted travel lanes, CMP will restrict travel lanes where possible.
Gentiana rubricaulis	Red stemmed gentian	GERU03AR	S1	Clearing	CMP will flag the populations prior to construction, clearing should be done during frozen ground conditions or on matted travel lanes, CMP will restrict travel lanes where possible.
Dryopteris goldiana	Goldie's wood fern	DRGO01AR	S2	Indirect impact, the clearing limits are located within 20 feet of the population	CMP will flag this population prior to construction, maintain the riparian buffer adjacent to this occurrence and will plant non-capable species along the edge of the clearing limits to provide additional shading. Clearing will be performed by hand only to avoid heavy equipment disturbance. Additionally, to mitigate for indirect impacts related to tree clearing, CMP will provide a one-time contribution of $10,000 for MNAP rare plant survey efforts in Maine.
Carex siccata	Dryspike sedge	CASI02AR	S2	No impact	Install and maintain flagging for avoidance throughout construction. Poles to be removed should be cut at ground level, soil added, and the area allowed to revegetate.
Carex siccata	Dryspike sedge	CASI01AR	S2	No impact, Close to demo structure but likely not impact by activity. Hand cut and winch structure.	Install and maintain flagging for avoidance throughout construction. Poles to be removed should be cut at ground level, soil added, and the area allowed to revegetate.

Description	Common Name	Feature ID	Rank	Proposed Impact Based on Original Design	CMP Proposed Avoidance, Minimization, or Mitigation
Houstonia longifolia	Long leaved bluet	HOLO01AR	S2/S3	No impact, clearing limits shown on map but no clearing will be needed here	Install and maintain flagging for avoidance throughout construction and verify the correct placement of the access road during access road installation.
Gentiana rubricaulis	Red stemmed gentian	GERU01AR	S1	Clearing (Minor impact, clips an edge of the polygon)	CMP will flag the populations prior to construction, clearing should be done during frozen ground conditions or on matted travel lanes, CMP will restrict travel lanes where possible.
Gentiana rubricaulis	Red stemmed gentian	GERU04AR	S1	Clearing (Minor impact, clips an edge of the polygon)	CMP will flag the populations prior to construction, clearing should be done during frozen ground conditions or on matted travel lanes, CMP will restrict travel lanes where possible.
Gentiana rubricaulis	Red stemmed gentian	GERU04AR	S1	Clearing (Minor impact, clips an edge of the polygon)	CMP will flag the populations prior to construction, clearing should be done during frozen ground conditions or on matted travel lanes, CMP will restrict travel lanes where possible.
Trichophorum clintonii	Clinton's bulrush	TRCL01AR	S3	No impact	Install and maintain flagging for avoidance throughout construction.
Galium kamtschaticum	Boreal bedstraw	GALKAM002DMC	S2	No impact	Install and maintain flagging for avoidance throughout construction.
Galium kamtschaticum	Boreal bedstraw	GALKAM003DMC	S2	No impact	Install and maintain flagging for avoidance throughout construction.
Galium kamtschaticum	Boreal bedstraw	GALKAM001DMC	S2	No impact	Install and maintain flagging for avoidance throughout construction.
Lindernia dubia var. anagallidea	Yellowseed false pimpernel	LIDU01AG	SH	No impact	Install and maintain flagging for avoidance (protection of basin) and hand cutting of vegetation only.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3006-28.1
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3006-26.1
ISTR-140-03
ISTR-140-03
WET-140-06
WET-140-05
VP-140-01
VP-140-02
WET-140-02
VP-140-03
PSTR-140-06
PSTR-140-01
ISTR-140-07
GREENE
Leeds
Greene
Legend
Clearing Limits
CMP Ownership / Easement Extent
Town Boundary
Project Centerline
Existing Transmission Line
Proposed Access Road
Proposed Structure
Existing Structure
Existing Substation
Proposed Converter Station
Stream
Wetland
Rare Plant (Polygon)
Rare Plant (Point)
SVP/ PSVP
USACE Vernal Pool
T and E Species
Bald Eagle Nest
Deer Wintering Area (DWA)
Tidal Waterfowl Wading Bird Habitat (TWWH)
Waterfowl Wading Habitat (IWWH)
SVP and PSVP Buffer (250')
Substation Limit of Disturbance
New England Clean Energy Connect
Natural Resource Maps
Segment 3
250
Feet
CENTRAL MAINE POWER
Figure 1 1
Small Whorled Pogonia Re-alignment
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Three (3) of the unique natural community types, meeting the minimum standards to qualify as a unique natural community, will be impacted by unavoidable tree clearing activities. These include portions of three Jack Pine communities, one Enriched Northern Hardwood Forest community, and one Hardwood River Terrace Forest community. The Hardwood River Terrace Forest community is within Segment 3 of the Project where project impacts have been minimized through co-location of corridors. These natural communities that will be impacted by the project total 9.229 acres of habitat. The Jack Pine and Enriched Northern Hardwood communities are all located within Segment 1 of the Project (new corridor). CMP conducted an analysis of Segment 1 that compared the environmental impacts of siting the transmission line on the north and south sides of the 300-foot wide corridor and provided this analysis to the MDEP and USACE (filed May 8, 2018). The analysis concluded that the southern alignment as proposed would cause fewer environmental impacts and was the preferred alternative. Similarly, reduction of overall impact to the unique natural communities in Segment 1 favors the southern alignment (i.e., 6.4 acres of a total of 20.9 acres of unique natural community types within the corridor will be impacted as opposed to the 14.5 acres that would be impacted if the transmission line were located on the northern side of the corridor). As detailed in Section 1.2.2.7, CMP proposes a fee contribution of $1,224,526.82 to the Maine Natural Areas Conservation Fund to compensate for unavoidable impacts to unique natural communities.

1.2.2 Total Compensation

The compensation package consists of 13 mitigation parcels, 3 of which are proposed for preservation to partially offset unavoidable natural resource impacts and 10 of which will be placed into conservation to provide compensation for recreational impacts to outstanding river segments, protect and preserve riparian buffers, and preserve deer wintering areas within the Upper Kennebec DWA. These 13 parcels, total 2,792.90 acres of land to be protected in perpetuity. CMP owns all of the tracts proposed for mitigation and will use the MDEP Declaration of Covenants and Restrictions (DOCR) template, tailored for existing uses and encumbrances, and reserving appropriate rights to CMP to manage vegetation, and intends to maintain fee ownership of the property and manage it in compliance with the DOCR and associated restrictions (i.e., undeveloped in perpetuity) until such time that it is transferred to a qualified recipient. The DOCR will be recorded prior to the start of construction activities.

In addition, CMP will provide a payment of $3,074,416.06 to the ILF Program; a $649,771.95 payment to the Maine Endangered and Nongame Wildlife Fund; a $200,000 commitment for culvert replacements; a $1,234,526.82 payment to the Maine Natural Areas Conservation Fund and has included a number of

habitat enhancements in the plan to improve habitat for coldwater fisheries, species of concern, and DWAs, further described as follows.

1.2.2.1 In-Lieu Fee

For those impacts offset through the ILF Program, compensation fees were calculated using the resource-specific formulas, based on the resource compensation rates and multipliers, as provided in the DEP ILF Fact Sheet (2017). The resource multiplier takes into consideration the significance of specific resources. Additionally, based on recommended guidance from the USACE and MDEP, an adjustment, or percentage of standard amount was applied to account for resources in which a full loss of functions and values do not occur.

As calculated within Exhibit 1-5.1 through 1-5.10 and summarized within Exhibit 1-5A, CMP is providing an In-Lieu Fee of $3,074,416.06 to off-set unavoidable impacts to resource functions and values as a result of the NECEC Project.

1.2.2.2 Compensation Parcels

MDEP allows for compensation which may include the restoration, enhancement, creation, or preservation of an area or areas that have functions or values similar to the area. 38 M.R.S. § 480-Z. CMP has selected its Flagstaff Lake, Little Jimmie Pond-Hardwood Tract, and Pooler Pond Tracts for preservation as mitigation. Of the three preservation tracts, only the Little Jimmie Pond-Harwood Tract will require “compensation work” in the form of enhancement through the control of invasive plant species on the property. Prior to construction, CMP will submit to the MDEP and USACE, for approval, an invasive species plan for the survey, control, and treatment of invasive species on the Project, including the Little Jimmie Pond-Harwood Tract. CMP will implement the control measures approved by MDEP and the USACE during the first full growing season following permit issuance and will submit a report by December 31st of that year documenting the efficacy of the treatment. CMP will provide follow up treatment if determined necessary by MDEP and USACE.

According to the USACE’s 2016 Mitigation Guidance, preservation as mitigation “does reduce the threat of future impacts and may stem future aquatic resource degradation.” Mitigation Guidance, p. 10. Furthermore, the USACE “encourages a combination of upland and aquatic resource preservation over aquatic resources-only preservation to offer better protection of aquatic functions,” as state laws may not

protect non-wetlands whose degradation would affect aquatic resources. Mitigation Guidance, p. 11. Pursuant to 33 C.F.R. § 332.3(h), preservation may be used to provide compensatory mitigation when:

(i) The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
(ii) The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the district engineer must use appropriate quantitative assessment tools, where available;
(iii) Preservation is determined by the district engineer to be appropriate and practicable;
(iv) The resources are under threat of destruction or adverse modifications; and
(v) The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

Each of the potential preservation tracts (Flagstaff Lake Tract, Little Jimmie Pond-Harwood Tract, and Pooler Pond Tract) included in this plan meets all of these criteria and provides important physical, chemical, or biological functions for the watershed in which it is located. A detailed description of each parcel is included in Exhibit 1-9: NECEC Potential Compensation Tract- Natural Resources Survey Results Report.

An analysis of the applicable regulatory framework and regional trends, prepared by the Musson Group and included as Exhibit 1-3, shows that each of these three tracts is open to development in ways that could damage these important functions and thereby threaten to adversely modify the ecological sustainability of the watershed.

The functions and values of the three preservation tracts are similar to the functions and values associated with Project impacts to wetlands. These three tracts will be used to offset permanent cover type conversion of forested wetlands, permanent fill in wetlands and temporary wetland fill in scrub-shrub wetlands. The three tracts contain 510.75 acres of wetlands and the functions and values present on the preservation tracts are more than sufficient to offset these impacts. A comparison of the functions and values of the Project impact types and the three preservation tracts is provided below in Table 1-4.

Documentation of CMP's title, right, or interest in each of the preservation tracts is included in Exhibit 1-10. For each property, CMP proposes to convey fee ownership to either a non-profit land trust/non-governmental organization or a state resource agency and the transfer document between the parties will contain deed covenants and restrictions to preserve the compensation tract and its ecological values in perpetuity.

Table 1-4: Functions and Values Comparison				
Impacts		**Compensation**		
Activity & Regulating Agency	**Functions and Values Impacted[1]**	**Compensation Type**	**Site Name**	**Primary Functions and Values Provided[2]**
Temporary Wetland Fill Impacts in Scrub Shrub Wetlands (USACE)	Temporary impacts to WH, FA, GW, and VQA	Wetland Preservation	Little Jimmie Pond-Harwood Tract	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
			Flagstaff Lake	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
			Pooler Pond Tract	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
Temporary Wetland Fill Impacts in Emergent Wetlands (USACE)	Temporary impacts to WH, FA, GW, and VQA	ILF	NA	NA
Permanent Cover Type Conversion of Forested Wetlands to Scrub Shrub (USACE)[3]	Conversion will result in no permanent loss of wetland functions or values. Functional shifts will occur with regards to GW, FA, NR, SS, WH, REC, UNQ, VQA, and ESH.	Wetland Preservation	Little Jimmie Pond-Harwood Tract	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
			Flagstaff Lake	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
			Pooler Pond Tract	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
Permanent Wetland Fill Impacts (MDEP & USACE)	Permanent loss of GW, PE, NR, WH, REC, UNQ, VQA, and ESH.	Wetland Preservation	Little Jimmie Pond-Harwood Tract	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
			Flagstaff Lake	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
			Pooler Pond Tract	GW, FF, FH, PE, STPR, NR, SS, WH, ED, REC
Permanent Cover Type Conversion in Upland Vernal Pool Habitat (MDEP & USACE)	Clearing of VP Habitats will result in a de minimus reduction in VP habitat value	ILF	NA	NA
Permanent Fill in Vernal Pool Habitat (MDEP & USACE)	WH	ILF	NA	NA

Table 1-4: Functions and Values Comparison				
Impacts		**Compensation**		
Activity & Regulating Agency	**Functions and Values Impacted[1]**	**Compensation Type**	**Site Name**	**Primary Functions and Values Provided[2]**
Direct and Indirect Impacts to High and Moderate Value Inland Wading Bird and Waterfowl Habitat (MDEP)	Clearing of IWWH habitats will result in a de minimis reduction of IWWH value	ILF	NA	NA

[1] Function & Value List: GW = Groundwater Recharge/Discharge, FA = Floodwater Alteration, FH = Fish & Shellfish Habitat, STPR = Sediment/Toxicant Retention, NR = Nutrient Removal, PE = Production Export, SS = Sediment and Shoreline Stabilization, WH = Wildlife Habitat, R = Recreation, ED = Educational & Scenic Value, VQA = Visual Quality and Aesthetics, ESH = Endangered Species Habitat, UH = Uniqueness/Heritage
[2] Source: CMP NECEC Potential Compensation Tracts- Natural Resource Survey Results (8/13/2018).
[3] Conversion of forested wetlands includes clearing within SVPH or IWWH.

1.2.2.3 Preservation for Recreational Uses of Outstanding River Segments

CMP is including, as part of this compensation plan to offset impact to existing recreational uses of outstanding river segments, land preservation of three tracts along the Dead River which collectively will add 1,053.5 acres to Maine's conserved lands and provide protection in perpetuity of 7.9 miles of river frontage along the Dead River, an outstanding river segment (12 M.R.S § 403).

These lands, as detailed within the *NECEC Potential Compensation Tract- Natural Resources Survey Results Report*, Exhibit 1-9, include the Grand Falls Tract, Lower Enchanted Tract, and Basin Tract (see Figure 1-2), which not only contain high quality natural resources but will also augment existing conserved lands, protect habitat connectivity, provide opportunity to expand recreational opportunities and trail networks, and provide long term protection of 7.9 miles along the Dead River, most notably used by whitewater rafting tourism companies. Adjacent conserved lands include two Western Mountain Conservation Easement ("CE") parcels, 457.84 and 560.35 acres, respectively, and the Dead River Trail and Conservation Corridor easement which includes 660.97 acres. In summary, the 1,053.5 acres contained within the Grand Falls Tract, Lower Enchanted Tract, and Basin Tract will add directly to adjacent conserved lands, which total approximately 1,679 acres, increasing the area conservation lands as a whole by 39%. The recreational opportunities and their relationship to other conserved lands are highlighted below.

Table 1-5

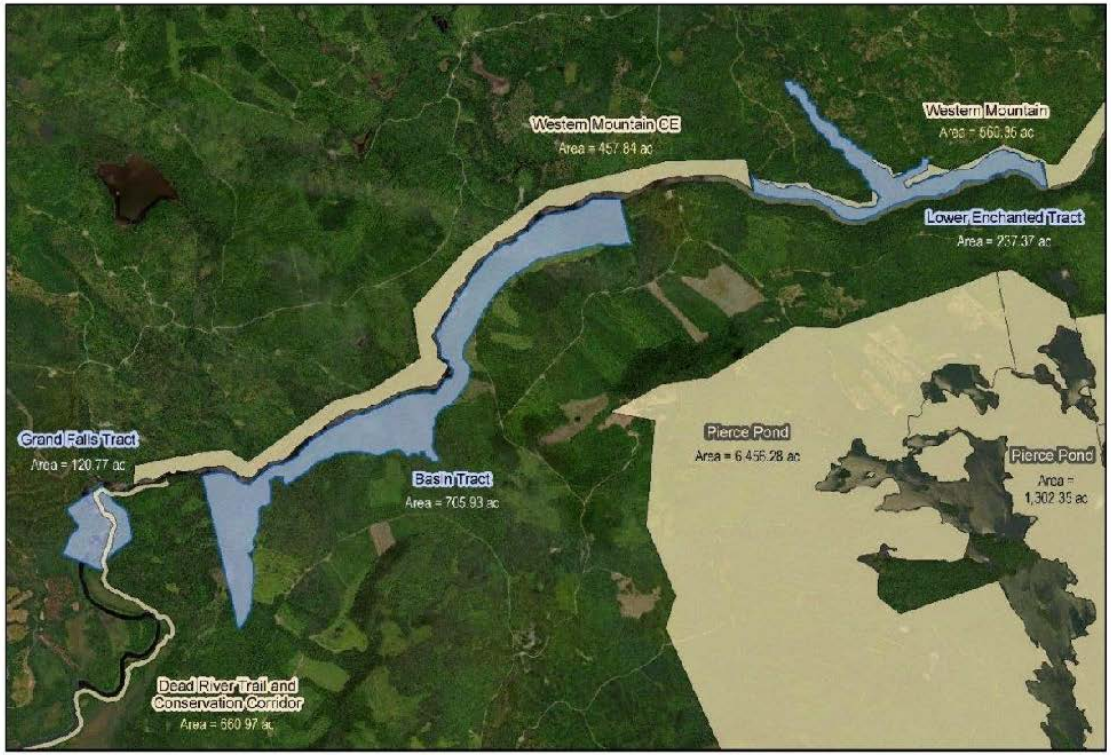
Tract	Dead River Frontage	Acres
Grand Falls Tract	1.4 miles (0.7 on each side)	120.84
Lower Enchanted Tract	2.3 miles along the north side	235.60
Basin Tract	4.2 miles along the south side	697.06
Total:	7.9 miles	1,053.50

Grand Falls Tract: The Dead River Trail and Conservation Corridor passes through this tract. This parcel is part of the Maine Huts & Trails network traveled by day and through hikers and also used for camping, cross country skiing and snowshoeing. The Northern Forest Canoe Trail traverses the tract connecting Flagstaff Lake with Spencer Stream and is the starting point for commercial Dead River rafting operations. The Tract is also highly regarded for trout and salmon fishing and hunting opportunities. The Grand Falls Tract has the largest horseshoe waterfall in the state. This tract is approximately 3.25 miles downstream, along the Dead River, of the 50,000 acre Bigelow Mountain-Flagstaff Lake-North Branch of the Dead River Focus Area of Statewide Ecological Significance. Within the intervening distance is a 1,542 acre moderate value IWWH, linking Grand Falls Tract with the Focus

Area. Conserved lands on this property are limited to the 200 foot wide Dead River Trail and Conservation Corridor on the east side of the river.

Lower Enchanted Tract: The Lower Enchanted Tract abuts the Western Mountain Conservation Easement parcel on both sides (east and west). Preservation of this tract will link segments of and expand on the Western Mountain Conservation Easement and will encompass approximately 0.7 miles on both sides of Enchanted Stream as well as 2.3 miles along the north shoreline of the Dead River. The Lower Enchanted Stream and the Dead River are very popular for brook trout and landlocked salmon fishing. Commercial river rafting on the Dead River passes along the shoreline of the Lower Enchanted Tract which also provides emergency access to the river.

Basin Tract: The Basin Tract includes approximately 4.2 miles of frontage along the south side of the Dead River. The Western Mountain Conservation Easement is located on the opposite shore of the Dead River, directly north of the Basin Tract. Commercial river rafting on the Dead River passes along the shoreline of the Basin Tract. Approximately one mile south of the 697-acre Basin Tract there are approximately 10,000 contiguous acres of Conserved Lands encompassing Pierce Pond, Grass Pond, Kilgore Pond, Split Rock Pond, Higher Pond, Dixon Pond, Fernald Pond, and Horseshoe Pond, and the Appalachian Trail Corridor. The Dead River is also highly regarded for brook trout and salmon fishing. Hunting opportunities are another recreational value of the Tract, as is its wetlands.



Legend

- Conserved Lands
- CMP Parcels

New England Clean Energy Connect
Proposed Lands for Conservation

0 0.5 1 Miles

New England Clean Energy Connect

Figure 1-2
Proposed Lands for Conservation

CENTRAL MAINE POWER

12/7/2018

1.2.2.4 Preservation of Riparian Buffers

MDEP and MDIFW have stated that conversion impacts to riparian buffers are compensable and have provided guidance to CMP to put forth a multifaceted plan to mitigate for these indirect impacts. The ILF Program does not provide a standard fee structure specific to habitat conversion within riparian buffers. In a meeting held between CMP, MDEP, and MDIFW on January 22, 2019, MDEP asked CMP to quantify forested conversion by calculating the linear feet of stream within the Project corridor whose riparian buffers would be converted from forested to scrub-shrub, and by calculating the linear feet of stream to be protected within the preservation parcels; monetary contributions and habitat enhancement would also count as additional compensation for these indirect impacts.

The NECEC will have 11.02 linear miles of forested conversion impact to streams; this includes all streams regardless of classification or value. The Grand Falls Tract, Lower Enchanted Tract, and Basin Tract contain a total of 12.02 linear miles of stream, providing greater than a 1:1 ratio.

In addition to preserving 12.02 miles of stream, CMP has also expanded the riparian buffers for vegetation management and maintenance activities. As discussed in Section 1.2.1.9, CMP will apply a 100-foot buffer to coldwater fishery habitats, outstanding river segments, RTE waterbodies, and all perennial streams in the new corridor portion (Segment 1) of the project. CMP will apply an expanded buffer of 75 feet to all other streams that do not meet these criteria.

Further detailed in Section 1.2.2.6, CMP will make a contribution of $180,000 to the Maine Endangered and Nongame Wildlife Fund to protect coldwater fishery habitat and will implement a Culvert Replacement Program (Exhibit 1-11) which includes the repair, removal or replacement of culverts within CMP-controlled lands as well as $200,000 of funding, sufficient to replace approximately 20-35 culverts on lands outside CMP's ownership.

This plan is robust and addresses the various requests made by the agencies to compensate for the indirect impact of forest conversion to streams contained within the NECEC corridor.

1.2.2.5 Preservation for the Upper Kennebec Deering Wintering Area

As discussed in Section 1.2.1.9, the Upper Kennebec DWA was identified by MDIFW as a biological deer wintering area with nearly four decades of data collection and in an area of the state where wintering deer are vulnerable to deep snow depths. A total of 39.209 acres of tree clearing is proposed within the Upper Kennebec DWA. In addition to establishing deer travel corridors within the ROW in this habitat, described in Section 1.2.2.6, and through consultation with MDIFW, CMP is proposing preservation of

lands within the larger Upper Kennebec DWA to mitigate for unavoidable impacts and provide long term protection of this deer wintering area.

CMP has identified 7 parcels for preservation, depicted in Figure 1-3, which CMP owns and which are located in the Upper Kennebec DWA. The table below includes the total acreage for each parcel, and the net acreage, i.e., the acreage of each parcel located within the mapped DWA.

Table 1-6

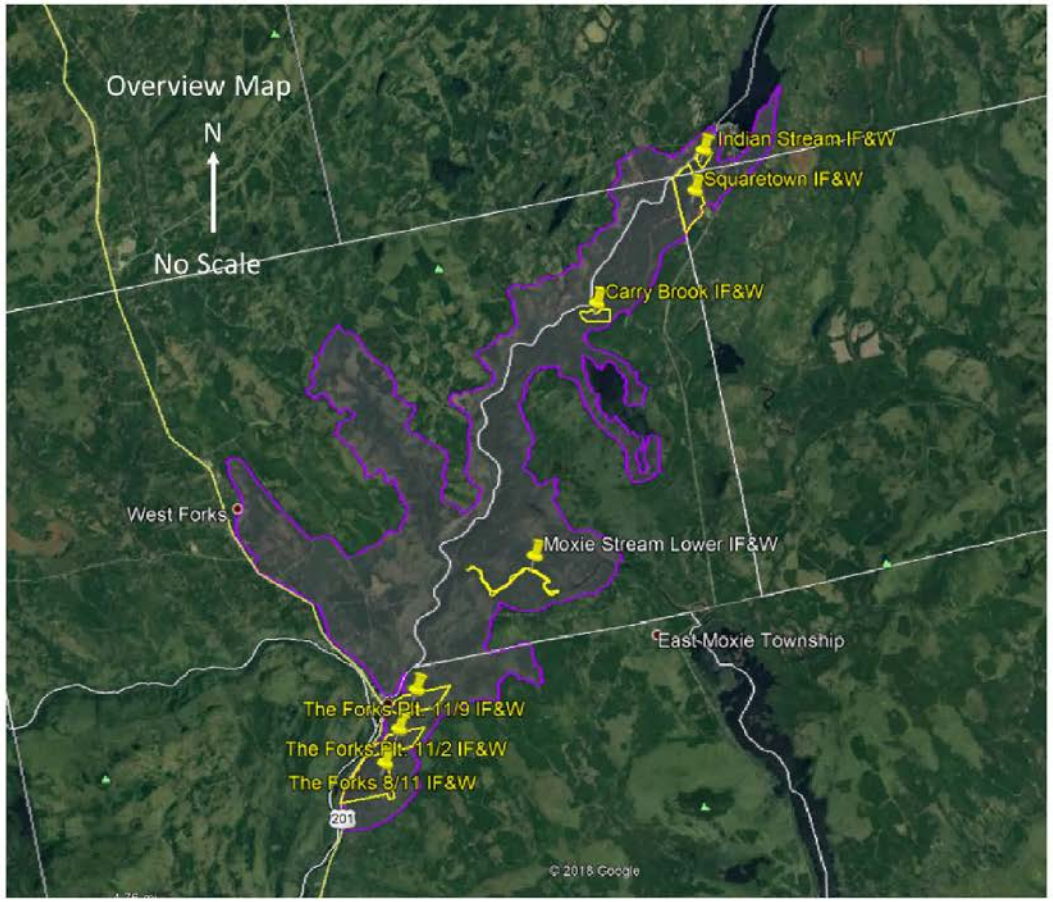
Parcel Name	Township	Total Acres	Less	Net Acres
The Forks Plt. 11/9	The Forks Plt.	130	5	126
The Forks Plt. 11/2	The Forks Plt.	109	7	102
The Forks Plt. 8/11	The Forks Plt.	233	5	228
Carry Brook	Moxie Gore	43	-	43
Moxie Stream Lower	Moxie Gore	29	-	29
Squaretown	Squaretown Twp	164	-	164
Indian Stream	Indian Stream Twp	25	-	25
			Total	**717**

CMP proposes to convey these properties to the Maine Bureau of Public Lands ("BPL") to be managed as deer wintering areas in perpetuity. The Forks Plt. 11/9 lot abuts the existing Cold Stream BPL parcel and the 11/2 and 8/11 lots are in close proximity and abut each other. The Moxie Stream parcel is located in the center of the mapped DWA and contains a segment of Moxie Stream. The Squaretown and Indian Stream parcels are in the northern section of the DWA. The properties contain softwood and mixed forest stands, preferred habitat for deer during the winter months.

CMP previously agreed to allow a multi-use recreational trail across The Forks Plt. Parcels to connect the Forks area trail systems (formerly the FAST Trail, Ridge Trail Section) from the Flood Road to the center of town, as part of a May 30, 2018 Memorandum of Understanding ("MOU") between CMP and the Western Mountain & Rivers Corporation ("WM&RC"). CMP will work with MDIFW to determine the specific construction, dimensions, location, and uses of this trail, such that the parcels retain their function and value as deer wintering areas.

MDIFW recommended that to appropriately mitigate for forest conversion within the Kennebec DWA, CMP should conserve land at an 8:1 ratio, which equals approximately 314 acres based on 39.209 acres

of forest conversion within the DWA. These parcels provide significantly more than the recommended 8:1 ratio, totaling 717 acres, an excess of 403 acres, and a ratio of greater than 18:1.



Legend

Preservation Parcel

Deer Wintering Area

New England Clean Energy Connect

Figure 1-3
Upper Kennebec DWA
Preservation Parcels

CENTRAL MAINE POWER

12/7/2018

1.2.2.6 Wildlife Habitat Protection and Enhancement

COLDWATER FISHERY MITIGATION

Coldwater fishery habitat is prevalent in the northern region of the Project. In fact, MDIFW has acknowledged, in an email from MDIFW Program Support Supervisor Robert Stratton –, that "viable brook trout habitat is not lacking in this region to the extent it might be elsewhere". Regardless, in addition to the 100 foot riparian buffer discussed in Section 1.2.1.9 above and the coldwater fishery habitat proposed for preservation, CMP is proposing the following measures to mitigate for coldwater fishery impacts and to improve coldwater fisheries habitat.

CMP has developed a culvert replacement program, in order to improve the habitat connectivity of coldwater fisheries in a number of locations where improperly installed, undersized, or damaged culverts are currently known to exist (Exhibit 1-11). In addition, within the Project right-of-way, CMP will replace existing culverts found to be damaged, installed improperly, or non-functioning. CMP will install replacement culverts consistent with Stream Smart Principles to improve or maintain habitat connectivity. In addition to replacing culverts within CMP-controlled lands associated with the Project, CMP will dedicate $200,000, sufficient to replace approximately 20-35 culverts on lands outside of CMP's ownership. CMP proposes to work with MDEP, MDIFW, and interested environmental non-governmental organizations, and to grant this money to the appropriate entity or entities who can identify those culverts most beneficial to replace, and who will manage and oversee their replacement. Additionally, CMP proposes a payment in the amount of $180,000 to the Maine Endangered and Nongame Wildlife Fund as additional mitigation for unavoidable indirect coldwater fishery impacts.

ROARING BROOK MAYFLY AND NORTHERN SPRING SALAMANDER HABITAT AVOIDANCE AND COMPENSATION

CMP executed surveys for Roaring Brook Mayfly and Northern Spring Salamander in the Fall of 2018. CMP will attempt to avoid crossing waterbodies with known occurrences of these two species. In the event alternative access cannot be found, CMP will coordinate with MDIFW regarding the location and placement of the equipment bridge prior to its installation. An environmental inspector will be present during installation of equipment bridges in these locations.

Through consultation with MDIFW, CMP agreed to modify its project design to include taller structures near Mountain Brook in Johnson Mountain Twp and Gold Brook in Appleton Twp to avoid and minimize impacts by allowing full height canopy to be retained within the conservation management areas

associated with rare species in these locations. MDIFW agreed that for unavoidable impacts to all other streams containing one or both of these species, a payment to the Maine Endangered and Nongame Wildlife Fund, using the MDEP ILF calculation (absent the wetland restoration and enhancement cost) at an 8:1 ratio is appropriate mitigation. As a result, CMP is proposing a contribution to the Maine Endangered and Nongame Wildlife Fund in the amount of $469,771.95.

HABITAT ENHANCEMENT FOR DEER WINTERING AREAS

The NECEC will have unavoidable forested conversion impacts to DWA, as discussed in in Section 1.2.1.9. In the co-located portions of the project, CMP has minimized impact by siting the HVDC line in existing corridors, thus requiring minimal additional clearing to accommodate the line. Only one deer wintering area, the Upper Kennebec DWA, was identified in Segment 1 (new corridor).

The Upper Kennebec DWA will require 39.209 acres of forest conversion. CMP's HDD design change at the Kennebec River has minimized clearing impact to this resource by preserving approximately 2,610 linear feet between the two termination stations and the Kennebec River. There will be no tree clearing activities in these areas. These areas will continue to function as deer travel corridors, providing habitat connectivity, within the riparian buffer of the river.

The remainder of the Kennebec DWA consists of 10,179 linear feet of right-of-way, and through consultation with the MDIFW, CMP has identified an additional 8 travel corridors to maintain habitat connectivity within the DWA. These additional 8 travel corridors, totaling approximately 3,279 linear feet (32.2% of the cleared DWA traversed), will maintain connectivity for deer travel in the winter months. CMP will manage these travel corridors as described Exhibits 10-1 and 10-2 of the Site Law Application (Revised January 2019). These management standards were developed in close consultation with MDIFW.

CMP also proposes, to enhance wildlife habitat in and adjacent to DWA, to revegetate disturbed soils in upland areas with a Wildlife Seed Mix, promoted by SAM and developed with Maine Seed Company. This wildlife friendly seed mix will offer nutrition to deer and other wildlife such as moose, rabbits, ruffed grouse, geese, and wild turkeys during late fall and early spring when woods forage is sparse. The

tender shoots derived from SAM's seed mix offer forage that is high in calories and protein, and deer find them to be highly digestible.[6]

Maine Seed Company's wildlife friendly seed mix contains highly nutritious cool season perennial grasses and clover that deer are attracted to in late fall and early spring. Other benefits[7] of the seed mix include:

- More wildlife-friendly than "conservation mixes"
- Provides superior deer nutrition immediately before and after the winter yarding season
- Grasses remain green and highly palatable into late fall/early winter, even under snow
- Contains five times the clover of "conservation mixes"
- White and red clover attract wildlife over most of the growing season
- Adaptable to a wide array of sites and soil conditions
- Cost effective - small seed size broadcast at only 25 lb./acre
- Plantings last several years with minimal maintenance.

1.2.2.7 Rare Plants and Unique Natural Communities

The NECEC will have unavoidable impacts to approximately 9.229 acres of unique natural communities, as discussed in Section 1.2.1.9. MNAP has not yet assigned a quality ranking to the unique natural communities that will be impacted by the project. In further consultation with MNAP, MNAP specified that if CMP elected to pay a fee in lieu of preservation for conversion impacts to unique natural communities, CMP should quantify the area of impact using a 250-foot buffer and apply the average assessed land value per square foot of impact, with a resource multiplier of 8 to the calculation. A fee of $1,224,526.82 was calculated for these unavoidable impacts.

MNAP and CMP also agreed that a one-time contribution of $10,000 to fund MNAP rare plant surveys would be adequate compensation for forest conversion impact associated with the Goldie's Wood Fern.

A total of $1,234,526.82 will be contributed to the Maine Natural Areas Conservation Fund.

[6] Lavigne, G., Experimental Wildlife Seed Mix Available through SAM, Maine Forest Products Council, June 2013.
[7] Advertisement for Wildlife See Mix, SAM and Maine Seed Company, available at: http://sportsmansallianceofmaine.org/archive/archive_files/2016/SAM_Seed_2016_ad.pdf

1.3 Conclusion

The NECEC Project will result in unavoidable temporary and permanent impacts to protected natural resources including freshwater wetlands, and is subject to the compensation requirements of the Wetlands and Waterbodies and Protection Rules (Chapter 310) and Significant Wildlife Habitat Rules (Chapter 335) of the Natural Resources Protection Act (38 M.R.S. §480-A-FF, and the Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (40 CFR §230) pursuant to Section 404 of the U.S. Clean Water Act (33 U.S.C. § 1344).

Compensation for NECEC Project impacts includes: 2,793 acres of land for preservation; a $3,074,416.06 in-lieu fee payment; a $649,771.95 payment to the Maine Endangered and Nongame Wildlife Fund; a $200,000 commitment for culvert replacements; a $1,234,526.82 payment to the Maine Natural Areas Conservation Fund; and implementation of various wildlife habitat enhancement measures. The total land preservation and $5,158,714.82 in monetary compensation surpasses requirements set forth in these compensation Rules so that the national goals of no net loss of functions and values, articulated in a February 6, 1990 Memorandum of Agreement between the US EPA and US Army Corps of Engineers Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines, are fulfilled.

Exhibit 1-1: NECEC Mitigation Guidance: Compensation Ratios and Adjustments Per Agency

Exhibit 1-1: NECEC Mitigation Guidance: Compensation Ratios and Adjustments Per Agency

Impact Type		In Lieu (ILF) Fee Compensation (MDEP & USACE)[1]		Preservation Ratios[2]		Adjustments to Standard Ratios/Amounts[3]	
		Formula	Multiplier	MDEP	USACE	DEP	USACE
Wetland Impact	Permanent Fill in Wetlands (Non-WOSS)	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	8:1	30:1	100%	100%
	Permanent Fill in WOSS	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	2	8:1	30:1	100%	100%
	Temporary Wetland Fill in PEM (<18 months)	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	20:1	USACE only	5%
	Temporary Wetland Fill in PSS[4] (<18 months)	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	20:1	USACE only	10%
	Permanent Forested Wetland Conversion	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	20:1	USACE only	15%
Impact to MDEP Significant Vernal Pool Habitat (250')	Permanent Wetland Fill in SVPH	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	2	8:1	30:1	100%	100%
	Permanent Forested Wetland Conversion SVPH	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	8:1	20:1	60%	15%
	Permanent Upland Fill in SVPH	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	8:1	DEP only	100%	DEP only
	Permanent Upland Conversion in SVPH	Avg. Assessed Land Value/Sq. Ft	1	8:1	DEP only	60%	DEP only
Impact to USACE Jurisdictional Vernal Pool Habitat	Direct Fill in Vernal Pool Depression or 100' Envelope	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	Corps only	n/a	Corps only	100%
	High Value (750')	(13,000 Sq. ft x 5) X (Natural Resource Enhancement & Restoration Cost + Avg. Assessed Land Value)	1	Corps only	1 high: 5 med/high	Corps only	5%
	Medium Value (750')	(13,000 Sq. ft x 3) X (Natural Resource Enhancement & Restoration Cost + Avg. Assessed Land Value)	1	Corps only	1 med: 3 med/high	Corps only	5%
	Low Value (750')	(13,000 Sq. ft x 1) X (Natural Resource Enhancement & Restoration Cost + Avg. Assessed Land Value)	1	Corps only	1 low: 1 med/high	Corps only	5%
Inland Wading Bird & Waterfowl Habitat (IWWH)	Permanent Wetland Fill in IWWH	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	2	8:1	30:1	100%	100%
	Permanent Forested Wetland Conversion IWWH	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	8:1	20:1	60%	15%
	Permanent Upland Fill in IWWH	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	8:1	DEP only	100%	DEP only
	Permanent Upland Conversion in IWWH	Avg. Assessed Land Value/Sq. Ft	1	8:1	DEP only	60%	DEP only

[1] Source: USACE New England District Compensatory Mitigation Guidance 2016, DEP Fact Sheet In Lieu Fee Compensation Program Rev 8/13/2015

[2] Source: USACE New England District Compensatory Mitigation Guidance 2016, MDEP NRPA Chapter 335

3 Based on ratios and adjustments within the DEP Fact Sheet-In-Lieu Fee Compensation Program, 2016 USACE New England District Compensatory Mitigation Guidance and discussions held during the Compensation Working Session on 4/3/18, with the USACE and MDEP.

[4] Given that hydrology or significant soil disturbance will not result, all forested wetlands will convert to scrub-shrub wetland.

Exhibit 1-2: MDEP Letter RE: *Compensation for significant vernal pool habitats within transmission line corridors*, April 25, 2017

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

AUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

April 25, 2017

Adam Marquis
Central Maine Power Company
83 Edison Drive
Augusta, ME 04336

Re: Compensation for significant vernal pool impacts within transmission line corridors

Dear Mr. Marquis:

As part of Central Maine Power Company's efforts to maintain and improve its transmission capabilities, there are times when new clearing and line placement occurs within significant vernal pool habitat (SVP) as defined in the *Natural Resources Protection Act*, 38 M.R.S. § 480-A et seq. and Chapter 335 *Significant Wildlife Habitat* rules, 06-096 C.M.R. ch. 335.

During the course of permitting for the Maine Power Reliability Program project, the Department determined in consultation with the Department of Inland Fisheries and Wildlife that impacts to SVPs resulting solely from vegetation conversion from forested to scrub/shrub could be compensated for at a rate less than 100%. During that project, the Department determined that compensation at a rate of 60% of that required by Chapter 310 *Wetlands and Waterbodies Protection Rules* and the Department's *In Lieu Fee Compensation Program,* would be adequate to offset the loss in functions and values to SVPs for vegetation conversion only.

This letter is to inform you that the Department will continue to assess compensation at a rate of 60% for vegetation conversion within transmission line corridors should compensation be required and barring any unforeseen circumstance where the facts of the situation would warrant a different rate based on the loss of functions and values of a significant vernal pool habitat.

I hope this letter serves yours needs. Feel free to call me at 207-446-1611 should you have any questions or need further clarification.

Sincerely,

Michael K. Mullen, Director
Land Division, Bureau of Land Resources

cc. Alison Sirois, SMRO Regional Manager
Dawn Hallowell, CMRO Regional Manager
Jim Beyer, EMRO and NMRO Regional Manager

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ite: www.maine.gov/dep

Exhibit 1-3: Musson Group Letter Report
***NECEC Compensation Plan Preservation Parcels*, August 10, 2018**

THE MUSSON GROUP Planning & Economic Development · Permitting · Project Management

August 10, 2018

Mr. Jay Clement
US Army Corps of Engineers, Maine Project Office
442 Civic Center Drive, Suite 350
Augusta, Maine 04330

RE: NECEC Compensation Plan – Preservation Parcels

Dear Mr. Clement,

We have considered your May 3, 2018 comments regarding the information on the potential preservation tracts that we sent to you and Jim Beyer on April 29, 2018, as well as Jim's June 1, 2018 comments. Based on those comments, as discussed below, we eliminated several parcels from our compensation plan for purposes of satisfying Army Corps requirements, though we are including those parcels as part of our compensation plan for the DEP, to go above and beyond the DEP's minimum requirements and to offset unavoidable Project impacts that are not otherwise captured through its compensation plan.

The parcels that we eliminated from our compensation plan for purposes of satisfying Corps requirements are:

1. Grand Falls Tract;
2. Basin Tract; and
3. Lower Enchanted Tract.

The parcels that we believe satisfy the Corps' requirements, and which are discussed below, are:

1. Flagstaff Lake Tract;
2. Little Jimmie Pond-Harwood Tract; and
3. Pooler Pond Tract.

Please see Attachment A, which is a map showing all compensation tract locations. Individual parcel maps also are attached, at Attachments B-G, showing the location and development district or zoning of each parcel.

According to the Corps' 2016 New England District Compensatory Mitigation Guidance ("Mitigation Guidance"), preservation as mitigation "does reduce the threat of future impacts and may stem future aquatic resource degradation." Mitigation Guidance, p. 10. Furthermore, the Corps "encourages a combination of upland and aquatic resource preservation over aquatic resources-only preservation to offer better protection of aquatic functions," as state laws may not protect non-wetlands whose degradation would affect aquatic resources. Mitigation Guidance, p. 11. Pursuant to 33 C.F.R. § 332.3(h), preservation may be used to provide compensatory mitigation when:

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(i) The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
(ii) The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the district engineer must use appropriate quantitative assessment tools, where available;
(iii) Preservation is determined by the district engineer to be appropriate and practicable;
(iv) The resources are under threat of destruction or adverse modifications; and
(v) The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

Each of the potential preservation tracts (Flagstaff Lake Tract, Little Jimmie Pond-Harwood Tract, and Pooler Pond Tract) that we are including in our plan meets all of these criteria and provides important physical, chemical, or biological functions for the watershed in which it is located. Our analysis of the applicable regulatory framework and regional trends shows that each of these three tracts is open to development in ways that could damage these important functions and thereby threaten to adversely modify the ecological sustainability of the watershed.

On the following pages we offer further analysis on each tract demonstrating that preservation may be used here to provide compensatory mitigation[1] because these parcels satisfy the criteria set forth in 33 C.F.R. § 332.3(h).

There are common themes that apply to each tract, including:

- **Access.** All three tracts – Flagstaff Lake, Little Jimmie Pond-Harwood, and Pooler Pond – are accessible via public roads, addressing the access concern that you and Jim raised in your comments. While Maine has a strong tradition of open access for members of the public to use private property for a wide variety of recreational activities free of charge, having direct access via a public road increases the likelihood of development.

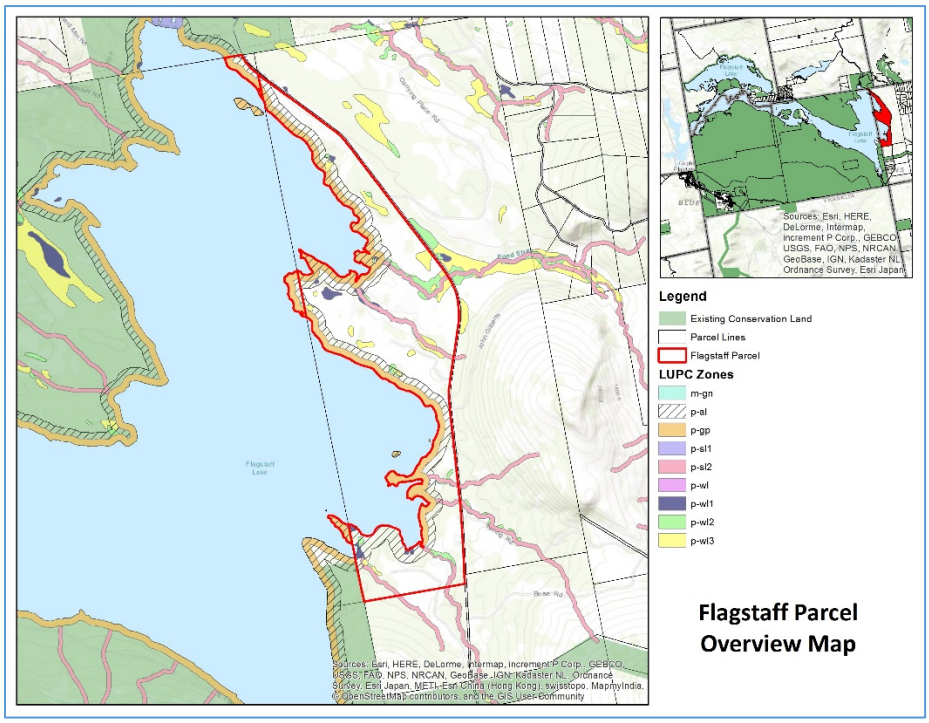
- **CMP's Development/Land Sale Policy.** Historically CMP's land policy has been to secure and retain certain surplus land to be offered as potential compensation (to be preserved in perpetuity) in order to offset unavoidable environmental impacts of future projects, including the NECEC Project. However, if regulatory agencies determine that specific tracts would not

[1] The Corps may consider mitigation as part of its Section 404 permitting, and because the Preferred Alternative is the least environmentally damaging practicable alternative, this compensatory mitigation may be considered and incorporated as a condition to the permit. *See Butte Environmental Council v. U.S. Army Corps of Engineers*, 620 F.3d 936, 946-947 (9th Cir. 2010) (rejecting plaintiff's contention that the USACE allowed the adoption of off-site mitigation measures to relieve the City of its responsibility to adopt the least environmentally damaging practicable alternative, and finding instead that while the Corps made compensatory mitigation a condition of the permit, "there is no indication that such mitigation was meant as an obligation in place of the City's responsibility to adopt the least environmentally damaging practicable alternative, as opposed to an obligation in addition to it."); *Florida Keys Citizens Coalition, Inc. v. U.S. Army Corps of Engineers*, 374 F. Supp. 2d 1116, 1132, 1134-35 (S.D. Fla. 2005) (upholding the Corps's Section 404 permit granted upon finding that "[t]he project as proposed with minimization efforts and mitigation ... is the least damaging practicable alternative.").

qualify as preservation/compensatory mitigation tracts because they are not, for example, under threat of destruction or adverse modification, CMP may consider offering these tracts for sale.

FLAGSTAFF LAKE TRACT

The Flagstaff Lake Tract (FLT) is approximately 831 acres located on the largely undeveloped eastern end of Flagstaff Lake in northwest Somerset County. The parcel has 4 miles of frontage along the Long Falls Dam Road, which is a paved public road and the main public access road to this area. The lake side of the property runs along the shoreline for approximately 8.5 miles. The property is defined by the 1150-foot contour line, which is just inland of the full lake elevation of 1146 feet. The land between the lake and the 1150-foot contour line is part of the Brookfield hydro project, but CMP has deeded access to this area that includes crossing rights and boat storage. Although the FLT is subject to flowage rights, such rights apply only to the extent to which such land has been historically flowed by the dam. Because the extent of such historical flowage is limited, and given the FLT's access right to Flagstaff Lake, the FLT could be developed at and above the highest typical and historical flowage elevations.



While your comments raise concern with the "level of human activity" at this parcel, echoed by Jim, existing development on the parcel is limited. Maine Huts and Trails (MHT) has constructed a popular lodge known as the Flagstaff Lake Huts along the northern shoreline and MHT maintains a trail network that crosses the property. The lodge and trail have been sited with sensitivity to the existing resources of the property, including wetlands and habitat. The facilities are operated to coexist with the important functions and values of the site and region. There is also one small leased camp near the middle of the property.

You also raised concern with this parcel's "tie in" to other protected parcels, a concern that Jim also noted. As discussed below, the FLT lies between the Maine Bureau of Parks and Land (MBPL) Dead River Peninsula property and Bigelow Preserve. Preservation of the FLT would link these two areas and close

a now open gap within the conservation land for this important part of the State of Maine, including over 8.5 miles of shoreline along Flagstaff Lake.

The property is located within Maine's Unorganized Territory and is regulated by the Land Use Planning Commission (LUPC). Much of the parcel is within a General Management Subdistrict (M-GN) where, in accordance to LUPC's Chapter 10 provisions, various land uses are permissible. Uses permitted without a permit include campsites, accessory structures, hand carry launches, trailed ramps, and forest management. Land uses that can be allowed through permitting include residential construction, subdivisions, and recreational lodging facilities. The parcel also includes the Wetland Protection Subdistrict (P-WL), including Wetlands of Special Significance (P-WL1, i.e., WOSS), Scrub-Shrub Wetlands (P-WL2, i.e., PSS), and Forested Wetlands (P-WL3, i.e., PFO). Other Protection Subdistricts on the FLT include Accessible Lake (P-AL), Great Pond (P-GP), Shoreland (P-SL2,), and Unusual Area (P-UA).

Physical, chemical, or biological functions
The existing functions and values of the FLT include the following (for more information please see the Natural Resources report from Power Engineers):

- *Lake Character*: Flagstaff Lake has been classified as a lake of statewide significance by LUPC due to its exceptional values. The Wildlands Lake Assessment identified it as having an outstanding resource rating for fisheries and for wildlife. It was rated as significant for scenic and shore character.

Flagstaff Lake Tract Summary	
Size	831.39 acres
NWI Wetlands	84 acres
Mapped Wetlands (delineated/GPS Identified)	412 acres
Inland Wading Bird/Waterfowl Habitat	30 acres
Upland Buffer Area	420 acres
Streams	9,810 linear feet
Non-Significant Vernal Pool Types	
1 PSVP 7 VPs 20 CVPs 39 PVPs	

- *Wetland Resources*: FLT contains approximately 412 acres of a diverse mix of wetland types (PFO, PSS, PEM) at the center of which is a high value IWWH. In addition to the lacustrine shoreline, there is also approximately 9,800 linear feet of named and unnamed perennial and intermittent streams that cross the tract and are tributaries to Flagstaff Lake.

- *Groundwater Recharge:* There are no Maine Geological Survey mapped sand and gravel aquifers on the FLT property. However, an esker at the south end of the lake is identified as a Significant Sand and Gravel Aquifer (MGS OF No. 01-132). The FLT is part of the surface hydrologic system draining into the lake and therefore helps to recharge this downgradient aquifer.

- *Fish Habitat:* Landlocked salmon, brook trout, yellow perch, chain pickerel, and an assortment of baitfish inhabit Flagstaff Lake and, although marginal for coldwater gamefish (MDIFW, 1988), in 2017 it was stocked with approximately 3,400, 7-to-8 inch landlocked salmon and brook trout to support the lake fishery for recreational anglers (MDIFW, 2018). Freshwater mussels observed

downstream along muddy shorelines of the Dead River are also likely to inhabit similar substrate in Flagstaff Lake.

- *Wildlife Habitat: M*oose, bear, deer, beaver, otter, mink, and other smaller mammals are abundant on FLT. In addition, FLT provides high quality habitat for a wide variety of raptors, waterfowl, gamebirds, passerines, songbirds, amphibians, reptiles, and insects. Habitat is further enhanced by the presence of a high rated IWWH (ID UMO-9951) near the center of the tract.

- *Recreation/Preservation:* FLT is at the crossroads of the MHT, Appalachian, and Northern Forest Canoe trail network traveled by day- and through-hikers and is also used for camping, cross-country skiing, and snowshoeing. Fishing and boating are widely used offerings of Flagstaff Lake, and hunting opportunities are also provided by FLT. When combined with the adjacent conservation lands, the FLT is part of a large conservation area comprising over 42,000 acres and over 8.5 miles of shoreline.

Overall, the FLT includes a combination of upland and aquatic resource preservation, rather than aquatic resources-only preservation, to offer better protection of aquatic functions (as state laws may not protect non-wetlands whose degradation would affect aquatic resources).

Ecological sustainability of the watershed

The resources listed above contribute significantly to the sustainability of the watershed. Palustrine wetlands along named and unnamed streams crossing FLT help to stabilize adjoining upland, thereby limiting and protecting lake degradation. The wetlands contribute to water quality in the lake as well as the downgradient aquifer. The tract consists of a variety of vegetative communities that provide different cover types, habitat characteristics, and ecological functions. Due to the large westward fetch of Flagstaff Lake, lacustrine and palustrine vegetated wetlands aligned along the east shore of the lake buffer and protect the adjoining shoreline from prevailing wind generated waves.

The FLT is within Maine's Western Mountain area, which is known for its natural resources and recreational opportunities. Multiple recreational trails, including the Appalachian Trail and the Northern Forest Canoe Trail, can be accessed from the FLT. The property lies between, and therefore links, the Maine Bureau of Parks and Land (MBPL) Dead River Peninsula property and the 36,000 acres of Public Land making up the Bigelow Preserve. Bigelow Mountain, with a highest elevation of 4,150 feet, and the view focal point from the property, is designated as a National Natural Landmark by the U.S. Department of the Interior.

Appropriateness and practicability of preservation

Preservation of FLT will allow for permanent protection from development and will preserve the existing wildlife habitat, water quality benefits, vernal pool habitat, and recreational/educational opportunities that are an integral component of the watershed. Approximately half of the 831.39 acre tract has a diverse mix of wetland types (PFO, PSS, PEM) at the center of which is a high value IWWH. There are approximately 9,800 linear feet of named and unnamed perennial and intermittent streams that cross the tract and are tributaries to Flagstaff Lake.

In addition, as noted in the section above, the FLT lies wholly within the 50,000-acre Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area. These are areas of Statewide Ecological Significance as identified by MNAP, MDIFW, MDMR, USFWS, TNC, Maine Audubon, and the Maine Coast Heritage Trust. This classification is based on the abundance of recreational opportunities and natural features and landscapes of exceptional ecological value. Preservation of this Tract along approximately 8.5 miles of the east shore of Flagstaff Lake will close a now open link between the conserved Bigelow Preserve to the south and the Dead River Peninsula to the north.

Preservation of this parcel is appropriate as it makes sense in the watershed context, provides protection of important aquatic resources, and is sustainable in the long-term.

Threat of destruction or adverse modifications

Like many areas in Maine, Somerset County has experienced population and economic decline, primarily due to the loss of manufacturing. However, in recent years Somerset County has shifted focus toward building a regional economy that takes advantage of the area's vast natural resources. Economic and community initiatives, such as the Somerset County Rural Cultural Plan, are working to shift the focus of growth and community development toward cultural opportunities, arts, and recreation. At the heart of these initiatives is the need to attract a steady flow of people to help preserve a sustainable population and economic base.

While removed from the core communities along Route 201, the FLT is positioned in a location that offers recreation-oriented development in the form of residential lots and/or recreational lodging facilities much like the existing MHT Flagstaff Lodge. The site has over 400 acres of upland available for development and offers over 8 miles of shoreline access on Flagstaff lake.

Residential Development. It is likely that any residential development on this site would take the form of single lots over a period of time rather than a full subdivision. Under current rules, landowners are allowed to create 2 lots every 5 years in each township without subdivision approval. This is known commonly as the "2 in 5 exemption". The LUPC has recognized that the "2 in 5" subdivision exemption could have negative implications to the principal values of the Unorganized Territory. These values, which include unique high-value natural resources and a unique natural character, are present in the FLT and surrounding lands. In any development analysis, the existing 2 in 5 exemption could result in several new lots, which would be sited in scattered and haphazard developments. This type of piecemeal development results in the loss of high value shoreline, forest fragmentation, and loss of recreational values.

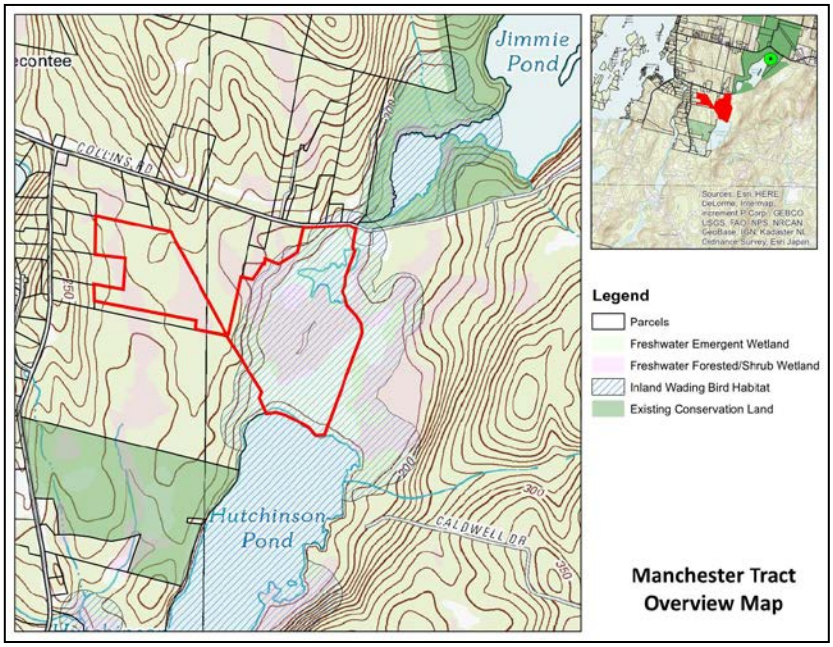
Recreational Lodging Development. The existing rules would allow the development of a recreational lodging facility. There are a several different scales of Recreational Lodging Facility that could be approved on the FLT. Within 500 feet of the shoreline the Chapter 10 rules allow for facilities that could accommodate a maximum overnight capacity of up to 100 people. Outside this area, the maximum size increases to allow a principal building of up to 12,000 SF and an overnight occupancy of up to 150 people. In addition to the risks of losing high value shoreline and of habitat fragmentation, one over-arching result of these types of developments is that the nature of the area could shift from a "backcountry" experience to an intensively managed recreation destination. This change would be contrary to the purposes for which the adjacent conservation parcels were established.

Forest Management Activities. According to the Forest Operations Notifications (FONS) from the last five and one-half years, within a 20-mile buffer of the FLT, the Maine Forest Service has received 784 notifications for forest management activities totaling 125,918.69 harvest acres. These notifications demonstrate that if this tract is determined to not qualify as a preservation/compensatory mitigation tract, and even if it were not sold for development, it would be under threat of destruction or adverse modification through forest management, which is common in this area.

In short, the parcel is open to development in ways that could damage the functions and values of wetland resources located there, and preservation would reduce the threat of future impacts and may stem future aquatic resource degradation.

Legal instrument
As part of the compensation package for NECEC, the entire tract will be permanently protected via a conservation easement or similar document.

LITTLE JIMMIE POND-HARWOOD TRACT



The Little Jimmie Pond-Harwood Tract (LJPT) is comprised of two separate parcels totaling approximately 110 acres. The property is accessible from the Collins Road, which is a public street in the Town of Manchester (about 6 miles from downtown Augusta). The LJPT has approximately 310 feet of road frontage along the Collins Road and approximately 900 feet of frontage on Hutchinson Pond.

The northern side of tract shares approximately 1,200-feet with the 886-acre Jamie's (Jimmie's) Pond Wildlife Management Area (WMA), which is managed by the Maine Department of Inland Fisheries and Wildlife (MDIFW). Jimmie's Pond is approximately 107 acres and is 75 feet deep. It is stocked with brook trout and splake. It also has small and large mouth bass and pickerel. The property provides habitat to numerous birds, including herons, hawks, loons, osprey and a wide variety of songbirds. Jamie's Pond is undeveloped but does provide carry-in boat access and six miles of hiking/cross-country skiing trails, which, with the surrounding woods, make Jamie's Pond a unique natural getaway in Central Maine. MDIFW manages the area primarily for wildlife.

LJPT is currently undeveloped but is actively used for recreational activities and hunting. The property is located within the Town's Rural Residential Zone, which allows for a mixture of uses including residential dwelling and commercial activities (with conditional use approval from the Town). Areas within 250 feet of the pond are in a Resource Protection Zone. LJPT was among the parcels considered in 2008 and 2009 for use in the compensation plan for the Maine Power Reliability Program (MPRP) project, and a natural resource inventory was completed on this parcel at that time.

Physical, chemical, or biological functions for the watershed

The existing functions and values of the LJPT include the following (for more information please see the Natural Resources report from Power Engineers):

- *Lake Character*: Hutchinson Pond has been classified by Maine DEP as a lake which is most at risk from new development. According to the Town's Comprehensive Plan, water quality is listed as "moderate-sensitive" and it would be very susceptible to phosphorous loading if not for its rapid flushing rate (seven flushes per year). The Kennebec Land Trust owns a 105-acre conservation parcel on Hutchinson Pond 2,765 feet of stream frontage and 1600 feet of undeveloped shoreline. They have recreational trails and access to the Pond. Nearby Jimmies Pond, which is connected to Hutchinson Pond by a small stream and wetland complex, contains a mixture of open water, shallow and deep marsh, shrub swamp, and flooded woodland. The area provides habitat for numerous species of waterfowl and wading birds, aquatic furbearers and other wildlife species. The 808 acres of upland habitat is predominantly mixed forest. The pond's shoreline remains largely undeveloped, making it popular with local anglers seeking to enjoy the unspoiled setting. It's also a quiet and scenic canoe or kayak.

- *Wetland Resources*: Approximately 66.46 acres (62%) of the 110 total acres of the LJPT were identified as wetland. The primary wetland system on the eastern parcel is a large emergent marsh (PEM) located on the northern end of Hutchinson Pond which extends off site and to the south from the southeast corner of the parcel. The portion of the marsh located on the LJPT totals approximately 50.5 acres. A perennial stream flows from the northern property boundary through the large marsh and into Hutchinson Pond (L1UB). The stream flow is relatively low velocity that has further slowed to a ponded condition by an active beaver dam. The marsh is surrounded by a perimeter of scrub-shrub wetland (PSS) that transitions into forested wetland in most locations before ultimately becoming upland forest both along the western marsh edge and within the large section of upland in the center of the marsh.

Little Jimmie Pont-Harwood Tract Summary	
Size	109.77 acres
Wetland Areas	66.97 acres
Inland Wading Bird/Waterfowl Habitat	75 acres
Upland Buffer Area	42.08 acres
Streams	3,030 linear feet
Vernal Pool Types	
2 PSVPs (42.80 acres of potential Critical Terrestrial Habitat) 6 VPs 2 ABA	

The most recent FIRM for this part of Manchester (Community Panel Nos. 23011 C0494D, C0513D effective date June 6, 2011), prepared FEMA identifies a 100-year floodplain associated with Inlet Stream that encompasses the wetland

southward from Collins Road to Hutchinson Pond (HP). On the west side of the parcel wetlands hydrologically connected to HP therefore also contribute to the function of flood flow alteration

- *Groundwater Recharge:* Groundwater recharge was noted as a primary function for the black spruce bog in the west parcel of LJPT as well as in the smaller isolated, seasonally flooded wetlands located throughout the property. Groundwater discharge was noted in the forested wetlands that are connected to the large emergent marsh in the east parcel as well as the black spruce bog and larger wetland system off-site to the west of LJPT.

- *Fish Habitat:* Surveys conducted by MDIFW indicate Hutchinson Pond has abundant warm water fish habitat, including pickerel and largemouth bass, white and yellow perch, pumpkinseed sunfish, baitfish and American eel. Brook trout are stocked annually in Jimmie Pond to the north of the parcel and likely migrate south into Hutchinson Pond during spring and fall when water temperatures are adequate.

- *Wildlife Habitat:* The variety of vegetation provides suitable habitat for a multitude of birds, reptiles, amphibians, insects, and mammals. The large marsh on the eastern part of the property has been mapped as IWWH (ID 031056) and provides outstanding habitat for species of birds. Deer Wintering Areas have also been identified on Beginning with Habitat maps in the forested area between the east and west parcels that comprise the LJPT. Upland areas associated with the wetlands provide additional habitat for various species which utilize a mix of wetland and upland habitats or those that typically utilize uplands as their primary habitat.

- *Recreation/Preservation:* The property is in close proximity to the greater Augusta area as well as between a WMA to the north and an existing conservation land parcel to the south. Numerous recreational opportunities are available on the property including, fishing, hunting, hiking, boating, and bird watching. The quality and type of wetlands on the property, soil types, diverse vegetation communities, and presence of numerous vernal pools would provide a vast array of educational opportunities for the public.

The LJHP Tract includes a combination of upland and aquatic resource preservation, rather than aquatic resources-only preservation, to offer better protection of aquatic functions (as state laws may not protect non-wetlands whose degradation would affect aquatic resources).

Ecological sustainability of the watershed

The resources listed above contribute significantly to the watershed. The LJPT is within the Kennebec River watershed and is connected hydrologically via the outlet of Hutchinson Pond, which drains into Cobbosseecontee Stream and ultimately connects with the Kennebec River approximately 10.5 downstream from the Tract. Immediately to the east of the tract on the opposite side of Benson Road is Beginning with Habitat's Cobbossee–Annabessacook Focus Area (BWH, 2018). The focus area is comprised of extensive areas of wetlands that provide habitat for wintering deer, rare species, and outstanding habitat for wading birds and waterfowl. Storm water runoff from uplands and small ephemeral streams that drain into the wetlands is dissipated within the organic soils and dense vegetation where nutrients carried with the runoff are processed into other forms and transferred to higher trophic levels in the ecosystem.

Open water and emergent marsh habitats in the west parcel have suitable organic and/or fine grained soils, slow moving water, variable water depths, flood storage capacity, and dense vegetation that are important and effective aspects of sediment, toxicant, and pathogen retention. The organic soils and long duration water retention time present in the black spruce bog in the west parcel also are important factors in sediment, toxicant, and pathogen reduction.

The emergent marsh in the east parcel is in a mapped floodplain and contains a riparian buffer area comprised of scrub-shrub wetland that transitions into forested wetland. The wetlands around the perimeter of the marsh are an important component of floodwater attenuation and help to provide overall stability for downstream water resources such as Hutchinson Pond.

Appropriateness and practicability of preservation

Preservation of this property will include 66.97 acres of diverse wetland habitat, 3,030 linear feet of streams, eight (8) vernal pools and 42.80 acres of vernal pool critical terrestrial habitat. Preservation of this tract will allow for permanent protection from development and will preserve the existing recreational opportunities, wildlife habitat, water quality benefits, vernal pool habitat, and educational opportunities of the LJPT.

The location of the LJPT in proximity to ecological focus areas, conservation lands, and protected wildlife areas provides enhanced value to the property from a protected land standpoint, primarily due to connectivity with these other parcels that will provide greater habitat functionality at a landscape scale. The current lack of development in the surrounding landscape and proximity to protected lands provides large buffer areas which augment the overall ecological functions of the property, specifically the diverse set of wetland systems located on site.

Preservation of this parcel is appropriate as it makes sense in the watershed context, provides protection of important aquatic resources, and is sustainable in the long-term.

Threat of destruction or adverse modifications

Development in this part of the Town of Manchester is primarily residential homes with small fields and secondary roads scattered throughout the area. Hutchinson Pond itself is lightly developed. Considering the property location within close proximity to Augusta (approximately 12.7 miles from Exit 109 on I-95 in Augusta), there are attractive options for future development

It is likely that any development on this parcel would be residential similar to the existing pattern of development in the area. Approximately twenty (20) acres or 18% of the property is zoned to permit single lot residential or duplex development with a permit from the Code Enforcement Officer. The minimum lot size, which is two acres, could allow an estimated ten homes to be built. Using the “2 in 5” subdivision exemption this type of development could have a negative impact on the wetlands and water quality of Hutchinson Pond. Subdivisions are also allowed with conditional use approval, as are several commercial activities. Overall, should development occur on this tract, it would cause fragmentation of the existing habitat and change the undeveloped nature of Hutchinson Pond.

Forest Management Activities. According to the FONS from the last five and one half years, within a 20-mile buffer of the LJPT, the Maine Forest Service has received 2,215 notifications for forest management activities totaling 89,221.97 harvest acres. These notifications demonstrate that if this tract is determined to not qualify as a preservation/compensatory mitigation tract, and even if it were not sold for development, it would be under threat of destruction or adverse modification through forest management, which is common in this area.

In short, the parcel is open to development in ways that could damage the functions and values of wetland resources located there, and preservation would reduce the threat of future impacts and may stem future aquatic resource degradation.

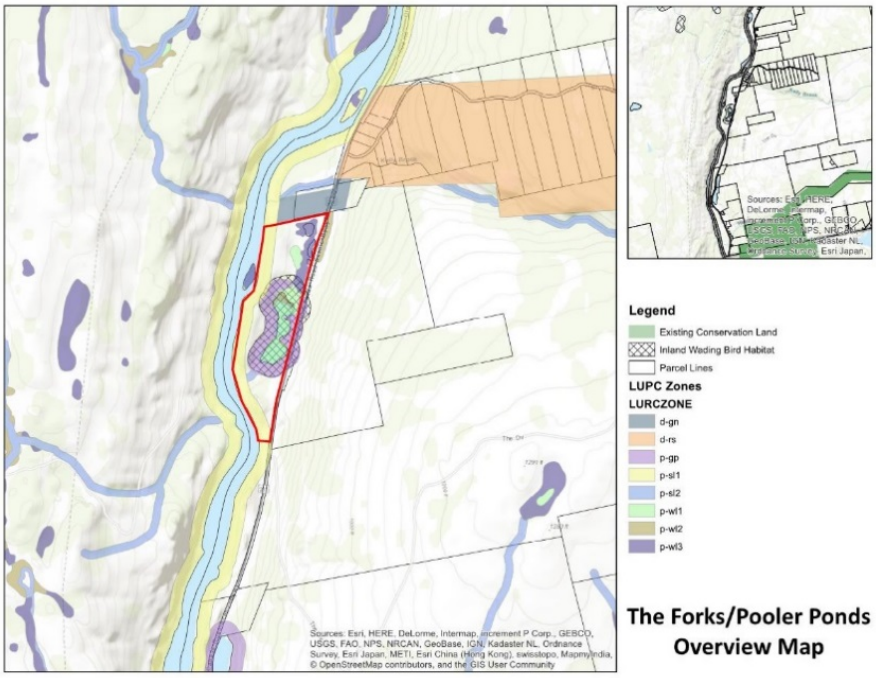
Legal instrument
As part of the compensation package for NECEC, the entire 110 acre (+/-) LJPT will be permanently protected via a conservation easement or similar document.

POOLER POND TRACT

The Pooler Pond Tract (PPT) is approximately 81 acres located along Maine Scenic Byway Route 201 in The Forks Plantation about 3 miles from the village of The Forks. The site has .8 miles of river frontage along the Kennebec and encompasses all of Pooler Pond.

There is no existing development on the property, however, a portion of the Forks Area Scenic Trail (F.A.S.T.) runs through the site between Pooler Pond and the River. The adjacent property is developed by a rafting and river campground.

The property is located within Maine's Unorganized Territory and is regulated under LUPC rules and guidelines. The parcel contains multiple zoning subdistricts including the Shoreland Protection Subdistrict (P-SL), the General Management Subdistrict (M-GN), Great Pond Subdistrict (P-GP), and Wetland Protection Subdistricts (P-WL). There are several permitted uses within each of these subdistricts including residential dwellings and campsites.



Retail stores, restaurants, and recreational lodging facilities are also allowed with special exception approval. Pooler Pond and the associated shoreline has been designated as an Inland Wading Bird and Water Fowl habitat by MDIFW. There are also areas wetland (and associated wetland zoning) around the northerly portion of the pond.

Physical, chemical, or biological functions for the watershed
Lake Character: Pooler Ponds (MIDAS # 4106) are designated as a "water quality limiting lake" (WQLL) sensitive to increased phosphorus concentrations and therefore is subject to additional residential development restrictions.

- *Wetland Resources*: Approximately 18.33 acres (22.6%) on PPT were identified as palustrine wetland. This includes the 8.12 acre Pooler Ponds complex (PUB) and 10.21 acres of additional palustrine wetland. The primary wetland system on this property is palustrine unconsolidated bottom (PUB) associated with the open water of the pond complex. The fringe of this wetland system is enveloped by a graminoid-dominant palustrine emergent area (PEM), which is bordered by a co-dominant palustrine scrub-shrub wetland (PSS). The Tract has approximately 0.8 river-miles of frontage along the Kennebec River, a permanently flooded, lower perennial riverine wetland system with an unconsolidated bottom (R2UBH). Where the land does not abruptly drop from bedrock cliff to river, there is generally a 20- to 50-foot strip of palustrine scrub shrub (PSS) wetland along the fringe of the Kennebec River.

  As mapped by the USDA NRCS on Web Soil Survey, approximately 56 acres (68%) of PPT is underlain by somewhat excessively drained (SED) soils. In addition to slightly more than 8 acres of waterbody, the remainder of the Tract is mapped as well drained. The soils are derived from glacial outwash plains, till plains and eskers consisting of fine silt loams and clay loams. Hydric soils were identified primarily along fringe wetlands that occur around most of Pooler Ponds and parts of the Kennebec River. The fringe wetlands associated with the pond are classified as PEM and PSS with some smaller components of PFO. A small PSS wetland was mapped along the Kennebec River consisting of fine loamy sands.

- *Groundwater Recharge:* PPT occurs on the Kennebec River Significant Sand and Gravel Aquifer. Onsite wetlands help groundwater discharge from up gradient, as well as recharge areas to the adjoining Kennebec River.

- *Fish Habitat:* The Kennebec River is popular for brook trout and landlocked salmon fishing. Pooler Ponds lack a perennial stream connection to the river and are most likely habitat for a warmwater fishery.

- *Wildlife Habitat:* PPT provides high quality habitat for a wide variety of wildlife including large mammals, raptors,

Pooler Pond Tract Summary	
Size	81.24 acres
Wetland Areas	18.33 acres
Inland Wading Bird/Waterfowl Habitat	31.39 acres
Upland Buffer Area	62.91 acres
Streams	4,480 linear feet
Vernal Pool Types	
1 VP	

waterfowl, passerines songbirds, amphibians, reptiles and insects. The property also has been mapped as a moderate value IWWH (ID UMO-9951) near the center of the Tract.

- *Recreation/Preservation:* PPT is located between a commercial rafting and river guide operation and campground immediately to the north and the Appalachian Trail Corridor 3.4 miles to the south. The Tract is also crossed by the F.A.S.T. and is an access point to fishing and boating on the Kennebec River. This easily accessible Tract provides diversity and abundance of aquatic plants and graminoids relevant to the study of botany and wetland ecology.

The PPT includes a combination of upland and aquatic resource preservation, rather than aquatic resources-only preservation, to offer better protection of aquatic functions (as state laws may not protect non-wetlands whose degradation would affect aquatic resources).

Ecological sustainability of the watershed
The resources outlined above contribute significantly to the ecological sustainability of the watershed. Riverine vegetated wetlands aligned along the east shore of the Kennebec River buffer and protect the adjoining upland shoreline from scour and erosion. Palustrine wetlands around the perimeter of Pooler Ponds also stabilize adjoining upland, thereby limiting and protecting lake degradation. The Tract provides a comprehensive mix of wetland types corresponding to the topographic gradient. PPT provides high quality habitat for a wide variety of wildlife including large mammals, raptors, waterfowl, passerines songbirds, amphibians, reptiles and insects.

In addition, this area of Route 201 is part of the Canada Scenic Byway and recognized for its recreational and scenic character. The area is developed with a mix of residential and commercial uses.

Appropriateness and practicability of preservation
There are no conserved lands or focus areas immediately adjacent to or within one mile of PPT. However, this area is important to the preservation of the watershed and recreational nature of the area. As part of the compensation package for NECEC, the approximately 81.24 acre Pooler Ponds Tract will be permanently protected. Preservation of this Tract along approximately 0.8 miles of the Kennebec River will secure access for rafting, other boating/ canoeing and fishing. In addition, preservation of PPT will result in permanent protection from development and will preserve the existing wildlife habitat, water quality benefits, vernal pool habitat, and educational opportunities adjacent to a Maine Scenic Byway.

Preservation of this parcel is appropriate as it makes sense in the watershed context, provides protection of important aquatic resources, and is sustainable in the long-term.

Threat of destruction or adverse modifications
Like the FLT, this property is located in a part of the state where the regional economy is shifting toward a focus on cultural opportunities, arts and recreation. This property has the same development opportunities due to the proximity of the site to existing development (3.5 miles to the village of The Forks, 4 miles to Caratunk, 20 miles to Bingham), availability of shore frontage for direct access to the Kennebec, shore frontage on Pooler Pond, and accessibility to a main road. It is likely that development

would be in the form of residential homes or camp style development, overnight accommodations, or recreational development, much like the FLT. Even without formal subdivision approval, development in the form of single lots over a period of time, using the "2 in 5 exemption", could have negative implications to unique undeveloped character of the river frontage and shoreline around Pooler Ponds.

Residential Development. It is likely that any residential development on this site would take the form of single lots over a period of time rather than a full subdivision. Under current rules, landowners are allowed to create 2 lots every 5 years in each township without subdivision approval. This is known commonly as the "2 in 5 exemption". The LUPC has recognized that the "2 in 5" subdivision exemption could have negative implications to the principal values of the Unorganized Territory. These values, which include unique high-value natural resources and a unique natural character, are present in the PPT and surrounding lands. In any development analysis, the existing 2 in 5 exemption could result in several new lots which would be sited in scattered and haphazard developments. This type of piecemeal development results in the loss of high value shoreline, forest fragmentation, and loss of recreational values.

Recreational Lodging Development. The existing rules would allow the development of a recreational lodging facility. There are a several different scales of Recreational Lodging Facility that could be approved on the FLT. Within 500 feet of the shoreline the Chapter 10 rules allow for facilities that could accommodate a maximum overnight capacity of up to 100 people. Outside this area, the maximum size increases to allow a principal building of up to 12,000 SF and an overnight occupancy of up to 150 people. In addition to the risks of losing high value shoreline, one over-arching results of these types of developments is that the nature of the area could shift from a "backcountry" experience to an intensively managed recreation destination. This change would be contrary to the purposes for which the adjacent conservation parcels were established.

Forest Management Activities. According to the FONS from the last five and one half years, within a 20-mile buffer of the PPT, the Maine Forest Service has received 627 notifications for forest management activities totaling 156,568.27 harvest acres. These notifications demonstrate that if this tract is determined to not qualify as a preservation/compensatory mitigation tract, and even if it were not sold for development, it would be under threat of destruction or adverse modification through forest management, which is common in this area.

The parcel is open to development in ways that could damage the functions and values of wetland resources located there, and preservation would reduce the threat of future impacts and may stem future aquatic resource degradation.

Legal instrument.
As part of the compensation package for NECEC, the entire tract will be permanently protected via a conservation easement or similar document.

Please do not hesitate to contact me if you have any questions.

Sincerely,
The Musson Group

Noel Musson, Principal

Enclosures

Exhibit 1-4: NECEC Compensation Package Summary

Exhibit 1-4 Compensation Package Summary as Required by USACE and NRPA

Project Impact				Compensation Required[1]			Compensation Sites			
Activity		Square feet	Acres	Agency Required by	Compensation Ratio X Adjustment[2]	Estimated Quantity Required	Flagstaff Lake Tract Total Acres= 831.39	Little Jimmie Pond-Harwood Tract Total Acres= 109.77	Pooler Pond Tract Total Acres= 81.24	Total Compensation Total Area= 1022.40
Impact to Wetlands	Permanent Fill in Wetlands (Non-WOSS)	13,389	0.307	USACE & MDEP	30:1 [6] USACE ratio applied	9.22	423.96 of wetland preservation	68.46 of wetland preservation	18.33 of wetland preservation	510.75 acres of wetland preservation to offset 4.12 acres of Permanent Fill in Wetlands (WOSS and Non-WOSS), 28.51 acres of Temporary Wetland Fill in PSS, and 105.55 of Permanent Forested Wetland Conversion, which is 13.45 acres over the amount of compensation required. $154,535.04 ILF for Temporary Wetland Fill in PEM.
	Permanent Fill in WOSS[3]	166,146	3.814	USACE & MDEP	30:1 [6] USACE ratio applied	114.43				
	Temporary Wetland Fill in PEM (<18 months)	835,486	19.180	USACE	See Exhibit 1-5A In-Lieu Fee Summary					
	Temporary Wetland Fill in PSS[4] (<18 months)	1,241,744	28.507	USACE	20:1 x 0.10 USACE ratio applied	57.01				
	Permanent Forested Wetland Conversion[5]	4,597,680	105.548	USACE	20:1 x 0.15 USACE ratio applied	316.64				
	Total Impact:	6,854,445	157.356		**Total Ac. Required:**	497.30				
Impact to Significant Vernal Pool Habitat (250')	Permanent Wetland Fill in SVPH	32,365	0.743	USACE & MDEP	See Exhibit 1-5A In-Lieu Fee Summary		See Exhibit 1-5A In-Lieu Fee Summary			$641,653.12 ILF amount
	Permanent Forested Wetland Conversion SVPH	169,670	3.895	USACE & MDEP						
	Permanent Upland Fill in SVPH	31,370	0.720	MDEP						
	Permanent Upland Conversion in SVPH	1,289,691	29.607	MDEP						
	Total Impact:	1,523,096	34.965		**Total Ac. Required:**	n/a				
Impact to USACE Jurisdictional Vernal Pools	Direct Fill in Vernal Pool Depression or 100' Envelope	96,610	2.218	USACE	See Exhibit 1-5A In-Lieu Fee Summary		See Exhibit 1-5A In-Lieu Fee Summary			$2,024,875.37 ILF amount
	High Value Vernal Pools[7]	49		USACE						
	Medium Value Vernal Pools	122		USACE						
	Low Value Vernal Pools	71		USACE						
	Total Impact:	2.22 acres of direct fill / 242 vernal pools								
Impact to Inland Wading Bird & Waterfowl	Permanent Wetland Fill in IWWH	149	0.003	USACE & MDEP	See Exhibit 1-5A In-Lieu Fee Summary		See Exhibit 1-5A In-Lieu Fee Summary			$253,352.53 ILF amount
	Permanent Forested Wetland Conversion IWWH	114,232	2.622	USACE & MDEP						
	Permanent Upland Fill in IWWH	598	0.014	MDEP						
	Permanent Upland Conversion in IWWH	539,556	12.387	MDEP						
	Total Impact:	654,535	15.026		**Total Ac. Required:**	n/a				
									Total In-Lieu Fee Payment	**$3,074,416.06**
									Total Compensation Land	**1022.40 Acres**

[1] Based on ratios and adjustments within the DEP Fact Sheet-In-Lieu Fee Compensation Program, 2016 USACE New England District Compensatory Mitigation Guidance and discussions held during the Compensation Working Session on 4/3/18, with the USACE and MDEP, as shown in Exhibit 1-1.

[2] In each case where compensation is required by both the MDEP and USACE, the higher ratio and adjustment was applied.

[3] Permanent wetland fill to PEM and PSS wetlands within SVPH and IWWH are excluded from this calculation and are calculated separately within their own respective categories.

[4] Given that hydrology or significant soil disturbance will not result, all forested wetlands will convert to scrub-shrub wetland.

[5] Conversion of forested wetlands excludes clearing within SVPH or IWWH and are calculated separately within their own respective categories.

[6] CMP offered a ratio of 30:1 to the USACE, which is above the 20:1 required, for land preservation for their consideration of the compensation parcels offered as part of this plan.

[7] Excludes impacts to SVPH.

Exhibit 1-5A: In Lieu Fee Summary
Exhibit 1-5B:Summary of Compensation Resulting from Consultation with Resource Agencies
Tables 5-1.1 – 5-1.12: ILF Calculations Tables

Exhibit 1-5A: In-Lieu Fee Summary

Impact Type		Resource Impact		In Lieu (ILF) Fee Compensation (MDEP & USACE)[1]		Adjustments to Standard Ratios/Amounts[2]		ILF Payment
		Sq ft	Acres	Formula	Multiplier	DEP	USACE	
Wetland Impact	**Permanent Fill in Wetlands (Non-WOSS)** See Exhibit 1-4	13,389	0.307	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	100%	100%	Preservation, See Exhibit 1-4
	Permanent Fill in WOSS[3] See Exhibit 1-4	166,146	3.814	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	2	100%	100%	Preservation, See Exhibit 1-4
	Temporary Wetland Fill in PEM (<18 months) See Table 1-5.1	835,486	19.180	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	5%	$154,535.04
	Temporary Wetland Fill in PSS[4] (<18 months) See Exhibit 1-4	1,241,744	28.507	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	10%	Preservation, See Exhibit 1-4
	Permanent Forested Wetland Conversion[5] See Exhibit 1-4	4,597,680	105.548	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	15%	Preservation, See Exhibit 1-4
Impact to MDEP Significant Vernal Pool Habitat (250')	**Permanent Wetland Fill in SVPH** See Table 1-5.2	32,365	0.743	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	2	100%	100%	$244,669.00
	Permanent Forested Wetland Conversion SVPH See Table 1-5.3	169,670	3.895	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	60%	15%	$335,360.93
	Permanent Upland Fill in SVPH See Table 1-5.4	31,370	0.720	Avg. Assessed Land Value/Sq. Ft	1	100%	DEP only	$5,294.90
	Permanent Upland Conversion in SVPH See Table 1-5.5	1,289,691	29.607	Avg. Assessed Land Value/Sq. Ft	1	60%	DEP only	$56,328.29
Impact to USACE Jurisdictional Vernal Pool Habitat[7] (750')	**Direct Fill in Vernal Pool Depression or 100' Envelope** See Table 1.5.6a	96,610	2.218	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	USACE only	100%	$382,331.87
	High Value Vernal Pools[7] See Table 1.5.6b	49 High Value Vernal Pools		(13,000 Sq. ft x 5) X (Natural Resource Enhancement & Restoration Cost + Avg. Assessed Land Value)	1	USACE only	5%	$586,592.50
	Medium Value Vernal Pools See Table 1.5.6c	122 Medium Value Vernal Pools		(13,000 Sq. ft x 3) X (Natural Resource Enhancement & Restoration Cost + Avg. Assessed Land Value)	1	USACE only	5%	$889,219.50
	Low Value Vernal Pools See Table 1-5.6d	71 Low Value Vernal Pools		(13,000 Sq. ft x 1) X (Natural Resource Enhancement & Restoration Cost + Avg. Assessed Land Value)	1	USACE only	5%	$166,731.50
Inland Wading Bird & Waterfowl Habitat (IWWH)	**Permanent Wetland Fill in IWWH** Table 1-5.7	149	0.003	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	2	100%	100%	$1,165.18
	Permanent Forested Wetland Conversion IWWH Table 1-5.8	114,232	2.622	Natural Resource Enhancement & Restoration Cost/Sq. Ft. X Avg. Assessed Land Value/Sq. Ft	1	60%	15%	$238,446.60
	Permanent Upland Fill in IWWH See Table 1-5.9	598	0.014	Avg. Assessed Land Value/Sq. Ft	1	100%	DEP only	$56.80
	Permanent Upland Conversion in IWWH See Table 1-5.10	539,556	12.387	Avg. Assessed Land Value/Sq. Ft	1	60%	DEP only	$13,683.95
					Total In-Lieu Fee Payment			**$3,074,416.06**

[1] In each case where compensation is required by both the MDEP and USACE, the higher ratio and adjustment was applied.

[2] Ratios and adjustments are based in part on the DEP Fact Sheet-In-Lieu Fee Compensation Program, 2016 USACE New England District Compensatory Mitigation Guidance and discussions held during the Compensation Working Session on 4/3/18, with the USACE and MDEP, as shown in Exhibit 1-1.

[3] Permanent wetland fill to PEM and PSS wetlands within SVPH and IWWH are excluded from this calculation and are calculated separately in their own respective categories.

[4] Given that hydrology or significant soil disturbance will not result, all forested wetlands will convert to scrub-shrub wetland.

[5] Conversion of forested wetlands excludes clearing within SVPH or IWWH, and are calculated separately in their own respective categories.

[6] Permanent wetland fill and forested wetland conversion impacts (shaded gray) in SVPH are included in the calculations provided in the Wetland Impact section of the table.

[7] Excludes impacts to SVPH.

[8] Permanent wetland fill and forested wetland conversion impacts (shaded gray) in IWWH are included in the calculations provided in the Wetland Impact section of the table.

Exhibit 1-5B: Summary of Compensation Resulting from Consultation with Resource Agencies

Impact Type		Resource Impact		Compensation Rationale	Resource Agency/Fund	Monetary Contribution/Land Preservation
		Sq ft	Acres			
Impact to Unique Natural Communities (MNAP)	Forested Conversion in Unique Natural Communities See Table 1-5.11	402,008	9.229	(Area of impact + MNAP identified directional buffers) x Avg. Assessed Land Value/Sq. Ft [1] x Multiplier of 8	Maine Natural Areas Conservation Fund	$1,224,526.82
	Forested Conversion to Goldie's Wood Fern	Goldie's Wood Fern		MNAP determined that adequate compensation for clearing impacts to the Goldie's Wood Fern is funding for rare plant surveys. The amount of funding was mutually agreed upon by MNAP and CMP.	Maine Natural Areas Conservation Fund	$10,000.00
Impact to Rare Species Streams (MDIFW)	Forested Conversion in the Roaring Brook Mayfly and Northern Spring Salamander Conservation Management Areas See Table 1-5.12	1,150,681	26.416	Avg. Assessed Land Value/Sq. Ft[1] x Multiplier of 8[2]	Maine Endangered and Nongame Wildlife Fund	$469,771.95
Impact to Coldwater Fisheries (MDEP / MDIFW)	Forested Conversion in Riparian Buffers	11.02 linear miles of all waterbodies within the NECEC project area will be impacted by forested conversion.		The Grand Falls Tract, Lower Enchanted Tract, and Basin Tract total 1053.50 acres, and contain 12.02 linear miles of stream to offset forest conversion impacts to riparian buffers within the NECEC project area.	Conservation recipient to be determined	1053.50 acres of Land Preservation containing 12.02 linear miles of stream.
				The Culvert Replacement Program includes repair, removal or replacement of culverts within CMP-controlled lands during construction of the NECEC. Additionally, CMP will provide funding sufficient to replace approximately 20-35 culverts on lands outside of CMP's ownership.	Grant recipient to be determined	$200,000.00
				The monetary contribution amount was based on the estimated labor and equipment costs to implement Chop and Drop on 87 perennial streams (Segment 1), which has been removed from the Compensation Plan at the request of MDIFW.	Maine Endangered and Nongame Wildlife Fund	$180,000.00
Impact to Outstanding River Segments[3] (MDEP)	Four Outstanding River Segments will be impacted by forested conversion.	425 linear feet or 850 feet of river frontage (both banks)		The Grand Falls Tract, Lower Enchanted Tract, and Basin Tract, collectively offer 7.9 miles of frontage on the Dead River, an Outstanding River Segment.	Conservation recipient to be determined	7.9 miles of frontage preserved on an Outstanding River Segment
Impact to Deer Wintering Areas (DWA) (MDIFW)	Forested Conversion in the Upper Kennebec DWA	1,707,943	39.209	Preservation of 717 aces within the Upper Kennebec DWA, which is sufficiently more than the recommended 8:1, an excess of 402 acres, and at a ratio of greater than 18:1.	Conservation recipient to be determined	717 acres of Land Preservation within the Upper Kennebec DWA
				Total Additional Monetary Contributions		**$2,084,298.76**
				Total Additional Land Preservation		**1770.50 Acres**

[1] Source: MDEP Fact Sheet- In Lieu Fee Compensation Program (rev 2017).
[2] On 11/8/2018, MDIFW recommended a resource multiplier of 8 be applied to the fee calculation for each species present, where both species are present a multiplier of 16 was applied.
[3] Outstanding River Segments, as identified in 38 M.R.S. § 480-P and 12 M.R.S § 403

Table 1-5.1 ILF Compensation for Temporary Wetland Fill in Emergent Wetlands

			Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[2]			
NECEC Project Component[1]	**Total Acres of Fill**	**Resource Impact (sq. ft.)**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission Structures	6.213	270,648	Androscoggin	3.61	0.17	$51,152.47
Transmission Structures	0.834	36,336	Cumberland	3.61	0.69	$7,812.24
Transmission Structures	2.058	89,641	Franklin	2.86	0.03	$12,953.12
Transmission Structures	0.097	4,221	Kennebec	3.61	0.16	$795.66
Transmission Structures	3.941	171,670	Lincoln	3.61	0.3	$33,561.49
Transmission Structures	0.535	23,307	Sagadahoc	3.61	0.27	$4,521.56
Transmission Structures	5.502	239,663	Somerset	3.61	0.04	$43,738.50
Total	**19.180 Acres**	**835,486 Sq. ft.**			**Total In-Lieu Fee**	**$154,535.04**

[1] Impacts are restricted to the temporary access for transmission line structures. There is no temporary wetland fill associated with substation development.

[2] Resource multiplier of 1 and an adjustment of 5%.

Table 1-5.2 ILF Compensation for Permanent Wetland Fill in SVPH

		Permanent Wetland Fill in SVPH[1]						Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[2]			
			Cowardin Cover Type (Sq. Ft.)								
NECEC Project Component	Total Acres of Fill	Resource Impact (sq. ft.)	PEM	PFO	PSS	HUC8 Watershed	Bailey and Keys Ecoregion	County	Natural Resource Enhancement and Restoration Cost ($)	Assessed Land Value ($)	In-Lieu Fee ($)
Transmission	0.001	40	0	0	40	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$302.40
Transmission	0.000	0	0	0	0	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$0.00
Transmission	0.000	0	0	0	0	NA	Western Foothills and Central Mountains	Franklin	2.86	0.03	$0.00
Transmission	0.000	0	0	0	0	NA	Central Interior	Kennebec	3.61	0.16	$0.00
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Lincoln	3.61	0.3	$0.00
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Sagadahoc	3.61	0.27	$0.00
Transmission	0.001	40	0	40	0	NA	Western Mountains	Somerset	3.61	0.04	$292.00
Merrill Road Converter	0.741	32,285	1,397	1,308	29,580	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$244,074.60
Fickett Road Substation	0.000	0	0	0	0	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
HDD Termination Stations	0.000	0	0	0	0	NA	Western Mountains	Somerset	3.61	0.04	$0.00
Total	**0.743 Acres**	**32,365 Sq. ft.**								**Total In-Lieu Fee**	**$244,669.00**

[1] Wetlands within SVPH are WOSS. For purposes of evaluating compensation, WOSS impacts shown in Exhibit 1-4 exclude WOSS associated with SVPH.

[2] Resource multiplier of 2.

Table 1-5.3 ILF Compensation for Permanent Forested Wetland Conversion in SVPH

		Permanent Wetland Conversion in SVPH						Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
			Cowardin Cover Type (Sq. Ft.)								
NECEC Project Component	Total Acres of Fill	Resource Impact (sq. ft.)[1]	PEM	PFO	PSS	HUC8 Watershed	Bailey and Keys Ecoregion	County	Natural Resource Enhancement and Restoration Cost ($)	Assessed Land Value ($)	In-Lieu Fee ($)
Transmission	0.670	29,198	0	29,198	0	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$66,221.06
Transmission	0.000	0	0	0	0	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$0.00
Transmission	1.943	84,640	0	84,640	0	NA	Western Foothills and Central Mountains	Franklin	2.86	0.03	$146,765.76
Transmission	0.000	0	0	0	0	NA	Central Interior	Kennebec	3.61	0.16	$0.00
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Lincoln	3.61	0.3	$0.00
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Sagadahoc	3.61	0.27	$0.00
Transmission	1.252	54,524	0	54,524	0	NA	Western Mountains	Somerset	3.61	0.04	$119,407.56
Merrill Road Converter	0.030	1,308	0	1,308	0	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$2,966.54
Fickett Road Substation	0.000	0	0	0	0	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
HDD Termination Stations	0.000	0	0	0	0	NA	Western Mountains	Somerset	3.61	0.04	$0.00
Total	**3.895 Acres**	**169,670 Sq. ft.**								**Total In-Lieu Fee**	**$335,360.93**

[1] Resource multiplier of 1 and a 60% adjustment.

Table 1-5.4: ILF Compensation for Permanent Upland Fill in SVPH

			Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Total Acres of Fill**	**Resource Impact (sq. ft.)**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission Structures	0.012	537	Androscoggin	0	0.17	$91.29
Transmission Structures	0.001	60	Cumberland	0	0.69	$41.40
Transmission Structures	0.005	199	Franklin	0	0.03	$5.97
Transmission Structures	0.000	0	Kennebec	0	0.16	$0.00
Transmission Structures	0.003	119	Lincoln	0	0.3	$35.70
Transmission Structures	0.000	0	Sagadahoc	0	0.27	$0.00
Transmission Structures	0.010	437	Somerset	0	0.04	$17.48
Merrill Road Converter Station	0.689	30,018	Androscoggin	0	0.17	$5,103.06
Fickett Road Substation	0.000	0	Cumberland	0	0.69	$0.00
HDD Termination Stations	0.000	0	Somerset	0	0.04	$0.00
Total	**0.720 Acres**	**31,370 Sq. ft.**			**Total In-Lieu Fee**	**$5,294.90**

[1] Resource multiplier of 1.

Table 1-5.5: ILF Compensation for Permanent Upland Conversion in SVPH

			Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Total Acres of Conversion**	**Resource Impact (sq. ft.)**	**County**	**Natural Resource Enhancement and Restoration Cost ($)[2]**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission Structures	7.512	327,223	Androscoggin	0	0.17	$33,376.75
Transmission Structures	0.000	0	Cumberland	0	0.69	$0.00
Transmission Structures	8.765	381,802	Franklin	0	0.03	$6,872.44
Transmission Structures	0.000	0	Kennebec	0	0.16	$0.00
Transmission Structures	0.000	0	Lincoln	0	0.3	$0.00
Transmission Structures	0.000	0	Sagadahoc	0	0.27	$0.00
Transmission Structures	12.699	553,190	Somerset	0	0.04	$13,276.56
Merrill Road Converter Station	0.631	27,476	Androscoggin	0	0.17	$2,802.55
Fickett Road Substation	0.000	0	Cumberland	0	0.69	$0.00
HDD Termination Stations	0.000	0	Somerset	3.61	0.04	$0.00
Total	**29.607 Acres**	**1,289,691 Sq. ft.**			**Total In-Lieu Fee**	**$56,328.29**

[1] Resource multiplier of 1 and an adjustment of 60%.

[2] For upland portions of SVPH, no restoration cost is associated with conversion impact to non-wetland resources.

Table 1-5.6a: ILF Compensation for Direct Fill in USACE Jurisdictional Vernal Pools (Depression or 100-foot Envelope)

			Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Total Acres of Fill**	**Resource Impact (sq. ft.)**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)[2]**
Transmission Structures/Station	1.392	60,640	Androscoggin	3.61	0.17	$229,219.20
Transmission Structures/Station	0.765	33,317	Cumberland	3.61	0.69	$143,263.10
Transmission Structures	0.007	297	Franklin	2.86	0.03	$858.33
Transmission Structures	0.000	0	Kennebec	3.61	0.16	$0.00
Transmission Structures	0.033	1,454	Lincoln	3.61	0.3	$5,685.14
Transmission Structures	0.001	60	Sagadahoc	3.61	0.27	$232.80
Transmission Structures/Stations	0.019	842	Somerset	3.61	0.04	$3,073.30
Total	**2.218 Acres**	**96,610 Sq. ft.**			**Total In-Lieu Fee**	**$382,331.87**

[1] Resource multiplier of 1.

Table 1-5.6b ILF Compensation for USACE High Value Jurisdictional Vernal Pools

					Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**High Value Pools (#)**	**Multiplier x Standard Sq Ft[2]**	**HUC8 Watershed**	**Bailey and Keys Ecoregion**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission	26	65,000	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$319,410.00
Transmission	0	65,000	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$0.00
Transmission	4	65,000	NA	Foothills and Central	Franklin	2.86	0.03	$37,570.00
Transmission	0	65,000	NA	Central Interior	Kennebec	3.61	0.16	$0.00
Transmission	4	65,000	NA	Midcoast Region	Lincoln	3.61	0.3	$50,830.00
Transmission	0	65,000	NA	Midcoast Region	Sagadahoc	3.61	0.27	$0.00
Transmission	13	65,000	NA	Western Mountains	Somerset	3.61	0.04	$154,212.50
Merrill Road Converter	2	65,000	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$24,570.00
Fickett Road Substation	0	65,000	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
Total No.	**49**						**Total In-Lieu Fee**	**$586,592.50**

[1] Resource multiplier of 1 and an adjustment of 5%.

[2] USACE 2016 Corps Mitigation Guidance: Standard of 13,000 sq.ft. x 5 for high value pools.

Table 1-5.6c ILF Compensation for USACE Medium Value Jurisdictional Vernal Pools

					Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Medium Value Pools (#)**	**Multiplier x Standard Sq Ft[2]**	**HUC8 Watershed**	**Bailey and Keys Ecoregion**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission	55	39,000	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$405,405.00
Transmission	7	39,000	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$58,695.00
Transmission	10	39,000	NA	Foothills and Central	Franklin	2.86	0.03	$56,355.00
Transmission	1	39,000	NA	Central Interior	Kennebec	3.61	0.16	$7,351.50
Transmission	17	39,000	NA	Midcoast Region	Lincoln	3.61	0.3	$129,616.50
Transmission	9	39,000	NA	Midcoast Region	Sagadahoc	3.61	0.27	$68,094.00
Transmission	23	39,000	NA	Western Mountains	Somerset	3.61	0.04	$163,702.50
Merrill Road Converter	0	39,000	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$0.00
Fickett Road Substation	0	39,000	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
Total No.	**122**						**Total In-Lieu Fee**	**$889,219.50**

[1] Resource multiplier of 1 and an adjustment of 5%.

[2] USACE 2016 Corps Mitigation Guidance: Standard of 13,000 sq.ft. x 3 for medium value pools.

Table 1-5.6d ILF Compensation for USACE Low Value Jurisdictional Vernal Pools

					Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Low Value Pools (#)**	**Multiplier x Standard Sq Ft[2]**	**HUC8 Watershed**	**Bailey and Keys Ecoregion**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission	29	13,000	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$71,253.00
Transmission	0	13,000	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$0.00
Transmission	11	13,000	NA	Foothills and Central	Franklin	2.86	0.03	$20,663.50
Transmission	0	13,000	NA	Central Interior	Kennebec	3.61	0.16	$0.00
Transmission	6	13,000	NA	Midcoast Region	Lincoln	3.61	0.3	$15,249.00
Transmission	0	13,000	NA	Midcoast Region	Sagadahoc	3.61	0.27	$0.00
Transmission	22	13,000	NA	Western Mountains	Somerset	3.61	0.04	$52,195.00
Merrill Road Converter	3	13,000	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$7,371.00
Fickett Road Substation	0	13,000	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
Total No.	**71**						**Total In-Lieu Fee**	**$166,731.50**

[1] Resource multiplier of 1 and an adjustment of 5%.

[2] USACE 2016 Corps Mitigation Guidance: Standard of 13,000 sq.ft. x 1 for low value pools.

Table 1-5.7 ILF Compensation for Permanent Wetland Fill in IWWH

		Permanent Wetland Fill in IWWH[1]						Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[2]			
			Cowardin Cover Type (Sq. Ft.)								
NECEC Project Component	Total Acres of Fill	Resource Impact (sq. ft.)[1]	PEM	PFO	PSS	HUC8 Watershed	Bailey and Keys Ecoregion	County	Natural Resource Enhancement and Restoration Cost ($)	Assessed Land Value ($)	In-Lieu Fee ($)
Transmission	0.000	0	0	0	0	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$0.00
Transmission	0.000	0	0	0	0	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$0.00
Transmission	0.000	0	0	0	0	NA	Western Foothills and Central Mountains	Franklin	2.86	0.03	$0.00
Transmission	0.000	0	0	0	0	NA	Central Interior	Kennebec	3.61	0.16	$0.00
Transmission	0.003	149	149	0	0	NA	Midcoast Region	Lincoln	3.61	0.3	$1,165.18
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Sagadahoc	3.61	0.27	$0.00
Transmission	0.000	0	0	0	0	NA	Western Mountains	Somerset	3.61	0.04	$0.00
Merrill Road Converter	0.000	0	0	0	0	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$0.00
Fickett Road Substation	0.000	0	0	0	0	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
HDD Termination Stations	0.000	0	0	0	0	NA	Western Mountains	Somerset	3.61	0.04	$0.00
Total	**0.003 Acres**	**149 Sq. ft.**								**Total In-Lieu Fee**	**$1,165.18**

[1] Wetlands within IWWH are WOSS. For purposes of evaluating compensation, WOSS impacts shown in Exhibit 1-4 exclude WOSS associated with IWWH.

[2] Resource multiplier of 2.

Table 1-5.8 ILF Compensation for Permanent Forested Wetland Conversion in IWWH

		Permanent Wetland Conversion in IWWH						Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
			Cowardin Cover Type (Sq. Ft.)								
NECEC Project Component	Total Acres of Fill	Resource Impact (sq. ft.)	PEM	PFO	PSS	HUC8 Watershed	Bailey and Keys Ecoregion	County	Natural Resource Enhancement and Restoration Cost ($)	Assessed Land Value ($)	In-Lieu Fee ($)
Transmission	0.000	0	0	0	0	NA	Central Maine Embayment	Androscoggin	3.61	0.17	$0.00
Transmission	0.000	0	0	0	0	NA	Presumpscot River and Casco Bay	Cumberland	3.61	0.69	$0.00
Transmission	0.590	25,705	0	25,705	0	NA	Western Foothills and Central Mountains	Franklin	2.86	0.03	$44,572.47
Transmission	0.000	0	0	0	0	NA	Central Interior	Kennebec	3.61	0.16	$0.00
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Lincoln	3.61	0.3	$0.00
Transmission	0.000	0	0	0	0	NA	Midcoast Region	Sagadahoc	3.61	0.27	$0.00
Transmission	2.032	88,527	0	88,527	0	NA	Western Mountains	Somerset	3.61	0.04	$193,874.13
Merrill Road Converter	0.000	0	0	0	0	Lower Androscoggin River	Central Maine Embayment	Androscoggin	3.61	0.17	$0.00
Fickett Road Substation	0.000	0	0	0	0	Presumpscot River and Casco Bay	Casco Bay Coast	Cumberland	3.61	0.69	$0.00
HDD Termination Stations	0.000	0	0	0	0	NA	Western Mountains	Somerset	3.61	0.04	$0.00
Total	**2.622 Acres**	**114,232 Sq. ft.**								**Total In-Lieu Fee**	**$238,446.60**

[1] Resource multiplier of 1 and an adjustment of 60%.

Table 1-5.9: ILF Compensation for Permanent Upland Fill in IWWH

			Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Total Acres of Fill**	**Resource Impact (sq. ft.)**	**County**	**Natural Resource Enhancement and Restoration Cost ($)**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission Structures	0.005	199	Androscoggin	0	0.17	$33.83
Transmission Structures	0.000	0	Cumberland	0	0.69	$0.00
Transmission Structures	0.002	79	Franklin	0	0.03	$2.37
Transmission Structures	0.000	0	Kennebec	0	0.16	$0.00
Transmission Structures	0.001	30	Lincoln	0	0.3	$9.00
Transmission Structures	0.000	0	Sagadahoc	0	0.27	$0.00
Transmission Structures	0.007	290	Somerset	0	0.04	$11.60
Merrill Road Converter Station	0.000	0	Androscoggin	0	0.17	$0.00
Fickett Road Substation	0.000	0	Cumberland	0	0.69	$0.00
HDD Termination Stations	0.000	0	Somerset	0	0.04	$0.00
Total	**0.014 Acres**	**598 Sq. ft.**			**Total In-Lieu Fee**	**$56.80**

[1] Resource multiplier of 1.

Table 1-5.10: ILF Compensation for Permanent Upland Conversion in IWWH

			Wetland Compensation Formula: Sq. Ft. of Wetland Impacted X (Natural Resource Enhancement and Restoration Cost + Assessed Land Value) x (Resource Multiplier)[1]			
NECEC Project Component	**Total Acres of Conversion**	**Resource Impact (sq. ft.)**	**County**	**Natural Resource Enhancement and Restoration Cost ($)[2]**	**Assessed Land Value ($)**	**In-Lieu Fee ($)**
Transmission Structures	0.387	16,877	Androscoggin	0	0.17	$1,721.45
Transmission Structures	0.000	0	Cumberland	0	0.69	$0.00
Transmission Structures	2.226	96,966	Franklin	0	0.03	$1,745.39
Transmission Structures	0.000	0	Kennebec	0	0.16	$0.00
Transmission Structures	0.000	0	Lincoln	0	0.3	$0.00
Transmission Structures	0.000	0	Sagadahoc	0	0.27	$0.00
Transmission Structures	9.773	425,713	Somerset	0	0.04	$10,217.11
Merrill Road Converter Station	0.000	0	Androscoggin	0	0.17	$0.00
Fickett Road Substation	0.000	0	Cumberland	0	0.69	$0.00
HDD Termination Stations	0.000	0	Somerset	0	0.04	$0.00
Total	**12.387 Acres**	**539,556 Sq. ft.**			**Total In-Lieu Fee**	**$13,683.95**

[1] Resource multiplier of 1 and an adjustment of 60%.

[2] For upland portions of IWWH, no restoration cost is associated with conversion impact to non-wetland resources.

Table 1-5.11: Compensation for Conversion in Unique Natural Communities

			Assessed Land Value x Resource Multiplier[1]			
NECEC Project Component	Total Acres of Conversion with 250' Directional Buffer [2]	Resource Impact (sq. ft.)	County	Natural Resource Enhancement and Restoration Cost ($)	Assessed Land Value ($)	In-Lieu Fee ($)
Transmission Structures	0.000	0	Androscoggin	0	0.17	$0.00
Transmission Structures	0.000	0	Cumberland	0	0.69	$0.00
Transmission Structures	0.000	0	Franklin	0	0.03	$0.00
Transmission Structures	0.000	0	Kennebec	0	0.16	$0.00
Transmission Structures	0.000	0	Lincoln	0	0.3	$0.00
Transmission Structures	0.000	0	Sagadahoc	0	0.27	$0.00
Transmission Structures	87.848	3,826,646	Somerset	0	0.04	$1,224,526.82
Merrill Road Converter Station	0.000	0	Androscoggin	0	0.17	$0.00
Fickett Road Substation	0.000	0	Cumberland	0	0.69	$0.00
HDD Termination Stations	0.000	0	Somerset	0	0.04	$0.00
Total	**87.848 Acres**	**3,826,646 Sq. Ft.**			**Total In-Lieu Fee**	**$1,224,526.82**

[1] Resource multiplier of 8.

[2] Permanent conversion impact to MNAP natural communities is 9.229 acres (402,008 sq.ft.). MNAP determined that it was appropriate to apply a 250' buffer in considering the area of which compensation would be provided. MNAP defined the 250' directional buffers for each occurrence, which totals the impact area presented in this table.

Table 1-5.12 Compensation for Conversion in Roaring Brook Mayfly and Northern Spring Salamander Conservation Management Areas

Township	County	Stream Name	Feature ID	Surveyed? (Y/N)	Species Present[1]	Clearing Impact within the Management Areas[2] (ac)	Clearing Impact (sq ft)	Assessed Land Value ($/sq ft)[3]	Resource Multiplier Applied to Fee[4]	Calculated Fee
Skinner Twp	Franklin	S. Branch Moose River	PSTR-09-11	Y	RBM	1.84	80,107	0.03	8	$19,225.64
Skinner Twp	Franklin	Trib to Bog Brook	PSTR-11-01	Y	NSS	2.75	119,659	0.03	8	$28,718.24
Appleton Twp	Somerset	Trib to Bog Brook	PSTR-12-07	Y	NSS	1.90	82,590	0.04	8	$26,428.72
Appleton Twp	Somerset	Gold Brook	PSTR-15-06	Y	RBM					
Appleton TWP	Somerset	Trib. to Gold Brook	PSTR-16-07	N	RBM					n/a, mitigation being proposed[5]
Appleton TWP	Somerset	Trib. to Gold Brook	PSTR-16-10	N	RBM					
Appleton TWP	Somerset	Trib. to Gold Brook	PSTR-16-15	N	RBM					
Appleton Twp	Somerset	Baker Stream	PSTR-17-07	Y	NSS	3.10	135,036	0.04	8	$43,211.52
Appleton Twp	Somerset	Baker Stream	PSTR-17R-04	Y	NSS					
Bradstreet TWP	Somerset	Unnamed Stream	PSTR-24-02	N	RBM/NSS	0.06	2,788	0.04	16	$1,784.22
Bradstreet TWP	Somerset	Trib. to Horse Brook	PSTR-26-05	N	RBM/NSS	1.32	57,456	0.04	16	$36,771.61
Johnson Mtn TWP	Somerset	Mountain Brook	PSTR-33-01	Y	RBM/NSS					
Johnson Mtn TWP	Somerset	Mountain Brook	PSTR-EM-34-01	Y	RBM/NSS					n/a, mitigation being proposed[5]
Johnson Mtn TWP	Somerset	Trib to Mountain Brook	PSTR-EM-34-02	Y	RBM/NSS					
Johnson Mtn TWP	Somerset	Trib. To East Branch Salmon Stream	PSTR-38-02	Y	NSS	4.30	187,308	0.04	8	$59,938.56
Johnson Mtn TWP	Somerset	Trib. To East Branch Salmon Stream	PSTR-38-06	Y	NSS					
Johnson Mtn TWP	Somerset	Trib. To East Branch Salmon Stream	PSTR-38-10	Y	NSS	2.25	97,792	0.04	8	$31,293.50
Johnson Mtn TWP	Somerset	Trib. To East Branch Salmon Stream	PSTR-38-15	Y	NSS	1.86	80,891	0.04	8	$25,885.09
Johnson Mtn TWP	Somerset	Trib. to Cold Stream	PSTR-40-07	N	RBM/NSS	4.08	177,855	0.04	16	$113,827.51
Johnson Mtn TWP	Somerset	Trib. to Cold Stream	PSTR-41-04	N	RBM/NSS					
Bradstreet TWP	Somerset	Trib to Piel Brook	PSTR-SRD1-02	N	RBM/NSS	1.48	64,599	0.04	16	$41,343.67
Bradstreet TWP	Somerset	Unnamed Stream	PSTR-SRD1-28-02	N	RBM/NSS	1.48	64,599	0.04	16	$41,343.67
Bradstreet TWP	Somerset	Unnamed Stream	PSTR-SRD1-28-05	N	RBM/NSS					
					Total Impact	**26.416 Acres**	**1,150,681 Sq. ft.**		**Total Fee**	**$469,771.95**

[1] For those streams outside of CMP's ownership and on lands which permission to survey was not granted from landowners, and unless the waterbody is hydrologically connected to another stream which presence/absence surveys were conducted, the presence of both species is assumed.

[2] The clearing impact includes the area extending 250 feet on both sides of the stream channel. The management areas were mapped according to "Notes on Mapping Protocol for Roaring Brook Mayfly Habitat Polygons in ETSC (12/22/10)" provided by MDIFW. This mapping protocol was applied to RBB and NSS waterbodies, as recommended by MDIFW. Where mapped management area polygons overlapped, the impact area was combined.

[3] Source: MDEP Fact Sheet- In Lieu Fee Compensation Program (rev 2017).

[4] On 11/8/2018, MDIFW recommended a resource multiplier of 8 be applied to the fee calculation for each species present, where both species are present a multiplier of 16 was applied.

[5] CMP will retain full height vegetation in the CMA's for these resources.

1-6: NECEC Proposed Criteria for USACOE Vernal Pools Values Determination for Compensation Plan Development- May 2018

New England Clean Energy Connect (NECEC)
Proposed Criteria for USACOE Vernal Pools Values Determination for Compensation Plan Development
May 2018

High Value

- Significant Vernal Pools (SVPs), as defined in Maine Natural Resource Protection Act (NRPA), Significant Vernal Pool definition according to Significant Wildlife Habitat Rules (Significant Wildlife Habitat 06-096 Chapter 335 Section 9) or Potentially Significant Vernal Pools (PSVPs) using these same criteria.
- Artificial pools which meet NRPA Significance criteria.
- Cluster/complexes of pools (pools whose depressions are within 1000 feet of one or more other surveyed vernal pools, and where there are no substantial travel barriers (i.e. streams or rivers greater than 25 feet wide; roads classified as principal arterials, minor arterials, and major/urban collectors)between pools.
- Pools with blue spotted salamander (at any life stage) or other state/federal listed rare, threatened or endangered (RTE) species, regardless of abundance.

Medium Value

- Natural or artificial pools whose indicator species abundance does not meet NRPA Significance criteria, but where 2 or more indicator species are present which approach abundance criteria (≥ 75% of NRPA abundance criteria), and/or where RTE species are present.

Low Value

- ATV/Skidder ruts/ABA/Spawning areas which do not meet NRPA significance criteria and which have low indicator species abundance and no RTE species.
- Pools having seasonal or temporary inlets/outlets with evidence of predatory fish.
- Pools whose 750 foot critical terrestrial habitat (CTH) is not comprised of at least 75% suitable forested conditions.

No compensation required (if surveyed feature meets any of these criteria)

- Presence of predatory fish with a permanent inlet/outlet.
- At least 75% forested cover type is retained in the CTH following construction and no fill occurs within the pool depression or 100-foot envelope.
- Where directional buffers are used to maintain a minimum of 75% of the CTH in a forested condition.
- Pools previously compensated for under another permit.
- ATV/Skidder ruts in active areas which experience repeated seasonal disturbance (e.g. club maintained or licensed ATV trail).
- Existing, ongoing human disturbance within the pool depression or within the 100 foot envelope (e.g. unauthorized fill, dumping, or existing polluted condition).

DRAFT

1-7: Position Paper on the Presence of Significant Vernal Pools in or Adjacent to Transmission Line Corridors, TRC Engineers, LLC, March 2009.

Position Paper on the Presence of Significant Vernal Pools in or Adjacent to Transmission Line Corridors in Maine

Prepared by:

TRC Engineers, LLC

Prepared for:

Central Maine Power Company

March 2009

Executive Summary

Central Maine Power Company (CMP), in support of its proposed Maine Power Reliability Program (MPRP), conducted extensive vernal pool mapping and assessment surveys along approximately 620 miles of CMP transmission corridor during the springs of 2007 and 2008. These surveys were performed in accordance with an agency-approved protocol and were consistent with the requirements and timeframes presented in the State of Maine Natural Resources Protection Act (NRPA) Chapter 335 – Significant Wildlife Habitat Rules. Central Maine Power documented 200 natural vernal pools and 689 anthropogenic pools within or adjacent to proposed MPRP transmission corridors. *Rana sylvatica*, *Ambystoma maculatum*, *Ambystoma laterale*, and *Eubranchipus sp*. or egg masses of these species were observed in these pools. Of the natural vernal pools, 88 (45 percent) qualified as significant vernal pools under Chapter 335. All of these significant vernal pools were located within, or adjacent to, transmission corridors that have been maintained in an early-successional shrub habitat for 40 years or more. In addition, 48 (56 percent) of these significant vernal pools' critical terrestrial habitat was 51 to 75 percent non-forested. In sum, fully 87.5 percent of the identified significant vernal pools had less than 75 percent forested habitat within their critical terrestrial habitat. Most of the non-forested land use within 250 feet of significant vernal pools was transmission corridor. Habitat conditions permeable to amphibian migration, including the presence of leaf litter, coarse woody debris, mammal burrows, dense herbaceous and shrub vegetation cover, were all observed in transmission corridors.

Based on the results of CMP's investigation, no measurable loss of vernal pool functions is apparent in and along electric utility transmission corridors; in fact, significant vernal pools remain abundant and highly productive in the typical scrub/shrub habitat found in most transmission line corridors, even after multiple decades. Data suggest the very different impacts from "hard" land uses (e.g., paved/commercial development) and "soft" land uses (e.g., transmission line maintenance). Given these results, design, location, and construction strategies should focus on maintaining existing vernal pool functions within transmission line corridors. In-lieu fee or preservation type compensatory mitigation strategies are more appropriate where significant natural resource impacts (i.e., functional loss) occurs, and are thus not appropriate in these situations. As an alternative to compensatory mitigation, research to further evaluate best management practices for vernal pool conservation along transmission corridors, may be appropriate.

1.0 INTRODUCTION

Central Maine Power Company (CMP) is currently proposing to bolster the long-term reliability of its bulk power electrical transmission system through a project known as the Maine Power Reliability Program (MPRP). As part of this process, CMP is proposing a number of transmission line and substation improvements to add reliability and redundancy to its aging 345 kilovolt (kV) and 115 kV transmission system. A component of this overall proposal is the consideration of potential impacts to various natural resources, including significant vernal pools. In order to document and evaluate the potential effects of the MPRP on significant vernal pools, CMP initiated an unprecedented effort in Maine during the springs of 2007 and 2008 to assess and map vernal pool resources within, and in the vicinity of, a number of existing transmission line corridors and substation sites. TRC Engineering (TRC) was hired to manage and perform this vernal pool resource assessment and mapping effort. In total, TRC surveyed over 620 miles of existing CMP transmission corridor and associated substation sites (both newly proposed substations and substation expansions) for the presence of vernal pool resources. CMP's vernal pool investigation resulted in one of the largest vernal pool datasets in the State of Maine. Figure 1 depicts the vernal pool survey area contrasted with the biophysical regions of Maine.

This position paper first identifies issues relevant to vernal pool conservation, regulation, and management along transmission corridors in Maine based on existing regulations and published best management practices. This is followed by a description of CMP's methods of vernal pool investigation, and a discussion of the results of CMP's investigation relative to existing knowledge of vernal pool ecology. In the final section of this paper, the findings of this vernal pool investigation are summarized, and recommendations are made regarding significant vernal pool management and regulation in transmission corridors.

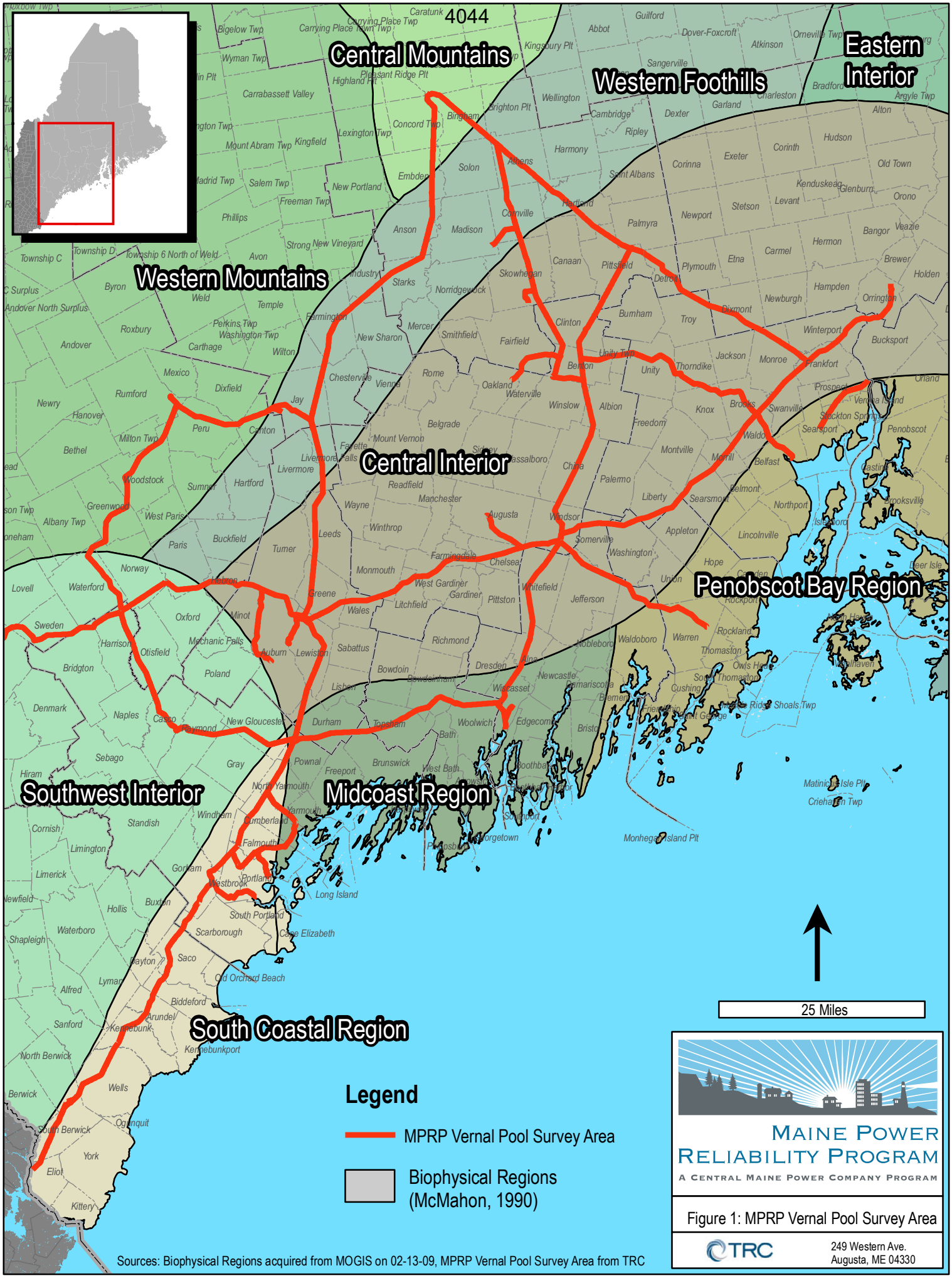


Figure 1: MPRP Vernal Pool Survey Area

2.0 ISSUE IDENTIFICATION

In the glaciated northeast, vernal pools are temporary to semi-permanent pools that are located in shallow depressions on the landscape, and that lack permanent hydrologic inlets or outlets and populations of predatory fish (Calhoun and deMaynadier, 2008). Vernal pools provide the primary breeding habitat for several amphibian species (DeGraff and Yamasaki, 2001), as well as other obligate vernal pool species. *Rana sylvatica* (wood frogs), *Ambystoma maculatum* (spotted salamanders), and *Ambystoma laterale* (blue spotted salamanders) spend most of their life cycles in upland or wetland habitats surrounding vernal pools, and migrate to vernal pools for a short part of the year during the spring breeding season (Semlitsch, 2000). Thus, although vernal pools are often small hydrologically isolated wetlands, they share a significant ecological connection to the surrounding landscape.

Regulatory protection is provided to certain vernal pools in Maine by the U.S. Army Corps of Engineers (USACE) under § 404 of the Clean Water Act (33 U.S.C. § 1344) and by the Maine Department of Environmental Protection (MDEP) under the Natural Resources Protection Act. Some municipalities in Maine also regulate impacts to vernal pools in their evaluation of proposed developments (e.g., Town of Falmouth, 2009). In recognition of the ecological connection between vernal pools and the adjacent landscape, federal and state regulations also exert jurisdiction over uplands and wetlands adjacent to vernal pools. Given that vernal pools occur broadly across the landscape in the glaciated northeast (Rheindhardt and Hollands, 2008), vernal pool regulations have significant implications for linear transmission corridor construction, because vernal pools are almost certain to be crossed by transmission corridors which span long distances across the landscape.

Projects reviewed by the USACE, pursuant to the Department of the Army Programmatic General Permit - State of Maine (MEPGP) are evaluated for project impacts within 500 feet of jurisdictional vernal pools. Larger projects being permitted by the USACE may also require review by the U.S. Fish and Wildlife Service (USFWS), which evaluates project impacts within 750 feet of vernal pools. Under NRPA, the MDEP exerts jurisdiction over “significant vernal pool habitat” as one type of regulated “significant wildlife habitat,” which includes significant vernal pools and land within 250 feet of significant vernal pool depressions. Vernal pools qualify as “significant” based on the presence of certain species known to utilize vernal pools for a critical part of their life phase, or by the abundance of egg masses deposited by certain amphibian species (06 096 C.M.R. Ch. 335 § 9(B)). The MDEP does not have jurisdiction over “non-significant” vernal pools. Both federal and state regulations require that applicants attempt to avoid and minimize impacts to these habitats to the greatest extent practicable, and, in some cases, to provide compensation.

Although not a regulatory requirement, some researchers/authors of current best development practices (guidance for avoiding and minimizing effects) for vernal pool

management recommend no impact to the vernal pool depression and minimal disturbance to the habitat within 100 feet of the pool, and maintenance of 75% of the habitat from 100 to 750 feet of the pool as contiguous forest with undisturbed ground cover (Calhoun and Klemens, 2002). These guidelines identify the habitat from 100 to 750 feet of the pool as the "critical terrestrial habitat" for pool breeding amphibians. Chapter 335 of MDEP's rules defines significant vernal pool habitat as a significant vernal pool depression and that portion of the critical terrestrial habitat within 250 feet of the high water mark of the pool depression.

Due to a lack of published research evaluating vernal pool conservation strategies, the vernal pool best development practices were developed based primarily on years of field observations regarding the effect of land development on pool breeding wildlife populations, (Calhoun and Klemens, 2002). Two recent case studies have demonstrated that residential and commercial development around vernal pools can cause precipitous declines or collapse of vernal pool breeding amphibians (Windmiller et al., 2008). The existing best development practices were based on the limited research regarding vernal pool conservation strategies that was available at the time of their publication, and they should be considered as provisional best-attempts that may need to be modified to meet local or site specific conservation needs (Windmiller and Calhoun, 2008). Despite the provisional nature of these guidelines, the current regulatory standards in the NRPA are predicated on the Calhoun and Klemens (2002) best development practices, and utilize a universal (i.e., "one size fits all") approach to vernal pool conservation, which may not be appropriate to all classes of land use, or optimal for vernal pool conservation and management.

It is also essential to recognize that the existing best development guidelines regarding conservation strategies for vernal pools are specific to three principal land use classes: residential, commercial, and forest management. The Calhoun and Klemens (2002) best development practice recommendations were designed specifically with respect to "hard" land uses (i.e., clearing, grubbing, grading and paving), including commercial and residential development that result in effectively irreversible and permanent habitat loss. More recent case studies evaluating the effect of land use on vernal pool populations also focus on residential and commercial development (Windmiller et al., 2008). However, "soft" land uses, such as forestry operations or transmission corridor construction, where alteration of habitat via removal of large trees (but not necessarily loss of all vegetation or habitat) occurs, warrants a different set of management guidelines. For example, habitat management guidelines for forestry operations have already been developed, and recommend leaving an undisturbed protection zone immediately adjacent to vernal pools, selected harvesting in a larger radius around vernal pools to maintain some shade and canopy cover, and maintaining uncompacted leaf litter and coarse woody debris on the forest floor (Calhoun and deMaynadier, 2004; deMaynadier and Houlahan, 2008). As with the best development guidelines for residential and commercial development, these habitat management guidelines for forestry operations are preliminary and further research is needed to confirm their effectiveness (deMaynadier and Houlahan, 2008). Very little research or published information exists on the effect of transmission corridor construction and maintenance on vernal pools in the glaciated northeast, and no best

development guidelines for transmission corridors relative to vernal pools have been published.

The lack of data regarding whether transmission corridor construction and maintenance adversely affects vernal pool populations is important to recognize, because the effect of transmission corridors on significant vernal pool habitats is markedly different than that of residential and commercial development, or even forestry operations. Transmission corridor construction through forested areas affects habitat principally via the conversion of forest to shrub and herbaceous cover types, and the presence of utility structures that have a minimal footprint. Paved surfaces, permanent roads, lawns, and buildings characteristic of hard forms of development are not necessary for transmission corridor construction and maintenance. Thus, the habitat and landscape conditions that are required to support significant vernal pools (such as shade, woody debris/organic litter, moisture, suitable non-breeding season habitat, and amphibian migration routes) are all maintained along transmission corridors.

Applying Maine's existing NRPA significant vernal pool regulatory and compensatory mitigation framework to transmission corridor construction does not appear to be justified based on the current and evolving knowledge of the effects of transmission line corridors on vernal pools and vernal pool conservation strategies. There is currently no published data documenting that transmission corridors cause a loss or degradation of vernal pool ecological functions.

As will be discussed below, recent scientific observations during CMP's 2007-08 vernal pool investigations indicate that many of the vernal pools occurring in or adjacent to transmission corridors were documented as significant vernal pools as described in Chapter 335. In the absence of previously published data on the occurrence of vernal pools in managed electric transmission corridors, these recent CMP data are particularly useful in evaluating the impact of long-established transmission line corridors on vernal pools.

3.0 METHOD OF INVESTIGATION

TRC completed vernal pool surveys along existing transmission corridors associated with the MPRP. Many of these corridors have been managed as electric transmission corridors for over 40 years. These surveys were located in the South Coastal, Midcoast, Penobscot Bay, Central Interior, Western Foothill, and Western Mountain biophysical regions of Maine (see Figure 1). The objectives of the vernal pool surveys were to identify potential vernal pools within the program area; to determine if the identified pools were being used by obligate pool species; to determine if any of the pools met the criteria for designation as significant vernal pool habitat in accordance with NRPA standards; and to determine U.S. Army Corps jurisdiction under Section 404 of the Clean Water Act.

Under NRPA regulatory standards (06 096 C.M.R. Ch. 335 § 9(B)) significant vernal pools are defined by either: (1) the abundance criteria, which requires surveying the number of amphibian egg masses belonging to certain species and the presence of fairy shrimp in any life stage; or (2) the rarity criteria, which looks to the documented use of a vernal pool by one or more state-listed threatened (T) or endangered (E) species that commonly require a vernal pool to complete a critical life stage. The specific egg mass abundance criteria that are necessary for a vernal pool to be considered significant include:

Species	Abundance Criteria
Blue spotted salamanders	Presence of 10 or more egg masses[1]
Spotted salamanders	Presence of 20 or more egg masses
Wood frogs	Presence of 40 or more egg masses

In Maine, state-listed threatened or endangered species known to use vernal pools for at least one critical life stage include the following:

Species	Listing	Life Stage(s)
Ringed Boghaunter (dragonfly)	Endangered	Egg laying, Larval Development, Larval Emergence
Spotted Turtle	Threatened	Foraging, Courtship, Mating
Blanding's Turtle	Endangered	Foraging, Hibernation
Ribbon Snake	Special Concern	Foraging
Wood Turtle	Special Concern	Foraging

Thus, field investigations focused on identification and tally of amphibian egg masses, identification of fairy shrimp, identification of threatened and endangered species, and wood frog chorusing surveys. Vernal pool and adjacent habitat characteristics were recorded. Evidence of anthropogenic alteration to the identified vernal pools was also

[1] An egg mass is defined as three or more individuals eggs clumped in a gelatinous matrix (06 096 C.M.R. Ch. 335 § 9(B)(4).)

documented. Pools that were created by anthropogenic activities, such as flooded ATV ruts surrounded by soils that were not flooded, were noted as "amphibian breeding areas" in order to distinguish them from non-significant natural vernal pools and significant natural vernal pools.

The timing of vernal pool surveys was also an important consideration. Vernal pool surveys were timed to coincide with the portion of the year when they are used by amphibians and invertebrates for breeding or aquatic phases of their lifecycle. Southern and coastal areas were surveyed first, followed by the western and northern portions of the study area. Egg mass surveys were conducted within the following regional timeframes suggested by the MDEP:

Geographic Region[2]	Wood Frogs	Spotted and Blue Spotted Salamanders
Northern Maine	May 1 – May 21	May 10 – May 31
Southern Maine	April 7 – April 21	April 20 – May 21

Field surveys were conducted by teams of two biologists experienced with evaluation of vernal pools of New England. Each team was responsible for documenting observations on a vernal pool data form that had previously been approved by Maine regulatory agencies. The field teams walked along study corridors to identify and assess new vernal pools, as well as to evaluate any potential vernal pools that had been previously identified from existing information. In general, each field team "meandered" within the study corridor to thoroughly assess the corridor and minimize the chances of any vernal pools (both in and outside of the study corridor) being missed.

To be consistent with NRPA protocol requirements and recommendations, amphibian egg mass surveys were conducted under appropriate field conditions and within the recommended daily timeframes for such survey efforts. To the extent possible, egg mass surveys were conducted during the day when the sun was out (typically between 9 am - 4 pm). Polarized sunglasses were generally used to minimize sun glare and to aid in the detection of egg masses. Two biologists conducted surveys beginning from separate ends of each pool and thoroughly searched the entire pool together, including the pool center, to ensure that all egg masses were counted. In order to reduce the possibility of errors or omissions in field observations, field biologist teams collaborated to observe, identify, and count egg masses. When agreement was reached regarding the number and types of egg masses that were present within an individual pool, the field team documented findings on the data form and took photographs. In order to prevent disturbance of breeding amphibians and egg masses, biologists entered and stayed within the pools only long enough to collect the necessary data for vernal pool evaluation, and were careful not to dislodge egg masses from attachment sites.

Wood frog chorusing surveys and fairy shrimp surveys were also completed concurrently with amphibian egg mass surveys. Chorusing wood frogs were noted and used to

[2] The northern Maine region is considered to be that part of the state north of a line extending from Fryeburg to Auburn to Skowhegan to Calais. The southern Maine region is the part of the state south of that same line (06 096 C.M.R. Ch. 335 § 9(B)(4)).

evaluate whether additional breeding activity could be anticipated within nearby pools and, hence, whether the pools should be revisited at a later date when breeding activity was completed for the season. Fairy shrimp were identified using dip nets, and direct visual observation of fairy shrimp within the water column. View tubes were also occasionally used. Biologists carefully searched sunny patches in the pool, as fairy shrimp often congregate in these areas.

A Geographic Information System (GIS) analysis of land use within the 250 foot critical terrestrial habitat of identified significant vernal pools was completed subsequent to field surveys. Based on aerial photo interpretation and the transmission right-of-way (ROW) boundary, land use was classified into forested and non-forested cover types occurring within and outside of the ROW boundary. Non-forested cover types included scrub-shrub transmission corridor, hayfields, croplands, and developed areas such as roads, houses, and lawns.

4.0 RESULTS AND DISCUSSION

Vernal pools were found to be abundant within and immediately adjacent to CMP's transmission corridors. CMP identified 88 significant vernal pools, 112 non-significant natural vernal pools, and 689 anthropogenically altered or created amphibian breeding areas (Table 1). Thus, of the vernal pools that were identified, 44 percent met the NRPA criteria for significant vernal pools. According to the Maine Department of Inland Fisheries and Wildlife (MDIF&W statement at a Maine Association of Wetland Scientists vernal pool workshop on February 6, 2009), that agency maintains a database of 230 natural vernal pools of which 63 (27 percent) are significant vernal pools. At a February 2009 professional workshop addressing vernal pool protection and management in Maine, agency officials stated that approximately 40 to 50 percent of the natural vernal pools on the landscape were expected to meet the Chapter 335 Significant Wildlife Habitat Rules vernal pool significance criteria. The occurrence of significant natural vernal pools along the transmission corridors surveyed as part of the MPRP (44 percent) falls in the middle of that 40 to 50 range and compares well with regulatory expectations. In addition, the occurrence ratio of significant vernal pools to all natural vernal pools within and along CMP's transmission corridors (88/200 = 44 percent) is higher than that of the existing MDIF&W vernal pool database (63/230 = 27 percent)

Spotted salamanders, blue spotted salamanders, and wood frogs were among the identified amphibians or amphibian egg masses. Fairy shrimp were also identified in a very limited number of pools. Other than the occurrence of fairy shrimp, no threatened or endangered species were observed within 250 feet of any vernal pools. This dataset is one of the largest vernal pool databases within the State of Maine.

The 689 identified amphibian breeding areas were comprised of pools created by human activities, but that were used by obligate pool breeding amphibians. Amphibian breeding areas were primarily all terrain vehicle (ATV) ruts located in wetlands or uplands, but other types of amphibian breeding areas such as farm ponds were also documented. Vernal pools created by human activities can often serve as ecological traps with insufficient hydroperiods, but some anthropogenic pools may have adequate hydroperiods for breeding success (DiMauro and Hunter, 2002). The ecological function of anthropogenically created amphibian breeding areas along transmission corridors is probably variable, and at this time their suitability as viable vernal pool habitat is unproven.

Table 1 Summary of Vernal Pools Identified Along the MPRP Survey Corridor

Approximate Survey Mileage	Significant Natural Vernal Pools	Non-Significant Natural Vernal Pools	Anthropogenically Altered/Created Amphibian Breeding Areas
620	88	112	689

Among the 88 pools that qualify as significant vernal pools under NRPA standards, 77 have non-forested cover types exceeding 25 percent of their critical terrestrial habitat (within 250 feet of the pool) (Table 2). The average non-forested coverage within 250 feet of significant vernal pools was 44 percent, with a range of 14 to 86 percent non-forested coverage (Table 3). Of these significant vernal pools, 50 currently have 26 to 50 percent non-forested cover types within 250 feet of the pool (Table 2), and 26 have 51 to 75 percent non-forested cover types. Land use within 250 feet of significant vernal pools included utility corridor, forest, agricultural land, and "hard" land uses such as roads, parking lots, houses/subdivisions, and lawns. Existing transmission corridors accounted for the vast majority of non-forested cover types within 250 feet of significant vernal pools. Of note, 87.5 percent of significant vernal pools within the surveyed corridors contained less than 25 percent forested cover types within their critical terrestrial habitat (within 250 feet of the pool depression).

The transmission corridors that the pools are located within or along have been in existence and managed as non-forested, early-successional habitat for nearly half a century or more (Table 2). These data suggest that conversion of forest cover types to utility corridor can support and maintain viable and healthy populations of vernal pool breeding amphibians, even after time periods spanning multiple amphibian generations. However, despite what appears to be robust populations of pool breeding amphibians and abundant pool breeding habitat along transmission corridors in Maine, NRPA standards suggest that existing transmission corridors that have existed for multiple decades may need to be counted toward the 25% non-forested habitat threshold beyond which mitigation is required.

Table 2: Significant Vernal Pool Buffer Habitat Characteristics Along the Survey Corridor

Total Number of Significant Vernal Pools	Approximate Age Range of Existing Utility Corridor (years)	Existing Non-Forested Habitat Cover Within 250 Feet of Significant Vernal Pools							
		< 25%		26-50%		51-75%		76% - 100%	
		n	%	n	%	n	%	n	%
88	40 to 60 plus	11	12.5	50	56.8	26	29.5	1	1

The documented abundance of significant vernal pools and associated wildlife occurrences within the surveyed CMP corridors suggests that the habitat conditions necessary to supporting vernal pool populations are maintained along transmission corridors. This is despite the removal of trees that are required to construct and maintain transmission line corridors in a safe and reliable condition. Among these habitat conditions are sufficient pool hydroperiods (Skidds and Golet, 2005), organic carbon inputs to vernal pool depressions via leaf litter and herbaceous vegetation, landscapes that are permeable to amphibian migration (Calhoun and Klemens, 2002), and suitable non-breeding season habitat (Semlitsch, 2000).

Table 3: Non-Forested Habitat Cover Within 250 Feet of Significant Vernal Pools

Number of Pools	Mean	Range
88	44%	14% to 86%

Hydroperiod, an essential element of amphibian breeding success, requires that suitable breeding habitat containing vernal pools must hold water long enough for amphibian larvae to complete their aquatic life phase (Skidds and Golet, 2005). Soil disturbance, harvest road construction, and tree removal are three activities that have been noted as having the potential to affect pool hydroperiod in managed forests (deMaynadier and Houlahan, 2008). While tree removal activities occur during transmission corridor construction, there are significant differences in their implementation relative to forestry operations. The primary differences and similarities between transmission line corridor establishment and forestry operations are summarized below.

During transmission corridor construction, soil disturbance is minimized by the use of erosion and sediment control measures, routine environmental inspections by utility representatives and consultants, third party environmental inspections, and the use of construction mats in wet areas to prevent soil rutting and compaction. Conversely, these practices are generally neither followed nor required in forest management operations. Permanent harvest roads that can alter local surface drainage patterns are common on managed woodlands. Permanent harvest roads are not constructed within transmission corridors. In addition, on transmission corridor projects, initial tree removal is completed in a relatively rapid, one-time effort. In contrast, soils in managed woodlands are often disturbed by the repeated passage of heavy equipment over time, during one or more forest harvests.

Furthermore, forest harvesting has not been proven to produce long-term effects on seasonal forest pool hydroperiod based on chronosequence investigations (Batzer et al., 2000; Palik et al., 2001). Higher groundwater tables have been documented following harvesting (Sun et al., 2000), suggesting that tree removal will not shorten pool hydroperiod. Other work has revealed only subtle effects on local water tables outside of the immediate post-harvest time period (Bliss and Comerford, 2002). These findings suggest that tree removal related to transmission corridor construction will not have any significant long-term effect on vernal pool hydroperiods.

That vernal pools and evidence of pool breeding wildlife populations were common along existing transmission corridors during 2007 and 2008 vernal pool assessment surveys demonstrates that the hydroperiod of many transmission corridor vernal pools is sufficient for pool breeding amphibians to complete their aquatic life phase. In the glaciated northeast, factors such as surficial geologic setting, landscape position, geomorphic setting, and catchment size may very well be more relevant to vernal pool hydroperiod within transmission corridors than tree removal and other activities related to transmission corridor construction.

Importation of leaves, woody debris, and other organic matter to vernal pool basins by wind, flowing water, or other means provides a source of organic carbon to vernal pool habitats. Such carbon sources may be important to supporting a pool's food web (Battle and Golladay, 2001). These organic matter inputs are derived from vegetation that grows within vernal pools and/or in adjacent uplands and wetlands. Transmission corridors are

maintained to support a completely vegetated shrub cover type. Common plants that were observed within Maine transmission corridor uplands during field surveys include *Juniperus communalis* (common juniper), *Spirea latifolia* (meadowsweet), *Rhus typhina* (staghorn sumac), graminoids, several herbaceous species, and hardwood saplings. In wetlands and vernal pools within transmission corridors *Ilex verticillata* (winterberry), *Alnus rugosa* (speckled alder), *Spirea tomentosa* (steeplebush), meadowsweet, *Onoclea sensibilis* (sensitive fern), *Osmunda cinnamomea* (cinnamon fern), and *Scirpus cyperinus* (wool grass) were commonly observed during field surveys. Most vernal pools along the transmission corridor contained significant amounts of organic detritus, which was apparently derived from vegetation within and/or adjacent to the transmission corridor. In addition to providing a source of organic carbon to support secondary production within vernal pools, these plants or their fallen woody branches parts were utilized as amphibian egg mass attachment sites. Subsequent to leaf out, shrub species provide a source of pool shade, as do taller trees adjacent to transmission line corridors.

In order to complete their life cycles and sustain local populations, pool breeding amphibians must be able to successfully migrate across the landscape to suitable non-breeding season habitat (Semlitsch and Skelly, 2008). According to literature, forested settings are the natural and preferred habitat for ambystomatid salamanders and wood frogs (DeGraff and Yamasaki, 2001); however, pool breeding amphibians are known to travel across other non-forested cover types. For example, in one Rhode Island study of golf course fairways, non-forested areas were not a dispersal barrier to spotted salamanders travelling to adjacent forested areas (Montieth and Paton, 2006). The presence of uncompacted leaf litter, coarse woody debris, and shade are important habitat characteristics for pool breeding amphibians (deMaynadier and Hunter, 1995). Areas with high densities of small mammal burrows and cool microclimates have also been found to be preferred by spotted salamanders (Montieth and Paton, 2006).

During field surveys, leaf litter, coarse woody debris, and mammal burrows were all observed within the early-successional cover type of Maine electricity transmission corridors. Shrubs observed in transmission corridors provide shade and organic debris. In addition, many vernal pools within Maine's transmission corridors were found within larger wetland complexes dominated by the scrub-shrub and emergent vegetation cover types. Many of these wetlands spanned the entire transmission corridor, thereby providing a moist environment for amphibians to migrate through as they travel between their breeding pool and adjacent habitat. This demonstrates that transmission corridors are 'permeable' to amphibian migration and movement. This is in contrast to many forms of hard land uses where pavement and construction destroys, removes, or permanently covers burrows, leaf litter, and woody debris, and also introduces the threat of vehicular mortality.

Suitable non-breeding season habitat is also essential for maintaining populations of amphibians that breed in vernal pools. Mean travel distances for spotted salamanders and wood frogs have been calculated at 390 feet and 633 feet, respectively, while maximum travel distances were measured to be 817 feet and 1,549 feet, respectively (numerous studies in Semlitsch and Skelly, 2008).

Transmission corridors surveyed for the MPRP were usually less than a few hundred feet wide; many were less than 150 feet and were adjacent to forested habitat. Therefore, non-breeding season forested habitats adjacent to transmission corridors are well within documented migration distances for pool breeding amphibians. In addition, in Pennsylvania transmission corridors maintained in an early-successional habitat condition were found to provide sufficiently moist microenvironments for salamanders including *Ambystoma jeffersonianum* (Jefferson salamander), *Plethodon cinereus* (red back salamander), and spotted salamander (Yahner et al., 2001). Therefore, it is also plausible that in Maine, the transmission corridor itself may be used as habitat, provided that sufficient leaf litter, burrows, and coarse woody debris, moisture, and shade are present.

5.0 SUMMARY AND RECOMMENDATIONS

In the glaciated northeast, vernal pools have become a focal issue in conservation and land use planning. Regulation of certain vernal pools in Maine has significant implications on the design and permitting of electric transmission corridors and vernal pool management. While existing recommended best development practices for vernal pool conservation are provisional, and were developed to address typically "hard" residential and commercial development, NRPA vernal pool regulations appear to have been developed around these preliminary guidelines and are being applied to a much broader class of land uses (e.g., "soft" land uses including electric transmission line corridors). The most recent literature, however, emphasizes the need for site-specific planning and flexibility for meeting vernal pool conservation needs. Thus, CMP sought to identify vernal pools in its existing transmission corridors and evaluate the implications of the existing regulatory framework on transmission corridor design, permitting, and maintenance. In completing this effort, CMP compiled what is likely one of the largest vernal pool databases in Maine. This new dataset adds to our understanding of vernal pool resources in Maine.

CMP's investigation demonstrates that vernal pools are ubiquitous in transmission corridors located within its service territory. Even after many decades of being managed as early-successional habitat, anthropogenic, natural, and significant vernal pools were found to be common in these corridors. The vast majority (87.5%) of the identified significant vernal pools that would be subject to NRPA jurisdiction currently have vernal pool critical terrestrial habitat that is less than 75 percent forested within 250 feet of the pool; in other words, more than 25 percent of the existing non-forested critical terrestrial habitat around these identified significant vernal pools is managed as early-successional habitat. Field observations of vegetation cover, leaf litter, and coarse woody debris suggest that transmission corridors support habitats that are permeable to the migration of vernal pool breeding amphibians to and from adjacent forests, and that transmission corridors themselves may be utilized as non-breeding season amphibian habitat. The observed abundance of natural and significant vernal pools that were utilized as breeding habitat by obligate vernal pool breeding species suggests that vernal pools in and along transmission corridors are able to function without loss or significant degradation of their ecological function.

These findings are significant relative to vernal pool management as it pertains to electric transmission corridor construction and maintenance. Data on significant vernal pools within and/or along CMP corridors, existing literature, and regulatory guidelines and requirements all demonstrate that significant vernal pools and transmission corridors (as currently constructed and maintained) are compatible. This is further emphasized by the following summary points:

- Extensive data collected by CMP show that significant vernal pools occur in transmission line corridors within the expected frequency range, and at a greater rate than shown in MDIF&W's existing database. Specifically, 45 percent of the

natural vernal pools assessed along CMP transmission corridors were significant. This falls in the middle of the agency-expected range of 40 to 50 percent of all pools assessed being significant;

- The average percentage of non-forested habitat within 250 feet of these significant vernal pools was 44 percent;

- Only 12.5 percent of these significant vernal pools had greater than 75 percent forest habitat coverage with their 250 foot buffers;

- Constructing and maintaining transmission line corridors does not negatively affect vernal pool hydroperiod;

- The early-successional (shrub and herbaceous vegetation) habitat associated with transmission line corridors appears to be permeable to amphibian migration and is capable of sustaining highly productive amphibian breeding habitat;

- The life span of the spotted salamander averages 15 to 20 years. Some of these corridors have been in existence for 40 or more years, a time period which spans multiple generations of spotted salamander. Given that the literature suggests that mole salamanders have high pool spawning fidelity (i.e., over 90 percent of the time they return to spawn in the pools from which they hatched and emerged), the data strongly suggests that several generations of spotted salamanders have successfully reproduced in these vernal pools. In addition, their offspring continue to breed in these pools;

- There is no literature demonstrating adverse impacts from transmission line corridors on vernal pools;

- Current regulations are based on studies that focused on "hard" developments, which are very dissimilar to the vegetated conditions present within transmission line corridors; and

- The current management of vernal pools in transmission line corridors is consistent with some of the significant vernal pool habitat management guidelines and goals presented in Chapter 335 and Calhoun and Klemens (2002). These guidelines and how there are wholly or partially met are as follows:
    - *(1) No disturbance within the vernal pool depression.* CMP and other electric utility companies expend a great amount of effort to ensure that vernal pool depressions are not disturbed during construction and maintenance activities. These efforts include (1) providing environmental oversight during the project design phase to ensure that, whenever possible, pole structures are not placed in vernal pools; (2) implementing and maintaining erosion and sediment controls that help prevent siltation of pools; (3) marking vernal pool depression with flagging tape prior to construction; and (4) performing environmental inspections during

construction to ensure that pools are not traversed by vehicles and construction equipment;

- *(2) Maintain a minimum of 75% of the critical terrestrial habitat as unfragmented forest with at least a partly-closed canopy of overstory trees to provide shade, deep litter and woody debris.* Although transmission line corridors cannot be maintained as forest for reliability and safety reasons (in other words, it is not "practicable"), they are maintained as early-successional habitat composed of shrubs and herbaceous plants. This habitat type provides some level of shading, significant litter accumulation (carbon input) from leaf drop and the die-back of herbaceous vegetation, and woody debris;
- *(3) Maintain or restore forest corridors connecting wetlands and significant vernal pools.* Within transmission line corridors, amphibian travel corridors composed of shrubs and thick growth of herbaceous vegetation are often present. Also, the CMP data indicate that transmission line corridors and their early-successional habitat are permeable to amphibian migration. This meets the needs for maintaining forested travel corridors, which are often required in the vicinity of "hard" development;
- *(4) Minimize forest floor disturbance.* With the exception of pole structure locations, transmission line corridors are not grubbed. Rather, trees are cut at ground level and root systems are left in the ground. In addition, mitigation techniques including winter construction and the use of equipment mats are utilized during construction to minimize ground disturbance such as rutting. By virtue of how transmission line corridors are constructed and maintained, ground disturbance is minimized;
- *(5) Maintain native understory vegetation and downed woody debris.* Transmission line corridors are constructed and maintained to encourage the growth of understory vegetation including shrubs and herbaceous plants. Also, downed woody debris from shrubs occurs naturally and is very common in transmission line corridors.

All of this information indicates that transmission line corridors, as they are currently constructed and maintained in Maine, do not cause a loss of the important ecological functions associated with significant vernal pools in Maine.

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1-8: Vernal Pool Occurrence and Species Distribution within Electrical Transmission Rights-of-Ways in Maine, TRC Environmental, April 2011.

Vernal Pool Occurrence and Species Distribution within Electrical Transmission Right-of-Ways in Maine

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Due to the nature of long distance bulk energy transmission, transmission corridors (or right-of-ways (ROWs)) occur in virtually every landscape position and habitat type across the country. ROWs are managed to sustain non-forested vegetation and can be several hundred feet in width and up to several hundred miles in length. Accordingly, they traverse regulated areas such as wetlands and vernal pool habitats throughout the glaciated northeast. Vernal pools and adjacent habitat areas are regulated by both state and federal agencies, each of which having unique criteria for determining thresholds of jurisdiction. A key aspect to "classically-defined" northeast vernal pool ecology and their regulatory definition is the presence of forested uplands around the pools that provide non-breeding adult-stage habitat for primary vernal pool species such as Ambystomid salamanders and wood frogs (*Rana sylvatica*). Therefore, the management of ROWs to allow only non-forested vegetation in and around vernal pools in the ROW presents a potential conflict for sustaining essential vernal pool habitat conditions. The major question that arises from this potential management conflict is whether and to what extent vernal pools are affected by ROWs in overall occurrence, types of species supported, and the potential populations of organisms based partially on the density of yearly egg masses. Due to the individual permitting requirements associated with several large and geographically diverse ROW maintenance and expansion projects in Maine, an evaluation of a large number of vernal pools occurring in and near ROWs was undertaken to evaluate vernal pool occurrence and species distribution within ROWs. It is worth noting that a large number of the ROWs surveyed have been maintained as non-forested corridors for 40 years or more.

Vernal pool habitats occurring within two large ROW maintenance and expansion projects in Maine were identified and evaluated over multiple breeding seasons. The methodology for field data collection was established based on regulatory criteria, and was similar between the projects. Field parameters included amphibian egg mass counts with species identification as well as other key characteristics cited in scientific literature and regulatory definitions. Surveys were scheduled to observe potential pools during and immediately following the period of active ovipositioning, and in most cases pools were observed twice during the breeding season to view the occurrence of different species that produce egg masses in earlier and later portions of the season. It was also noted if pools were entirely or partially within, or adjacent to the maintained ROW corridor by "percent within the ROW" along this continuum. For purposes of this analysis, pools that occurred within at least 75% within the ROW were considered to be fully "ROW" pools. Categories of pools that were 25 to 75% in the ROW were considered transitional and the balance of the observed pools were considered non-ROW pools. Portions of the projects

involving proposed, undeveloped ROW corridors and potential mitigation sites afforded the opportunity to conduct the same surveys to observe and compare pools within undeveloped areas.

Results for all the surveys were tallied and analyzed for 1,834 vernal pools, all of which contained either wood frog or spotted salamander egg masses, or both. Vernal pool occurrence observations indicate that 55.3% of the total pools observed were considered ROW pools and 23.5% of the pools were found in a non-ROW setting. The remaining 21.2% of the pools were in transitional areas. A total of 1,175 identified pools contained wood frog egg masses. Among these pools, 66.7% occurred in the ROW, 23.7% occurred in transition areas and 9.5% in non-ROW areas. A total of 1,301 identified pools contained spotted salamanders. Among these pools 49.5% occurred in the ROW, 19.9% occurred in transitional areas, and 30.6% occurred in non-ROW areas.

In order to determine the relative "productivity" of each pool in terms of the number of egg masses that were present at the point of seasonally highest occurrence, the number of egg masses occurring per pool for each species was categorized into groups of 1 to 9, 10 to 19, 20 to 39 and 40 or greater egg masses. In this way, it is easier to see which pools could meet the Maine Department of Environmental Protection (MDEP) definition for a Significant Vernal Pool (SVP) (see below). For wood frogs, pools in the ROW (i.e., as above, with 75% of pool occurring in ROW) containing 1 to 9 egg masses comprised 63.7% of the total pools, and 21% of the pools contained 20 or more egg masses (9.3% with 40 or more egg masses). For pools outside of the ROW, pools containing 1 to 9 wood frog egg masses comprised 92.1% of the total pools, and 4.4% of the pools contained 20 or more egg masses (2.6% with 40 or more egg masses). For spotted salamanders, pools in the ROW containing 1 to 9 egg masses comprised 79.5% of the total pools, and 9.1% of the pools contained 20 or more egg masses (3.1% with 40 or more egg masses). For pools outside of the ROW, pools containing 1 to 9 egg masses comprised 62.2% of the total pools, and 26.2% of the pools contained 20 or more egg masses (10.2% with 40 or more egg masses).

This large sampling of data provides the opportunity for several observations. First, while the vernal pool observations concentrated on ROWs and their immediate environs versus a broader study that would compare undeveloped land to ROW, vernal pools containing spotted salamanders and wood frogs egg masses occur half and two-thirds of the time, respectively, directly within ROWs relative to transitional or non-ROW settings. Second, for wood frogs, pools that occur directly within the ROW have a higher egg mass count and distribution per pool (36.3% with 10 or more egg masses) as compared with pools in non-ROW settings (7.9% with 10 or more egg masses). This trend is somewhat reversed for spotted salamanders, though not as pronounced. This suggests that the increased amount of sunlight in an open ROW area compared to an area of dense forested canopy, encouraged wood frog breeding, whereas the spotted salamander prefers deeper depressions with slightly longer hydroperiods typically receiving less direct sunlight.

When looking at pools potentially regulated by the Maine Department of Environmental Protection (MDEP), pools were broken down similarly, as above, with bins (percentage categories) including pools in ranges of ROW occupancy ranging from 0-25%, 26-50%, 51-75%,

and 76-100%. Pools with a 100% rating were found to be completely in a woodland setting, conversely pools with a 0% rating were found to be completely in the non-forested ROW. Due to the majority of the project area being located within existing ROW areas, the data summaries indicate that 67% of the pools surveyed on this project were located nearly entirely within the ROW. Eight percent of the pools within the ROW (0-25% forested) were found to have over 40 wood frog egg masses and therefore potentially regulated by the MDEP. Comparatively, 12% were found to have the same abundance in non-ROW (76-100% forested) settings. For spotted salamanders, a 20 egg mass threshold was used to coincide with MDEP regulations. In the ROW setting, 6% of the pools met MDEP *abundance* criteria, while in the non-ROW setting 20% met the criteria.

These findings are congruent with the results found above as that wood frogs do not show a strong preference between pools with a forested canopy and pools within a maintained ROW setting and therefore demonstrate that maintained ROW vegetation does not seem to be a deterrent in the usage of pools in these areas for breeding. Spotted Salamanders are shown to have a higher abundance within a forested setting as opposed to a maintained ROW and similarly have more pools with the potential to be regulated by the MDEP. This may be explained, as discussed above, by a preference for deeper pools with a more forested canopy.

Continued studies of vernal pools within ROWs and adjacent habitats, including adult population analyses, will help to provide further information about the ecology and viability of vernal pools within non- and semi-forested environments.

1-9: NECEC Potential Compensation Tracts-
Natural Resource Survey Results

August 13, 2018

CENTRAL MAINE POWER COMPANY

NECEC Potential Compensation Tracts

Natural Resources Survey Results

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NECEC Compensation Tracts Natural Resources Survey Results

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ACRONYMS AND ABBREVIATIONS

COMPENSATION TRACT	ABBREVIATION	TOWN/TOWNSHIP (Twp)
Little Jimmie Pond-Harwood Tract	LJPT	Manchester
Flagstaff Lake Tract	FLT	Flagstaff & Dead River Twps
Pooler Ponds Tract	PPT	The Forks Plantation Twp
Grand Falls Tract	GFT	Spring Lake Twp
Lower Enchanted Tract	LET	Lower Enchanted Twp
Basin Tract	BT	Pierce Pond Twp

ACRONYM / ABBREVIATION	TERM
ABA	Amphibian Breeding Area
AT	Appalachian Trail
BMPs	Best Management Practices
BCC	Bird of Conservation Concern
BWH	Beginning with Habitat
CFR	Code of Federal Regulations
CMP	Central Maine Power Company
CVP	Corps Vernal Pool
CWA	Clean Water Act
DWA	Deer Wintering Area
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GIS	geographic information system
GPS	Global Positioning System
HVDC	high voltage direct current
I-95	Interstate 95
ILF	In Lieu Fee
IPaC	Information for Planning and Consultation
IWWH	Inland Waterfowl and Wading Bird Habitat
KLT	Kennebec Land Trust
kV	kilovolt
L	Lacustrine
MLUPC	Maine Land Use Planning Commission
MBPL	Maine Bureau of Parks and Land
MCHT	Maine Coast Heritage Trust
MDEP	Maine Department of Environmental Protection
MDIFW	Maine Department of Inland Fisheries and Wildlife
MDMR	Maine Department of Marine Resources
MEGIS	Maine Office of Geographic Information Systems
MGS	Maine Geological Survey

ACRONYM / ABBREVIATION	TERM
MHT	Maine Huts and Trails
MNAP	Maine Natural Areas Program
M.R.S.	Maine Revised Statutes
MW	megawatt
NECEC	New England Clean Energy Connect Project
NED	*New England District*
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service
NRPA	Natural Resources Protection Act
NWPL	National Wetland Plant List
NWI	National Wetlands Inventory
OM	Organic Matter
PEM	Palustrine Emergent
PFO	Palustrine Forested
POW	Palustrine Open Water
Project	New England Clean Energy Connect Project
PSS	Palustrine Scrub-Shrub
PSVP	Potential Significant Vernal Pool
PUB	Palustrine Unconsolidated Bottom
PVP	Potential Vernal Pool
R	Riverine
RTE	Rare, threatened or endangered
SC	Special Concern
SLODA	Site Location of Development Act/Site Law
SVP	Significant Vernal Pool
T&E	Threatened and Endangered
TNC	The Nature Conservancy
Twp	Township
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VP	Vernal Pool
WMA	Wildlife Management Area
WOSS	Wetlands of Special Significance
WOTUS	Waters of the United States
WQLL	water quality limiting lake

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1.0 NECEC COMPENSATION TRACTS NATURAL RESOURCE SURVEYS

1.1 Introduction

Central Maine Power Company (CMP) proposes to construct the New England Clean Energy Connect Project (NECEC Project or the Project), a high voltage direct current (HVDC) transmission line and related facilities capable of delivering up to 1,200 megawatts (MW) of electric generation from the Canadian border to the New England Control Area in response to the Request for Proposals for Long-Term Contracts for Clean Energy Projects dated March 31, 2017 and issued by the Massachusetts Department of Energy Resources and the Electric Distribution Companies of Massachusetts.

The proposed NECEC Project is composed of the following components displayed on Figure 1:

- Segments 1, 2, and 3 – HVDC Components and Associated Upgrades
- Segment 4 – 345 kilovolt (kV) STATCOM Substation and 115 kV Rebuilds
- Segment 5 – New 345 kV Transmission Line and Associated Rebuilds

On September 27, 2017 CMP submitted to the Maine Department of Environmental Protection (MDEP) permit applications for the NECEC Project under the provisions of the Site Location of Development Act (SLODA) and the Natural Resources Protection Act (NRPA). On the same date, a related permit application was submitted under the provisions of Section 404 of the Clean Water Act (CWA) to the United States Army Corps of Engineers (USACE). A more detailed description and discussion of the Project can be found in these permit applications.

Section 13, Compensatory Mitigation, of the NRPA application describes in detail the extent of wetland-related impacts that are anticipated to be necessary for construction of the approximately 146.5-mile NECEC Project. These impacts are summarized in Table 1.1 (Table 13-1 of NRPA application) and the majority are temporary or secondary in nature. Several additional forms of impact have also been added below to the original table in response to subsequent discussion and input from regulatory agencies. Permanent, direct impacts to protected natural resources have been minimized to the extent practicable through the Project design process. Direct impacts are associated with permanent fill as opposed to indirect impacts such as vegetation clearing.

TABLE 1-1 SUMMARY OF RESOURCE IMPACTS

RESOURCE IMPACT	ACRES OF IMPACT
Temporary Wetland Fill	47.21 acres
Permanent cover type conversion of Forested Wetlands (Includes wetland cover type conversion within Significant Vernal Pool Habitat (SVPH) and Inland Waterfowl and Wading Bird Habitat (IWWH)	149.07 acres
Permanent upland cover type conversion of IWWH	13.31 acres
Permanent upland cover type conversion of SVPH	31.31 acres
Permanent Fill in Wetlands of Special Significance (WOSS) (Includes fill within SVPH and IWWH)	0.85 acre
Permanent Fill in Wetland (Non-WOSS)	4.47 acres
Permanent upland fill in IWWH	0.01 acre
Permanent upland fill in SVP Habitat	0.74 acre
Direct and indirect impact to USACE Jurisdictional Vernal Pools	4.7 acres in depression or within 100 ft Value: 56 high, 122 medium, 72 low

1.1.1 Wetland Compensation

When in excess of specific permanent impact thresholds, that can be as little as 15,000 square feet (0.34 acre), compensatory mitigation is typically required by the MDEP under the provisions of the NRPA and associated Wetlands and Waterbodies Protection Rules (Chapter 310) to offset loss of functions and values provided by wetlands. The USACE and United States Environmental Protection Agency (USEPA) have established similar rules for "Compensatory Mitigation for Losses of Aquatic Resources" (40 Code of Federal Regulations [CFR] Part 230) as a means of addressing the federal "*No Net Loss*" policy related to Section 404 of the CWA. In addition, *New England District* (NED) *Compensatory Mitigation Guidance* (September 7, 2016) developed by the USACE (hereafter "NED Guidance") is also relevant and provides additional clarification of compensation objectives and requirements in Maine.

Types of wetland compensation recognized by the NRPA (Ch 310 §5(C) (4)) include:

- Restoration of previously degraded wetlands.
- Enhancement of existing wetlands.
- Creation of wetland from upland.
- Preservation of existing wetlands or adjacent uplands where the site to be preserved provides significant wetland functions.

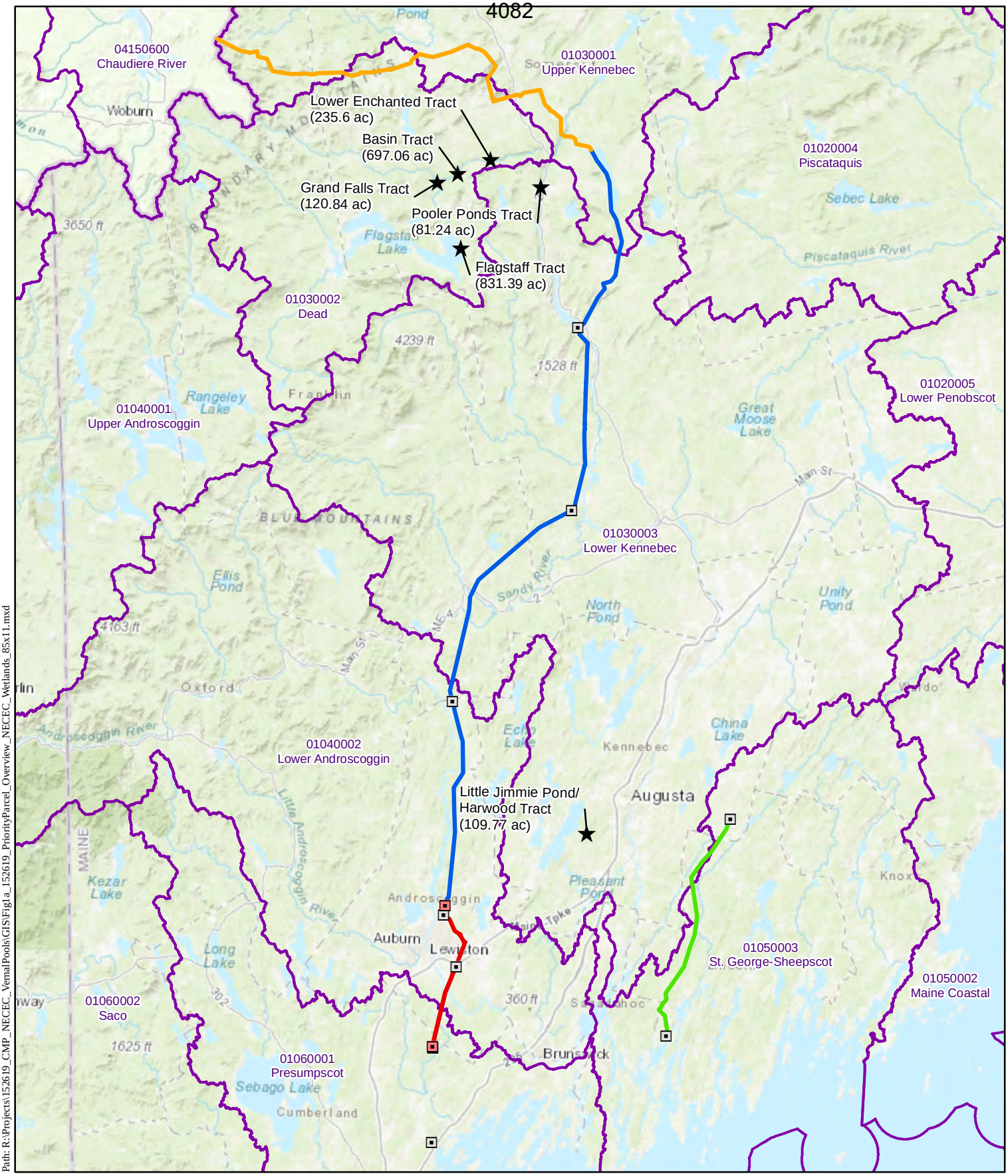
Similar forms of compensation are recognized by NED Guidance, however "Enhancement" is referred to as "Rehabilitation."

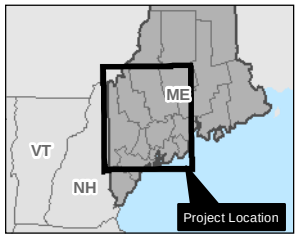
In addition to the above types of "permittee responsible mitigation," another form of compensatory mitigation recognized in Maine by the MDEP, USACE, USEPA, and other federal resource agencies is In Lieu Fee (ILF), where a compensation fee, based on area (square feet) of impact and other variables, is paid into a fund dedicated for implementation of wetland compensation (38 Maine Revised Statutes [M.R.S.] § 480(Z)).

Presented in this document are the results of field surveys augmented by a detailed assemblage of published maps and other information conducted to support the following tracts to be considered for use as Compensatory Mitigation for the NECEC Project:

- Little Jimmie Pond-Harwood Tract (LJPT)
- Flagstaff Lake Tract (FLT)
- Pooler Ponds Tract (PPT)
- Grand Falls Tract (GFT)
- Lower Enchanted Tract (LET)
- Basin Tract (BT)

The locations of the six Compensation Tracts, ranging in size from 81.24 to 831.39 acres, for an aggregate area of 2,075.90 acres, are also displayed on Figure 1.1.





Compensation Tract
Existing Substation
Proposed Substation
HVDC (New ROW)
HVDC (Existing ROW)
Rebuild Section
New 345 kV Line
HUC 8 Watershed Boundary

N
W E
S

1 in = 14 miles

0 7 14
Miles

Figure 1a
Compensation Tract Location
Watershed Boundaries

Kennebec and Somerset Counties
Maine

Date:8/13/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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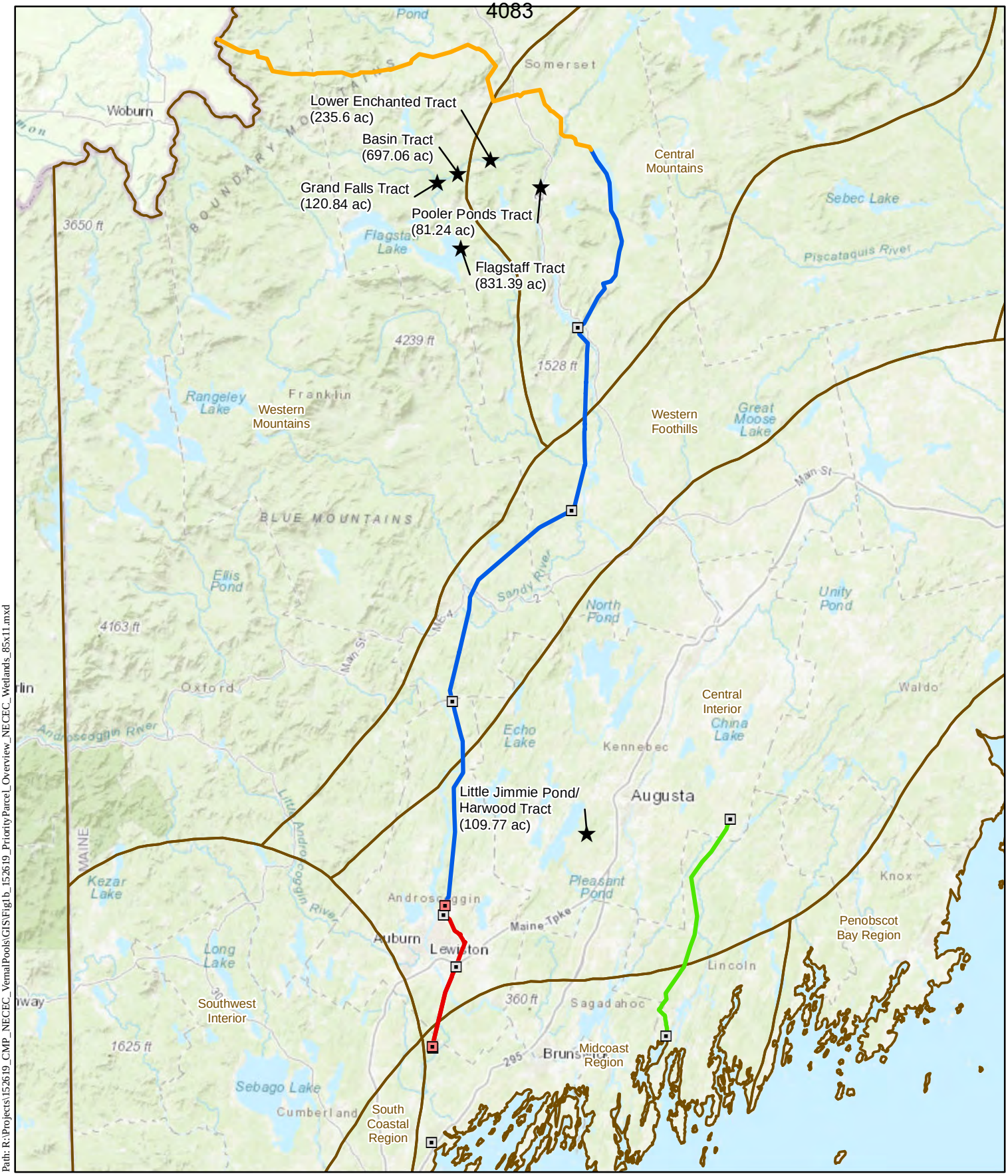

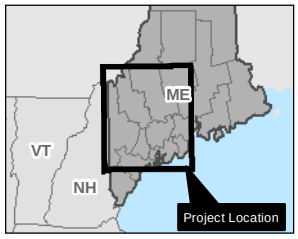

- Compensation Tract
- Existing Substation
- Proposed Substation
- HVDC (New ROW)
- HVDC (Existing ROW)
- Rebuild Section
- New 345 kV Line
- Biophysical Region

N
W E
S

1 in = 14 miles

0 7 14
Miles

Figure 1b
Compensation Tract Location
Biophysical Regions

Kennebec and Somerset Counties
Maine

Date:8/13/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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1.2 New England District Compensatory Mitigation Guidance

The NED Guidance establishes criteria related to observations, analyses and other considerations relevant to documenting and evaluating potential sites and forms of compensatory mitigation for the six potential NECEC Compensation Tracts. NRPA wetland compensation standards also reflect many of these criteria (Ch 310 §6 A-H). NED Guidance for Mitigation Site Selection generally encompasses:

- Ecologic suitability based on:
    - Hydrologic conditions, soil characteristics and other physical and chemical characteristics.
    - Watershed–scale features such as habitat diversity, connectivity and other landscape scale functions.
    - Size and location relative to hydrologic sources and other ecologic features.
    - Reasonably foreseeable effects on ecologically important aquatic or terrestrial resources.
    - Other relevant factors such as: development trends, anticipated land use changes, habitat status and trends, location in stream network, local or regional goals for protection of particular habitat, and water quality and floodplain management goals.
- Landscape position being of similar setting and wetland types as of the impacted aquatic resource(s).
- Resistance to disturbance by being located near refuges, buffers, green spaces and other preserved natural elements of the landscape.
- Sustainability considerations such as current and future hydrology and preference for locations in areas that will remain as open space not to be severely impacted by clearly predictable development.
- Surrounding land use/plans, including probable future land use.

For preservation as compensatory mitigation in particular, NED Guidance indicates:

- Resources to be preserved provide important physical, chemical or biological function for the watershed.
- Resources to be preserved contribute to the ecological sustainability of the watershed.
- Resources are under threat of destruction or adverse modifications.
- The preservation site will be permanently protected through an appropriate real estate or other legal instrument.

1.3 Analysis of Existing Data

Prior to the commencement of field surveys of the six potential Compensation Tracts, existing information was reviewed to determine the potential extent of wetlands within the survey areas. These source materials included:

- Maine Office of GIS data catalog for Biologic and Ecologic/Environment and Conservation (MEGIS 2018)
- Maine Department of Environmental Protection Interactive Maps and Data (MDEP 2018)

- Maine Department of Inland Fisheries and Wildlife Beginning with Habitat Maps (MDIFW 2018)
- Maine Land Use Planning Commission Land Use Guidance Maps (MLUPC 2018)
- United States Geological Survey 7.5-minute Topographic Quadrangle Maps (USGS 2018)
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Wetlands Mapper (USFWS 2018)
- United States Geological Survey (USGS) National Hydrography Dataset (NHD) Viewer (USGS 2018)
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) 2018 Web Soil Survey (USDA NRCS 2018)
- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) of Kennebec and Somerset Counties (FEMA 2018)

The information was compiled and synthesized into a geographic information system (GIS) geo-referenced database and used in the field to assist wetland scientists in the location and identification of wetland systems and other relevant natural resources on the Compensation Tracts.

1.4 Field Survey Methods

NWI Maps developed from photo-interpretation of aerial imagery are a widely used and accepted means to identify the location and general extent of wetlands throughout the United States (Benefiel and Lake 2012). Although information can be misused/misinterpreted, NWI maps are very appropriate for a variety of uses including: preliminary site assessment for development and transportation/utility corridors, environmental impact assessment reports, natural resource inventories, wildlife surveys, refuge planning and acquisition, and land appraisal (Tiner 1997).

The Maine Land Use Planning Commission (MLUPC) supported a study by the USFWS to evaluate the accuracy of NWI maps for use as regulatory wetland guidance maps (Nichols 1994). Amendments dated August 18, 2005 to the MLUPC's Land Use Guidance Maps note adoption of NWI wetlands on the Dead River, Carrying Place, Spring Lake, Lower Enchanted and Pierce Pond Townships and The Forks Plantation, where five of the NECEC Compensation Tracts (FLT, GFT, LET, BT, and PPT) are located. Similar NWI mapping appears on the Augusta 7.5-minute USGS topographic map where the Manchester Tract (LJPT) is located.

Limitations of NWI maps are recognized and attributed to a variety of well identified reasons (Tiner 1997 and 2007; Nichols 1994), some of which are particularly relevant to the NECEC Compensation Tracts. "Omission" rather than "commission" error, or the under-representation versus the over-representation, of wetlands is most common. Particularly relevant limitations responsible for omission error include: imagery scale and quality, difficulty in recognizing "drier-end" wetlands, linear (long) narrow wetlands unmapped due to dimensional scale, difficulty in mapping forested wetlands and difficulty in mapping wetlands on glacial till (Tiner 1997 and 2007); these limitations are present on one or more of the six NECEC Compensation Tracts. Field surveys, documenting the presence, extent and physical characteristics (vegetation, soils and hydrology), as well as preliminary habitat assessments, were therefore undertaken to evaluate and document the suitability of the six Tracts as compensatory mitigation for the NECEC Project.

1.4.1 Wetland Delineation

Evidence indicative of wetland from three parameters – vegetation, soils and hydrology – was used to identify and delineate wetlands in accordance with the 1987, *Corps of Engineers Wetland Delineation Manual* (USACE 1987) and the subsequent *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (USACE 2012). With the exception of unusual or atypical situations, evidence of wetland must be exhibited by all three parameters for an area or position to be designated as wetland.

When used in combination with evidence from the two other parameters, specific vegetation is a conspicuous and rapid means to identify the presence and extent of wetlands. The National Wetland Plant List (NWPL) issued by the USACE provides an indicator rating of a plant being indicative of wetlands or a hydrophyte. The NWPL was used to evaluate vegetation during the delineation of wetland boundaries on the six Compensation Tracts. Lists of vegetation and related NWPL indicator ratings appear as Appendix B for each Tract.

In addition to review of soil mapping by the NRCS web soil survey, throughout the course of field identification and the Global Positioning System (GPS) survey of wetlands on the six Compensation Tracts, soil characteristics including composition (organic vs mineral), texture, color (based on Munsell Soil Color Charts), and presence of redoximorphic features, were also examined in shallow soil profiles with a soil auger. Presence of hydric soils, in combination with dominance of hydrophytic vegetation and evidence of wetland hydrology were therefore used to identify the delineated wetland boundaries.

Hydrologic evidence indicative of wetlands includes a variety of primary and secondary indicators such as surface water, high water table, saturation near the surface and water stained leaves, sediment deposits, drift lines or adventitious roots. In combination with the presence of evidence from vegetation and soils, such examples of wetland hydrology were considered during mapping wetlands on the six potential Compensation Tracts.

1.4.2 National Wetland Inventory Classification

The National Wetland Inventory makes use of *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) to differentiate types of wetlands https://www.fws.gov/wetlands/data/wetland-codes.html. As discussed in subsequent sections, wetlands on each Compensation Tract are identified and described by the NWI code. With this hierarchical classification, most freshwater wetlands on the Compensation Tracts are classified as being of the Palustrine (P) system and then to the class-level, based on dominant plant type as: Forested (PFO), Scrub-Shrub (PSS), Emergent (PEM), or Unconsolidated Bottom (PUB). Wetlands on parts of LJPT and FLT are also of the Lacustrine (L) system, and limnetic (1) subsystem, where instead of plant type, substrate is used to differentiate class-level as being Unconsolidated Bottom (L1UB). In similar fashion, wetlands on parts of GFT, LET and BT are of the Riverine (R) system, and upper perennial (3) subsystem, where substrate is also Unconsolidated Bottom (R3UB). For PPT, being located on the Kennebec River and downstream of the confluence with the Dead River, the subsystem is lower perennial (2) and riverine wetlands on this tract are therefore classified as R2UB.

Due to substrate being the basis for subsystem differentiation for the Lacustrine and Riverine systems, whereas vegetation is used to distinguish Palustrine classes, no attempts were made to capture with GPS the boundaries/areal extent of Lacustrine or Riverine wetlands. Practicality also entered into this decision from the simple basis of seasonal variability of water levels as well as, how far into the lake or river does a GPS polygon extend to arrive at corresponding acreage? Consequently, length or “frontage/river-miles,”

(measured in feet/miles), is deemed to be a more appropriate unit for uniformly quantifying Lacustrine or Riverine wetlands on the Compensation Tracts. Where a segment of Riverine wetland lies wholly within a Tract, (as is the case for a reach of the Dead River on GFT or Enchanted Stream on LET), an approximation of acreage derived from length and representative width is presented for the Riverine wetland units, chiefly for comparative purposes in relation to the size of the overall Tract as well as other delineated and GPS-surveyed palustrine wetland classes.

It is important to recognize that except where bordered by bedrock cliffs such as on LET and GFT, along essentially all Riverine system wetlands, a bordering band of PSS is present and most typically dominated by alder (*Alnus* spp.) or willows (*Salix* spp.). The width of this PSS is dependent on substrate, scour from higher stream stage and steepness of abutting slope. Although present due to mapping scale the band of PSS was not delineated or GPSed where less than approximately 30 feet in width along the river edge. Consequently, GPSed wetland acreage on PPT, LET, GFT and BT is inherently conservative and would therefore equate to an additional approximately 3.5 acres (30 feet by 5,280 feet /43,560 square feet) of PSS per river-mile along the Kennebec and Dead Rivers.

Streams of lesser size than the Kennebec and Dead Rivers or Enchanted Stream are typically not addressed by NWI mapping. The USGS National Hydrography Dataset (NHD), which is akin to NWI mapping but for rivers and streams, provides GIS-based data from which river and stream lengths on the Compensation Tracts are quantified. Unmapped smaller streams encountered in palustrine wetlands during the spring 2018 field surveys are displayed on accompanying tract resource maps (Figures 2.2, 3.3, 4.3, 5.3, 6.3 and 7.3). The mapping is supported by documentation of observed fundamental characteristics (perennial, intermittent or ephemeral flow, width/depth, substrate, fish, beaver dams, etc.). Field surveys also provide a means to reliably compare from tract to tract, the acreage of reaches of rivers or streams contained entirely within Tracts such as the Dead River and Enchanted Stream on GFT and LET respectively.

1.4.3 Wetlands of Special Significance

Under the provisions of the NRPA and related Rules (Chapter 310), certain characteristics are relevant to whether a wetland is regulated as a "freshwater wetland of special significance" (Ch 310 §4A 1-8). Characteristic of Wetlands of Special Significance (WOSS) that could potentially occur on the Compensation Tracts are listed below along with coding used in subsequent sections describing the presence of WOSS on each Tract:

- contains a "*critically imperiled* (S1)" (Ch 310 §3F) or "*imperiled* (S2)" (Ch 310 §3L) community as defined by the Natural Areas Program [**S1/S2**];
- is identified as "*significant wildlife habitat*" (38 MRS §480-B(10)) by the Maine Department of Inland Fisheries and Wildlife (MDIFW) [**SWH**] including:

    1. habitat for state or federal listed endangered or rare species,
    2. high and moderate value "*deer wintering areas*" (DWA) and travel corridors,
    3. high and moderate value *inland waterfowl and wading bird habitat*" (IWWH), and
    4. "*significant vernal pools*" (SVP);
- is located within 250 feet of a "*great pond*" (38 M.R.S. §480-B(5)) **[GP 250]**;

- contains more than 20,000 square feet of open water or aquatic or emergent marsh vegetation [**20k POW/PEM**];
- is a "*floodplain wetland*" (38 MRS §480-B(2-D)) inundated with floodwater during a 100-year flood event based on mapping by FEMA (Ch 310 §4A (6)) **[FP]**;
- is a "*peatland*" (Ch 310 §3P) [**PT**]; or
- is located within 25 feet of a "*river, stream or brook*" (38 M.R.S. §480-B(9), Ch 310 §4A (8)) [**RSB**].

1.4.4 Vernal Pools

Vernal pools are defined by the MDEP as: "a natural, temporary to semi-permanent body of water occurring in a shallow depression that typically fills during the spring or fall and may dry during the summer. Vernal pools have no permanent inlet or outlet and no viable populations of predatory fish" (Chapter 335 §9). "Significant vernal pools" are recognized by the presence of fairy shrimp (Eubrandhipus spp.), or specific numbers of blue spotted salamander (Ambystoma laterale), spotted salamander (Ambystoma maculatum) or wood frog (Lithobates sylvaticus) egg masses; in central Maine, MDIFW guidelines recommend evidence of these species be observed between April 25th and May 25th. Vernal pools documented to be used by state-listed rare, endangered or threatened species such as Blanding's turtles (Emydoidea blanddingii), spotted turtles (Clemmys guttata), boghaunter dragonflies (Williamsoni fletcheri, W. interni), Eastern ribbon snakes (Thamnophis sauritus), wood turtles (Clemmys insculpta), four-toed salamanders (Hemidactylium scutalum), swamp darner dragonflies (Epiaeschna heros), and comet darner dragonflies (Anax longipes), are also considered to be "significant vernal pool habitat" (Ch 335 §9B 1-4).

Under the provisions of Section 404 of the federal Clean Water Act, the USACE regulates activities in "waters of the United States," which include vernal pools. Vernal pools are defined by the New England District of the USACE in the General Permit (GP) for the state of Maine reissued on October 13, 2015. The USACE definition, while very similar to the MDEP's does not reference "natural" and does not recognize or differentiate significant vernal pools based on number of certain egg masses. Instead, the GP definition indicates: "…the presence of any of the following species in any life stage in any abundance level/quantity would designate the waterbody as a vernal pool: fairy shrimp, blue spotted salamanders, spotted salamanders or wood frogs. The Corps may determine during a Category 2 Review that a waterbody should not be regulated as a vernal pool based on available evidence."

Activities in and adjacent to certain types of vernal pools are regulated by the MDEP under the provisions of the NRPA. The extent of this jurisdiction can be as far as 250 feet outward of what are referred to as "significant vernal pools" Chapter 335 §9A(7)) to encompass "critical terrestrial habitat." Under the Maine GP, the USACE also regulates activities in vernal pools and outward from the perimeter for a distance of as much as 750 feet to encompass what is referred to as the "VP management area." Therefore, the spring 2018 screening provides information relevant to amphibian habitat surrounding vernal pools as well as a preliminary indication of the potential extent of regulatory jurisdiction.

Due to these differences in definitions which result in dissimilar approaches to regulatory jurisdiction, the following classification was established for the spring 2018 survey for vernal pools and vernal pool-like features occurring at each of the six Compensation Tracts. Although several rounds of surveys took place during May through June at LJPT, the classification was also developed to account for the brief, solitary reconnaissance-level surveys conducted during early June for the substantially larger tracts in the northern region along the Kennebec and Dead Rivers.

- **SVP** – "S***ignificant Vernal Pool***": Meets MDEP definition (Ch 335 (9)) with appropriate number of indicator egg masses.
- **PSVP** – **Potentially Significant Vernal Pool**: Meets MDEP definition except with >50% required number (i.e., not 100%) of indicator egg masses.
- **VP** – **Vernal Pool**: Meets MDEP definition except <50% required number (i.e., not 100%) or no indicator species egg masses.
- **CVP** – **Corps Vernal Pool**: Occurs in "*waters of the United States*" (WOTUS), typically in areas of disturbance (i.e., not "natural" per MDEP definition) such as skidder/ATV ruts, and contains indicator species egg masses. The other above forms of vernal pools are also subject to USACE jurisdiction.
- **PVP** – **Potential Vernal Pool**: exhibits depression/basin characteristics of VP or CVP but due to brief solitary survey, no other finding made (typically PVPs are reviewed again during a second survey).
- **ABA** – **Amphibian Breeding Area**: Not a MDEP vernal pool, not in USACE WOTUS (therefore, not regulated) but feature (i.e., mud puddle, rut in upland) contains any number of indicator egg masses.

Based on the observation of qualified wetland scientists, these resources have been tentatively identified as high, medium, or low value in accordance with the USACE Mitigation Guidance, but they are not proposed to offset vernal pool impact within the Project areas because they have not been verified. For this reason, CMP's compensation plan provides compensation in the form of ILF.

The boundaries of the wetlands and location of streams/waterbodies, vernal pools, and other natural resources on the Compensation Tracts were delineated in the field with colored flagging. Flagging positions and data point locations were recorded using a Trimble Geo XT mapping-grade GPS unit with positional data post-processed to sub-meter accuracy for transfer onto GIS-based mapping of natural resources on the individual Compensation Tracts.

1.4.5 Rare, Threatened, and Endangered Species

Numerous plant and animal species in Maine are considered rare, threatened, or endangered (RTE) and are protected under the federal Endangered Species Act of 1973 (16 United States Code [U.S.C.] §§ 1531 et seq.), the Maine Endangered Species Act, and/or the Maine Natural Areas Program (MNAP) statute (12 M.R.S. §§ 544, 544-B & 544-C). Under the federal Endangered Species Act, 'endangered' means a species is in danger of extinction throughout all or a significant portion of its range; 'threatened' means a species is likely to become endangered within the foreseeable future. Under the Maine Endangered Species Act, species of 'special concern' are administrative categories established by policy, not regulation, and are for planning and informational purposes (MDIFW 2009). Updated records of federally- and state-listed RTE species are maintained by the USFWS and MNAP, respectively. The online tool created by the USFWS, Information for Planning and Consulting (IPaC), generates a register of any listed species, critical habitat, migratory birds, or other natural resources that occur within the roject boundaries provided by the user. MNAP assesses rareness of plants and animals through analysis of historical research, field surveys, and evaluation by professionals; these assessments are updated biennially.

Regarding the compensation parcels evaluated within the scope of this Project, five of six tracts (FLT, PPT, GFT, LET, and BT) occur in Somerset County, and the remaining tract (LJPT) is in Kennebec

County. Lists of the RTE plant species currently and/or historically known to occur in Somerset and Kennebec Counties were compiled using publicly available information from the MNAP Rare Plant List and Rare Plant Fact Sheet. Of the 347 RTE plant species currently tracked in Maine, a total of approximately 87 species are found or have been found in Somerset County, and a total of approximately 36 are found or have been found in Kennebec County. Given that RTE plant species often have high coefficients of conservatism (a 0 through 10 metric of the Floristic Quality Index of plants native to a region) and are thus associated with specific ecological niches, each of these species was filtered by habitat preference to estimate potential of occurrence. Plants found in habitats not present on any of the tracts (such as, but not limited to, alpine, estuarine, and coastal environments) were disregarded. While surveys for rare species were not formally conducted, species with phylogenetic affinity to those on the RTE list were given appropriate scrutiny. Preliminary observations of plants were noted and appear in Appendix B for each tract. Due to the scope and the schedule of the Project, as well as to variations in phenology and time limitations, identification of all plants on the tracts was not possible.

An informal list of endangered animals was compiled for each tract (Appendix A) using the IPaC program from the USFWS website. Although not considered an official list for the purposes of permitting, the list provided a guideline for surveyors to look for evidence of these species. Observations of animal signs were documented, and details are included in the wildlife section of each tract. Migratory birds and songbirds were identified based on sight or auditory call.

1.5 Functional Assessments

A *Descriptive Approach* to assessing wetland functions and values, described in a September 1999 supplement (the Supplement) to *The Highway Methodology Workbook* by the New England Division of the USACE (USACE-NED 1999), is an assessment method recognized and accepted by the MDEP. Functions and values of wetlands on Compensation Tracts have been evaluated by this method and are summarized below. As described in Section 12 of the September 27, 2017 NRPA permit application, the same assessment method was used to evaluate all wetland areas under state or federal jurisdiction that may be impacted by the NECEC Project. Specific functions and values determined to be provided by wetlands at individual Compensation Tracts are discussed in subsequent sections.

The Supplement indicates "*Wetland functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society.*" Wetland functions relate to the ecological significance of wetland properties without regard to subjective values. Wetland functions are generally considered to be the result of biologic, geologic, hydrologic, biogeochemical, and/or physical processes that occur or take place in a wetland. Functions and values of wetlands are dependent on, and influenced by, various physical characteristics at the site, which are indicative of relative levels of function and value. These include: size and proximity of wetlands to ongoing development activity, geologic setting, soil characteristics, presence and duration of hydrology, landscape position, and wetland cover type. Consequently, the effects of changes to these physical characteristics are evaluated in assessing whether an activity or project impacts wetland-specific functions and values.

Functions attributed to wetlands include the following:

- Groundwater Recharge/Discharge (**GW**) – considers the potential for a wetland to serve as a groundwater recharge or discharge area.
- Floodflow Alteration (Storage & Desynchronization) (**FS**) – considers the effectiveness of a wetland in reducing flood damage by water retention for prolonged period following precipitation event and the gradual release of floodwaters. It adds to the stability of the wetland ecological

system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

- Fish and Shellfish Habitat (**FH**) – considers the effectiveness of seasonal or permanent watercourses associated with the subject wetland for fish and shellfish habitat.
- Sediment/Toxicant/Pathogen Retention (**STPR**) – considers the effectiveness of a wetland as a trap for sediments, toxicants or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas such as preventing ill effects of nutrients entering aquifers or downstream surface waters.
- Nutrient Removal/Retention/Transformation (**NR**) – considers the effectiveness of a wetland as a trap for nutrients in runoff water from surrounding uplands or upstream eroding wetland areas the ability of the wetland to process these nutrients in other forms or trophic levels and thereby functioning to reduce or prevent degradation of water quality.
- Production (Nutrient) Export (**PE**) – evaluates the effectiveness of a wetland to produce food or usable products for humans or another living organism.
- Sediment/Shoreline Stabilization (**SS**) – considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.
- Wildlife Habitat (**WH**) – considers the effectiveness of a wetland to provide habitat for various types and populations of animals (resident and migratory) typically associated with wetlands and the wetland edge.

Wetland values are generally considered to be benefits derived from either these functions or other characteristics of a wetland. Perceived values arise from the functional ecological processes exhibited by wetlands but are determined also by human perceptions, the location of a particular wetland, the human pressures on a wetland, and the extent of the resource (Mitsch and Gosselink 1993). The value of a particular function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions. Values attributed to wetlands include the following:

- Recreation (**REC**) – considers the suitability of a wetland and associated water courses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting and other active or passive recreational activities.
- Education/Scientific Value (**ED**) – considers the suitability of the wetland as a site for an "outdoor classroom," or as a location for scientific study or research.
- Uniqueness/Heritage (**UQ**) – considers the effectiveness of a wetland or its associated waterbodies to provide certain special values, that may include archaeological sites, critical habitat for endangered species, and its overall health and appearance, role in the ecological system of the area, and relative importance as a typical wetland class for this geographic location whereby these functions are clearly valuable attributes relative to aspects of public health, recreation and habitat diversity.
- Visual Quality/Aesthetics; and (**VQ**) – considers the visual and aesthetic quality and usefulness of a wetland.
- Threatened or Endangered Species Habitat (**ES**) – considers the suitability of a wetland to support threatened or endangered species.

The functions and values identified above may vary slightly in terminology, but encompass all the functions identified in, and addressed by, the NRPA Wetland Protection Rules. As defined in these Rules, "functions" are:

The roles wetlands serve which are of value to society or the environment, including but not limited to, flood storage, flood water conveyance, ground water recharge and discharge, erosion control, wave attenuation, water quality protection, scenic and aesthetic use, food chain support, fisheries, wetland plant habitat, aquatic habitat and wildlife habitat (Chapter 310 §3J).

A basic concept presented by the Supplement is an identification of "Considerations/Qualifiers" that can be used as indicators or descriptors of the presence of particular functions or values. From as few as three to as many as 32 of these "Considerations/Qualifiers" are identified in Appendix A of the Supplement for each of the respective wetland functions and values. These "Considerations/Qualifiers" therefore become a checklist or outline of indicators of functions and values for wetland scientists to observe, compare against, and structure assessments. The Supplement indicates these "Considerations" are intended to be flexible and are ultimately based on "best professional judgment." Consequently, as described in Section 12 of the September 27, 2017 NRPA permit application, the effects of changes to these physical characteristics have also been evaluated for these same wetland-specific functions and values by the NECEC Project.

2.0 LITTLE JIMMIE POND–HARWOOD TRACT

2.1 Site Location Information

Municipality: Manchester **County:** Kennebec

Biophysical Region: Central Interior

Watershed (HUC 12): Upper Cobbosseecontee Stream (010300032308)

NECEC Components within HUC 8 (01030003) Watershed: HVDC, Existing Right-of-Way

Closest NECEC Component: Corridor Expansion Site (Livermore Falls)

Coordinates of Site Centroid (Lat/Long WGS 84): 44°16'18.21"N, 69°52'23.75"W

2.2 Natural Resource Inventory Summary (quantities are +/-):

Total Site Area .....109.77 acres

NWI Palustrine Wetland Area.....75.01 acres

Delineated and GPS-surveyed Palustrine Wetland Area..... .....68.08 acres

NHD Rivers and Streams..... 2,410 feet (0.46 mile)

Delineated and GPS-surveyed Rivers and Streams.....3,030 feet (0.58 mile)

Upland Area.....41.69 acres

Inland Waterfowl and Wading Bird Habitat (Moderate Value)……....71.92 acres

Significant Vernal Pools.....none

Other Vernal Pool Types……...2 high value PSVPs, 6 medium value VPs, 1 low value VP

Vernal Pool Critical Terrestrial Habitat (750 feet)..... 81.84 acres

Deer Wintering Area……..…….0.5 acre

2.3 Site Description

The approximately 109.77-acre Little Jimmie Pond-Harwood Tract (hereafter “LJPT” or “the Tract”) is in Manchester, Maine approximately 4.7 miles from the state capitol in Augusta. LJPT is comprised of distinct western and eastern parcels. The Tract has about 710 feet of frontage on the south side of Collins Road that borders the north end of Hutchinson Pond and extends to the west toward Benson Road (Figure 2.1).

The northern side of the western parcel shares an approximately 1,200-foot boundary with the MDIFW 886-acre Jamie’s Pond Wildlife Management Area (WMA) which in addition to hunting and fishing opportunities, provides a network of trails that are quickly accessed by the daily commuters and citizens in surrounding communities (Capital Walks 2008).

With approximately 900 feet of frontage on Hutchinson Pond, the east parcel is located approximately 800 feet north of the 81-acre Hutchinson Pond property that was protected and preserved as compensatory

mitigation for Central Maine Power Company's Maine Power Reliability Program (MPRP) Project and is now managed by the Kennebec Land Trust (KLT 2018). Wetlands on the eastern parcel extend southward along the intervening distance between the LJPT and the KLT properties.

2.4 Surrounding Land Use, Protected Open Space and Focus Areas

Surrounding lands in the general vicinity of the LJPT are primarily forested, with residential homes, small fields, and secondary roads scattered throughout the area. The Tract frontage on Collins Road would provide an access point to the property for future development. The property is approximately 12.7 miles from Exit 109 on Interstate 95 (I-95) in Augusta, and therefore is at risk for future development given its relatively close proximity to the greater capital area. The developable land is field-verified, forested upland in and around wetland areas of various cover types. Approximately 20 acres (18%) of the Tract harbors the potential for Rural/Residential (R1) housing development (Figure 2.2). The minimum lot size for the R1 zone in Manchester is about two acres (Town of Manchester 2017), allowing for an estimated 10 homes to be built.

LJPT is hydrologically connected via the outlet of Hutchinson Pond to Cobbosseecontee Stream and ultimately the Kennebec River. Immediately to the east of the tract on the opposite side of Benson Road is Beginning with Habitat's Cobbossee–Annabessacook Focus Area (BWH 2018a). The focus area is comprised of extensive areas of wetlands that provide habitat for wintering deer, rare species, and outstanding habitat for wading birds and waterfowl. Rare plants and animals noted in the focus area include water stargrass (*Heteranthera dubia*), least bittern (*Ixobrychus exilis*), and ribbon snake (*Thamnophis sauritus*).

The location of the LJPT in proximity to ecological focus areas, conservation lands, and protected wildlife areas provide enhanced value to the property from a protected land standpoint, primarily due to connectivity with these other parcels that will provide greater habitat functionality at a landscape scale. The current lack of development in the surrounding landscape and proximity to protected lands provides large buffer areas which augment the overall ecological functions of the property, specifically the diverse set of wetland systems located on site.

2.5 Wildlife Use

Evaluations of the landscape (i.e., aerial photo interpretation) and on-site investigations were performed to document both wildlife use and available habitat on the Tract. The presence of variable habitat types across the Tract makes it an attractive landscape for a wide variety of fauna. Habitat types found on LJPT include forested uplands comprised of mixed vegetation, emergent wetland marsh (Photos 2.1 and 2.2), scrub-shrub wetlands (Photo 2.3), forested wetlands (Photo 2.4), black spruce bog (Photo 2.5), streams, and seasonally flooded wetlands.

The variable habitat on LJPT, such as mixed forests, scrub-shrub, emergent marsh, forested wetlands, and uplands, provides opportunity for a wide variety of bird species that are typically found in the greater central Maine region. Game birds such as ruffed grouse (*Bonasa umbellus*) and wild turkeys (*Meleagris gallopavo*) were both heard and observed on the Tract. Variation in cover types provides habitat for a variety of raptors, owls, woodpeckers and passerine species. During site survey efforts, a bald eagle (*Haliaeetus leucocephalus*) was observed in flight over Hutchinson Pond near the southeastern end of the east parcel. Mapped IWWH is available in the large marsh on the north end of Hutchinson Pond (Figure 2.2). Two American bitterns (*Botaurus lentiginosus*) were observed and heard calling from the marsh during field surveys. In the open water sections of the marsh, common loon (*Gavia immer*), mallard (*Anas platyrhynchos*) and black ducks (*Anas rubripes*) were noted. Beaver (*Castor canadensis*) activity was

observed in the marsh with recent tree cuttings, dam building activity and an active lodge (Photo 2.2). An adult barred owl (*Strix varia*) with two fledglings was also observed in the forested upland along the western edge of the marsh. Other birds observed or heard calling during field surveys included oven bird (*Seiurus aurocapilla*), winter wren (*Troglodytes hiemalis*), black capped chickadee (*Poecile atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), pileated woodpecker (*Hylatomus pileatus*), hairy woodpecker (*Leuconotopicus villosus*), downy woodpecker (*Picoides pubescens*), red wing blackbird (*Agelaius phoeniceus*), great blue heron (*Ardea herodias*), and multiple warbler species.

There are numerous vernal pools of varying sizes, depths, and types located on LJPT. Some of these pools fit the classic definition of a vernal pool (i.e., isolated depressions surrounded by upland forest) while others are topographic depressions within larger wetland complexes. For instance, numerous depressional vernal pools (Photos 2.7 and 2.8) are located within topographic lows of the black spruce bog on the west parcel. During springtime vernal pool investigations, wood frogs (*Lithobates sylvaticus*) and spotted salamander (*Ambystoma maculatum*) were noted as actively breeding in pools on site, as per the presence of their respective egg masses. Two were rated as high value PVPs, six as medium value VPs and one as a low value VP. Other herptiles observed at LJPT include garter snakes (*Thamnophis* spp.), green frog (*Lithobates clamitans*), bull frog (*Lithobates catesbeianus*), American toad (*Anaxyrus americanus*) and northern leopard frog (*Lithobates pipiens)* were also noted.

There are approximately 3,030 linear feet of stream and two beaver impoundments on the Tract. Two of the streams (totaling 620 feet in length) are relatively small, approximately two to three feet wide, with intermittent flow. Each stream drains through forested wetlands into the large emergent marsh in the east parcel. The remaining length is a larger perennial stream that flows beneath Collins Road onto the Tract's east parcel and then through the emergent marsh into Hutchinson Pond at the southeastern corner of LJPT. This approximately 20 feet wide, straightened stream is ponded in areas by beaver impoundments (Figure 2.3).

Due to the diverse range of habitats on the LJPT along with its direct connection and close proximity to other conserved lands in the area, a wide range of mammal species typically found in the central Maine region can utilize the Tract. On site surveys noted the presence of snowshoe hare (*Lepus americanus*), beaver, porcupine (*Erethizon dorsatum*), raccoon (*Procyon lotor*), white-tail deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), and red squirrel (*Sciurus vulgaris*). A preliminary review of the property using the USFWS online IPaC system was conducted to evaluate potential presence of federally threatened or endangered species. The results of the IPaC review appear in Appendix 2A.

2.6 Vegetation

LJPT consists of a variety of vegetative communities (Appendix 2B) which provide different cover types and habitat characteristics. The property is primarily composed of mature wetland and upland forests, portions of which include predominantly coniferous and mixed coniferous-deciduous forest. There are large areas of emergent marsh located in the east parcel. Of note is a black spruce (*Picea mariana*) bog on the eastern area of the west parcel.

Dominant tree species in the mixed evergreen-deciduous upland forests of the west parcel are eastern hemlock (*Tsuga canadensis)* and American beech (*Fagus grandifolia*). The shrub stratum contains saplings of the above-mentioned tree species, as well as American witch hazel (*Hamamelis virginiana*) and striped maple (*Acer pensylvanicum*). Common herbaceous plants in the understory consist of violet (*Viola* spp.), wood sorrel (*Oxalis montana*), starflower (*Lysimachia borealis*), Canada mayflower

(*Maianthemum canadense*), evergreen wood fern (*Dryopteris intermedia*), and prickly tree club-moss (*Dendrolycopodium dendroideum*).

Dominant tree species in the mixed evergreen-deciduous upland forest enveloped by the emergent marsh (PEM) of the east parcel include red maple (*Acer rubrum*), eastern white pine (*Pinus strobus*), balsam fir (*Abies balsamea*), ironwood (*Carpinus carolinianus*), gray birch (*Betula populifolia*), and white ash (*Fraxinus americana*). The shrub stratum in this area consists of saplings of the aforementioned tree species. The understory consists primarily of New York fern (*Parathelypteris novaboracensis*), brackenfern (*Pteridium aquilinum)*, sarsaparilla (*Aralia nudicaulis*), Canada mayflower, and starflower.

The emergent marsh (PEM) on the eastern section of the east parcel is predominantly composed of tussock sedge (*Carex stricta*) and bluejoint grass (*Calamagrostis canadensis*). The shrub stratum occurs in the ecotone between open wetland and upland forest and consists primarily of meadowsweet (*Spiraea alba* var. *latifolia*), smooth arrow-wood (*Viburnum dentatum*), and speckled alder (*Alnus incana* ssp. *rugosa*).

In the black spruce bog (PFO4/1), the dominant tree species are black spruce and red maple. The shrub layer consists of Labrador tea (*Rhododendron groendlandicum*) and common winterberry (*Ilex verticillata*), along with a mix of eastern hemlock, black spruce, and eastern white pine saplings. The herbaceous layer is comprised predominantly of barber-pole bulrush (*Scirpus microcarpus*), cinnamon fern (*Osmundastrum cinnamomeum*), common woolsedge (*Scirpus cyperinus*), three-seeded sedge (*Carex trisperma*), rough bedstraw (*Galium asprellum*), marsh fern (*Thelypteris palustris*), and poison ivy (*Toxicodendron radicans* ssp. *radicans*). Common nonvascular plants present include various species of *Sphagnum* mosses.

Forested wetlands (PFO1) are dominated by eastern hemlock, red maple, balsam fir, and yellow birch (*Betula alleghaniensis*). The typical shrub understory includes yellow birch saplings. Dominant herbs, grasses, and graminoids are sensitive fern (*Onoclea sensibilis*), cinnamon fern, interrupted fern (*Osmunda claytonia*), violet, bladder sedge (*Carex intumescens*), and silvery sedge (*Carex canescens*).

Along the northwestern corner of the western parcel, there is a beaver impounded open water area with a mix of live and standing dead snags of red maple. The herbaceous layer consists primarily of three-seeded sedge, common wool sedge, common soft rush (*Juncus effusus*), broadleaf cattail (*Typha latifolia*), and bur-reed (*Sparganium* spp.). Floating aquatic plants present are common duckweed (*Lemna minor*).

There were no observations of invasive plant species within the wetlands located on the LJPT. The lack of invasive species within the wetlands on site generally increases the overall functions of each wetland system.

2.7 Wetland Characteristics, Functions and Values

Approximately 68.08 acres (62%) of the 109.77-acre LJPT were identified as wetland during the field survey effort. The primary wetland system on the eastern parcel (Photos 2.1, 2.2, and 2.3) is a large emergent marsh (PEM) located on the northern end of Hutchinson Pond at the southeast corner of the parcel. The portion of the marsh located on the LJPT totals approximately 50.5 acres. A perennial stream flows from the northern property boundary through the large marsh and into Hutchinson Pond (L1UB). The stream flow is relatively low velocity that has further slowed to a ponded condition by an active beaver dam. This creates outstanding wildlife habitat for inland wading birds and waterfowl (IWWH) rated as moderate value by MDIFW. The marsh is surrounded by a perimeter of scrub-shrub wetland (PSS) that transitions into forested wetland in most locations before ultimately becoming upland forest

both along the western marsh edge and within the large section of upland in the center of the marsh. The transitional habitat between open water, emergent marsh, scrub-shrub, forested wetland, and upland forest provides a high degree of vertical stratigraphy in vegetation that further enhances wildlife function for numerous species of amphibians, reptiles, birds, and mammals.

A deer wintering area is located between the west and east parcels and the based on the exent of confierous cover the approximately one-half acre mapped to occur on the west parcel (Figure 2.3) is likely to be larger. Numerous established hunting tree stands were noted along the edge of the emergent marsh in the east parcel. Hunting stands were also observed in the upland areas around the marsh to the west. Established game trails along with tracks, droppings, and tree rubs from white tail deer suggest that the east parcel is a productive location for hunting activities. Other hunting activities would include turkey, grouse, and waterfowl due to the proximity to Hutchinson Pond and the open water sections of the emergent marsh.

In addition to hunting, the frontage along the northern end of Hutchinson Pond in the east parcel would provide opportunity for other recreational activities such as canoeing or fishing. According to MDIFW, Hutchinson Pond is a warm water fishery with principal species of largemouth bass (*Micropterus salmoides*) and chain pickerel (*Esox niger*). In addition to warm water species, MDIFW annually stocks brook trout (*Salvelinus fontinalis*) in Jimmie Pond to the north of LJPT. During spring and fall seasons when water temperatures are adequate, it is likely that brook trout migrate south through the perennial stream connecting Jimmie Pond to Hutchinson Pond, offering an opportunity for trout fishing both in the stream and Hutchinson Pond.

The primary wetland system on the west parcel is an approximately eight-acre black spruce bog (Photo 2.5). The bog is comprised of a mix of deciduous and coniferous trees, primarily black spruce and red maple, with dense shrub and herbaceous layers. The dense understory provides habitat for various birds, amphibians, and mammals.

The soils in the lowland portions of the site are comprised primarily of organic materials underlain with glaciomarine sediment. Organic soils (Togus fibrous peat) are located in both the emergent marsh and the black spruce bog. Mineral soils (Paxton-Charlton very stony fine sandy loams and Ridgebury very stony fine sandy loam) are found in the remaining wetlands on site and are primarily derived from very stony glacial till that has a dense restrictive layer which impedes stormwater penetration and perches runoff. Portions of the site at higher elevations are derived from moderately deep glacial tills (Woodbridge very stony fine sandy loam) which are moderately well drained.

There were no observations of invasive plant species within the wetlands located on the LJPT. The lack of invasive species within the wetlands on site generally increases the overall functions of each wetland system.

The principal functions and values of the wetlands located on LJPT are wildlife habitat, nutrient removal, sediment/toxicant retention, recreation, flood flow alteration, groundwater recharge/discharge, and production export. The primary wetland systems in the east and west parcels both function to maintain/improve water quality. Both ultimately drain to the Kennebec and attenuate floodwaters by temporarily storing storm water runoff resulting in enhanced sediment and shoreline stabilization as well as nutrient removal and sediment retention. A summary of the functions and values for the wetlands on LJPT appears in Table 2.1.

TABLE 2-1 SUMMARY OF FUNCTIONS AND VALUES OF WETLANDS ON THE 109.77-ACRE LITTLE JIMMIE POND-HARWOOD TRACT

FUNCTION / VALUE	EXPLANATION
Groundwater Recharge/Discharge (GW)	Groundwater recharge was noted as a primary function for the black spruce bog in the west parcel of LJPT as well as in the smaller isolated, seasonally flooded wetlands located throughout the Tract. Groundwater discharge was noted in the forested wetlands that are connected to the large emergent marsh in the east parcel as well as the black spruce bog and larger wetland system off-site to the west of LJPT.
Flood flow Alteration (FF)	The most recent FIRM for this part of Manchester (Community Panel Nos. 23011 C0494D, C0513D effective date June 6, 2011), prepared FEMA identify a 100-year floodplain associated with Inlet Stream that encompasses the wetland southward from Collins Road to Hutchinson Pond (HP). On the west side of the parcel, wetlands are hydrologically connected to HP, and therefore also contribute to the function of flood flow alteration.
Fish and Shellfish Habitat (FH)	Surveys conducted by MDIFW indicate HP has abundant warm water fish habitat, principally for not only chain pickerel but also as a sport fishery for largemouth bass. Other species reported to occur in HP include white and yellow perch, pumpkinseed sunfish, baitfish and American eel. Brook trout are also stocked annually in Jimmie Pond to the north of the parcel and likely migrate south into Hutchinson Pond during spring and fall when water temperatures are adequate.
Production Export (PE)	The diverse vegetation observed on site provides plentiful seed and fruit sources for various species of wildlife. The eight vernal pools identified on site are also an important source of nutrient production and export within the local ecological system.
Sediment/Toxicant/ Pathogen Retention (STPR)	Open water and emergent marsh habitats in the west parcel have suitable organic and/or fine grain soils, slow moving water, variable water depths, flood storage capacity, and dense vegetation that are important and effective aspects of sediment, toxicant, and pathogen retention. The organic soils and long duration water retention time present in the black spruce bog in the west parcel also are important factors in sediment, toxicant, and pathogen reduction.
Nutrient Removal (NR)	Organic soils and dense vegetation in both the emergent marsh and black spruce bog on the LJPT are effective in performing this function. Storm water runoff from uplands and small ephemeral streams that drain into the wetlands is dissipated within the organic soils and dense vegetation where nutrients carried with the runoff are processed into other forms and transferred to higher trophic levels in the ecosystem.
Sediment/Shoreline Stabilization (SS)	The emergent marsh in the east parcel is in a mapped floodplain and contains a riparian buffer area comprised of scrub-shrub wetland that transitions into forested wetland. The wetlands around the perimeter of the marsh are an important component of floodwater attenuation and help to provide overall stability for downstream water resources such as HP.
Wildlife Habitat (WH)	Wetlands on the LJPT are comprised of a diverse mix of vegetative communities, wetland classes, and water regimes. The variety and lifeforms of vegetation provide suitable habitat for a multitude of birds, reptiles, amphibians, insects, and mammals. Moderate value IWWH (ID 031056) in the large marsh on the east parcel provides outstanding habitat for these species of birds. DWA is also identified on BWH maps in the forested area between the east and west parcels (Figure 2.2). Upland areas associated with the wetlands provide additional habitat for various species which utilize a mix of wetland and upland habitats or those that typically utilize uplands as their primary habitat.
Educational/ Scientific Value (ED)	Wetlands on the LJPT are diverse and would therefore provide ample opportunities for ecological education and learning. The property is close to the greater Augusta area, as well as WMA to the north and an existing conservation land parcel to the south. The quality and type of wetlands on the property, soil types, diverse vegetation communities, and presence of numerous vernal pools would provide a vast array of educational opportunities for the public.
Recreation (REC)	LJPT has access opportunities from Collins Road. Numerous recreational opportunities are available on the property including, fishing, hunting, hiking, boating, and bird watching

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2.8 Compensation

As part of the compensation package for NECEC, the approximately 109.77-acre Little Jimmie Pond Tract will be permanently protected by a conservation easement or similar instrument. Preservation of this property will include 66.97 acres of diverse wetland habitat, 3,030 linear feet of streams, nine vernal pools, and 81.24 acres of vernal pool critical terrestrial habitat (Figure 2.3). Considering the Tract's proximity to Augusta, current zoning, road frontage, and available upland area, LJPT is at risk of development for residential housing and the potential associated adverse impacts. Preservation of the Tract will allow for permanent protection from development and will preserve the existing recreational opportunities, wildlife habitat, water quality benefits, vernal pool habitat, and educational opportunities of LJPT.

2.9 Photographs

PHOTO 2-1 THE EMERGENT MARSH (PEM) ON THE EASTERN SIDE OF PARCEL IS PART OF THE IWWH

PHOTO 2-2 RECENT BEAVER ACTIVITY FLOODS THIS SECTION OF EMERGENT MARSH

PHOTO 2-3 WESTWARD VIEW OF EMERGENT/SCRUB-SHRUB WETLAND (PEM/PSS), ANOTHER WETLAND COVER TYPE OF THE IWWH ON THE EAST PARCEL

PHOTO 2 A FORESTED WETLAND (PFO4/1) IS LOCATED WEST OF THE LARGE PEM

PHOTO 2-5 A BLACK SPRUCE BOG (PFO4/1) IS LOCATED ON THE WEST PARCEL OF LJPT

PHOTO 2-6 THIS FLOODED SECTION OF FORESTED WETLAND OCCURS ALONG THE WESTERN PROPERTY BOUNDARY

PHOTO 2-7 THIS POTENTIALLY SIGNIFICANT VERNAL POOL (PSVP-1) OCCURS ON THE NORTH SIDE OF THE WEST PARCEL.

PHOTO 2-8 THIS POTENTIALLY SIGNIFICANT VERNAL POOL (PSVP-2) IS LOCATED ON THE EAST PARCEL

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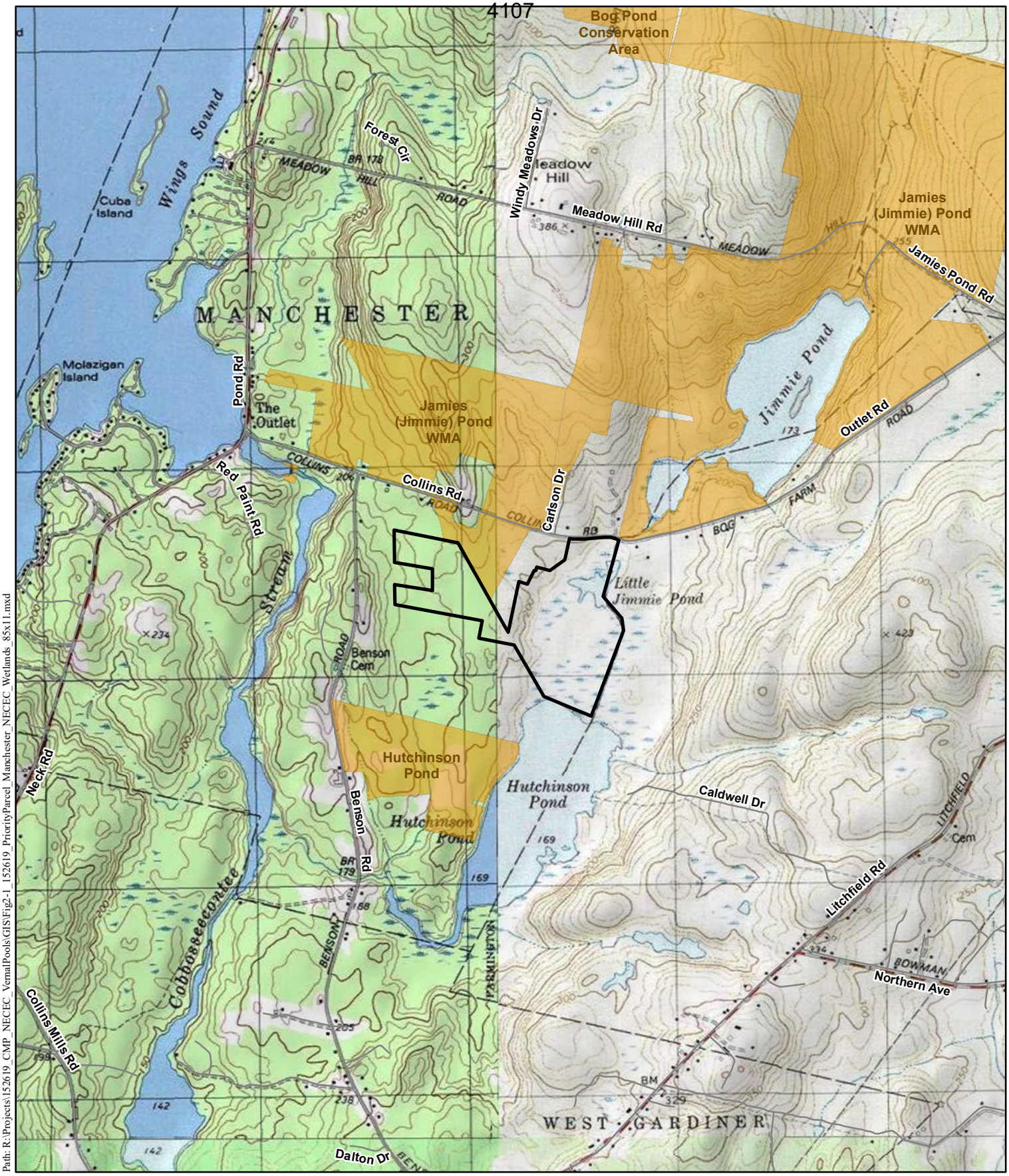

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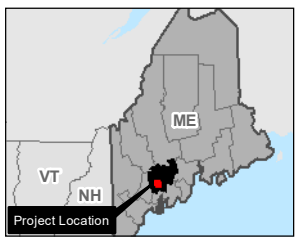

Road
Conserved Lands
Survey Boundary

N
W E
S

SCALE: 1 " = 2,000 '

0 1,000 2,000
Feet

Figure 2.1: Locus
Little Jimmie Pond
Harwood Tract

Kennebec County
Maine

Date:8/6/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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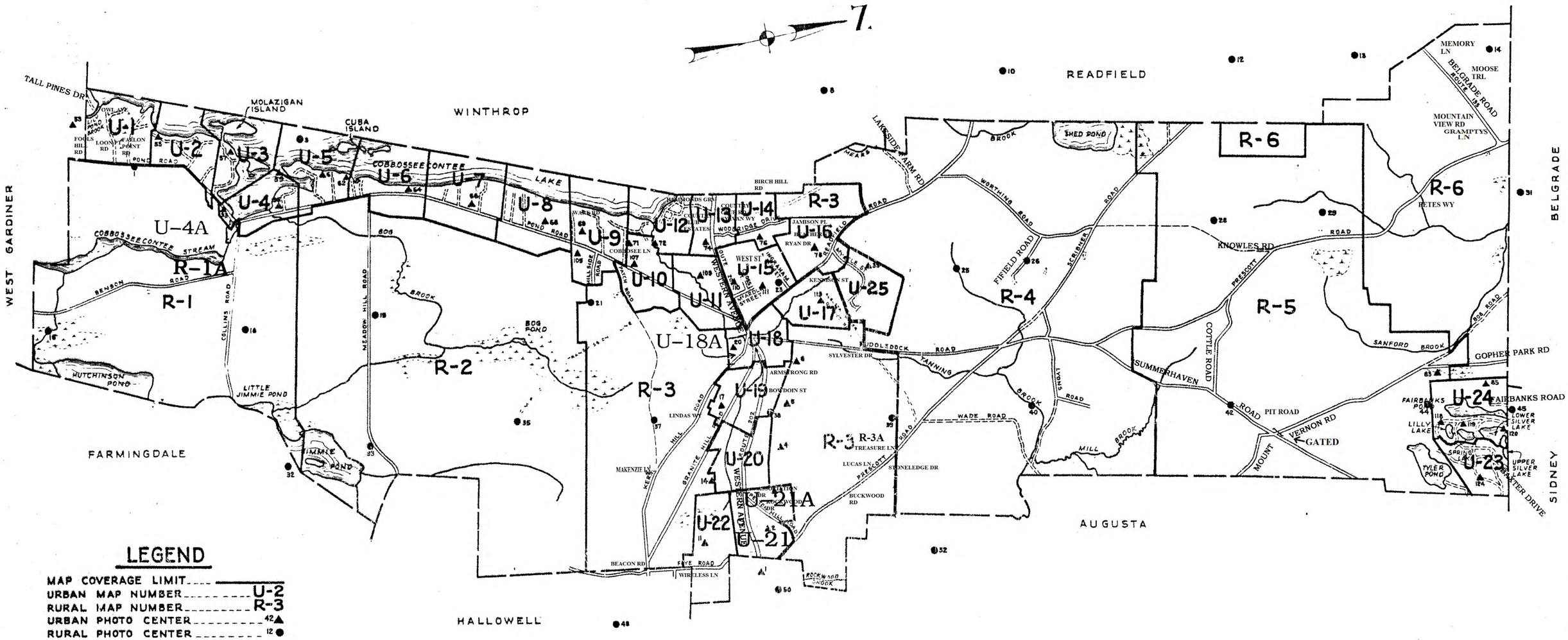

PREPARED BY
WRIGHT & PIERCE
CONSULTING ENGINEERS
TOPSHAM, MAINE
1968

MANCHESTER
MAINE

PROPERTY MAP
MANCHESTER, MAINE
APRIL 1, 2016

INDEX

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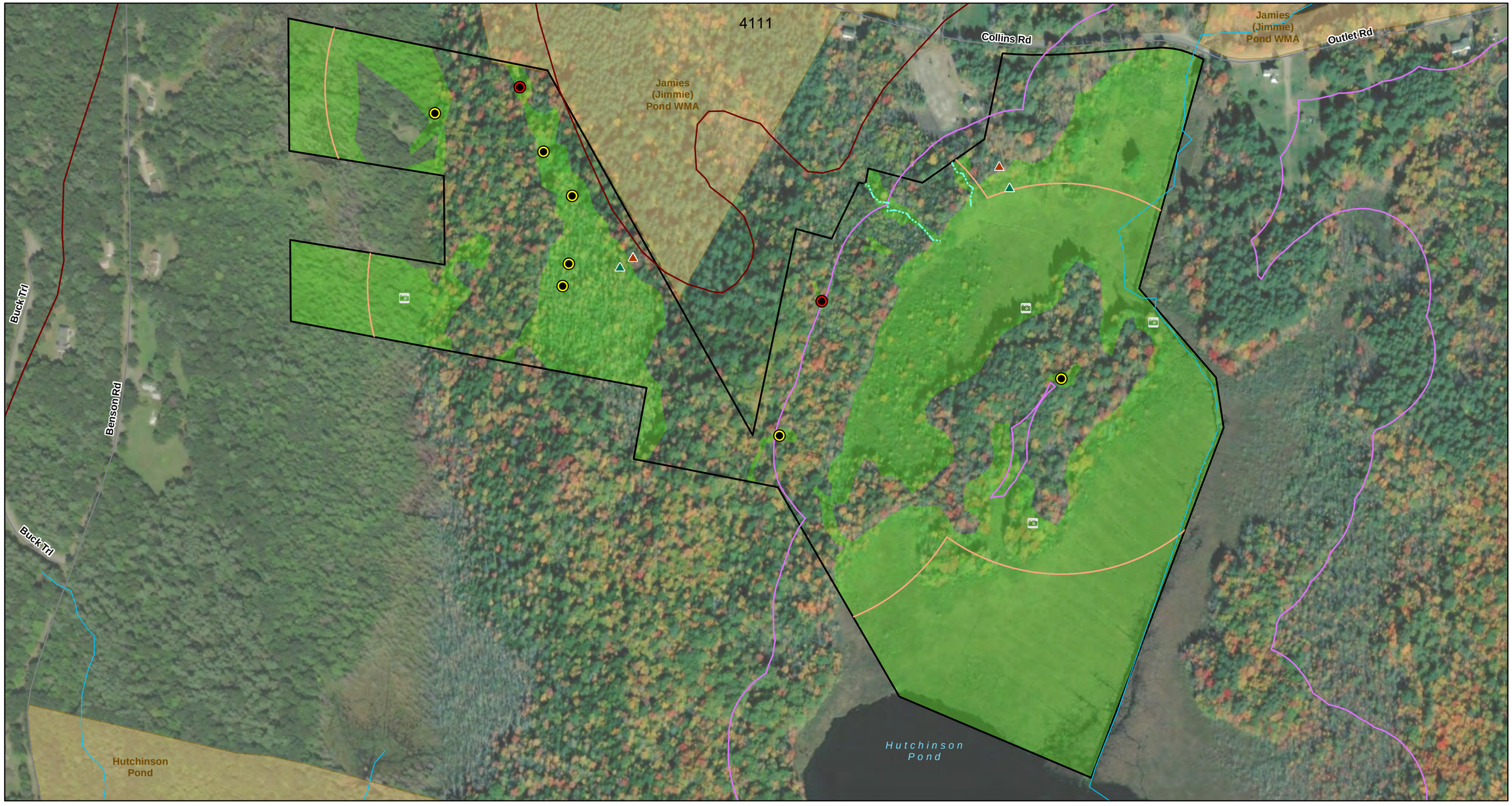

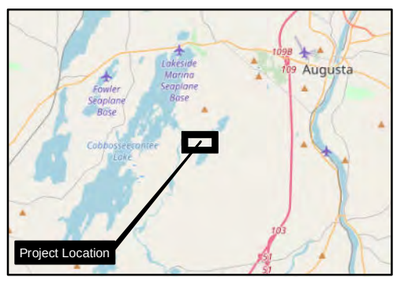

- Wetland Data Point
- Upland Data Point
- Potential Significant Vernal Pool
- Vernal Pool
- Photograph
- Delineated Ephemeral Stream
- Stream (NHD)
- Critical Terrestrial Habitat (750')
- DeerWinteringAreas
- Inland Waterfowl and Wading Bird Habitat
- Survey Area
- Road
- Delineated Wetland
- Conservation Land

Figure 2.3: Natural Resources
Little Jimmie Pond - Harwood Tract

Manchester Township, Kennebec County, Maine

0 175 350 700
Feet

1 " = 350 '

Page 1 of 1

Central Maine Power
NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER

POWER ENGINEERS

Date: 8/8/2018; Author: KK; Project: 152619

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APPENDIX 2A IPAC RESULTS: LITTLE JIMMIE POND–HARWOOD TRACT

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IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Project information

NAME

Compensatory Mitigation

LOCATION

Kennebec County, Maine

DESCRIPTION

Manchester

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

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MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species

[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

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Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Atlantic Salmon Salmo salar There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2097	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

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Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

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The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

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NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

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Canada Warbler Cardellina canadensis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Evening Grosbeak Coccothraustes vespertinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Olive-sided Flycatcher Contopus cooperi This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

NOT FOR CONSULTATION

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

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1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

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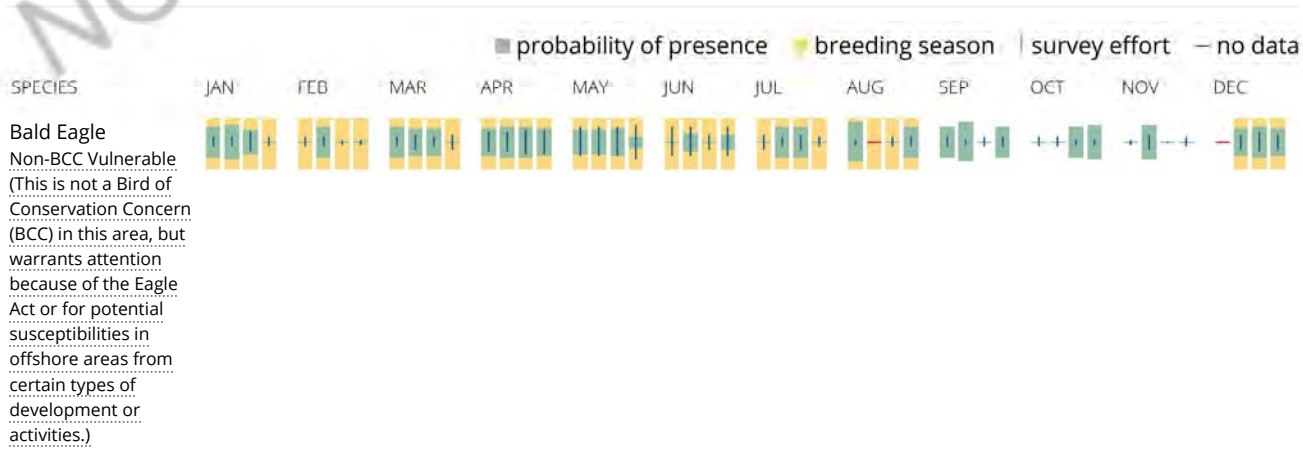

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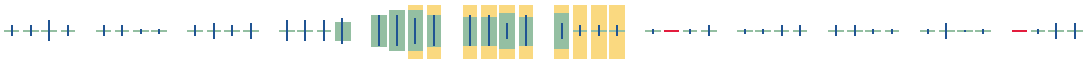
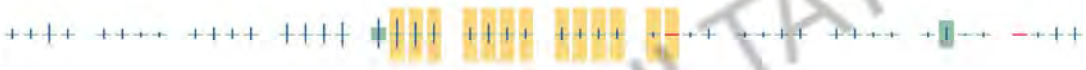
Black-billed Cuckoo
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Bobolink
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

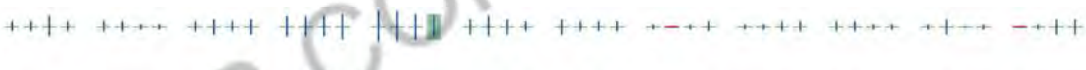


Canada Warbler
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Evening Grosbeak
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

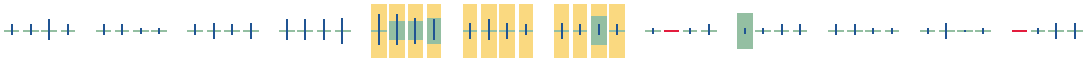


Lesser Yellowlegs
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Olive-sided Flycatcher
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prairie Warbler
BCC Rangewide (CON)
(This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



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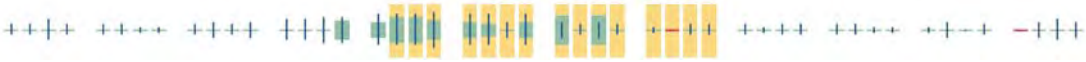
Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

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To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in

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knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1E

FRESHWATER FORESTED/SHRUB WETLAND

- PFO4E
- PFO4/1B
- PSS1E
- PFO1E
- PFO4/1E

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FRESHWATER POND

PUBHh

LAKE

L1UBH

RIVERINE

R2UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX 2B VEGETATION LIST: LITTLE JIMMIE POND–HARWOOD TRACT

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Abies balsamea	Balsam Fir	Pinaceae	FAC
Acer pennsylvanicum	Striped Maple	Aceraceae	FACU
Acer rubrum	Red Maple	Aceraceae	FAC
Alnus incana ssp. *rugosa*	Speckled Alder	Betulaceae	FACW
Aralia nudicaulis	Sarsaparilla	Araliaceae	FACU
Betula alleghaniensis	Yellow Birch	Betulaceae	FAC
Betula papyrifera	Paper Birch	Betulaceae	FACU
Betula populifolia	Gray Birch	Betulaceae	FAC
Calamagrostis canadensis	Bluejoint	Poaceae	OBL
Carex canescens	Silvery Sedge	Cyperaceae	OBL
Carex crinita	Fringed Sedge	Cyperaceae	OBL
Carex flava	Yellow Sedge	Cyperaceae	OBL
Carex intumescens	Bladder Sedge	Cyperaceae	FACW
Carex stricta	Tussock Sedge	Cyperaceae	OBL
Carex tribuloides	Blunt Broom Sedge	Cyperaceae	FACW
Carex trisperma	Three-seeded Sedge	Cyperaceae	OBL
Carpinus carolinianus	Ironwood	Betulaceae	FAC
Coptis trifolia	Three-Leaf Goldthread	Ranunculaceae	FACW
Dendrolycopodium dendroideum	Prickly Club-Moss	Lycopodiaceae	FACU
Dryopteris intermedia	Evergreen Wood Fern	Dryopteridaceae	FAC
Eleocharis erythropoda	Red-Footed Spike sedge	Cyperaceae	OBL
Equisetum fluviatile	Water Horsetail	Equisetaceae	OBL
Equisetum sylvaticum	Woodland Horsetail	Equisetaceae	FACW
Fagus grandifolia	American Beech	Fagaceae	FACU
Fraxinus americana	White Ash	Oleaceae	FACU
Fraxinus pennsylvanica	Green Ash	Oleaceae	FACW
Galium asprellum	Rough Bedstraw	Rubiaceae	OBL
Galium palustris	Marsh Bedstraw	Rubiaceae	OBL
Glyceria striata	Fowl Manna Grass	Poaceae	OBL
Hamamelis virginiana	American Witch-Hazel	Hamamelidaceae	FACU
Ilex verticillata	Common Winterberry	Aquifoliaceae	FACW
Impatiens capensis	Jewelweed	Balsaminaceae	FACW
Iris versicolor	Blue-Flag Iris	Iridaceae	OBL
Juncus effusus	Common Soft Rush	Juncaceae	OBL
Lemna minor	Common Duckweed	Lemnaceae	OBL
Lysimachia borealis	Starflower	Myrsinaceae	FAC

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Maianthemum canadense	Canada Mayflower	Ruscaceae	FACU
Medeola virginiana	Indian Cucumber-Root	Liliaceae	FACU
Onoclea sensibilis	Sensitive Fern	Onocleaceae	FACW
Osmunda claytonia	Interrupted Fern	Osmundaceae	FAC
Osmunda regalis var. *spectabilis*	Royal Fern	Osmundaceae	OBL
Osmundastrum cinnamomeum	Cinnamon Fern	Osmundaceae	FACW
Oxalis montana	Northern Wood Sorrel	Oxalidaceae	FACU
Parathelypteris novaboracenis	New York Fern	Thelypteridaceae	FAC
Picea mariana	Black Spruce	Pinaceae	FACW
Pinus strobus	Eastern White Pine	Pinaceae	FACU
Pteridium aquilinum	Bracken Fern	Dennstaeditaceae	FACU
Quercus rubra	Red Oak	Fagaceae	FACU
Rhododendron groenlandicum	Labrador Tea	Ericaceae	OBL
Rubus pubescens	Dwarf Red Raspberry	Rosaceae	FACW
Salix nigra	Black Willow	Salicaceae	OBL
Scirpus cyperinus	Common Woolsedge	Cyperaceae	OBL
Sparganium sp.	Bur-reed	Typhaceae	OBL
Spiraea alba var. *latifolia*	Meadowsweet	Rosaceae	FACW
Spiraea tomentosa	Steeplebush	Rosaceae	FACW
Streptopus lanceolatus	Rose Twisted Stalk	Liliaceae	FACU
Symphyotrichum sp.	American Aster	Asteraceae	N/A
Thelypteris palustris	Marsh Fern	Thelypteridaceae	FACW
Tsuga canadensis	Eastern Hemlock	Pinaceae	FACU
Toxicodendron radicans ssp. *radicans*	Poison-Ivy	Anacardiaceae	FAC
Ulmus americana	American Elm	Ulmaceae	FACW
Viburnum dentatum	Smooth Arrowwood	Adoxaceae	FAC
Viburnum lantanoides	Hobblebush	Adoxaceae	FACU
Viola sp.	Violet	Violaceae	N/A
INDICATOR STATUS	OCCURRENCE IN WETLANDS (% per Reed, 1998)		
Obligate (OBL)	Almost always occurs in wetlands under natural conditions (99%)		
Facultative Wetland (FACW)	Usually in wetlands, occasionally found in non-wetlands (67- 99%)		
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands. (33-67%)		
Facultative Upland (FACU)	Usually in non-wetlands, occasionally found in wetlands (1-33%)		
Upland (UPL)	Almost always in non-wetlands under natural conditions (1%)		

[1] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.USACE National Wetland Plant List. Web.20 June 2018.

[2] Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1, USACE Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at https://www.fws.gov/wetlands/documents/national-wetland-plant-list-indicator-rating-definitions.pdf [Verified 20 June 2018]
*Reed, P. B., Jr. 1988. *National List of Plant Species that Occur in Wetlands.* Washington, DC, USFWS.

3.0 FLAGSTAFF LAKE TRACT

3.1 Site Location Information

Municipalities: Carrying Place and Dead River Townships **County:** Somerset

Biophysical Region: Western Mountains

Watershed (HUC 12): West Carry Pond-Flagstaff Lake (010300020304)

NECEC Components within HUC 8 (01030000) Watershed: HVDC, New ROW

Closest NECEC Component: HVDC, Existing Right of Way

Coordinates of Site Centroid (Lat/Long WGS 84): 45°11'11.48"N, 70°9'42.41"W

3.2 Natural Resource Inventory Summary (quantities are +/-):

Total Site Area .....831.39 acres

NWI Palustrine Wetland Area.....82.48 acres

Delineated and GPS-surveyed Palustrine Wetland Area….....423.96 acres

NHD Rivers and Streams.....10,580 feet (2.00 miles)

Delineated and GPS-surveyed Rivers and Streams..... .....10,790 feet (2.04 miles)

Upland Area..... 407.43 acres

Inland Wading Bird and Waterfowl Habitat (High Value) ……. 28.88 acres

Significant Vernal Pools……... None

Non-Significant Vernal Pool Types…… 4 medium value VPs; 3 medium value, 4 medium/low value and 2 low value CVPs; 39 PVPs (hundreds in skidder ruts not GPS-surveyed)

Vernal Pool Critical Terrestrial Habitat……..... 232.28 acres

3.3 Site Description

The approximately 831.39-acre Flagstaff Lake Tract (hereafter "FLT" or "the Tract") is located along approximately 8.5 miles of the east shore of Flagstaff Lake (Photo 3.1) where the boundary corresponds to the 1,050 feet mean sea level (MSL) topographic contour. The east boundary is the paved, Long Falls Dam Road. Most of the Tract occurs in Carrying Place Township; however, the northern tip and west side of the central and southern peninsulas are located in Dead River Township (Figure 3.1).

With the exception of a shore side, seasonal cabin located where the shoreline is closest to Long Falls Dam Road (Photo 3.2) and the Maine Huts & Trail (MHT) lodge on the central peninsula that supports and lodges hikers over the approximately 3.0-mile MHT network crossing the property, the Tract is essentially undeveloped. FLT lies between, and therefore links, the Maine Bureau of Parks and Land (MBPL) 854-acre Dead River Peninsula property with its public boat ramp on the north and 3,600 acres of public land making up the Bigelow Preserve on the south and the opposite shore of Flagstaff Lake. The

view focal point from the Tract is Bigelow Mountain (elevation of 4,150 feet), which is designated as a National Natural Landmark by the United States Department of Interior.

3.4 Surrounding Land Use, Protected Open Space and Focus Areas

FLT is displayed on Figure 3.2, MLUPC's Land Use Guidance Map for Carrying Place Town Twp. (T2 R3 BKP WKR). Most of FLT is designated as the Management Subdistrict General (M-GN). In addition, the following Protection Subdistricts occur at FLT:

- P-AL – Accessible Lake
- P-GP – Great Pond
- P-SL1 – Shoreland Areas within 250 feet of the normal high-water mark
- P-SL2 – Shoreland Areas within 75 feet of the normal high-water mark
- P-UA – Unusual Area
- P-WL2 – scrub shrub and other nonforested wetlands
- P-WL3 – forested wetlands (excluding those covered under PWL-1, PWL-2)

Although not subject to formal protective instruments, FLT lies wholly within the 50,000 acre Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area of Statewide Ecological Significance (https://www.maine.gov/dacf/mnap/focusarea/bigelow_mountain_focus_area.pdf) as identified by MNAP, MDIFW, MDMR, USFWS, TNC, Maine Audubon, and the Maine Coast Heritage Trust. This classification is based on the abundance of recreational opportunities, natural features and landscapes of exceptional ecological value.

Historical significance on and around FLT include The Great Carrying Place, Benedict Arnold's expedition portage route from The Kennebec, through East, Middle, and West Carry Ponds to Flagstaff Lake. This trail was made and used by Native Americans thousands of years before the 1775 expedition led by Arnold. Early in the Revolutionary War his 1,100-man army carried boats weighing hundreds of pounds along with food and supplies over this portage for an ill-fated sneak attack on Quebec. The trail adds uniqueness and historic value to the already existing beauty of the Flagstaff Lake region (http://matlt.org/hike/arnold-expedition-appalachian-trail-hike).

3.5 Wildlife Use

Wildlife usage and habitat evaluations on FLT were conducted based on field surveys, aerial photograph interpretation of landscape and terrain, and research of IPaC results from the USFWS for endangered species, critical habitat, migratory birds, and fisheries (Appendix 3A). FLT's size and wide variety of habitat makes it an ideal home for many species of fauna to thrive. The tract contains an abundance of mixed coniferous-deciduous forest suitable for many mammals, birds, and amphibians. FLT provides numerous palustrine wetland habitats including forested (PFO), emergent (PEM), and scrub-shrub (PSS) wetlands, intermittent and perennial streams flowing to Flagstaff Lake, as well as the Lake itself. As mentioned above, the entirety of FLT is within the Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area, an acclaimed recreational destination that encompasses a wide range of natural features and exceptional ecological value.

Rare animals within the Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area likely to be found on FLT include: bald eagle (*Haliaeetus leucocephalus*), the mussel commonly known as creeper (*Strophitus undulates*), and Canada lynx (*Lynx canadensis*) (BWH 2018b). FLT is an attractive site for a variety other of mammals including, but not limited to: beaver (*Castor canadensis*), white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), Eastern gray squirrel (*Sciurus carolinensis*) and red squirrel (*Sciurus vulgaris*). Coyote (*Canis latrans*), mink (*Neovison vison*), river otter (*Lontar canadensis*), fisher (*Pekania pennanti*) and pine marten (*Martes americana)* are other furbearers that inhabit or traverse the Tract.

Several Birds of Conservation Concern (BCC) listed in the IPaC report are present in and around FLT; these BCCs are the Canada warbler (*Cardellina canadensis*), the Cape May warbler (*Setophaga tigrina*), evening grosbeak (*Coccothraustes vespertinus*), olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), wood thrush (*Hylocichla mustelina*) and peregrine falcon (*Falco peregrinus*). FLT is an ideal habitat area for bald eagles (*Haliaeetus leucocephalus*) with an abundance of food sources in Flagstaff Lake and tall trees for perching and nesting. The Tract contains a 35-acre high value IWWH (ID UMO-9951) comprised of scrub-shrub and emergent sedge wetlands with several beaver dams creating open water areas. In addition, the IWWH is also a highly productive habitat for other species of birds as well as mammals, fish, and amphibians.

Several other bird species were observed on the Tract during field surveys including common raven (*Corvus corax*), black-capped chickadee (*Poecile atricapillus*), American woodcock (*Scolopax minor*), and wild turkey (*Meleagris gallopavo*). Common loons (*Gavia immer*) were observed swimming and fishing near the shore of Flagstaff Lake and a constructed, protective loon nesting raft was found washed ashore near the tip of the northernmost peninsula on the southern third of the Tract. Previously logged areas are abundant with red and black raspberry (*Rubus* spp.) and low bush blueberry *(Vaccinium angustifolium*) providing soft mast for many passerine bird species and mammals.

A variety of amphibian species inhabit FLT wetlands. During field surveys, adult and juvenile American toads (*Anaxyrus americanus*), green frogs (*Lithobates clamitans*), and wood frogs (*Lithobates sylvaticus*) were observed. Spotted salamander (*Ambystoma maculatum*) egg masses were observed throughout the Tract, generally in hundreds of man-made pools such as skidder ruts and borrow pits (identified as CVPs 9 of which are of medium to low value). Four, medium values natural vernal pools (VP) and at least 39 potential vernal pools (PVP) with and without wood frog and salamander egg masses were found on the Tract.

3.6 Vegetation

The Tract consists of a variety of vegetative communities which provide different cover types, habitat characteristics, and ecological functions. The property is primarily composed of forest, portions of which include mature mixed coniferous-deciduous forests and early successional forest regeneration. There are also large areas of scrub-shrub swamps, emergent marshes, and beaver-impounded open water areas.

Wetlands and uplands were identified in the mixed coniferous-deciduous forests on the Tract, and their natural community types were identified as evergreen seepage forest, spruce-fir wet flats, and low elevation spruce-fir forest respectively. Dominant tree species in the evergreen seepage forests are northern white cedar (*Thuja occidentalis*) with occasional frequency of red spruce (*Picea rubens*). Common understory species include goldthread (*Coptis trifolia*), bunchberry (*Chamaepericlymenum*

canadense), and twinflower (*Linnaea borealis*). Dominant tree species in the spruce-fir wet flats are balsam fir (*Abies balsamea*) and red spruce with the occasional frequency of red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*). Common understory plants found are cinnamon fern (*Osmundastrum cinnamomeum*), three-seeded sedge (*Carex trisperma*), bunchberry, and Canada mayflower (*Maianthemum canadense*). Common bryophytes are *Sphagnum* mosses. Dominant tree species in the upland forest are balsam fir, red spruce, and eastern white pine (*Pinus strobus*). The shrub stratum contains saplings of the above mentioned tree species and dwarf shrub low-bush blueberry (*Vaccinium angustifolium*).

Early successional forest regeneration on site corresponds with impacts related to historic commercial timber harvest. Often these impacted areas include dense regeneration stands of balsam fir, red spruce, quaking aspen (*Populus tremuloides*), red maple, and paper birch (*Betula papyrifera*) with occasional residual overstory. The shrub layer in this system is dominated by the above mentioned tree saplings and includes sporadic populations of striped maple (*Acer pennsylvanicum)*. The herbaceous stratum in this zone is dominated by red raspberry (*Rubus idaeus*), an opportunistic species quick to colonize after disturbance, nodding sedge (*Carex gynandra*) (typically more abundant in the pooled-up water areas associated with skidder ruts), and bracken fern (*Pteridium aquilinum*).

Scrub-shrub swamps (PSS) on the property are associated with stream banks and the shoreline of the lake, typically most abundant where these two types of systems converge. Dominant woody species include speckled alder (*Alnus incana* ssp. *rugosa*) and meadowsweet (*Spiraea alba* var. *latifolia*), as well as balsam fir, northern white cedar and red maple saplings. Dominant woody vegetation along the shoreline of the lake includes speckled alder, meadowsweet, and sweet gale (*Myrica gale*). Dominant understory plants include sensitive fern (*Onoclea sensibilis*), Canada mayflower, tall meadow-rue (*Thalictrum pubescens*), swamp dewberry (*Rubus hispidus*), and violets (*Viola* spp.).

At several locations throughout this property are open-water beaver impounded areas. As a result of the hydrologic modification from the beaver activity, standing dead red spruce and northern white cedar snags occupy the flooded area. On the periphery of the open water, speckled alder is the dominant shrub. Emergent vegetation includes a suite of sedges (*Carex* spp.), bulrushes (*Scirpus* spp.), and other graminoids.

3.7 Wetland Characteristics, Functions and Values

Adjoining the approximately 32-square-mile Flagstaff Lake (L1UB), approximately 424 acres (51%) of the 831.39-acre FLT were identified as palustrine wetland during field surveys (Figure 3.3). The primary wetland type on this Tract is palustrine forested (PFO) with a mix of evergreen (4) and deciduous vegetation (1) (Photo 3.3). Variations of forested wetland occur across FLT such as ones dominated by dead snags (PFO5) readily conspicuous along Lower Falls Dam Road to the north of Pond Stream and in large areas impounded by beaver dams (Photo 3.4). PFO also occurs as discrete relatively undisturbed stands in areas selectively harvested for timber resulting in localized ponding of water and establishment of associated herbaceous emergent dominated (PEM) wetlands (Photo 3.5). The second most abundant wetland type at FLT is palustrine scrub-shrub (PSS1) and occurs in areas regenerating from timber harvesting, beaver flowages and along the lake edge and riparian areas (Photo 3.6).

The third most abundant wetland type at FLT are differing forms of PEM which, as previously noted, occur in localized areas harvested for timber around ponded skidder ruts as well as in less disturbed settings (Photo 3.7). The PEM dominated wetland along an unnamed stream south of Pond Stream (Photo 3.8) is also the primary reason this wetland is designated as a high value IWWH (Figure 3.3) by MDIFW.

Presence of emergent wetland also contributes to vegetative diversity in the widespread, smaller scale vernal pools (Photo 3.9) and in the hundreds of PVPs, CVPs or ABAs associated with skidder ruts.

Mineral soils at FLT are generally derived from dense lodgment or basal till parent material, however as displayed in eroding bluffs along segments of the east shore of Flagstaff Lake, well sorted fine sands suggest there are localized areas of the Tract where soils originate from a cap of eolian sediments most likely wind deposited after glacial retreat and prior to establishment of vegetation. Organic soils originated from accumulation of vegetation in water such as along the major stream courses and in larger, somewhat isolated wetlands such as the PFO that dominates the south side of FLT's central peninsula.

As mapped by the USDA NRCS on Web Soil Survey, approximately 25 to 29 percent or between 205 to 240 acres of FLT is underlain by poorly drained (PD), or very poorly drained (VPD) hydric soils that are characteristic of wetlands. Map Unit Name and Symbols for hydric soils at FLT include:

- Bucksport and Wonsqueak mucks (WO) – VPD organic soils derived from vegetation deposited in water.
- Pillsbury-Peacham association (PPB) – PD fine to coarse loams derived from lodgment till.

Bucksport and Wonsqueak mucks are the hydric soils mapped to be most extensive and predominantly occur along the main drainages of the site (e.g., Pond Stream and Jerome Brook).

The sensitively sited, well maintained and highly used Maine Huts and Trails network enables all wetland types on FLT and their related functions and values to be observed and enjoyed by the public (Photo 3.10).

TABLE 3-1 SUMMARY OF FUNCTIONS AND VALUES OF WETLANDS ON THE 831.39-ACRE FLAGSTAFF LAKE TRACT

FUNCTION/VALUE	EXPLANATION
Groundwater Recharge/Discharge (GW)	Although there are no MGS mapped sand and gravel aquifers on FLT proper, an esker at the south end of the Lake is identified as a Significant Sand and Gravel Aquifer (MGS OF No. 01-132). Being part of the surface hydrologic system, wetlands on FLT draining into the Lake therefore recharge this down gradient aquifer.
Flood flow Alteration (FF)	Dead River and Carrying Place Twps are designated as "no data/No Specific Flood Hazard Area" (USGS OF Rpt 2006-1100), however water levels along the Dead River are actively managed at the Long Falls Dam outlet of Flagstaff Lake by Brookfield Renewable Energy. In relation to these fluctuating water levels, a principal function of wetlands on the Flagstaff Lake parcel that are along and hydrologically connected to the Flagstaff Lake is Floodflow Alteration.
Fish and Shellfish Habitat (FH)	Landlocked salmon, brook trout, yellow perch, chain pickerel and an assortment of baitfish inhabit Flagstaff Land and although marginal for cold water gamefish (MDIFW 1988) in 2017 it was stocked with approximately 3,400, 7- to 8-inch landlocked salmon and brook trout to support the Lake fishery for recreational anglers (MDIFW 2018). Freshwater mussels observed downstream along muddy shorelines of the Dead River are also likely to inhabit similar substrate in Flagstaff Lake.
Production Export (PE)	As evidenced by browse, droppings and other sign, woody vegetation in FLT wetlands is a fundamental food source for all herbivorous and omnivorous wildlife inhabiting the Tract. Seeds, roots and stems from herbaceous vegetation in not only PEM but PSS and PFO wetlands on FLT are also food sources for not only mammals, but the wide variety of birds, amphibians, reptiles, fish and insects that inhabit or traverse the Tract.
Sediment/Toxicant/ Pathogen Retention (STPR)	Micro-topography as well as woody and herbaceous vegetation throughout FLT wetlands physically slow surface water transport and retain these degraders of water quality to Flagstaff Lake as well as lesser tributaries. Sediments/toxicants/pathogens trapped with accumulation of vegetative remains as peat or other forms of hydric soils is another form of FLT wetlands protecting water quality of tributary streams and Flagstaff Lake.
Nutrient Removal (NR)	Micro-topography as well as woody and herbaceous vegetation throughout FLT wetlands slow surface water transport of phosphorus adhering to sediment protecting Flagstaff Lake as well as lesser tributaries from eutrophication water quality degradation . Direct uptake of nutrients by wetland vegetation and subsequent accumulation of dead vegetation in organic soils and peat is another pathway of FLT wetlands protecting water quality.
Sediment/Shoreline Stabilization (SS)	Due to the large westward fetch of Flagstaff Lake, lacustrine and palustrine vegetated wetlands aligned along the east shore of the lake buffer and protect the adjoining shoreline from prevailing wind generated waves. Palustrine wetlands along named as well as unnamed streams crossing FLT also stabilize adjoining upland and uplands thereby limiting and protecting lake degradation.
Wildlife Habitat (WH)	In addition to direct observation as well as tracks, droppings and other sign, moose, bear, deer, beaver, otter, mink and other smaller mammals are abundant on FLT that is further enhanced by the presence of a high rated IWWH (ID UMO-9951) near the center (Photo 3.8) of the Tracts. As described in detail above, FLT provides high quality habitat for a wide variety of raptors, waterfowl, gamebirds, passerines songbirds, amphibians, reptiles and insects.
Educational/ Scientific Value (ED)	FLT recognized for its research and educational opportunities as an integral component of the Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area of Statewide Ecological Significance (https://www.maine.gov/dacf/mnap/focusarea/bigelow_mountain_focus_area.pdf) including being crossed by a segment of the Great Carrying Place/Arnold's Trail.
Recreation (REC)	FLT is at the crossroads of the MHT, Appalachian and Northern Forest Canoe Trail network traveled by day, and through hikers and is also used for camping, cross country skiing and snowshoeing (Photo 3.10). Fishing and boating are a widely used offering of Flagstaff Lake, and hunting opportunities are also provided by FLT.

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3.8 Compensation

As part of the compensation package for NECEC, the approximately 831.39-acre Flagstaff Lake Tract will be permanently protected by a conservation easement or similar instrument. Preservation of FLT along approximately 8.5 miles of the east shore of Flagstaff Lake will protect a currently unprotected link between the conserved Bigelow Preserve to the south and the Dead River Peninsula to the north (Figure 3.1). In addition, approximately half (424 acres) of FLT is comprised of a diverse mix of wetland types (PFO, PSS, PEM), at the center of which is a 28.88-acre high value IWWH. In addition to the lacustrine shoreline, approximately 10,790 linear feet of named and unnamed perennial and intermittent streams cross the Tract and are tributaries to Flagstaff Lake (Figure 3.3).

Notably, the well sited Maine Huts and Trails facility and a solitary cabin are presently the limit of residential type development at FLT. Considering that most of the Tract is zoned M-GN, with upland chiefly concentrated as sizable islands along the lake shore, FLT is therefore potentially easily accessible for other camp lots from the paved Long Falls Dam Road that forms the eastern boundary. Preservation of FLT will allow for permanent protection from development and will preserve the existing recreational opportunities, wildlife habitat, water quality benefits, vernal pool habitat, and educational opportunities of an integral component of the Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area of Statewide Ecological Significance.

3.9 Photographs

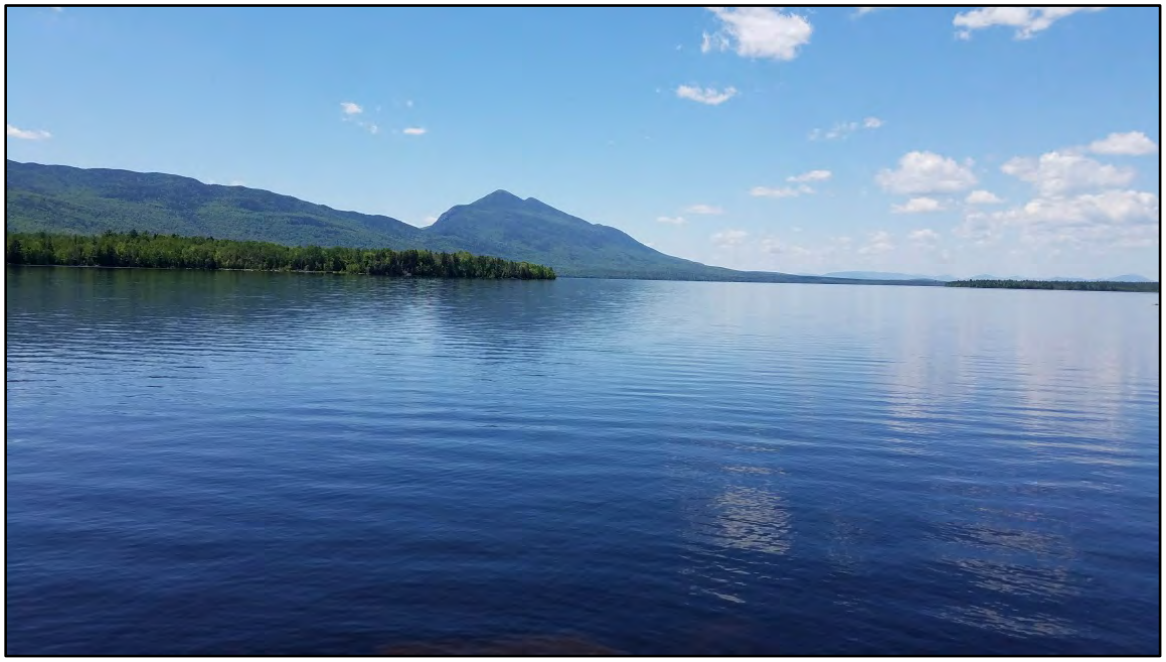

PHOTO 3-1 THE WESTWARD FOCAL POINT FROM FLT ACROSS FLAGSTAFF LAKE IS BIGELOW MOUNTAIN

PHOTO 3-2 THIS PRIVATELY-OWNED CABIN IS LOCATED ABOUT 125 FEET FROM WATER'S EDGE WHERE FLAGSTAFF LAKE IS APPROXIMATELY 450 FEET FROM LONG FALLS DAM ROAD

PHOTO 3-5 SKIDDER RUTS IN LOGGED AREAS COLLECT WATER BECOMING POTENTIAL VERNAL POOL HABITATS AND ALLOW EARLY SUCCESSIONAL REGENERATION

PHOTO 3-6 SCRUB-SHRUB WETLANDS (PSS) OCCUR THROUGHOUT FLT, ESPECIALLY NEAR THE LAKE EDGE AND IN RIPARIAN AREAS

PHOTO 3-3 FORESTED WETLANDS (PFO1/4) OF NORTHERN WHITE CEDAR (*THUJA OCCIDENTALIS*) AND SPHAGNUM MOSSES ARE THE DOMINANT FOREST TYPE ACROSS FLT

PHOTO 3-4 STANDING DEAD SNAGS (PFO5) RESULT FROM A BEAVER FLOWAGE ALONG THE SOUTHERN EDGE OF FLT

PHOTO 3-7 EMERGENT WETLANDS (PEM) HARBOR HIGH GRAMINOID DIVERSITY AND PROVIDE HABITAT FOR A WIDE VARIETY OF WILDLIFE

PHOTO 3-8 PONDED OPEN WATER AREAS WITHIN THE IWWH PROVIDE WILDLIFE HABITAT FOR A VAST RANGE OF WETLAND DEPENDENT BIRDS AND MAMMALS INCLUDING BEAVER

PHOTO 3-9 SPOTTED SALAMANDER EGG MASSES (ARROW) OCCUR IN A VERNAL POOL

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PHOTO 3-10 THE MAINE HUTS AND TRAILS NETWORK TRAVERSES THE FLT AND CONNECTS WITH THE ARNOLD TRAIL, NORTHERN CANOE TRAIL AND THE APPALACHIAN TRAIL

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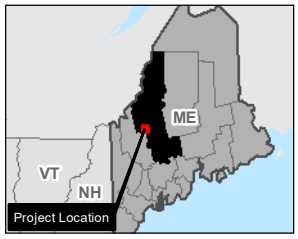

Road
Conserved Lands
Survey Boundary
Approximate Maine Huts and Trails Lease

N
W E
S

SCALE: 1 " = 3,000 '

0 1,500 3,000
Feet

Figure 3.1: Locus
Flagstaff Lake Tract

Somerset County
Maine

Date:8/6/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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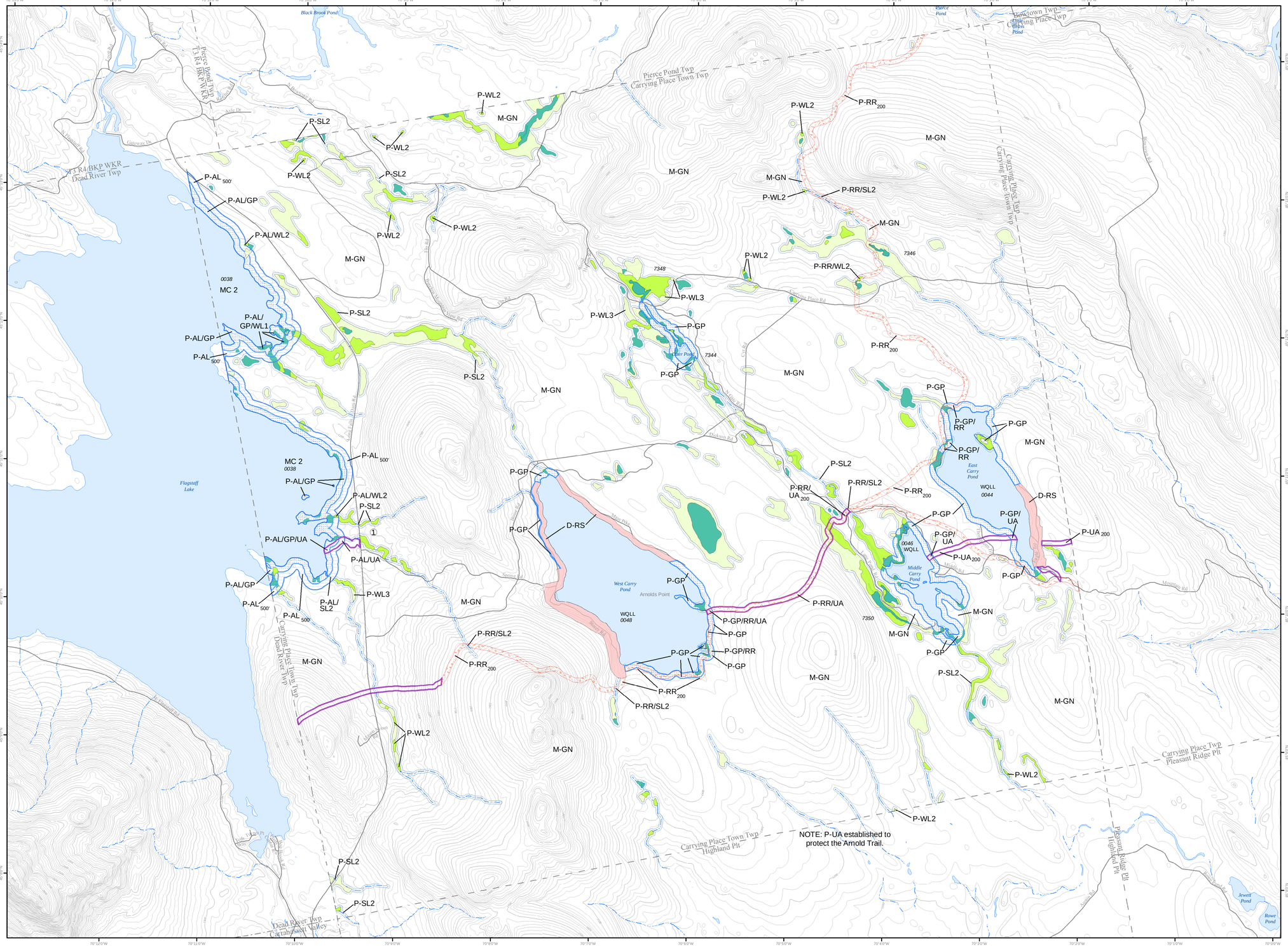
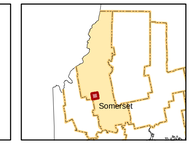
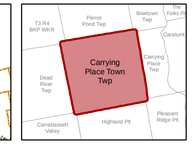
Carrying Place Town Twp.

T2 R3 BKP WKR

Somerset County







Land Use Guidance Map

Department of Agriculture, Conservation and Forestry

Maine Land Use Planning Commission

Legend

DEVELOPMENT SUBDISTRICTS

- D-RS: Residential

MANAGEMENT SUBDISTRICTS

- M-GN: General

PROTECTION SUBDISTRICTS

- P-AL: Accessible Lake
- P-GP: Great Pond
- P-RR200: Recreation - 200'
- P-SL2: Shoreland - 75'
- P-UA: Unusual Area
- P-WL1: Wetlands of Special Significance
- P-WL2: Scrub-shrub Wetlands
- P-WL3: Forested Wetlands

For complete descriptions of those areas included within the various subdistricts, and the associated regulations, refer to the Commission's Chapter 10 rules: Land Use Districts and Standards. Where any inconsistencies exist between the district boundaries, as shown on this map, and those described by the Commission's Land Use Districts and Standards, the latter shall govern.

For simplicity, this map does not show all the Wetland Protection Subdistricts for areas identified pursuant to Section 10.23,N,2 such as the beds of rivers, lakes, and other water bodies, and freshwater wetlands within 25 feet of stream channels. Nevertheless, these areas are within P-WL Subdistricts. In addition, this map does not show the Shoreland Protection Subdistricts along stream channels flowing through wetlands. Nevertheless, these areas are within P-SL2 Protection Subdistricts. If the locations of flowing waters or bodies of standing water existing on the ground differ from those shown on the map, then, pursuant to 12 M.R.S., Section 685-A(2)(G), P-GP, P-RR, P-SL, P-WL, and other subdistrict boundaries that are based upon the location of such waters shall, as appropriate, be deemed to follow the flowing water or body of standing water existing on the ground.

This Land Use Guidance Map was adopted by the Maine Land Use Planning Commission on **08/03/2005**, and became effective on **08/18/2005**.

This map is certified to be a true and correct copy of the Official Land Use Guidance Map of the Maine Land Use Planning Commission.

By: Catherine M Carroll, Director, Maine Land Use Planning Commission.

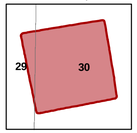
Amendments			
Location #	Zoning Permit	Effective Date	Remarks
1	ZP759	08/18/2005 06/29/2017	Adoption of digital NWI wetlands

0 0.5 1 1.5 2 Miles

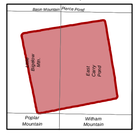
0 1,000 2,000 3,000 4,000 Meters

0 2,000 4,000 6,000 8,000 Feet

DeLorme map locus



USGS 7.5' quad index



(1) Map amendment location

▲ Point at which a river drains 25 square miles - symbol points upstream (12 M.R.S. Sec. 682-B(4))

9999 MIDAS number: Unique number assigned to each standing body of water in Maine.

WQLL Water Quality Limiting Lake - Refer to Section 10.23,E,3,g of the Commission's Land Use Districts and Standards.

MC# Lake Management Classes - Refer to Section 10.02 (Definitions) of the Commission's Land Use Districts and Standards.

SOURCES: Maine Land Use Planning Commission, USGS

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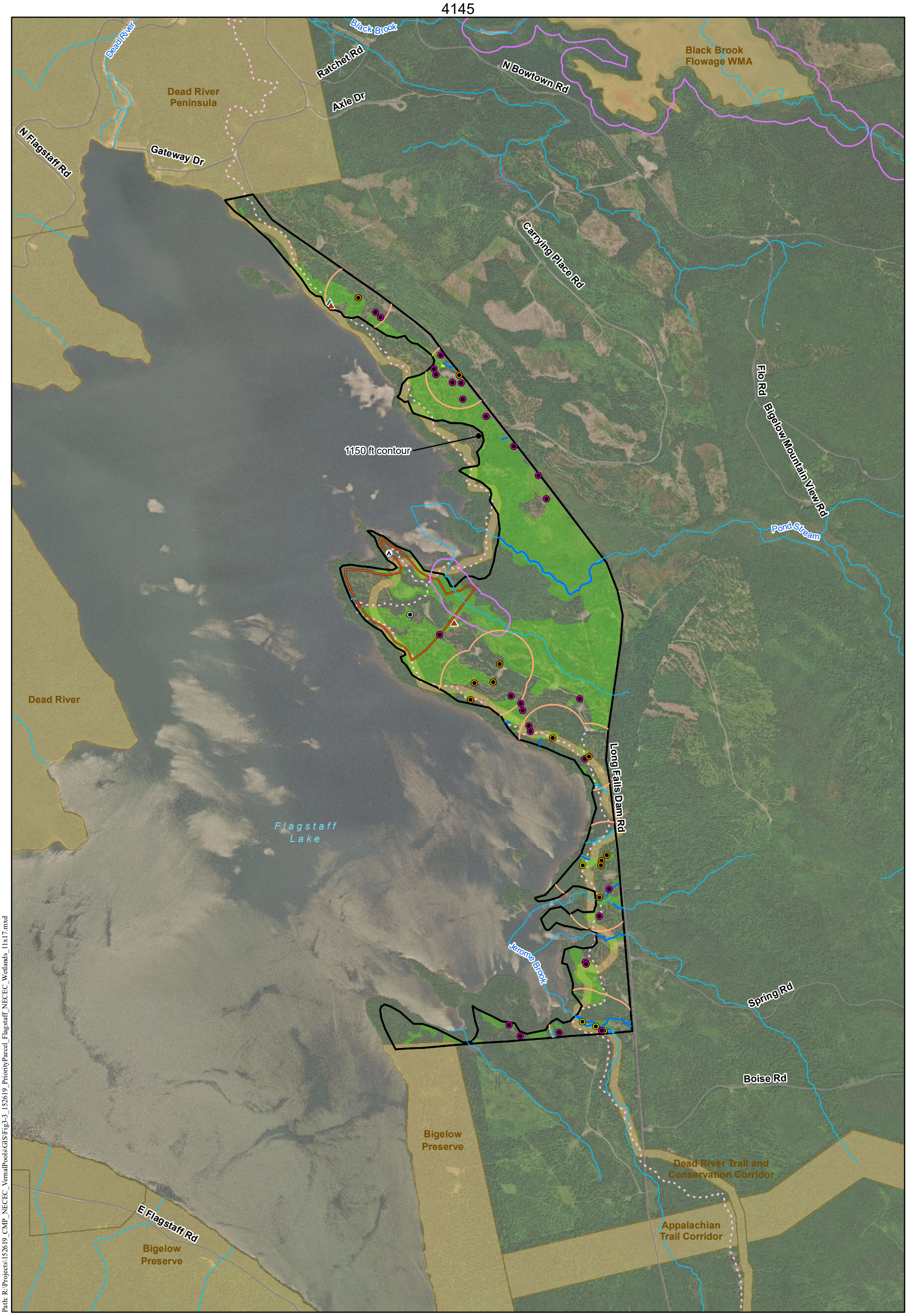

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- Wetland Data Point
- Upland Data Point
- Corps Vernal Pool
- Vernal Pool
- Potential Vernal Pool
- Amphibian Breeding Area
- Stream (NHD)
- Maine Huts & Trails Hut
- Maine Huts & Trails Main Trail
- Delineated Intermittent Stream
- Delineated Perennial Stream
- Road
- Delineated Wetland/ Wetland Island
- Vernal Pool
- Critical Terrestrial Habitat (750')
- Inland Waterfowl and Wading Bird Habitat
- Conservation Land
- Survey Area
- Approximate Maine Huts and Trails Lease

1 " = 2,000 '

0 1,000 2,000

Feet

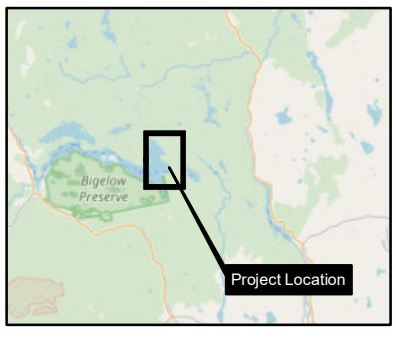

Figure 3.3: Natural Resources Flagstaff Lake Tract

Somerset County Maine

NAD 1983 HARN StatePlane Maine West FIPS 1802 Feet Foot US
Transverse Mercator
North American 1983 HARN

Date: 8/6/2018
Author: KK
PEI: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER

POWER ENGINEERS

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APPENDIX 3A IPAC RESULTS: FLAGSTAFF TRACT

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

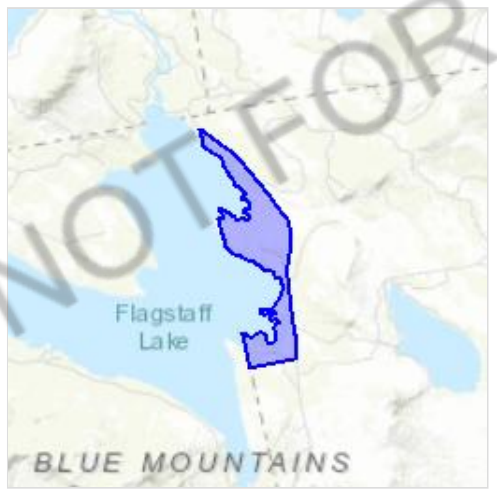
Project information

NAME

Compensatory Mitigation

LOCATION

Somerset County, Maine



DESCRIPTION

FLT

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

NOT FOR CONSULTATION

Canada Lynx Lynx canadensis — Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/3652

Northern Long-eared Bat Myotis septentrionalis — Threatened

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the

NOT FOR CONSULTATION

Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Canada Warbler Cardellina canadensis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cape May Warbler Setophaga tigrina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Jul 31
Evening Grosbeak Coccothraustes vespertinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Olive-sided Flycatcher Contopus cooperi This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31

NOT FOR CONSULTATION

Rusty Blackbird Euphagus carolinus — Breeds May 10 to Jul 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush Hylocichla mustelina — Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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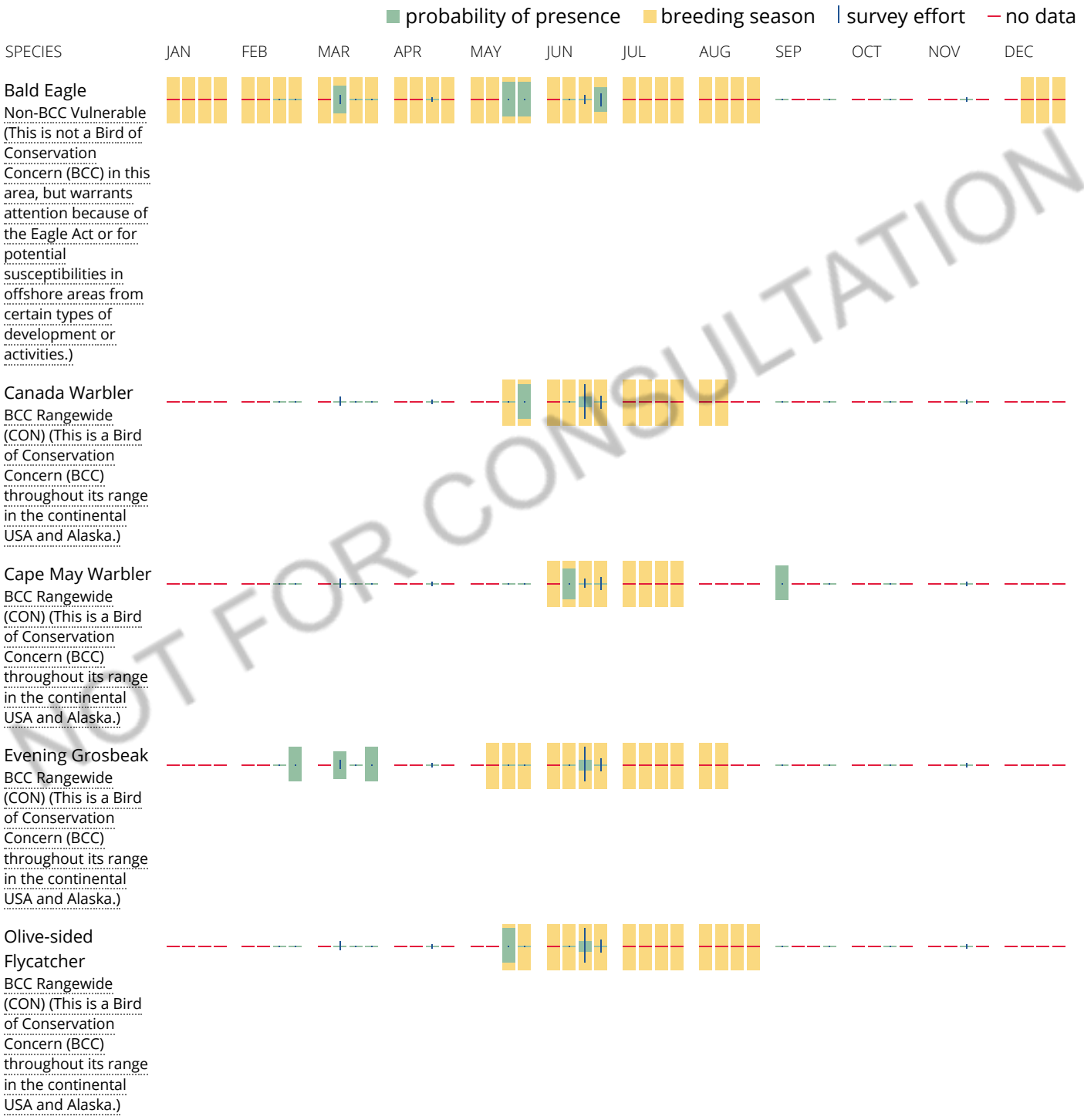
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



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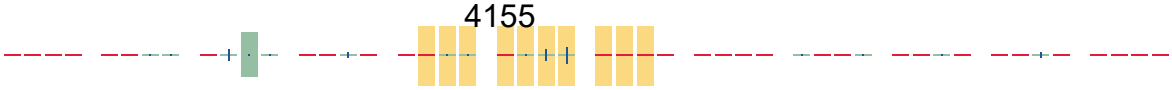
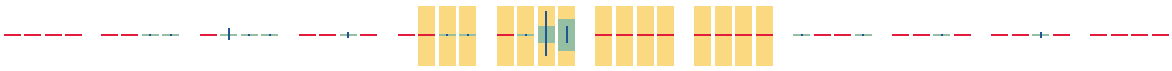
Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds

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guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize

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potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1Fh
- PEM1Eh
- PEM1Eb
- PEM1E

FRESHWATER FORESTED/SHRUB WETLAND

- PFO4E
- PSS1E
- PSS1Eh

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PFO5Fb
PSS1Eb
PSS4E
PSS1F

FRESHWATER POND

PUBFb

LAKE

L1UBHh

RIVERINE

R3UBH
R4SBC
R5UBH
R2UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX 3B VEGETATION LIST: FLAGSTAFF TRACT

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Abies balsamea	Balsam Fir	Pinaceae	FAC
Acataea pachypoda	White Baneberry	Ranunculaceae	FACU
Acer pennsylvanicum	Striped Maple	Sapindaceae	FACU
Acer rubrum	Red Maple	Sapindaceae	FAC
Acer saccharum	Sugar Maple	Sapindaceae	FACU
Alnus incana ssp. *rugosa*	Speckled Alder	Betulaceae	FACW
Anemone quinquefolia	Nightcaps	Ranunculaceae	FACU
Aralia nudicaulis	Wild Sarsaparilla	Araliaceae	FACU
Betula alleghaniensis	Yellow Birch	Betulaceae	FAC
Betula papyifera	White Birch	Betulaceae	FACU
Betula populifolia	Gray Birch	Betulaceae	FAC
Calamagrostis canadensis	Bluejoint	Poaceae	OBL
Carex arctata	Drooping Wood Sedge	Cyperaceae	N/A
Carex brunnescens	Brownish Sedge	Cyperaceae	FACW
Carex crinita	Fringed Sedge	Cyperaceae	OBL
Carex debilis	White Edge Sedge	Cyperaceae	FACW
Carex echinata	Star Sedge	Cyperaceae	OBL
Carex gracillima	Graceful Sedge	Cyperaceae	FACU
Carex gynandra	Nodding Sedge	Cyperaceae	OBL
Carex intumescens	Greater Bladder Sedge	Cyperaceae	FACW
Carex stipata	Stalk-Grain Sedge	Cyperaceae	OBL
Carex stricta	Tussock Sedge	Cyperaceae	OBL
Carex trisperma	Three-Seed Sedge	Cyperaceae	OBL
Chamaedaphne calyculata	Leatherleaf	Ericaceae	OBL
Chamaepericlymenum canadense	Bunchberry	Cornaceae	FAC
Clematis virginiana	Virginia Virgin's-Bower	Ranunculaceae	FAC
Clintonia borealis	Yellow Bluebead Lily	Liliaceae	FAC
Coptis trifolia	Three-Leaf Goldthread	Ranunculaceae	FACW
Cypripedium acaule	Pink Lady's Slipper	Orchidaceae	FACW
Dendrolycopodium dendroideum	Prickley Tree Club Moss	Lycopodiaceae	FACU
Dichanthelium sp.	Rosette Grass	Poaceae	N/A
Dryopteris sp.	Wood Fern	Dryopteridaceae	N/A
Eleocharis acicularis	Needle Spike Rush	Cyperaceae	OBL
Eleocharis palustris	Common Spike Rush	Cyperaceae	OBL
Epigaea repens var. *glabrifolia*	Trailing Arbutus	Ericaceae	N/A

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Equisetum arvense	Field Horsetail	Equisetaceae	FAC
Equisetum sylvaticum	Woodland Horsetail	Equisetaceae	FACW
Fagus grandifolia	American Beech	Fagaceae	FACU
Galium asprellum	Rough Bedstraw	Rubiaceae	OBL
Gaultheria hispidula	Creeping Snowberry	Ericaceae	FACW
Gaultheria procumbens	Eastern Teaberry	Ericaceae	FACU
Gymnocarpium dryopteris	Northern Oak Fern	Woodsiaceae	FACU
Ilex mucronata	Mountain Holly	Aquifoliaceae	OBL
Ilex verticillata	Winterberry	Aquifoliaceae	FACW
Impatiens capensis	Jewelweed	Balsaminaceae	FACW
Iris versicolor	Harlequin Blueflag	Iridaceae	OBL
Juncus effusus	Soft Rush	Juncaceae	OBL
Kalmia angustifolia	Sheep Laurel	Ericaceae	FAC
Larix laricina	American Larch	Pinaceae	FACW
Linnaea borealis	Twinflower	Caprifoliaceae	FAC
Lonicera canadensis	American Honeysuckle	Caprifoliaceae	FACU
Lysimachia borealis	Starflower	Myrsinaceae	FAC
Maianthemum canadense	Canada Mayflower	Ruscaceae	FACU
Medeola virginiana	Indian Cucumber Root	Liliaceae	FACU
Myrica gale	Sweetgale	Myricaceae	OBL
Onoclea sensibilis	Sensitive Fern	Onocleaceae	FACW
Osmunda claytonia	Interrupted Fern	Osmundaceae	FAC
Osmundastrum cinnamomeum	Cinnamon Fern	Osmundaceae	FACW
Oxalis montana	Northern Wood Sorrel	Oxalidaceae	FACU
Parathelypteris novaborecensis	New York Fern	Thelypteridaceae	FAC
Picea rubens	Red Spruce	Pinaceae	FACU
Pinus strobus	Eastern White Pine	Pinaceae	FACU
Populus balsamifera	Balsam Poplar	Salicaceae	FACW
Populus grandidentata	Big-Tooth Aspen	Salicaceae	FACU
Populus tremuloides	Quaking Aspen	Salicaceae	FACU
Pteridium aquilinum	Bracken Fern	Dennstaeditaceae	FACU
Rhododendron canadense	Rhodora	Ericaceae	FACW
Rhododendron groenlandica	Rusty Labrador Tea	Ericaceae	OBL
Ribes glandulosum	Skunk Currant	Grossulariaceae	FACW
Ribes lacustre	Bristly Black Gooseberry	Grossulariaceae	FACW
Rubus hispidus	Bristly Dewberry	Rosaceae	FACW
Rubus idaeus	Red Raspberry	Rosaceae	FACU
Salix spp.	Willow	Salicaceae	N/A
Scirpus cyperinus	Common Woolsedge	Cyperaceae	OBL

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Scirpus microcarpus	Barber Pole Bulrush	Cyperaceae	OBL
Solidago rugosa	Wrinkle Leaf Goldenrod	Asteraceae	FAC
Sorbus americana	American Mountain Ash	Rosaceae	FAC
Spiraea alba var. *latifolia*	Meadowsweet	Rosaceae	FACW
Spiraea tomentosa	Steeplebush	Rosaceae	FACW
Thalictrum pubescens	Tall Meadow Rue	Ranunculaceae	FACW
Thuja occidentalis	Northern White Cedar	Cupressaceae	FACW
Trillium erectum	Stinking Benjamin	Melanthiaceae	FACU
Trillium undulatum	Painted Trillium	Melanthiaceae	FACU
Typha latifolia	Broad Leaved Cattail	Typhaceae	OBL
Vaccinium angustifolium	Lowbush Blueberry	Ericaceae	FACU
Vaccinium corymbosum	Highbush Blueberry	Ericaceae	FACW
Veratrum viride	American False Hellebore	Melanthiaceae	FACW
Viburnum dentatum	Smooth Arrowwood	Adoxaceae	FAC
Viburnum lantanoides	Hobblebush	Adoxaceae	FACU
Viburnum lentago	Nanny-berry	Adoxaceae	FAC
Viola spp.	Violet	Violaceae	N/A
INDICATOR STATUS	OCCURRENCE IN WETLANDS (% per Reed, 1998)		
Obligate (OBL)	Almost always occurs in wetlands under natural conditions (99%)		
Facultative Wetland (FACW)	Usually in wetlands, occasionally found in non-wetlands (67- 99%)		
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands. (33-67%)		
Facultative Upland (FACU)	Usually in non-wetlands, occasionally found in wetlands (1-33%)		
Upland (UPL)	Almost always in non-wetlands under natural conditions (1%)		

[1] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.USACE National Wetland Plant List. Web 20 June 2018.

[2] Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1, USACE Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at https://www.fws.gov/wetlands/documents/national-wetland-plant-list-indicator-rating-definitions.pdf [Verified 20 June 2018].

*Reed, P. B., Jr. 1988. *National List of Plant Species that Occur in Wetlands.* Washington, DC, USFWS.

4.0 POOLER PONDS TRACT

4.1 Site Location Information

Municipality: The Forks Plantation **County:** Somerset

Biophysical Region: Central Mountains

Watershed (HUC 12): Kelly Brook-Kennebec River (010300030101)

NECEC Components within HUC 8 (01030003) Watershed: HVDC, Existing right of way

Closest NECEC Component: HVDC, Existing ROW

Coordinates of Site Centroid (Lat/Long WGS 84): 45°17'25.16"N, 69°59'28.86"W

4.2 Natural Resource Inventory Summary (quantities are +/-):

Total Site Area .....81.24 acres

NWI Palustrine Wetland Area .....16.20 acres

Delineated and GPS-surveyed Palustrine Wetland Area.....18.33 acres

NHD Rivers and Streams .....6,390 feet (1.21 miles)

(NOTE: NHD Rivers and Streams length above includes length of flowage path through Pooler Ponds)

Delineated and GPS-surveyed Rivers and Streams ….....4,480 feet (0.85 mile)

Upland Area.....62.91 acres

Inland Wading Bird and Waterfowl Habitat (Moderate Value) ……...31.39 acres

Significant Vernal Pools .....None

Other Non-Significant Vernal Pool Types ……1 medium value VP

Vernal Pool Critical Terrestrial Habitat (750 feet) ..... 8.10 acres

4.3 Site Description

Approximately three miles south of the village of The Forks is the 81.24-acre Pooler Ponds Tract (hereafter “PPT” or the “Tract”), bound on the west by 0.8 mile of the Kennebec River, on the east by Maine Scenic Byway US Route 201 (also known as the Old Canada Road), and on the north by a rafting and river campground (Figure 1, Photos 4.1 and 4.2). The Tract is located 3.4 miles north of the Appalachian Trail crossing of US Route 201 and is traversed by the Kennebec River Trail (Photo 4.3). Aside from boating and fishing access roads as well as hiking trails, PPT is otherwise undeveloped (Photo 4.4), and the centerpiece of the Tract is a moderate value 31.39-acre IWWH.

4.4 Surrounding Land Use, Protected Open Space and Focus Areas

PPT is displayed on Figure 4.2, MLUPC's Land Use Guidance Map for The Forks Plantation (T1 R4 BKP EKR). Most of PPT is designated as a General Management Subdistrict M-GN). In addition, the following Protection Subdistricts occur at PPT:

- P-GP – Great Pond
- P-SL1 – areas within 250 feet of the normal high-water mark
- P-SL2 – areas within 75 feet of the normal high-water mark
- P-WL1 – wetlands of special significance (WOSS)
- P-WL2 – scrub shrub and other nonforested wetlands
- P-WL3 – forested wetlands (excluding those covered under PWL-1, PWL-2)

Pooler Ponds (MIDAS # 4106) are also designated as a "water quality limiting lake" (WQLL) sensitive to increased phosphorus concentrations and therefore is subject to additional residential development restrictions. There are no Conserved Lands or Focus Areas immediately adjacent to or within one mile of PPT.

4.5 Wildlife Use

Wildlife usage and habitat evaluations on PPT were conducted based on field surveys, aerial photo interpretation of landscape and terrain, and research of IPaC results from the USFWS for endangered species, critical habitat, migratory birds, and fisheries in and around the area. According to the results of the IPaC report (Appendix 4A), two threatened species: Canada lynx (*Lynx canadensis*) and Northern long-eared bat (*Myotis septentrionalis*); and one endangered species – Atlantic salmon (*Salmo salar*) could be affected by activities on the property.

Multiple moose (*Alces alces*) and whitetail deer (*Odocoileus virginianus*) remains along with active beaver (*Castor canadensis*) dams were observed on the property during natural resource surveys. As moderate rated IWWH, the abundance of aquatic vegetation, chiefly pond lilies (*Nymphaea* spp., *Nuphar* spp.) and other aquatics including watershield (*Brasenia schreberi*), arrowhead (*Sagitarria cuneata*), and floating manna grass (*Glyceria septentrionalis)* are worthy food sources for waterfowl and moose as well as cover habitat for amphibians. The large areas of adjoining mixed forested upland also provide browse for both deer and moose.

Pooler Ponds, and the adjoining emergent and forested wetlands, forested uplands and Kennebec River provide ideal habitat for several bird species. The IPaC report indicates two BCC – Canada warbler (*Cardellina canadensis*) and Cape May warbler (*Setophaga tigrina*) – could be affected by activities on the property. Other birds that may use PPT include, but are not limited to bald eagle (*Haliaeetus leucocephalus*), belted kingfisher (*Megacerylt alcyon*), several species of warblers (*Parulidae*), common loon (*Gavia immer*), northern goshawk (*Accipiter gentilis*), yellow-bellied flycatcher (*Empidonax flaviventris*), olive-sided flycatcher (*Contopus cooperi*), red-breasted nuthatch (*Sitta canadensis*), winter wren (*Troglodytes hiemalis*), and rusty blackbird (*Euphagus carolinus*).

A gray tree frog (*Hyla versicolor*) was observed on the Tract near a small stream bed (Photo 4.5). Spotted salamander (*Ambystoma maculatum*) egg masses (Photo 4.6) were observed on the edges of the pond complex and in the one delineated medium-value vernal pool found during field surveys. American toads (*Anaxyrus americanus*) and green frogs (*Lithobates clamitans*) are other common amphibians within the Tract. Garter snakes (*Thamnophis spp*.) were also observed on the Tract and turtles that may exist on site include, but may not be limited to painted turtles (*Chrysemys picta*), and common snapping turtle (*Chelydra serpentine*).

4.6 Vegetation

The Tract includes a variety of vegetative communities which provide different cover types and habitat characteristics. The property is primarily composed of mature forest, portions of which include deciduous forest and mixed coniferous-deciduous forest. There are also large areas of scrub-shrub and emergent habitats. The scrub-shrub areas are located along the Kennebec River, near the northwest boundary of the property, and typically in between the emergent areas along the shoreline and the upland forest further up slope from the ponds. The emergent areas are primarily located along the shoreline of Pooler Ponds.

Dominant tree species in the upland deciduous forest include northern red oak (*Quercus rubra*) and American beech (*Fagus grandifolia*). Dominant tree species in the upland mixed coniferous-deciduous forest are balsam fir (*Abies balsamea*), eastern white pine (*Pinus strobus*), red maple (*Acer rubrum*), and eastern hemlock (*Tsuga canadensis*). The scrub-shrub stratum contains beaked hazelnut (*Corylus cornuta*), choke cherry (*Prunus virginiana*), and striped maple (*Acer pennsylvanicum).* The herbaceous understory is dominated by Canada mayflower (*Maianthemum canadense*), starflower (*Lysimachia borealis*), bracken fern (*Pteridium aquilinum*), and wood fern (*Dryopteris* sp.).

Forested wetlands are dominated by red maple and yellow birch (*Betula alleghaniensis*). The typical scrub-shrub stratum contains saplings of red maple and black ash (*Fraxinus nigra*), as well as the occasional occurrence of speckled alder (*Alnus incana* ssp. *rugosa*). The herbaceous layer in the forested wetlands is dominated by sensitive fern (*Onoclea sensibilis*), bluejoint grass (*Calamagrostis canadensis*), and common wool sedge (*Scirpus cyperinus*).

Emergent areas (Photo 4.7) are predominantly confined to the pond margins and are dominated by graminoids, most specifically floating manna grass (*Glyceria septentrionalis*), fowl manna grass (*Glyceria striata*), three-way sedge (*Dulichium arundinaceum*), common spike-rush (*Eleocharis palustris*) and common wool sedge (*Scirpus cyperinus*). Other sedges found around the pond margin include fringed sedge (*Carex crinita*), northeastern sedge (*Carex cryptolepis*), hop sedge (*Carex lupulina*), sallow sedge (*Carex lurida*), and lesser bladder sedge (*Carex vesicaria*). Common forbs found in this zone are Allegheny monkey flower (*Mimulus ringens*) and swamp candles (*Lysimachia terrestris*). Adjacent scrub-shrub wetlands (Photo 4.8) are dominated by speckled alder, meadowsweet (*Spiraea alba* var. *latifolia*), and common winterberry (*Ilex verticillata*).

Submerged aquatic vegetation includes white water-lily (*Nymphaea odorata*), yellow pond-lily (*Nuphar* sp.), bur-reed (*Sparganium* sp.), northern arrowhead (*Sagittaria cuneata*), water-shield (*Brasenia schreberi*), and pondweed (*Potamogeton* sp).

4.7 Wetland Characteristics, Functions and Values

Combining the approximately 8.12-acre Pooler Ponds complex (PUB) with approximately 10.21 acres of additional palustrine wetland, 18.33 acres (22.6%) of the 81.24 total acres on PPT were identified as

palustrine wetland during the field survey (Figure 4.3). The primary wetland system on this Tract is palustrine unconsolidated bottom (PUB) associated with the open water of the pond complex. The fringe of this wetland system is enveloped by a graminoid-dominant palustrine emergent area (PEM) (Photo 4.8), which is bordered by a co-dominant palustrine scrub-shrub wetland (PSS). The codominance of these two wetland types creates outstanding wildlife habitat for inland wading birds and waterfowl (IWWH). The transitional habitat between open water, emergent marsh, scrub-shrub, forested wetland, and upland forest provides a high degree of vertical stratigraphy in vegetation that further enhances wildlife attractiveness for numerous species of amphibians, reptiles, birds, and mammals. At the southern end of the pond complex, an intermittent stream flows southwest to the Kennebec River. The Tract has approximately 0.8 river-miles of frontage along the Kennebec River, a permanently flooded, lower perennial riverine wetland system with an unconsolidated bottom (R2UBH). Where the land does not abruptly drop from bedrock cliff to river, there is generally a 20- to 50-foot strip of palustrine scrub shrub (PSS) wetland along the fringe of the Kennebec River (as described earlier in Section 1.5 of this document).

As mapped by the USDA NRCS on Web Soil Survey, approximately 56 acres (68%) of PPT is underlain by somewhat excessively drained (SED) soils. In addition to slightly more than eight acres of waterbody, the remainder of the Tract is mapped as well drained. The soils are derived from glacial outwash plains, till plains and eskers consisting of fine silt loams and clay loams. Hydric soils were identified primarily along fringe wetlands which occur around most of Pooler Ponds and parts of the Kennebec River. The fringe wetlands associated with the pond are classified as PEM and PSS with some smaller components of PFO. A small PSS wetland was mapped along the Kennebec River consisting of fine loamy sands.

TABLE 4-1 SUMMARY OF FUNCTIONS AND VALUES OF WETLANDS ON THE 81.24-ACRE POOLER POND TRACT

FUNCTION/VALUE	EXPLANATION
Groundwater Recharge/Discharge (GW)	PPT occurs on the Kennebec River Significant Sand and Gravel Aquifer and wetlands on the Tract are therefore sites of groundwater discharge from up gradient, as well as recharge areas to the adjoining Kennebec River (Neil and Locke 2008).
Flood flow Alteration (FF)	The Forks Twp is designated as "no data/No Specific Flood Hazard Area" (Dudley and Schalk 2006), however water levels along the Kennebec River are actively managed at the Long Falls Dam outlet of Flagstaff Lake and the Harris Station Dam on Indian Pond by Brookfield Renewable Energy. In relation to these fluctuating water levels, a principal function of wetlands on the Pooler Ponds parcel that are along and hydrologically connected to the Kennebec River is Floodflow Alteration.
Fish and Shellfish Habitat (FH)	The Kennebec River is popular for brook trout and landlocked salmon fishing and on the first day of field surveys an angler was removing his inflatable boat at the "Hole in the Wall" access point (Photo 4.3) at PPT after a successful morning of fishing. Pooler Ponds lack a perennial stream connection to the River and are most likely habitat for a warm water fishery.
Production Export (PE)	As evidenced by browse, droppings and other sign, woody vegetation in wetlands is a fundamental food source for all herbivorous and omnivorous wildlife inhabiting PPT. Seeds, roots and stems from herbaceous vegetation in not PUB, PEM, PSS and PFO wetlands that make up the IWWH on PPT are also food sources for not only waterfowl, but the wide variety of mammals, birds, amphibians, reptiles, fish and insects that inhabit or traverse the Tract.
Sediment/Toxicant/ Pathogen Retention (STPR)	Micro-topography as well as woody and herbaceous vegetation throughout wetlands around the perimeter off Pooler Ponds physically slow surface water transport and retain these degraders of water quality to the Kennebec River. Sediments/toxicants/pathogens trapped with accumulation of vegetative remains as peat or other forms of hydric soils is another way PPT wetlands protect water quality of Pooler Ponds and the Kennebec River.
Nutrient Removal (NR)	Micro-topography as well as woody and herbaceous vegetation throughout PPT wetlands slow/detain surface water transport of phosphorus adhering to sediment, protecting Pooler Ponds (designated as WQLL, from eutrophication and general water degradation of Kennebec River. Direct uptake of nutrients by wetland vegetation and accumulation of plant remains in organic soils and peat is another way PPT wetlands protect water quality.
Sediment/Shoreline Stabilization (SS)	Riverine vegetated wetlands aligned along the east shore of the Kennebec River buffer and protect the adjoining upland shoreline from scour and erosion. Palustrine wetlands around the perimeter of Pooler Ponds also stabilize adjoining upland and thereby limiting and protecting lake degradation.
Wildlife Habitat (WH)	In addition to direct observation as well as tracks, droppings and other sign, moose, deer, beaver, otter, mink and other smaller mammals are abundant on PPT that is further enhanced by the presence of the moderate value IWWH (ID UMO-9951) near the center of the Tract. As described in greater detail above, PPT provides high quality habitat for a wide variety of large mammals and furbearers, raptors, waterfowl, passerines songbirds, amphibians, reptiles and insects.
Educational/ Scientific Value (ED)	This easily accessible Tract provides diversity and abundance of aquatic plants and graminoids relevant to the study of botany and wetland ecology. In addition, the Tract provides a comprehensive zonation of vegetative stratigraphy / wetland types corresponding to the topographic gradient.
Recreation (REC)	PPT is located between a commercial rafting and river guide operation and campground immediately to the north and the Appalachian Trail Corridor 3.4 miles to the south. The Tract is also crossed by the Kennebec River Trial and is an access point to fishing and boating on the Kennebec River.

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4.8 Compensation

As part of the compensation package for NECEC, the approximately 81.24-acre Pooler Ponds Tract (Figure 4.3) will be permanently protected by a conservation easement or similar instrument. Preservation of this Tract along approximately 0.8 mile of the Kennebec River will secure access for rafting, other boating/canoeing and fishing. In addition, approximately 40 percent (31.39 acres) of the 81.24-acre FLT is a moderate value IWWH comprised of diverse wetland types (PFO, PSS, PEM, PUB). Preservation of PPT will result in permanent protection from development and will preserve the existing recreational opportunities, wildlife habitat, water quality benefits, vernal pool habitat, and educational opportunities adjacent to a Maine Scenic Byway (US Route 201).

4.9 Photographs

PHOTO 4-1 A NORTHWARD VIEW OF POOLER PONDS DISPLAYS THE HYDROLOGIC CONNECTIVITY OF THIS GREAT POND, WETLAND OF SPECIAL SIGNIFICANCE (WOSS). NOTE: ROUTE 201 IN THE BACKGROUND

PHOTO 4-2 THE KENNEBEC RIVER SERVES AS THE WESTERN BOUNDARY OF THE TRACT AND PROVIDES RECREATIONAL OPPORTUNITIES SUCH AS FISHING AND RAFTING

PHOTO 4-3 THE KENNEBEC RIVER TRAIL TRAVERSES PPT AND PROVIDES RIVER ACCESS FOR ANGLERS AND BOATERS; LOCALLY THIS ACCESS POINT IS REFERRED TO AS 'HOLE IN THE WALL'

PHOTO 4-4 POOLER PONDS HOSTS A VARIETY OF ECOLOGICAL SYSTEMS, INCLUDING PALUSTRINE UNCONSOLIDATED BOTTOM (PUB), EMERGENT (PEM), SCRUB-SHRUB (PSS), AND FORESTED (PFO) WETLANDS

PHOTO 4-5 A GRAY TREE FROG (*HYLA VERSICOLOR*) RESTS ON A SENSITIVE FERN (*ONOCLEA SENSIBILIS*) FROND

PHOTO 4-6 EIGHT SPOTTED SALAMANDER EGG MASSES FOUND NOT ONLY IN THIS SINGLE VERNAL POOL ON PPT, BUT WERE ALSO OBSERVED AT SEVERAL LOCATIONS IN POOLER PONDS AS WELL

PHOTO 4-7 EMERGENT WETLANDS (PEM) DOMINATED BY A SUITE OF SEDGES (*CAREX* SPP.) AND COMMON WOOL SEDGE (*SCIRPUS CYPERINUS*) ARE PREVALENT ALONG THE POND EDGE

PHOTO 4-8 SCRUB-SHRUB WETLANDS (PSS) ARE TYPICALLY DOMINATED BY SPECKLED ALDER (*ALNUS INCANA* SSP. *RUGOSA*) WITH SENSITIVE FERN (*ONOCLEA SENSIBILIS*) AS THE DOMINANT UNDERSTORY

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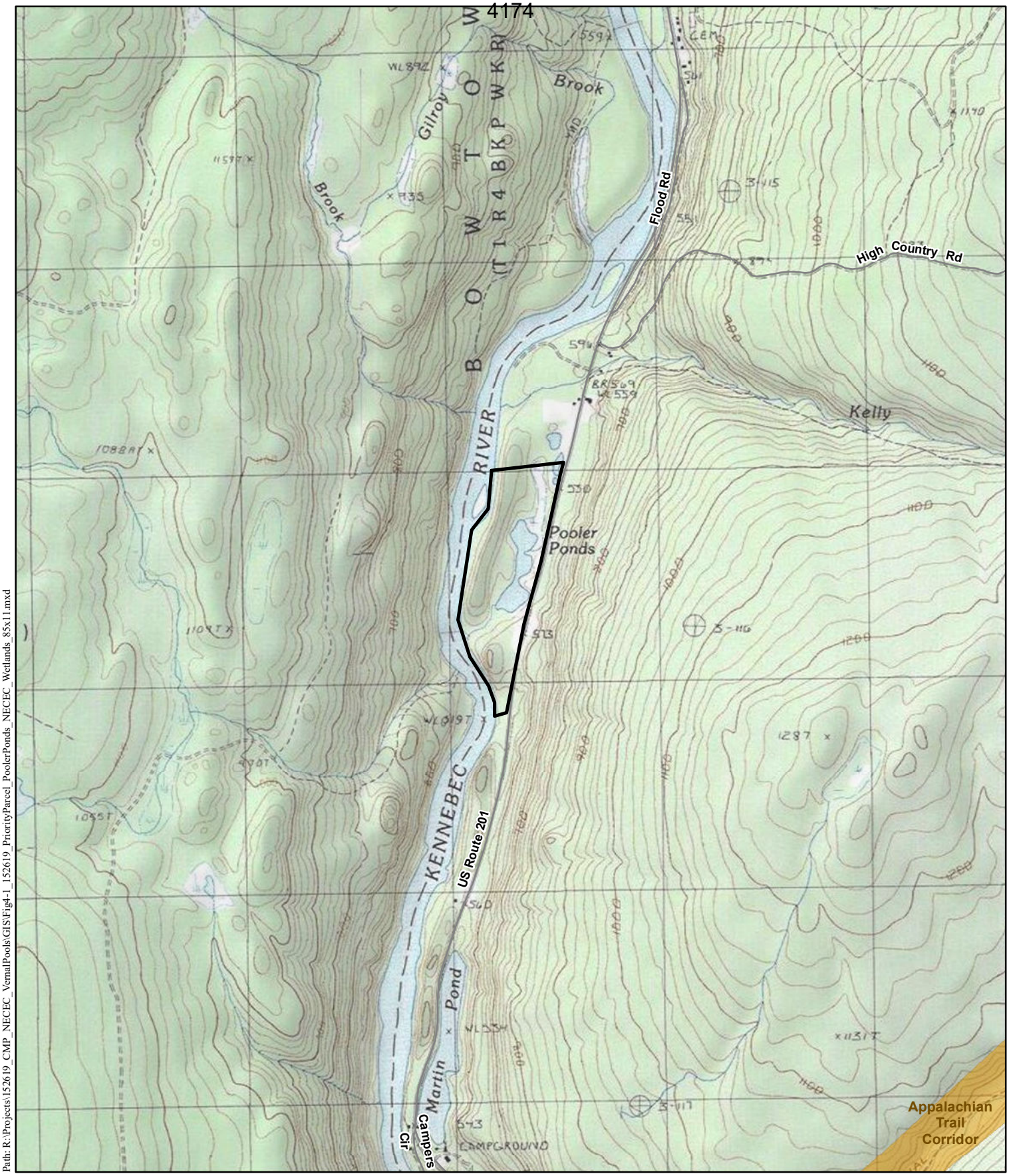

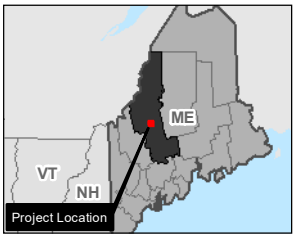

Road
Conserved Lands
Survey Boundary

N
W E
S

SCALE: 1 " = 2,000 '

0 1,000 2,000
Feet

Figure 4.1: Locus
Pooler Ponds Tract

Somerset County
Maine

Date:8/6/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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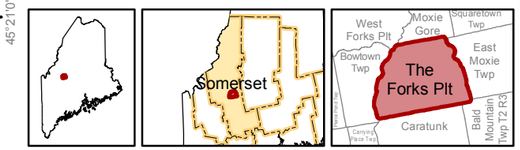
The Forks Plt.

T1 R4 BKP EKR

Somerset County



Land Use Guidance Map

Department of Agriculture, Conservation and Forestry

Maine Land Use Planning Commission

Legend

DEVELOPMENT SUBDISTRICTS

- D-GN: General
- D-RS: Residential

PROTECTION SUBDISTRICTS

- P-GP: Great Pond
- P-RR200: Recreation - 200'
- P-RR: Recreation
- P-SL1: Shoreland - 250'
- P-SL2: Shoreland - 75'
- P-WL1: Wetlands of Special Significance
- P-WL2: Scrub-shrub Wetlands
- P-WL3: Forested Wetlands

This map does not show all designated P-WL Subdistricts, such as non-tidal water bodies and freshwater wetlands within 25 feet of flowing waters.

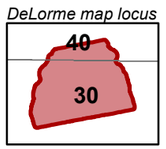
This map is a reducedsize version and should not be considered definitive. Full sized, official Land Use Guidance Maps are available on the LUPC website or by request.

Amendments			
Location #	Zoning Permit	Effective Date	Remarks
1	ZP633	03/11/1999	
2	ZP633A	05/12/2000	
		08/18/2005	Adoption of digital NWI wetlands
3	ZP708	07/26/2007	

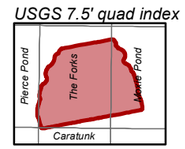
0 1,400 2,800 4,200 5,600 Meters

0 4,800 9,600 14,400 19,200 Feet

DeLorme map locus



USGS 7.5' quad index



(1) Map amendment location

▲ Point at which a river drains 25 square miles - symbol points upstream (12 M.R.S. Sec. 682-B(4))

9999 MIDAS number: Unique number assigned to each standing body of water in Maine.

WQLL Water Quality Limiting Lake - Refer to Section 10.23,E,3,g of the Commission's Land Use Districts and Standards.

MC# Lake Management Classes - Refer to Section 10.02 (Definitions) of the Commission's Land Use Districts and Standards.

SOURCES: Maine Land Use Planning Commission, USGS

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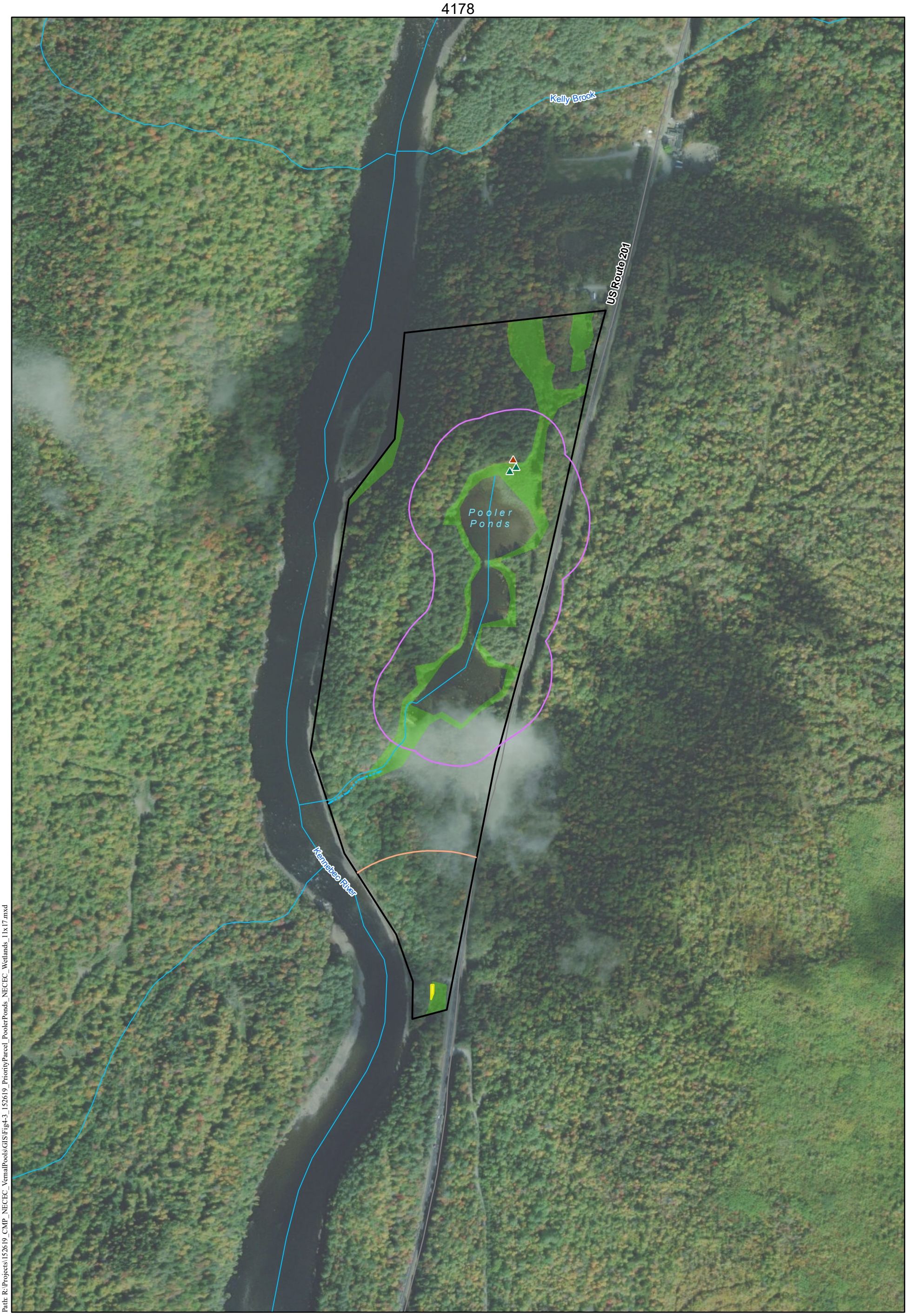

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- Wetland Data Point
- Upland Data Point
- Stream (NHD)
- Delineated Intermittent Stream
- Road
- Delineated Wetland
- Vernal Pool
- Critical Terrestrial Habitat (750')
- Inland Waterfowl and Wading Bird Habitat
- Survey Area

1 " = 500 '

0 250 500

Feet

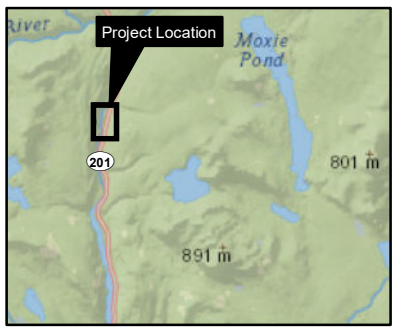

Figure 4.3: Natural Resources
Pooler Ponds Tract

Somerset County
Maine

NAD 1983 HARN StatePlane Maine West FIPS 1802 Feet
Foot US
Transverse Mercator
North American 1983 HARN

Date: 8/6/2018
Author: KK
PEI: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER

POWER ENGINEERS

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APPENDIX 4A IPAC RESULTS: POOLER PONDS TRACT

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Project information

NAME

Compensatory Mitigation

LOCATION

Somerset County, Maine

DESCRIPTION

Pooler Ponds Tract

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

NOT FOR CONSULTATION

Canada Lynx *Lynx canadensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Atlantic Salmon *Salmo salar* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2097	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

NOT FOR CONSULTATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NOT FOR CONSULTATION

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Canada Warbler Cardellina canadensis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cape May Warbler Setophaga tigrina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Jul 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

NOT FOR CONSULTATION

probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Canada Warbler BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –	– – – –

4187

Cape May Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

NOT FOR CONSULTATION

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Facilities

NOT FOR CONSULTATION

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1E

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1Cx
- PFO4/SS1E
- PSS1E

FRESHWATER POND

- PUBH
- PUBFx

RIVERINE

- R2UBH
- R4SBC
- R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

NOT FOR CONSULTATION

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

APPENDIX 4B VEGETATION LIST: POOLER PONDS TRACT

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1,2]
Abies balsamea	Balsam Fir	Pinaceae	FAC
Acer pennsylvanicum	Striped Maple	Sapindaceae	FACU
Acer rubrum	Red Maple	Sapindaceae	FAC
Agrostis capillaris	Colonial Bentgrass	Poaceae	FAC
Agrosits gigantea	Redtop Bentgrass	Poaceae	FACW
Alnus incana ssp. *rugosa*	Speckled Alder	Betulaceae	FACW
Anthoxanthum odoratum	Sweet Vernal Grass	Poaceae	FACU
Apocynum cannabinum	Indian Hemp	Apocynaceae	FAC
Betula alleghaniensis	Yellow Birch	Betulaceae	FAC
Betula populifolia	Gray Birch	Betulaceae	FAC
Brasenia schreberi	Water-Shield	Nymphaceae	OBL
Calamagrostis canadensis	Bluejoint	Poaceae	OBL
Cardamine diphylla	Crinkleroot	Brassicaceae	FACU
Carex crinita	Fringed Sedge	Cyperaceae	OBL
Carex cryptolepis	Northeastern Sedge	Cyperaceae	OBL
Carex intumescens	Greater Bladder Sedge	Cyperaceae	FACW
Carex lupulina	Hop Sedge	Cyperaceae	OBL
Carex lurida	Shallow Sedge	Cyperaceae	OBL
Carex scoparia	Pointed Broom Sedge	Cyperaceae	FACW
Carex vesicaria	Lesser Bladder Sedge	Cyperaceae	OBL
Caulophyllum thalictroides	Blue Cohosh	Berberidaceae	N/A
Chamaepericlymenum canadense	Bunchberry	Cornaceae	FAC
Corylus cornuta	Beaked Hazelnut	Betulaceae	FACU
Crataegus spp.	Hawthorne	Rosaceae	N/A
Dryopteris intermedia	Evergreen Wood Fern	Dryopteridaceae	FAC
Dulichium arundinaceum	Three-Way Sedge	Cyperaceae	OBL
Eleochaeris palustris	Common Spike-Rush	Cyperaceae	OBL
Equisetum arvense	Field Horsetail	Equisetaceae	FAC
Equisetum sylvaticum	Woodland Horsetail	Equisetaceae	FACW
Fagus grandifolia	American Beech	Fagaceae	FACU
Fraxinus americana	White Ash	Oleaceae	FACU
Fraxinus nigra	Black Ash	Oleaceae	FACW
Fraxinus pennsylvanica	Green Ash	Oleaceae	FACW
Glyceria septentrionalis	Floating Manna Grass	Poaceae	OBL
Glyceria striata	Fowl Manna Grass	Poaceae	OBL
Hieracium aurantiacum	Orange Hawkweed	Asteraceae	N/A

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1,2]
Hypericum perforatum	Common St. John's Wort	Hypericaceae	FACW
Ilex verticillata	Common Winterberry	Aquifoliaceae	FACW
Impatiens capensis	Jewelweed	Balsaminaceae	FACW
Iris versicolor	Blue Iris	Iridaceae	OBL
Juncus articulatus	Joint-Leaved Rush	Juncaceae	OBL
Juncus effusus	Soft Rush	Juncaceae	OBL
Leucanthemum vulgare	Ox-Eye Daisy	Asteraceae	UPL
Lycopus sp.	Water Horehound	Lamiaceae	OBL
Lysimachia borealis	Starflower	Myrsinaceae	N/A
Lysimachia terrestris	Swamp Candles	Myrsinaceae	OBL
Maianthemum canadense	Canada Mayflower	Ruscaceae	FACU
Maianthemum racemosum	Feathery False Solomon's Seal	Ruscaceae	FACU
Matteuccia struthiopteris	Ostrich Fern	Onocleaceae	FAC
Mimulus ringens	Allegheny Monkey-Flower	Phrymaceae	OBL
Mitchella repens	Partridge Berry	Rubiaceae	FACU
Nuphar sp.	Pond-Lily	Nymphaceae	OBL
Nymphaea odorata	White Water-Lily	Nymphaceae	OBL
Onoclea sensibilis	Sensitive Fern	Onocleaceae	FACW
Parathelypteris novaborecensis	New York Fern	Thelypteridaceae	FAC
Parthenocissus quinquefolia	Virginia-Creeper	Vitaceae	FACU
Phalaris arundinacea	Reed Canary Grass	Poaceae	FACW
Pinus strobus	Eastern White Pine	Pinaceae	FACU
Poa pratensis ssp. *pratensis*	Kentucky Blue Grass	Poaceae	FACU
Populus grandidentata	Big-Tooth Aspen	Salicaceae	FACU
Potamogeton sp.	Pondweed	Potamogetonaceae	OBL
Prunus virginiana	Choke Cherry	Rosaceae	FACU
Pteridium aquilinum	Bracken Fern	Dennstaeditaceae	FACU
Pyrola elliptica	Elliptic-Leaved Shinleaf	Ericaceae	FACU
Quercus rubra	Northern Red Oak	Fagaceae	FACU
Rhus hirta	Staghorn Sumac	Anacardiaceae	N/A
Rubus hispidus	Bristly Dewberry	Rosaceae	FACW
Rubus idaeus	Red Raspberry	Rosaceae	FACU
Sagittaria cuneata	Northern Arrowhead	Alismataceae	OBL
Sambucus racemosa	Red Elderberry	Adoxaceae	FACW
Scirpus cyperinus	Common Woolsedge	Cyperaceae	OBL
Silene vulgaris	Bladder Campion	Caryophyllaceae	N/A
Solidago canadensis	Canada Goldenrod	Asteraceae	FACU
Solidago rugosa ssp. *rugosa*	Common Wrinkle Leaved Goldenrod	Asteraceae	FAC

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1,2]
Sparganium sp.	Bur-Reed	Typhaceae	OBL
Spiraea alba var. *latifolia*	Meadowsweet	Rosaceae	FACW
Swida sericea	Red Osier Dogwood	Cornaceae	FACW
Tsuga canadensis	Eastern Hemlock	Pinaceae	FACU
Ulmus americana	American Elm	Ulmaceae	FACW
Vaccinium angustifolium	Lowbush Blueberry	Ericaceae	FACU
Vaccinium angustifolium	Lowbush Blueberry	Ericaceae	FACU
Veratrum viride	American False Hellebore	Melanthiaceae	FACW
Veronica americana	American Speedwell	Plantaginaceae	OBL
Viburnum lantanoides	Hobblebush	Adoxaceae	FACU
Viola spp.	Violets	Violaceae	N/A

INDICATOR STATUS	OCCURRENCE IN WETLANDS (% per Reed, 1998)
Obligate (OBL)	Almost always occurs in wetlands under natural conditions (99%)
Facultative Wetland (FACW)	Usually in wetlands, occasionally found in non-wetlands (67- 99%)
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands. (33-67%)
Facultative Upland (FACU)	Usually in non-wetlands, occasionally found in wetlands (1-33%)
Upland (UPL)	Almost always in non-wetlands under natural conditions (1%)

[1] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.USACE National Wetland Plant List. Web.20 June 2018.

[2] Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1, USACE Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at https://www.fws.gov/wetlands/documents/national-wetland-plant-list-indicator-rating-definitions.pdf [Verified 20 June 2018]

*Reed, P. B., Jr. 1988. *National List of Plant Species that Occur in Wetlands.* Washington, DC, USFWS.

5.0 GRAND FALLS TRACT

5.1 Site Location Information

Municipality: Spring Lake Township (T03 R04 BKP WKR) **County:** Somerset

Biophysical Region: Western Mountains

Watershed (HUC 12): Spring Lake-Upper Dead River (010300020502)

NECEC Components within HUC 8 (01030002) Watershed: HVDC, New ROW

Closest NECEC Component: HVDC, New ROW

Coordinates of Site Centroid (Lat/Long WGS 84): 45°17'43.03"N, 70°13'14.93"W

5.2 Natural Resource Inventory Summary (quantities are +/-):

Total Site Area .....120.84 acres

NWI Palustrine Wetland Area.....12.10 acres

Delineated and GPS-surveyed Palustrine Wetland Area….....14.51 acres

NHD Rivers and Streams .....3,690 feet (0.70 mile)

Delineated and GPS-surveyed Streams .....5,610 feet (1.06 miles)

Outstanding River Segment (Ch 200 §403: Dead River)…….……..…… 0.70 mile

Upland Area..... .....106.33 acres

Inland Wading Bird and Waterfowl Habitat (Moderate Value) ……..16.06 acres

Significant Vernal Pools .....1 high value SVP

Non-Significant Vernal Pools ……...1 high value PSVP

Vernal Pool Critical Terrestrial Habitat (750 feet) .....40.09 acres

Deer Wintering Area…….40 acres

5.3 Site Description

The 120.84-acre Grand Falls Tract (hereafter “GFT” or “the Tract”) – the centerpiece of which is Grand Falls (Photos 5.1 and 5.2) – is bisected by the Dead River and therefore has approximately 0.8 mile of frontage on each side of the River (Figure 5.1). GFT is a unique and stunning Tract with not only scenic views of Grand Falls and the associated display of diverse geologic features but also productive forested (PFO), scrub-shrub (PSS), and emergent (PEM) wetlands. Having a blend of cover types, GFT provides a range of habitats for a variety of animal species and includes a moderate value IWWH which connects the Tract to a 50,000-acre Focus Area of Statewide Ecological Significance. In addition to the Maine Huts and Trails network, the Northern Forest Canoe Trail traverses the Tract connecting Flagstaff Lake with Spencer Stream.

5.4 Surrounding Land Use, Protected Open Space and Focus Areas

In addition to the Maine Huts and Trails bridge (Photo 5.3), two long-established cabins are located on the Tract (one on each side of the Dead River) and a third is immediately adjacent to the west boundary (Photo 5.4). On the east bank of the Dead River, at the upstream end of the Northern Forest Canoe Trail portage which makes use of the MHT network is a simple canoe support station (Photo 5.5). Downstream of this and immediately north of a large island a relic cribwork spans the river (Photos 5.6 and 5.7). With the exception of a gated, gravel road, no other development exists on the Tract.

GFT is displayed on Figure 5.2, MLUPC's Land Use Guidance Map for Spring Lake Twp (T3 R4 BKP WKR). Much of GFT is designated as a General Management Subdistrict M-GN). In addition, the following Protection Subdistricts occur at GFT:

- P-FP – Flood Prone
- P-FW – Fish and Wildlife 060030
- P-RR – Recreation –Water
- P-SL1 – Shore Land within 250 feet of the normal high-water mark
- P-UA – Unusual Area
- P-WL1 – Wetlands of special significance (WOSS)
- P-WL2 – Wetlands scrub shrub (PSS)

GFT is approximately 3.25 miles downstream, along the Dead River, of the 50,000-acre Bigelow Mountain-Flagstaff Lake-North Branch of the Dead River Focus Area of Statewide Ecological Significance. Within the intervening distance is the 1,542-acre moderate value IWWH, linking GFT with the Focus Area. Conserved lands on the Tract are limited to the 200 feet wide Dead River Trail and Conservation Corridor on the east side of the River.

5.5 Wildlife Use

Wildlife usage and habitat evaluations on GFT were conducted based on field surveys, aerial photo interpretation of landscape and terrain, and research of IPaC results from the USFWS for endangered species, critical habitat, migratory birds, and fisheries in and around the area. According to the results of the IPaC report (Appendix 5A), two threatened species - Canada lynx (*Lynx canadensis*) and Northern long-eared bat (*Myotis septentrionalis*); and one endangered species – Atlantic salmon (*Salmo salar*) could be affected by activities on the property.

Moose (*Alces alces*) tracks were witnessed on GFT along the shore of the Dead River. Based on the location and vegetative cover in the location of P-FW (060030) on the LUPC map (Figure 5.2) an approximately 40-acre Deer Wintering Area is located along the northeast side of GFT which also extends downstream along the Dead River to Basin Tract (BT). Small mammals were observed during field surveys including red squirrel (*Sciurus vulgaris*), chipmunk (*Tamias sp*.), and snowshoe hare (*Lepus americanus*). Black bear (*Ursus americanus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*) beaver (*Castor candensis*), mink (*Neovison vison*), river otter (*Lontar canadensis*), fisher (*Pekania pennanti*) and pine marten (*Martes americana)* are furbearers that inhabit or traverse the Tract. Several passerine birds and birds of prey are likely to use GFT for its diverse habitat and abundance of food sources, including

hard and soft mast and a number of fish species. Tall balsam firs and Eastern white pines allow for birds of prey to nest along the Dead River.

The various wetland cover types, upland forest, and riverine habitat make it a suitable place for birds to reside. MDIFW has identified a moderate value 1,526 acres IWWH along the Dead River, most of which is upstream, however approximately 13 percent GFT occurs within this significant wildlife habitat.

During field surveys, one high value State Significant Vernal Pool (SVP) with over 40 spotted salamander (*Ambystoma maculatum*) egg masses was observed (Photo 5.8). One high value potentially significant vernal pool (PSVP) was recorded with twelve (12) spotted salamander egg masses, along with one potential vernal pool, all on the east side of the Dead River. Due to the timing of surveys, the presence of wood frog (*Lithobates sylvaticus*) egg masses could not be verified. American toads (*Anaxyrus americanus*) and green frogs (*Lithobates clamitans*) are other common amphibians within the Tract. Garter snakes (*Thamnophis spp*.) were present as well during field surveys.

The Upper Dead River, also referred to as the Grand Falls Flowage, is known for its rainbow trout (*Oncorhynchus mykiss*) which often feed on smelts that wash in to the river from Flagstaff Lake. Rainbow trout are a local, naturally reproducing population possibly stocked illegally many years ago. Landlocked salmon (*Salmo salar sebago*) and brook trout (*Salvelinus fontinalis*) are also abundant in the River (https://mainehuts.org/discover/things-do/fishing). These are excellent resources for birds of prey and even the occasional opportunistic black bear.

5.6 Vegetation

The property includes a variety of vegetative communities which provide different cover types, habitat characteristics, and ecological function. The property is primarily composed of mixed coniferous-deciduous forests. There are also several scrub-shrub wetlands, typically associated with the shore of the Dead River and the banks of feeder tributary streams.

Wetlands and uplands were identified in the mixed coniferous-deciduous forest mentioned above. Dominant tree species in the wetland forest include red maple (*Acer rubrum*), northern white cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*), and yellow birch (*Betula allegheniensis*). Common woody plants in the shrub stratum are typically saplings of balsam fir. Common understory plants include sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmunda cinnamomeum*), interrupted fern (*Osmunda claytonia*), violets (*Viola* spp.), dewberry (*Rubus hispidus*), and *Sphagnum* spp. mosses.

In the forested uplands, the dominant tree species are red spruce (*Picea rubens*), balsam fir, red maple, and eastern white pine (*Pinus strobus*). Dominant understory plants in the shrub stratum include American beech (*Fagus grandifolia*) saplings, mountain ash (*Sorbus americana*), and beaked hazelnut (*Corylus cornuta*). Common forbs include starflower (*Lysimachia borealis*), yellow blue-bead lily (*Clintonia borealis*), Canada mayflower (*Maianthemum canadense*), sarsaparilla (*Aralia nudicaulis*), and rosy bells (*Streptopus lanceolatus*).

The scrub shrub wetlands are dominated by speckled alder (*Alnus incana* ssp. *rugosa*) and meadowsweet (*Spiraea alba* var. *latifolia*). Common herbaceous plants in the understory are bluejoint grass (*Calamagrostis canadensis*), tall meadow-rue (*Thalictrum pubescens*), sedges (*Carex* spp.), and wrinkle-leaved goldenrod (*Solidago rugosa*).

5.7 Wetland Characteristics, Functions, and Values

Approximately 14.51 acres (12%) of the 120.84 total acres of the GFT were identified as palustrine wetlands during the field surveys (Figure 5.3). Although the largest wetland type on the Tract is the Dead River covering approximately 18.66 acres, characterized as a permanently flooded, lower perennial riverine system with an unconsolidated bottom (R2UBH), as discussed earlier it is excluded from total palustrine wetland area. Therefore, the second most abundant wetland type is palustrine forested with a mixed coniferous-deciduous canopy (PFO4/1) (Photo 5.9). The third most abundant wetland type (Photos 5.10 and 5.11) is palustrine scrub shrub (PSS), occurring predominantly along the shores of the Dead River in addition to the intermittent and perennial tributary streams that feed into the Dead River. The least abundant wetland system represented on the Tract is palustrine emergent (PEM, localized near the southeastern boundary of the parcel where the Dead River meanders around the island (Photo 5.12). However, despite its small extent, the PEM habitat is integral to the IWWH. The Dead River flows from the southern end of the property to the northern end of the property where it merges with Spencer Creek and turns toward the east. Accounting for both banks of the Dead River, approximately a total of 1.6 river miles of frontage occur on the Tract.

Opportunities for education and recreation abound on this Tract, along with opportunities for cultural values such as aesthetics. The falls and the surrounding ravines and bedrock provide examples of the effect of hydrology on landscape formation. The existing network of Maine Huts and Trails and the Northern Forest Canoe Trail exhibits an already-established recreational aspect to the site, such as canoeing, kayaking, rafting, fishing, and hiking.

As mapped by the USDA NRCS on Web Soil Survey, approximately 32 acres (26%) of GFT is underlain by poorly drained (PD) hydric soils. Areas of the tract where these soils occur are typically on zero to two percent slopes. Map Unit Name and Symbols for hydric soils at GFT consist of the Charles-Cornish-Wonsqueak complex (CG) a PD/VPD coarse silt loam formed in alluvial deposits on flood plains. Wetlands exist predominantly on the more gently sloping west side of the Dead River mapped as fine sandy loams whereas on the east side of the Dead River with 20 to 60 percent slopes well drained, upland soils predominate.

TABLE 5-1 SUMMARY OF FUNCTIONS & VALUES OF WETLANDS ON THE 120.84 ACRE GRAND FALLS TRACT

FUNCTION/VALUE	EXPLANATION
Groundwater Recharge/Discharge (GW)	Wetlands on river valley slopes of GFT are commonly associated with spring/seeps or sites of groundwater discharge and as part of the surface hydrologic system at other locations on GFT are recharge areas to the baseflow of the Dead River.
Flood flow Alteration (FF)	Spring Lake Twp is designated as "no data/No Specific Flood Hazard Area" (Dudley and Schalk 2006), however water levels along the Dead River are actively managed at the Long Falls Dam outlet of Flagstaff Lake by Brookfield Renewable Energy. In relation to these fluctuating water levels, a principal function of wetlands on the Grand Falls parcel that are along and hydrologically connected to the Dead River is Floodflow Alteration.
Fish and Shellfish Habitat (FH)	As observed during field surveys the Dead River at Grand Falls is popular for brook trout and landlocked salmon fishing. In 2017 the segment of the Dead River crossing T3 R4 BKP WKR where LET is located was stocked with approximately 1,550, 8- to 14-inch landlocked salmon and brook trout to support the fishery for recreational angler (MDIFW 2018). Freshwater mussels were observed along muddy shorelines of the Dead River upstream of Grand Falls.
Production Export (PE)	As evidenced by browse, droppings and other sign, woody vegetation in GFT wetlands is a fundamental food source for all herbivorous and omnivorous wildlife inhabiting the Tract. Seeds, roots and stems from herbaceous vegetation in not only PEM but PSS and PFO wetlands on GFT are also food sources for not only mammals, but the wide variety of birds, amphibians, reptiles, fish and insects that inhabit or traverse the Tract.
Sediment/Toxicant/ Pathogen Retention (STPR)	Micro-topography as well as woody and herbaceous vegetation throughout GFT wetlands physically slow surface water transport and retain these degraders of water quality to the Dead River. Sediments/toxicants/pathogens trapped with accumulation of vegetative remains as peat or other forms of hydric soils is another form of GF T wetlands protecting water quality of tributary streams and the Dead River.
Nutrient Removal (NR)	Micro-topography as well as woody and herbaceous vegetation throughout GFT wetlands slow surface water transport of nutrients protecting the Dead Rivera as well as lesser tributaries from water quality degradation (Photo 5.9). Direct uptake of nutrients by wetland vegetation and subsequent accumulation of dead vegetation in organic soils and peat is another pathway of GFT wetlands protecting water quality.
Sediment/Shoreline Stabilization (SS)	Riverine and palustrine wetlands aligned along both shores of the Dead River buffer and protect the adjoining upland shoreline from scour and erosion.
Wildlife Habitat (WH)	In addition to direct observation as well as tracks, droppings and other sign, moose, bear, deer, coyote, beaver, otter, mink and other smaller mammals are abundant on GFT that is further enhanced by the presence along the Dead River on the southern edge of the Tract of approximately 16 acres of a 1,542 acres moderate value IWWH. Based on the location and vegetative cover in the location of P-FW (060030) on the LUPC map (Figure 5.2) a Deer Wintering Area is located along the northeast side of GFT which also extends downstream along the Dead River to BT.
Educational/ Scientific Value (ED)	Educational values of GFT are recognized and promoted by a Maine Geologic Facts and Localities report by the Maine Geological Survey (Marvinney 2014). Due to proximity and connectivity, educational and scientific values of GFT are similar to those of the Bigelow Mountain-Flagstaff Lake-North Branch Dead River Focus Area of Statewide Ecological Significance (https://www.maine.gov/dacf/mnap/focusarea/bigelow_mountain_focus_area.pdf).
Recreation (REC)	GFT, crossed by the MHT network traveled by day, and through hikers is also used for camping cross country skiing and snowshoeing. The Northern Forest Canoe Trail (Photo 5.5) crosses the Tract which is the starting point for commercial Dead River rafting operation. The Tract is also regarded for trout and salmon fishing and hunting opportunities.

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5.8 Compensation

As part of the compensation package for NECEC, the approximately 120.84-acre Grand Falls Tract will be permanently protected by a conservation easement or similar instrument. Preservation of GFT (Figure 5.3) will expand on the Dead River Trail and Conservation Corridor and will encompass not only Grand Falls but also approximately 0.8 mile on each side of this reach of the Dead River which is designated as an Outstanding River Segment (Ch 200 §403). This key location will also augment Western Mountain conservation easement on the north side of the Dead River near the mouth of Spencer Stream. In addition, approximately 12 percent (14.41 acres) of the 120.84-acre GFT are comprised of a diverse mix of wetland types (PFO, PSS, PEM) with much of the PSS and PEM being part of the wetland in the Tract's 16.06-acre portion of a 1,542 acres moderate value IWWH. P-FW 060030 on the MLUPC Land Use Guidance Map (Figure 5.2) also indicates a Deer Wintering Area occurs in the northeast corner of GFT.

Two long established cabins and the Maine Huts and Trails bridge are presently the limit of residential type development at GFT. Portions of the Tract are zoned M-GN and additional development similar to the three cabins now on and immediately adjacent to GFT could therefore take place. Preservation of GFT would provide permanent protection from development and preserve the existing wetland based- wildlife, vernal pool, fish and shellfish habitats, water quality benefits, and recreational and educational opportunities.

5.9 Photographs

PHOTO 5-1 GRAND FALLS IS A HORSESHOE WATERFALL ON THE DEAD RIVER APPROXIMATELY 40 FEET TALL AND 200 FEET WIDE

PHOTO 5-2 GRAND FALLS ATTRACT VISITORS ANNUALLY FOR ITS SCENIC VIEWS AND NATURAL SPLENDOR

PHOTO 5-3 A MAINE HUTS AND TRAILS BRIDGE CROSSES THE DEAD RIVER UPSTREAM FROM GRAND FALLS

PHOTO 5-4 TWO CABINS ARE LOCATED ON THE TRACT (ONE ON EACH SIDE OF THE DEAD RIVER) AND A THIRD IS IMMEDIATELY ADJACENT TO THE WEST BOUNDARY

PHOTO 5-5 THE NORTHERN FOREST CANOE TRAIL AND THE MAINE HUTS AND TRAILS TRAIL SYSTEM PASS THROUGH THE TRACT; HERE A RACK AND A FOOD STORAGE BOX BESIDE THE PORTAGE TAKE OUT ALLOWS PADDLERS TO CARE FOR THEIR EQUIPMENT WHILE TAKING IN VIEWS OF GRAND FALLS

PHOTO 5-6 RELIC CRIBWORK LIKELY FROM HISTORIC LOGGING OPERATIONS SPANS THE WIDTH OF THE DEAD RIVER UPSTREAM FROM GRAND FALLS

PHOTO 5-7 THIS HISTORIC SIGN AND ITS RESPECTIVE CAMPSITE ARE LOCATED ON THE ISLAND, APPROXIMATELY ONE THIRD OF A MILE SOUTH OF THE BRIDGE (WARDEN MAYNARD ATWOOD OF KINGFIELD, MAINE, RETIRED IN 1984)

PHOTO 5-8 A "SIGNIFICANT VERNAL POOL" ON GFT PROVIDES HABITAT FOR SPOTTED SALAMANDER EGG MASSES

PHOTO 5-9 FORESTED WETLANDS (PFO4/1) ON GFT ARE TYPICALLY DOMINATED BY RED MAPLE, BALSAM FIR, NORTHERN WHITE CEDAR, AND YELLOW BIRCH

PHOTO 5-10 THIS TRIBUTARY STREAM TO THE DEAD RIVER IS DOMINATED BY AN ALDER SHRUB SWAMP WETLAND (PSS)

PHOTO 5-11 ALDER SHRUBLAND (PSS) OCCURS AS A FRINGE BETWEEN AN OPEN AREA AND A FORESTED WETLAND (PFO)

PHOTO 5-12 AN EMERGENT WETLAND (PEM) BORDERS THE WEST BANK OF THE DEAD RIVER, UPSTREAM FROM GRAND FALLS. FRESHWATER MUSSELS WERE FOUND ALONG THE SHORELINE IN THIS VICINITY

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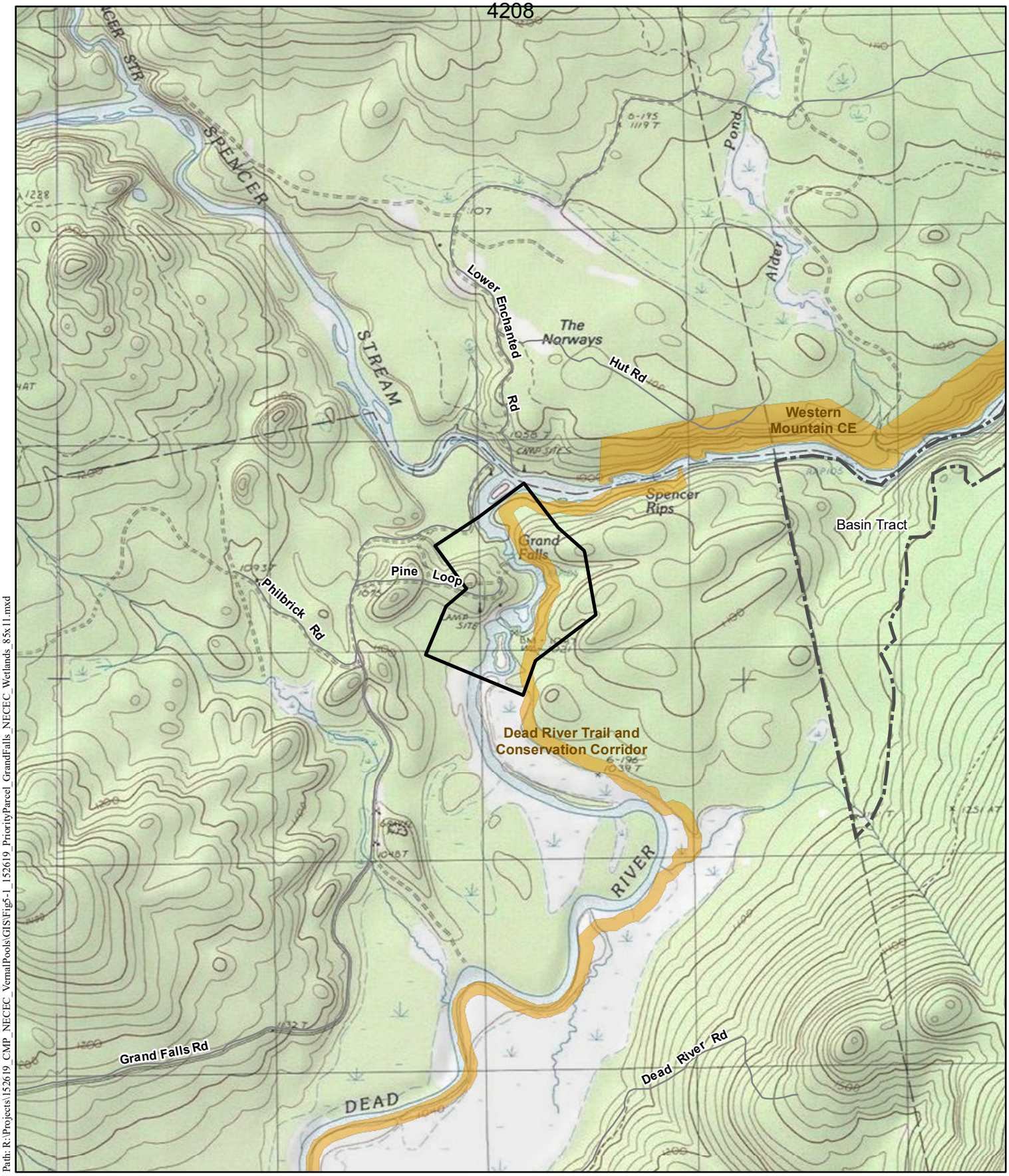

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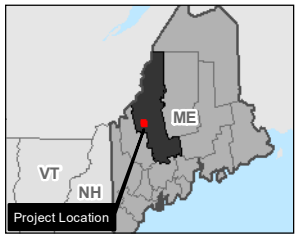

Road
Conserved Lands
Other Tract
Survey Area

N
W E
S

SCALE: 1 " = 2,000 '

0 1,000 2,000
Feet

Figure 5.1: Locus
Grand Falls Tract

Somerset County
Maine

Date:8/6/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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Land Use Guidance Map

T3 R4 BKP WKR

Spring Lake Twp.
Somerset County

Maine Department of Agriculture, Conservation and Forestry
LAND USE PLANNING COMMISSION
Augusta, Maine 04333−0022
(207) 287−2631
TTY (888) 577−6690
http://www.maine.gov/doc/lupc

Legend

Development Subdistricts

D−RS Residential

Protection Subdistricts

P−AL Accessible Lake
P−FP Flood Prone
P−FW Fish and Wildlife
P−GP Great Pond
P−RR Recreation −Water
P−SG Soils and Geology
P−SL1 250 ft Shoreland −Major
P−SL2 75 ft Shoreland −Minor
P−UA Unusual Area
P−WL1 Wetlands − Significant
P−WL2 Wetlands − Scrub−shrub
P−WL3 Wetlands − Forested

Management Subdistricts

M−GN General

Water body
Improved road
Unimproved road
Trail

Areas designated as two or more protection zones are annotated with each zone, e.g. P−FP/FW/WL1, P−FP/SL1, etc., where necessary

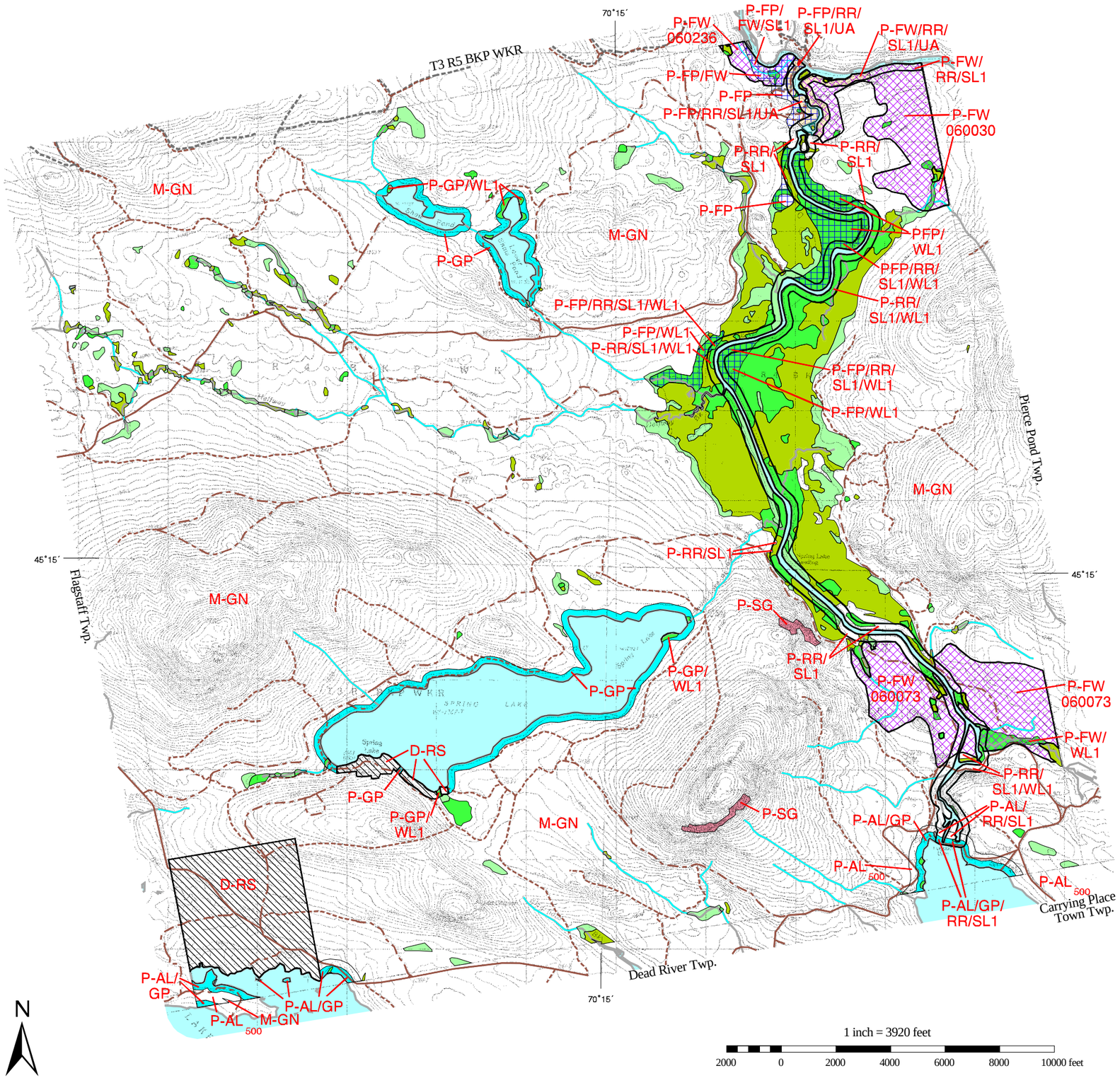
or Subdistrict boundary
① Zoning amendment

Topographic base, roads and trails from U.S. Geological Survey 7.5−minute map series

For the purpose of simplicity, this map does not show the Wetland Protection Subdistricts for areas identified pursuant to Section 10.16,K,2 such as beds of rivers, lakes, and other water bodies, and freshwater wetlands within 25 feet of stream channels, which are nevertheless within P−WL Subdistricts.

This map is a reduced version of the official Land Use Guidance Map. It is not certified to be a true and correct copy. Full size official LUPC Land Use Guidance Maps are available from the Commission at its Augusta office. Potential applicants unsure of their zoning should request a full size map from the Augusta office.

Land Use Guidance Map last amended on August 18, 2005



1 inch = 3920 feet

2000 0 2000 4000 6000 8000 10000 feet

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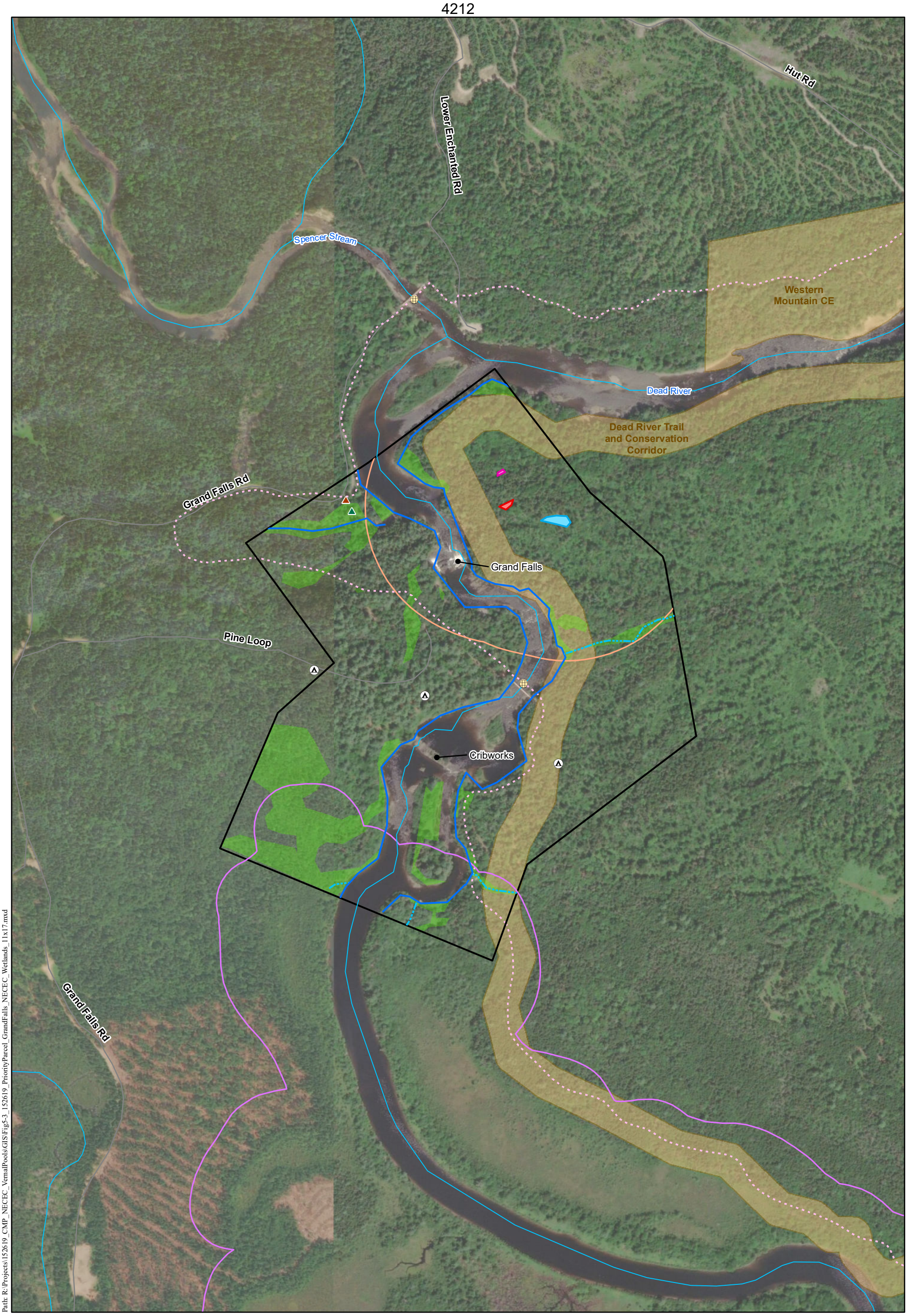

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- Wetland Data Point
- Upland Data Point
- Stream (NHD)
- Maine Huts & Trails Bridge
- Cabin
- Maine Huts & Trails Main Trail
- Delineated Intermittent Stream
- Delineated Perennial Stream
- Road
- Delineated Wetland
- Significant Vernal Pool
- Potential Significant Vernal Pool
- Potential Vernal Pool
- Critical Terrestrial Habitat (750')
- Inland Waterfowl and Wading Bird Habitat
- Conservation Land
- Survey Area

1 " = 500 '

0 250 500

Feet

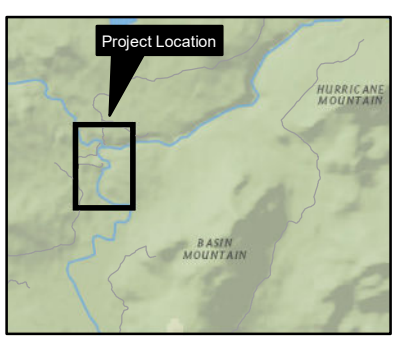

Figure 5.3: Natural Resources Grand Falls Tract

Somerset County Maine

NAD 1983 HARN StatePlane Maine West FIPS 1802 Feet Foot US
Transverse Mercator
North American 1983 HARN

Date: 8/6/2018
Author: KK
PEI: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER

POWER ENGINEERS

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APPENDIX 5A IPAC RESULTS: GRAND FALLS TRACT

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Project information

NAME

Compensatory Mitigation

LOCATION

Somerset County, Maine

DESCRIPTION

GFT

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

NOT FOR CONSULTATION

Canada Lynx *Lynx canadensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Atlantic Salmon *Salmo salar* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2097	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

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Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

4219

THERE ARE NO MIGRATORY BIRDS OF CONSERVATION CONCERN EXPECTED TO OCCUR AT THIS LOCATION.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

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3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1E

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1E
- PSS1/EM1E
- PFO4E
- PFO1E
- PSS1F

RIVERINE

- R3UBH
- R2UBH
- R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error

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is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX 5B VEGETATION LIST: GRAND FALLS TRACT

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Abies balsamea	Balsam Fir	Pinaceae	FAC
Acer rubrum	Red Maple	Sapindaceae	FAC
Acer saccharum	Sugar Maple	Sapindaceae	FACU
Alnus incana sp. *rugosa*	Speckled Alder	Betulaceae	FACW
Anemone quinquefolia	Nightcaps	Ranunculaceae	FACU
Aralia nudicaulis	Wild Sarsaparilla	Araliaceae	FACU
Betula alleghaniensis	Yellow Birch	Betulaceae	FAC
Calamagrostis canadensis	Bluejoint	Poaceae	OBL
Carex trisperma	Three-Seed Sedge	Cyperaceae	OBL
Carex stricta	Tussock Sedge	Cyperaceae	OBL
Chamaedaphne calyculata	Leatherleaf	Ericaceae	OBL
Chamaepericlymenum canadense	Bunchberry	Cornaceae	FAC
Clematis virginiana	Devil's Darning Needles	Ranunculaceae	FAC
Clintonia borealis	Yellow Bluebead Lily	Liliaceae	FAC
Corylus cornuta	Beaked Hazelnut	Betulaceae	FACU
Fraxinus nigra	Black Ash	Oleaceae	FACW
Gaultheria hispidula	Creeping Spicy Wintergreen	Ericaceae	FACW
Geum rivale	Purple Avens	Rosaceae	OBL
Hypericum punctatum	Spotted St. John's Wort	Hypericaceae	FAC
Ilex verticillata	Common Winterberry	Aquifoliaceae	FACW
Lysimachia borealis	Starflower	Myrsinaceae	FAC
Maianthemum canadense	Canada Mayflower	Ruscaceae	FACU
Matteuccia struthiopteris	Ostrich Fern	Onocleaceae	FAC
Onoclea sensibilis	Sensitive Fern	Onocleaceae	FACW
Osmunda claytonia	Interrupted Fern	Osmundaceae	FAC
Osmundastrum cinnamomeum	Cinnamon Fern	Osmundaceae	FACW
Picea rubens	Red Spruce	Pinaceae	FACU
Pinus strobus	Eastern White Pine	Pinaceae	FACU
Populus balsamifera	Balsam Poplar	Salicaceae	FACW
Prunus virginiana	Chokecherry	Rosaceae	FACU
Ribes lacustre	Bristly Swamp Currant	Grossulariaceae	FACW
Rubus hispidus	Bristly Dewberry	Rosaceae	FACW
Rubus idaeus	Red Raspberry	Rosaceae	FACU
Solidago canadensis	Canadian Goldenrod	Asteraceae	FACU
Solidago rugosa	Wrinkle-Leaf Goldenrod	Asteraceae	FAC
Sorbus americana	American Mountain-Ash	Rosaceae	FAC

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Spiraea alba var. *latifolia*	Meadowsweet	Rosaceae	FACW
Swida sericea	Red Osier Dogwood	Cornaceae	FACW
Thalictrum pubescens	Tall Meadow-Rue	Ranunculaceae	FACW
Thuja occidentalis	Northern White Cedar	Cupressaceae	FACW
Tiarella cordifolia	Foam Flower	Saxifragicaceae	FACU
Trillium erectum	Stinking Benjamin	Melanthiaceae	FACU
Uvularia sessilifolia	Sessile-Leaf Bellwort	Colchicaceae	FACU
Viola spp.	Violet	Violaceae	N/A
INDICATOR STATUS	OCCURRENCE IN WETLANDS (% per Reed, 1998)		
Obligate (OBL)	Almost always occurs in wetlands under natural conditions (99%)		
Facultative Wetland (FACW)	Usually in wetlands, occasionally found in non-wetlands (67- 99%)		
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands. (33-67%)		
Facultative Upland (FACU)	Usually in non-wetlands, occasionally found in wetlands (1-33%)		
Upland (UPL)	Almost always in non-wetlands under natural conditions (1%)		

[1] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.USACE National Wetland Plant List. Web.20 June 2018.

[2] Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1, USACE Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at https://www.fws.gov/wetlands/documents/national-wetland-plant-list-indicator-rating-definitions.pdf [Verified 20 June 2018].

*Reed, P. B., Jr. 1988. *National List of Plant Species that Occur in Wetlands.* Washington, DC, USFWS.

6.0 LOWER ENCHANTED TRACT

6.1 Site Location Information

Municipality: Lower Enchanted Township **County:** Somerset

Biophysical Region: Central Mountains

Watershed (HUC 12): Enchanted Stream (010300020504),
Gulf Stream-Lower Dead River (010300020506)

NECEC Components within HUC 8 (01030002) Watershed: HVDC, New right of way

Closest NECEC Component: HVDC New ROW

Coordinates of Site Centroid (Lat/Long WGS 84): 45°19'50.89"N, 70°6'13.71"W

6.2 Natural Resource Inventory Summary (quantities are +/-):

Total Site Area .....235.60 acres

NWI Palustrine Wetland Area .....7.68 acres

Delineated and GPS-surveyed Palustrine Wetland Area .....12.97 acres

NHD Rivers and Streams .....19,210 feet (3.64 miles)

Outstanding River Segment (Ch 200 §403: Dead River)……..……..2.3 miles

Delineated and GPS-surveyed Rivers and Streams.....22,620 feet (4.28 miles)

Upland Area.....222.63 acres

Significant Vernal Pools .....None

Non-Significant Vernal Pools ……..1 high value PSVP, 5 low value VPs

Vernal Pool Critical Terrestrial Habitat (750 feet)..... 84.46 acres

6.3 Site Description

The approximately 235.60-acre Lower Enchanted Tract (hereafter “LET” or “the Tract”) has a configuration similar to an inverted “T” with approximately 1.33 miles of frontage on each side of Enchanted Stream (Photos 6.1 and 6.2) and 2.30 miles of frontage along the north side of the Dead River (Figure 6.1). Access to the east side of the LET is by Whiskey Springs Road from Lower Enchanted Road, from which a former logging road also leads to the west side of the Tract.

Although extensive timber harvesting has occurred on each side of Enchanted Stream to the Dead River, the entirety of LET remains essentially uncut and therefore contains a 3.63-mile undisturbed riparian corridor. Widths of the Tract along Enchanted Stream range from 250 to 1,050 feet and are typically 200 feet and 300 feet on the east and west sides, respectively, whereas along the Dead, widths range from 300 to 900 feet with representative widths on the upstream and downstream segments of 400 and 700 feet, respectively.

6.4 Surrounding Land Use, Protected Open Space and Focus Areas

Lower Enchanted Stream is spanned by a bridge on LET that is part of the Maine Huts and Trails network along the length of the Dead River (Figure 6.2, Photo 6.3). The Dead River (Photo 6.4) is heavily used by rafters and from Whiskey Springs Road; an appendage on the east side of the Tract provides emergency access to the River. Lower Enchanted Stream and the Dead River are also popular for brook trout (*Salvelinus fontinalis*) and landlocked salmon (*Salmo salar sebago*) fishing. In 2017, the segment of the Dead River crossing T3 R4 BKP WKR where LET is located was stocked with approximately 1,550, 8- to 14-inch landlocked salmon and brook trout to support the fishery for recreational anglers (MDIFW 2018). The northern tip of LET is within 150 feet of the southern terminus of a moderate value IWWH associated with Lower Enchanted Pond. There are no Focus Areas immediately adjacent to or within one mile of LET.

LET is displayed on Figure 6.2, MLUPC's Land Use Guidance Map for Lower Enchanted Twp. (T2 R5 BKP WKR). Most of LET is designated as a General Management Subdistrict M-GN). In addition, the following Protection Subdistricts occur at LET:

- P-RR – Recreation –Water
- P-SL1 – Shore Land within 250 feet of the normal high-water mark
- P-WL2 – Wetlands scrub shrub (PSS)
- P-WL3 – Wetlands forested wetlands (PFO)

6.5 Wildlife Use

Wildlife usage and habitat evaluations on LET were conducted based on field surveys, aerial photo interpretation of landscape and terrain, and research of IPaC results from the USFWS for endangered species, critical habitat, migratory birds, and fisheries in and around the area. According to the results of the IPaC report (Appendix 6A), two threatened species: Canada lynx (*Lynx canadensis*) and Northern long-eared bat (*Myotis septentrionalis*); and one endangered species – Atlantic salmon (*Salmo salar*) could be affected by activities on the property.

Bald eagles (*Haliaeetus leucocephalus*) likely make use of the LET riparian corridor. The wide Dead River valley lined with tall trees along the shoreline and valley walls is an ideal habitat area for bald eagles and other birds of prey. This allows for the birds to nest high and have a 360-degree view as well as have abundant fishing in the River. A pair of common ravens (*Corvus corax*) was observed sounding alarm calls as field crews approached what was likely their nest.

White-tailed deer (*Odocoileus virginianus*) and moose (*Alces alces*) droppings were observed, mainly on the gentler slopes of the Tract. American beech (*Fagus grandifolia*) is a common upland tree species and beech nuts, is a prevalent food source for deer, Eastern gray squirrel (*Sciurus carolinensis*), red squirrel (*Sciurus vulgaris*), chipmunks (*Tamias sp*.), and black bear (*Ursus americanus*). Coyote (*Canis latrans*), red fox (*Vulpes vulpes*) beaver (*Castor candensis*), mink (*Neovison vison*), river otter (*Lontar canadensis*), fisher (*Pekania pennanti*) and pine marten (*Martes americana)* are furbearers that inhabit or traverse the Tract.

Several pools harboring indicator species egg masses were observed on site including five low value natural vernal pools (VP) and one high value potentially significant vernal pool (PSVP) (Photo 6.5). Due to survey timing, only spotted salamander (*Ambystoma maculatum*) egg masses were observed, though the presence of wood frogs (*Lithobates sylvaticus*) is likely as well. American toads (*Anaxyrus americanus*) and green frogs (*Lithobates clamitans*) are other common amphibians observed within the Tract. Garter snakes (*Thamnophis spp*.) were also observed during field visits.

6.6 Vegetation

This Tract includes a variety of vegetative communities which provide different cover types and habitat characteristics. The Tract is primarily composed of mature forest, portions of which include dominantly deciduous and areas of mixed-growth (coniferous and deciduous) forest. In addition, there are also large areas of scrub-shrub communities, generally present along the periphery of the river. The eastern and western boundaries of the upstream portion of the parcel are characterized by early successional forests, predominantly big-toothed aspen (*Populus grandidentata*), balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*) and red spruce (*Picea rubens*).

Wetlands and uplands were identified in each type of vegetative community mentioned above. Dominant tree species in the upland forest are eastern hemlock (*Tsuga canadensis*), balsam fir, red spruce, and sugar maples (*Acer saccharum*). The shrub and sapling understory layer of the upland forest includes beaked hazelnut (*Corylus cornuta*), hobblebush (*Viburnum lantanoides*), and striped maple (*Acer pennsylvanicum*). Common forbs in the upland forest are painted trillium (*Trillium undulatum*), red trillium (*Trillium erectum*), yellow blue-bead lily (*Clintonia borealis*), and sarsaparilla (*Aralia nudicaulis*).

Forested wetlands (PFO) are dominated by red maple (*Acer rubrum*), balsam fir, yellow birch (*Betula allegheniensis*), northern white cedar (*Thuja occidentalis*), and black ash (*Fraxinus nigra*). The dominant understory plant in the PFO is sensitive fern (*Onoclea sensibilis*). The scrub-shrub wetlands (PSS) are dominated by speckled alder (*Alnus incana* ssp. *rugosa*) and meadowsweet (*Spiraea alba* var. *latifolia*), with occasional abundance of steeplebush (*Spiraea tomentosa*) and willow (*Salix* spp.). Herbaceous plants found in the shrublands are dominated by bluejoint grass (*Calamagrosits canadensis*), American false hellebore (*Veratrum viride*), and a suite of sedges (*Carex* spp.) and bulrushes (*Scirpus* spp.).

6.7 Wetland Characteristics, Functions and Values

Approximately 12.97 acres (5.5%) of the 235.60 total acres of the LET were identified as palustrine wetlands during the field surveys (Figure 5.3). Although the largest wetland type on the Tract is the Enchanted Stream covering approximately 6.67 acres, characterized as a permanently flooded, lower perennial riverine system with an unconsolidated bottom (R3UBH), as discussed earlier it is excluded from total palustrine wetland area. Accounting for both banks, LET contains approximately 2.7 miles of frontage along the Enchanted Stream. The Enchanted Stream flows southeast through the Tract to the Dead River (Photo 6.4). The Tract has a total of approximately 2.3 miles of frontage on the Dead River, including sections both upstream and downstream of the mouth of Enchanted Stream. The second most abundant wetland type is palustrine scrub shrub (PSS), typically displayed as a speckled alder thicket growing within the floodplain of the riverine system (Photo 6.6). The least abundant wetland type is palustrine forested, which typically occurs at the toe of slope between the Enchanted Stream and the steep hillsides along the stream valley. Variations of forested wetland (Photo 6.7) occur across LET such as those dominated by deciduous trees (PFO1) and those dominated by mixed coniferous-deciduous canopy (PFO4/1).

As mapped by the USDA NRCS on Web Soil Survey, the entire Lower Enchanted Tract consists of somewhat excessively drained (SED), well drained (WD), or moderately well drained (MWD) soils with slopes ranging between 15 and 60 percent. Due to the steep valley walls on both sides of Enchanted Stream any surface and groundwater rapidly flows directly to the stream channel, or are hillside seep wetlands delineated during field surveys (Photo 6.8). The Dead River valley contains a larger area of flatter slopes allowing for a higher abundance of poorly drained, hydric soils. Hydric soils were observed predominantly along the shores of Enchanted Stream and the Dead River.

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TABLE 6-1 SUMMARY OF FUNCTIONS & VALUES OF WETLANDS ON THE 235.60-ACRE LOWER ENCHANTED TRACT

FUNCTION/VALUE	EXPLANATION
Groundwater Recharge/Discharge (GW)	Wetlands on river valley slopes of LET are commonly associated with spring/seeps or sites of groundwater discharge and as part of the surface hydrologic system at other locations on LET are recharge areas to the baseflow of Enchanted Stream and the Dead River (Photo 6.8).
Flood flow Alteration (FF)	Lower Enchanted Twp is designated as "no data/No Specific Flood Hazard Area" (Dudley and Schalk 2006), however water levels along the Dead River are actively managed at the Long Falls Dam outlet of Flagstaff Lake by Brookfield Renewable Energy. In relation to these fluctuating water levels, a principal function of wetlands on the Lower Enchanted parcel that are along and hydrologically connected to the Dead River is Floodflow Alteration.
Fish and Shellfish Habitat (FH)	Lower Enchanted Stream and the Dead River are popular for brook trout and landlocked salmon fishing. In 2017, the segment of the Dead River crossing T3 R4 BKP WKR where LET is located was stocked with approximately 1,550, 8- to 14-inch landlocked salmon and brook trout to support the fishery for recreational angler (MDIFW 2018). Freshwater mussels observed upstream and downstream on GFT and BT along muddy shorelines of the Dead River are also likely to inhabit similar substrate on LET.
Production Export (PE)	As evidenced by browse, droppings and other sign, woody vegetation in LET wetlands is a fundamental food source for all herbivorous and omnivorous wildlife inhabiting the Tract. Seeds, roots and stems from herbaceous vegetation in not only PEM but PSS and PFO wetlands on GFT are also food sources for not only mammals, but the wide variety of birds, amphibians, reptiles, fish and insects that inhabit or traverse the Tract.
Sediment/Toxicant/ Pathogen Retention (STPR)	Micro-topography as well as woody and herbaceous vegetation throughout LET wetlands physically slow surface water transport and retain these degraders of water quality to the Dead River. Sediments/toxicants/pathogens trapped with accumulation of vegetative remains as peat or other forms of hydric soils is another form of LET wetlands protecting water quality of tributary streams and the Dead River.
Nutrient Removal (NR)	Micro-topography as well as woody and herbaceous vegetation throughout LET wetlands slow surface water transport of nutrients protecting the Dead River as well as lesser tributaries from water quality degradation. Direct uptake of nutrients by wetland vegetation and subsequent accumulation of dead vegetation in organic soils and peat is another pathway of LET wetlands protecting water quality.
Sediment/Shoreline Stabilization (SS)	Riverine and palustrine wetlands aligned along the north shore of the Dead River and both shores of Enchanted Stream buffer and protect the adjoining upland shoreline from scour and erosion (Photo 6.6).
Wildlife Habitat (WH)	In addition to direct observation as well as tracks, droppings and other sign, moose, bear, deer, coyote, beaver, otter, mink and other smaller mammals are abundant on LET. The northern tip of LET is within 150 feet of the southern terminus of a 276-acre moderate value IWWH associated with Lower Enchanted Pond.
Educational/ Scientific Value (ED)	Although there appear to be no records of educational use or scientific research, attributes of LET including the baseline of mapped resources and its remote location along riparian corridors of Enchanted Stream and the Dead River could be relevant to further study.
Recreation (REC)	LET is crossed by the MHT network traveled by day, and through hikers that is also used for camping cross country skiing and snowshoeing (Photo 6.3). Commercial river rafting on the Dead River pass along the shoreline of the Tract which also provides emergency access to the river. Enchanted Stream as well as the Dead River are regarded for trout and salmon fishing. Hunting opportunities are another recreational value of the Tract and its wetlands.

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6.8 Compensation

As part of the compensation package for NECEC, the approximately 235.60-acre Lower Enchanted Tract will be permanently protected by a conservation easement or similar instrument. Preservation of LET will link segments of and expand on the Western Mountain Conservation Easement and will encompass approximately 0.7 mile on both sides of Enchanted Stream as well as 2.3 miles along the north shoreline of the Dead River (Figure 6.3) which is designated as an Outstanding River Segment (Ch 200 §403). In addition, approximately 5.5 percent (12.97 acres) of the 235.60-acre LET are comprised of a mix of PSS and PFO riparian wetland.

Most of the Tract is zoned M-GN, and easily accessible by Whiskey Springs Road. Development of this otherwise undeveloped riparian Tract could therefore occur. Preservation of LET would provide permanent protection from development and preserve the existing wetland based-wildlife, vernal pool, fish and shellfish habitats, water quality benefits, and recreational, and educational values of this Tract.

6.9 Photographs

PHOTO 6-1 AN UPSTREAM VIEW FROM THE MHT BRIDGE DISPLAYS A POOL ON LOWER ENCHANTED STREAM

PHOTO 6-2 A DOWNSTREAM VIEW FROM THE MHT BRIDGE OF RIFFLES/RAPIDS ON LOWER ENCHANTED STREAM

PHOTO 6-3THE MHT TRAIL CROSSES LET LOCATED APPROXIMATELY FIVE MILES DOWNSTREAM ON THE DEAD RIVER FROM THE GRAND FALLS HUT

PHOTO 6-4 THE CONFLUENCE OF LOWER ENCHANTED STREAM (LEFT) AND THE DEAD RIVER (RIGHT SIDE) IS LOCATED NEAR THE CENTER OF THE TRACT.

PHOTO 6-5 A POTENTIALLY SIGNIFICANT VERNAL POOL (PSVP) FOUND ON THE EAST SIDE OF LOWER ENCHANTED STREAM PROVIDES HABITAT FOR SPOTTED SALAMANDER EGG MASSES, AS WELL AS OTHER ADULT AMPHIBIANS

PHOTO 6-6 SCRUB SHRUB FLOODPLAIN WETLANDS ARE ABUNDANT ALONG THE BANKS OF THE LOWER ENCHANTED STREAM (RIGHT SIDE OF PHOTO) AND ARE TYPICALLY DOMINATED BY SPECKLED ALDER AND MEADOWSWEET

PHOTO 6-7 A FORESTED WETLAND (PFO) OCCURS THROUGHOUT THE TRACT BETWEEN THE TOE OF SLOPE (AT LEFT) AND LOWER ENCHANTED STREAM

PHOTO 6-8 SEVERAL TRIBUTARY STREAMS RUN DOWN THE STEEP SLOPES OF THE VALLEY, ULTIMATELY DRAINING INTO THE LOWER ENCHANTED STREAM

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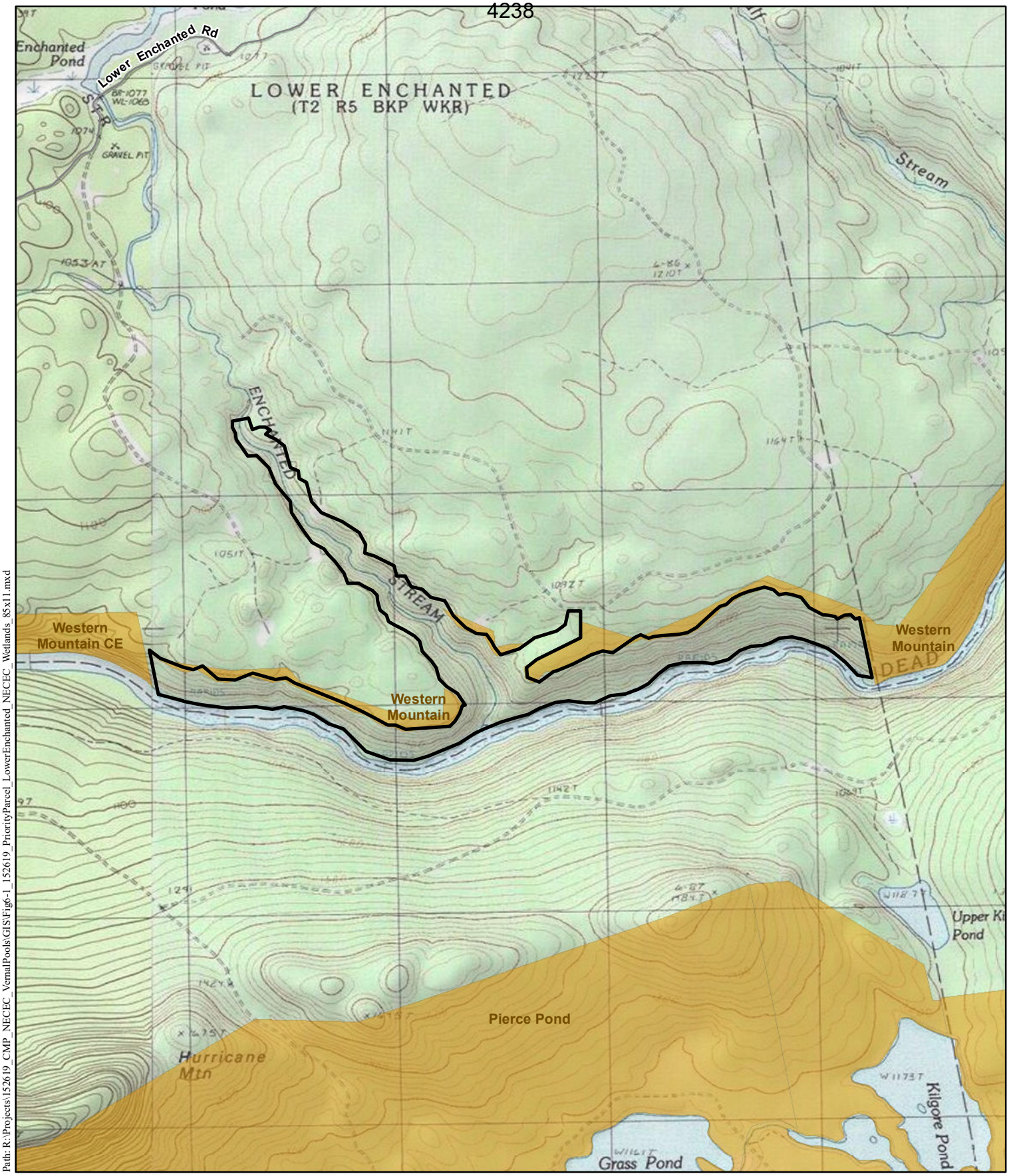

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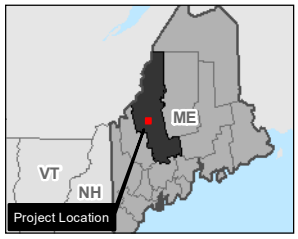

Road
Conserved Lands
Survey Boundary

N
W E
S

SCALE: 1 " = 2,000 '

0 1,000 2,000
Feet

Figure 6.1: Locus
Lower Enchanted Tract

Somerset County
Maine

Date:8/6/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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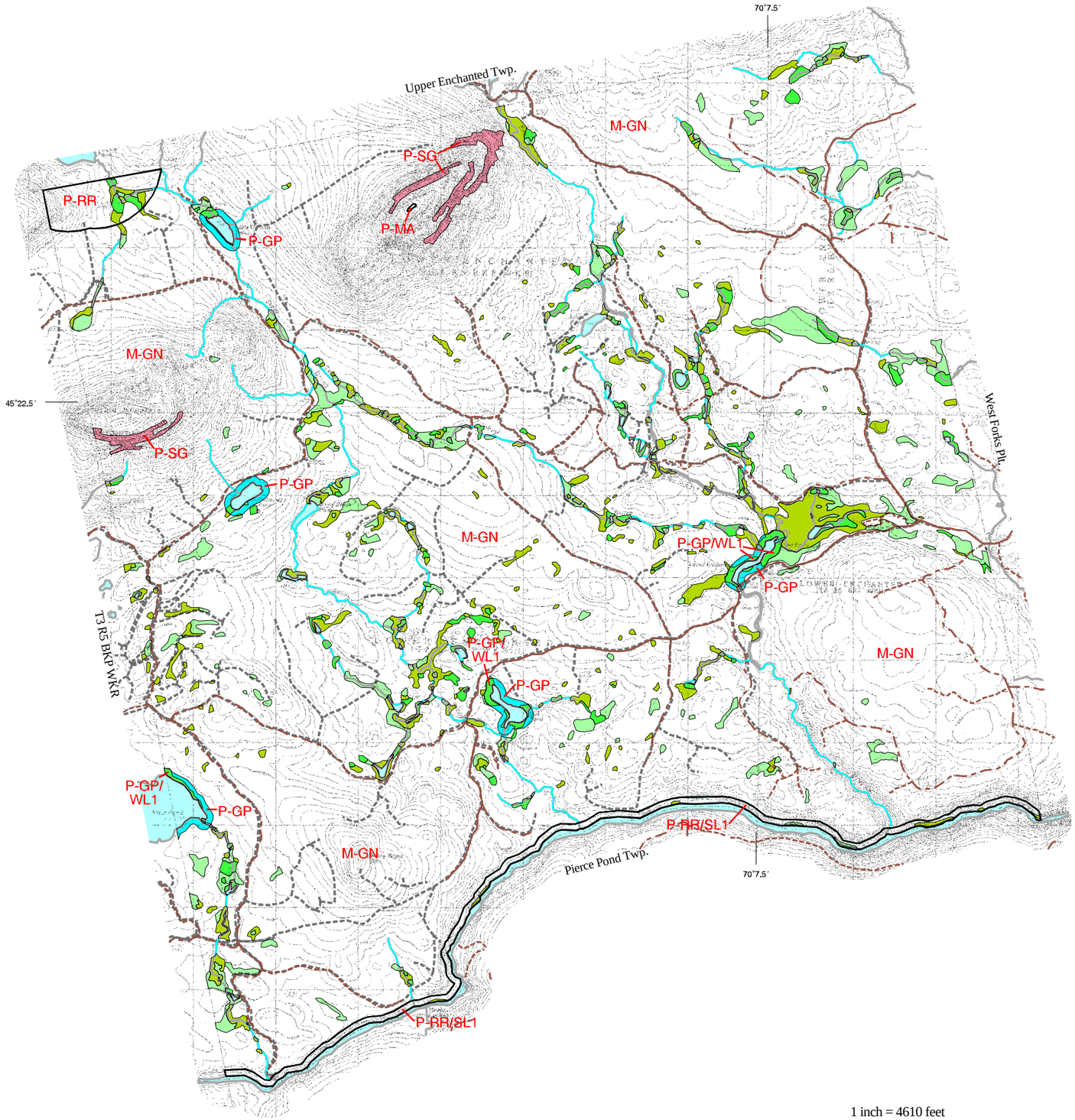
Land Use Guidance Map

Lower Enchanted Twp.

T2 R5 BKP WKR
Somerset County

Maine Department of Agriculture, Conservation and Forestry
LAND USE PLANNING COMMISSION
Augusta, Maine 04333−0022
(207) 287−2631
TTY (888) 577−6690
http://www.maine.gov/doc/lupc



N

1 inch = 4610 feet

2000 0 2000 4000 6000 8000 10000 feet

Legend

Development Subdistricts

Protection Subdistricts

- P−GP Great Pond
- P−MA Mountain Area
- P−RR Recreation −Water
- P−SG Soils and Geology
- P−SL1 250 ft Shoreland −Major
- P−SL2 75 ft Shoreland −Minor
- P−WL1 Wetlands − Significant
- P−WL2 Wetlands − Scrub−shrub
- P−WL3 Wetlands − Forested

Management Subdistricts

- M−GN General

- Water body
- Improved road
- Unimproved road
- Trail

Areas designated as two or more protection zones are annotated with each zone, e.g. P−FP/FW/WL1, P−FP/SL1, etc., where necessary

—— or —— Subdistrict boundary
(1) Zoning amendment

Topographic base, roads and trails from U.S. Geological Survey 7.5−minute map series

For the purpose of simplicity, this map does not show the Wetland Protection Subdistricts for areas identified pursuant to Section 10.16,K,2 such as beds of rivers, lakes, and other water bodies, and freshwater wetlands within 25 feet of stream channels, which are nevertheless within P−WL Subdistricts.

This map is a reduced version of the official Land Use Guidance Map. It is not certified to be a true and correct copy. Full size official LUPC Land Use Guidance Maps are available from the Commission at its Augusta office. Potential applicants unsure of their zoning should request a full size map from the Augusta office.

Land Use Guidance Map last amended on August 18, 2005

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4242

Enchanting Stream

Whiskey Springs Rd

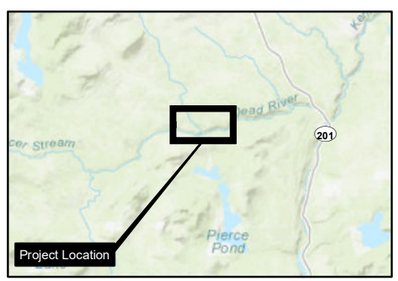
Western Mountain CE

Western Mountain

Western Mountain

Western Mountain

Dead River



- Corps Vernal Pool
- Vernal Pool
- Wetland Data Point
- Upland Data Point
- Maine Huts & Trails Bridge
- Delineated Intermittent Stream
- Delineated Perennial Stream
- Stream (NHD)
- Critical Terrestrial Habitat (750')
- Potential Significant Vernal Pool
- Inland Waterfowl and Wading Bird Habitat
- Survey Area
- Maine Huts & Trails Main Trail
- Road
- Delineated Wetland
- Conservation Land

Figure 6.3: Natural Resources
Lower Enchanted Tract

Somerset County, Maine

DRAFT

0 500 1,000 2,000
Feet

1 " = 1,000 '

Page 1 of 1

Central Maine Power
NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER

POWER ENGINEERS

Date: 8/6/2018; Author: KK; Project: 152619

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APPENDIX 6A IPAC RESULTS: LOWER ENCHANTED TRACT

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Project information

NAME

Compensatory Mitigation

LOCATION

Somerset County, Maine

DESCRIPTION

LET

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

NOT FOR CONSULTATION

Canada Lynx *Lynx canadensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Atlantic Salmon *Salmo salar* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2097	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

NOT FOR CONSULTATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NOT FOR CONSULTATION

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

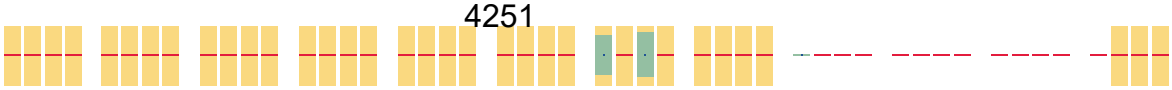
■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

NOT FOR CONSULTATION

4251

Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds

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guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize

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potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1C
- PFO1C
- PSS1E

RIVERINE

- R3UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

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Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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APPENDIX 6B VEGETATION LIST: LOWER ENCHANTED TRACT

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Abies balsamea	Balsam Fir	Pinaceae	FAC
Acer rubrum	Red Maple	Sapindaceae	FAC
Acer saccharum	Sugar Maple	Sapindaceae	FACU
Actaea pachypoda	Doll's Eyes	Ranunculaceae	UPL
Alnus incana ssp. *rugosa*	Speckled Alder	Betulaceae	FACW
Anemone canadensis	Round-Leaf Thimbleweed	Ranunculaceae	FACW
Anemone quinquefolia	Nightcaps	Ranunculaceae	FACU
Aralia nudicaulis	Wild Sarsaparilla	Araliaceae	FACU
Arisaema triphyllum	Jack-in-the-Pulpit	Araceae	FAC
Athyrium angustum	Northern Lady Fern	Woodsiaceae	FAC
Betula alleghaniensis	Yellow Birch	Betulaceae	FAC
Calamagrostis canadensis	Bluejoint	Poaceae	OBL
Cardamine diphylla	Crinkle Root	Brassicaceae	FACU
Carex leptalea	Bristly-Stalk Sedge	Cyperaceae	OBL
Carex spp.	Sedge	Cyperaceae	N/A
Clintonia borealis	Yellow Bluebead Lily	Liliaceae	FAC
Corylus cornuta	Beaked Hazelnut	Betulaceae	FACU
Dichanthelium sp.	Rosette Grass	Poaceae	N/A
Eleocharis acicularis	Needle Spike-Rush	Cyperaceae	OBL
Equisetum scirpoides	Dwarf Scouring-Rush	Equisetaceae	FAC
Equisetum sylvaticum	Woodland Horsetail	Equisetaceae	FACW
Fagus grandifolia	American Beech	Fagaceae	FACU
Fraxinus americana	White Ash	Oleaceae	FACU
Fraxinus nigra	Black Ash	Oleaceae	FACW
Fraxinus pennsylvanica	Green Ash	Oleaceae	FACW
Galium aparine	Sticky-Willy	Rubiaceae	FACU
Galium palustre	Common Marsh Bedstraw	Rubiaceae	OBL
Geum rivale	Purple Avens	Rosaceae	OBL
Gymnocarpium dryopteris	Northern Oak Fern	Woodsiaceae	FACU
Lysimachia borealis	Starflower	Myrsinaceae	FAC
Maianthemum canadense	Canada Mayflower	Ruscaceae	FACU
Matteuccia struthiopteris	Ostrich Fern	Onocleaceae	FAC
Medeola virginiana	Indian Cucumber-Root	Liliaceae	FACU
Onoclea sensibilis	Sensitive Fern	Onocleaceae	FACW
Osmunda claytonia	Interrupted Fern	Osmundaceae	FAC
Osmundastrum cinnamomeum	Cinnamon Fern	Osmundaceae	FACW

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Parathelypteris novaborecensis	New York Fern	Thelypteridaceae	FAC
Phegopteris connectilis	Narrow Beech Fern	Thelypteridaceae	FACU
Picea rubens	Red Spruce	Pinaceae	FACU
Pinus strobus	Eastern White Pine	Pinaceae	FACU
Populus balsamifera	Balsam Poplar	Salicaceae	FACW
Populus grandidentata	Big-Tooth Aspen	Salicaceae	FACU
Populus tremuloides	Quaking Aspen	Salicaceae	FACU
Prunus virginiana	Chokecherry	Rosaceae	FACU
Ribes glandulosum	Skunk Currant	Grossulariaceae	FACW
Ribes sp.	Currant	Grossulariaceae	N/A
Rubus idaeus	Red Raspberry	Rosaceae	FACU
Rubus hispidus	Bristly Dewberry	Rosaceae	FACW
Salix sp.	Willow	Salicaceae	N/A
Spiraea alba var. latifolia	Meadowsweet	Rosaceae	FACW
Streptopus lanceolatus	Rosy Bells	Liliaceae	FACU
Swida sericea	Red Osier Dogwood	Cornaceae	FACW
Thalictrum pubescens	Tall Meadow-Rue	Ranunculaceae	FACW
Thuja occidentalis	Northern White Cedar	Cupressaceae	FACW
Tiarella cordifolia	Heart-Leaf Foamflower	Saxifragicaceae	FACU
Trillium erectum	Stinking Benjamin	Melanthiaceae	FACU
Trillium undulatum	Painted Trillium	Melanthiaceae	FACU
Tsuga canadensis	Eastern Hemlock	Pinaceae	FACU
Tussilago farfara	Colt's-Foot	Asteraceae	FACU
Uvularia sessilifolia	Sessile-Leaf Bellwort	Colchicaceae	FACU
Veratrum viride	American False Hellebore	Melanthiaceae	FACW
Viburnum lantanoides	Hobblebush	Adoxaceae	FACU
Viola spp.	Violet	Violaceae	N/A
INDICATOR STATUS	OCCURRENCE IN WETLANDS (% per Reed, 1998)		
Obligate (OBL)	Almost always occurs in wetlands under natural conditions (99%)		
Facultative Wetland (FACW)	Usually in wetlands, occasionally found in non-wetlands (67- 99%)		
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands. (33-67%)		
Facultative Upland (FACU)	Usually in non-wetlands, occasionally found in wetlands (1-33%)		
Upland (UPL)	Almost always in non-wetlands under natural conditions (1%)		

[1] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17.USACE National Wetland Plant List. Web.20 June 2018.

[2] Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1, USACE Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at https://www.fws.gov/wetlands/documents/national-wetland-plant-list-indicator-rating-definitions.pdf [Verified 20 June 2018].*Reed, P. B., Jr. 1988. *National List of Plant Species that Occur in Wetlands.* Washington, DC, USFWS.

7.0 BASIN TRACT

7.1 Site Location Information

Municipality: Pierce Pond Township **County:** Somerset

Biophysical Region: Western Mountains

Watershed (HUC 12): Gulf Stream-Lower Dead River (010300020506)
Spring Lake-Upper Dead River (010300020502)

NECEC Components within HUC 8 (01030002) Watershed: HVDC, New ROW

Closest NECEC Component: HVDC New right of way

Coordinates of Site Centroid (Lat/Long WGS 84): 45°18'22.94"N, 70°10'43.99"W

7.2 Natural Resource Inventory Summary (quantities are +/-):

Total Site Area .....697.06 acres

NWI Palustrine Wetland Area.....9.73 acres

Delineated and GPS-surveyed Palustrine Wetland Area.....63.37acres

NHD Rivers and Streams.....25,750 feet (4.88 miles)

Delineated and GPS-surveyed Rivers and Streams.....35,210 feet (6.67 miles)

Outstanding River Segment (Ch 200 §403: Dead River)…… 4.16 miles

Upland Area..... .....633.69 acres

Significant Vernal Pools .....None

Other Non-Significant Vernal Pools Types……1 low value VP, 1 low value CVP, 4 PVP

Vernal Pool Critical Terrestrial Habitat (750 feet) .....69.56 acres

Deer Wintering Area……180 acres

7.3 Site Description

The approximately 697.06-acre Basin Tract (hereafter “BT” or “the Tract”) is located on the north side of Basin and Hurricane Mountains and has approximately 4.2 miles of frontage along the south side of the Dead River (Figure 7.1, Photos 7.1 and 7.2). Widths of the Tract from the Dead River range between approximately 300 and 5,780 feet at the west property line which coincides with the township boundary shared by T2R4 (Pierce Pond) and T3R4. In the vicinity of a perennial stream near the Tract’s mid-length along the Dead River, the width is approximately 2,800 feet, upstream and downstream of which representative widths of BT are 1,500 and 1,200 feet, respectively.

Timber harvesting occurred along the southern side of the Tract since September 2013, however along the Dead River, the entirety of BT remains uncut and is therefore a 4.2-mile undisturbed riparian corridor. Access to the east end of BT is from North Bowtown road and the west end can be reached on foot from the Maine Huts and Trails across the Dead River bridge at Grand Falls.

7.4 Surrounding Land Use, Protected Open Space and Focus Areas

BT has no cabins or trails, but does have a campsite along the Dead River (Photos 7.3 and 7.4) and is otherwise undeveloped. The Tract is displayed on Figure 7.3, MLUPC's Land Use Guidance Map for Pierce Pond Twp. (T2 R4 BKP WKR). Most of BT is designated as General Management Subdistrict M-GN). In addition, the following Protection Subdistricts occur at BT:

- P-FW – Fish and Wildlife 060030
- P-RR – Recreation –Water
- P-SL1 – Shore Land within 250 feet of the normal high-water mark
- P-SL2 – Shore Land within 75 feet of the normal high-water mark
- P-WL1 – Wetlands of special significance (WOSS)
- P-WL2 – Wetlands scrub shrub (PSS)

Approximately one mile south of the 697-acre BT there are approximately 10,000 contiguous acres of Conserved Lands encompassing: Pierce Pond, Grass Pond, Kilgore Pond, Split Rock Pond, Higher Pond, Dixon Pond, Fernald Pond and Horseshoe Pond as well as the Appalachian Trail Corridor. There are no Focus Areas immediately adjacent to or within one mile of BT.

7.5 Wildlife Use

Wildlife usage and habitat evaluations on BT were conducted based on field surveys, aerial photo interpretation of landscape and terrain, and research of IPaC results from the USFWS for endangered species, critical habitat, migratory birds, and fisheries in and around the area. According to the results of the IPaC report (Appendix 7A), two threatened species - Canada lynx (*Lynx canadensis*) and Northern long-eared bat (*Myotis septentrionalis*) - and one endangered species – Atlantic salmon (*Salmo salar*) could be affected by activities on the property.

During field surveys, either evidence of or actual sightings occurred for moose (*Alces alces*), white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*), red fox (*Vulpes vulpes*), Eastern gray squirrel (*Sciurus carolinensis*), red squirrel (*Sciurus vulgaris*), woodland jumping mouse (*Napaeozapus insignisand*), chipmunks (*Tamias sp*.) and snowshoe hare (*Lepus americanus*). Based on the location and vegetative cover in the location of P-FW (060030) on the LUPC map (Figure 6.2), an approximately 180-acre Deer Wintering Area is located along the riparian corridor across the center of the Tract and along west boundary which also extends upstream along the Dead River to GFT. Coyote (*Canis latrans*), beaver (*Castor candensis*), mink (*Neovison vison*), river otter (*Lontar canadensis*), fisher (*Pekania pennanti*) and pine marten (*Martes americana)* are furbearers that inhabit or traverse the Tract.

Several bird species were observed and heard on the property including, but not limited to bald eagle (*Haliaeetus leucocephalus*), sharp-shinned hawk (*Accipiter striatus*), common raven (*Corvus corax*), American robin (*Turdus migratorius*), and wood thrush (*Hylocichla mustelina*). The Tract has been logged in upland portions in past years; however, this disturbance allows for opportunistic, successional plant species to colonize such as red raspberry which increases in cut areas and has a positive impact on food sources for many birds and animals

Vernal pools on the property consist of one low value vernal pools, one low value Corps vernal pools and four potential vernal pools. The vernal pool contained spotted salamander (*Ambystoma maculatum*) egg masses at the time of observation (Photo 7.5). The other pools have the potential to harbor wood frog (*Lithobates sylvaticus*) egg masses, but due to survey timing, finding presence of such egg masses was not possible. Garter snakes (*Thamnophis* spp.) American toads (*Anaxyrus americanus*), and green frogs (*Lithobates clamitans*) were also observed during field surveys.

7.6 Vegetation

The property includes a variety of vegetative communities which provide different cover types, habitat characteristics, and ecological function. The property is primarily composed of mature mixed coniferous-deciduous forest. There are also large swaths of scrub-shrub floodplain wetlands along the Dead River and early successional forest close to the southern boundary where there is evidence of historic logging operations.

Uplands and wetlands were identified in the mixed coniferous-deciduous forests. Dominant tree species in the forested uplands include American beech (*Fagus grandifolia*), eastern hemlock (*Tsuga canadensis*), eastern white pine (*Pinus strobus*), red spruce (*Picea rubens*), and red maple (*Acer rubrum*). Common woody plants in the shrub stratum include striped maple (*Acer pennsylvanicum*), mountain maple (*Acer spicatum*), hobblebush (*Viburnum lantanoides*), and beaked hazelnut (*Corylus cornuta*). Common forbs and grasses in the upland forested understory are northern long-awned wood grass (*Brachyelytrum aristosum*), whorled aster (*Oclemena acuminate*), starflower (*Lysimachia borealis*), rosy bells (*Streptopus lanceolatus*), sarsaparilla (*Aralia nudicaulis*), elliptic-leaved shinleaf (*Pyrola elliptica*) and evergreen wood fern (*Dryopteris intermedia*).

Forested wetlands typically occur at the base of the slope on a terraced flat above the riverine floodplain. Dominant tree species in the forested wetland include northern white cedar (*Thuja occidentalis*), yellow birch (*Betula allegheniensis*), balsam fir (*Abies balsamea*) and red maple. Common herbaceous plants in the forested wetland understory (Photo 7.6) include interrupted fern (*Osmunda claytonia*), sensitive fern (*Onoclea sensibilis*), jewelweed (*Impatiens capensis*), bedstraw (*Galium* spp.), fowl manna grass (*Glyceria striata*), and sedges (*Carex* spp.).

The early successional forest around previously logged areas are dominated by gray birch (*Betula populifolia*), quaking aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), opportunistic red raspberry (*Rubus idaeus*) and other early successional species such as fireweed (*Chamerion angustifolium*), drooping sedge (*Carex gynandra*), sweet vernal grass (*Anthoxanthum odoratum*), timothy grass (*Phleum pretense*), bent grass (*Agrostis* spp.), common St. John's wort (*Hypericum perforatum*), vetch (*Vicia* sp.), flat top goldenrod (*Euthamia graminifolia*), and hawkweeds (*Hieracium* spp).

Due to the steep sloping topography of the site, toe of slope seeps and ephemeral drainages occur sporadically throughout the tract, creating microclimatic wetlands that exist in channels (Photo 7.7). Common understory plants found in these habitats include foam flower (*Tiarella cordifolia*), jewelweed, enchanter's nightshade (*Circaea alpine*), sensitive fern, sedges, and buttercups (*Ranunculus* spp.).

The scrub-shrub wetlands occur primarily along the banks of the Dead River and are subject to seasonal flooding linked to dam releases upstream. Dominant shrubs in this habitat are speckled alder (*Alnus incana* ssp. *rugosa*), meadowsweet (*Spiraea alba* var. *latifolia*), and red-osier dogwood (*Swida sericea*). Common herbaceous plants are Canada goldenrod (*Solidago Canadensis*), Kentucky bluegrass (*Poa pratensis*), Virginia virgin's bower (*Clematis virginiana*), northern long-awned wood grass (*Brachyelytrum aristosum*), wrinkle leaved goldenrod (*Solidago rugosa*), tall meadow-rue (*Thalictrum pubescens*), and bedstraw (*Galium* spp.).

7.7 Wetland Characteristics, Functions and Values

Approximately 63.37 acres (9.1%) of the 697 total acres of the BT were identified as palustrine wetland during the field survey effort. The primary wetland system is palustrine forested (PFO4/1) (Photo 7.8), generally located on topographic terraces between the palustrine scrub shrub (PSS) floodplain of the Dead River and the steep slopes on the southern end of the site. The portion of the forested wetland located on the BT totals approximately 48.6 acres. The second most abundant wetland is palustrine scrub shrub, which occupies a total of 14.7 acres of the property (Photo 7.9). The Dead River, a permanently flooded, upper perennial riverine system with an unconsolidated bottom (R3UBH) that flows west to east, is the northern property boundary. Approximately 4.2 river miles of the Dead River frontage occurs on the Tract (Photos 7.1 and 7.2). The section of the Dead that flows along the BT boundary has a moderate velocity with varying classes of whitewater that fluctuate with seasonal high water and upstream dam releases. This creates outstanding recreational opportunities for rafters and kayakers. Approximately 1.5 miles downstream of the northwestern boundary of the Tract, an unnamed stream (R3UBH) flowing south to north through upland forest, joins the Dead River (Photo 7.10). This area has been identified by LUPC as a significant deer wintering habitat.

As mapped by the USDA NRCS on Web Soil Survey, approximately 330 acres (47%), of BT is underlain by very poorly drained (VPD) and somewhat poorly drained (SPD) hydric soils. These areas of hydric soils typically occur on slopes of 0 to 15 percent. Map Unit Name and Symbols for hydric soils at BT include:

- Bucksport and Wonsqueak mucks (WO) – VPD organic soils derived from vegetation deposited in water with 0 to 2 percent slopes.
- Colonel-Peru-Pillsbury (PD) association (CNC) – SPD mineral soils of loamy and coarse loamy textures with 3 to 15 percent slopes.
- Colonel-Pillsbury (PD)-Skerry association (CRB) – SPD mineral soils of loamy and coarse loamy textures with 0 to 8 percent slopes.

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TABLE 7-1 SUMMARY OF FUNCTIONS & VALUES OF WETLANDS ON THE 697.06 ACRE BASIN TRACT

FUNCTION/VALUE	EXPLANATION
Groundwater Recharge/Discharge (GW)	Wetlands on river valley slopes of BT are commonly associated with spring/seeps or sites of groundwater discharge and as part of the surface hydrologic system at other locations on BT are recharge areas to the baseflow of the Dead River (Photo 7.7).
Flood flow Alteration (FF)	Pierce Pond Twp is designated as "no data/No Specific Flood Hazard Area" (Dudley and Schalk 2006), however water levels along the Dead River are actively managed at the Long Falls Dam outlet of Flagstaff Lake by Brookfield Renewable Energy. In relation to these fluctuating water levels, a principal function of wetlands on the Basin Tract that are along and hydrologically connected to the Dead River is Floodflow Alteration.
Fish and Shellfish Habitat (FH)	The Dead River is popular for brook trout and landlocked salmon fishing. Downstream in 2017, the segment of the Dead River crossing T3 R4 BKP WKR where LET is located was stocked with approximately 1,550, 8- to 14-inch landlocked salmon and brook trout to support the fishery for recreational angler (MDIFW 2018). Freshwater mussels were observed on BT along muddy shorelines of the Dead River.
Production Export (PE)	As evidenced by browse, droppings and other sign, woody vegetation in BT wetlands is a fundamental food source for all herbivorous and omnivorous wildlife inhabiting the Tract. Seeds, roots and stems from herbaceous vegetation in not only PEM but PSS and PFO wetlands on BT are also food sources for not only mammals, but the wide variety of birds, amphibians, reptiles, fish and insects that inhabit or traverse the Tract.
Sediment/Toxicant/ Pathogen Retention (STPR)	Micro-topography (Photo 7.5) as well as woody and herbaceous vegetation throughout BT wetlands physically slow surface water transport and retain these degraders of water quality to the Dead River. Sediments/toxicants/pathogens trapped with accumulation of vegetative remains as peat or other forms of hydric soils is another form of BT wetlands protecting water quality of tributary streams and the Dead River.
Nutrient Removal (NR)	Micro-topography as well as woody and herbaceous vegetation throughout BT wetlands slow surface water transport of nutrients protecting the Dead River as well as lesser tributaries from water quality degradation. Direct uptake of nutrients by wetland vegetation and subsequent accumulation of dead vegetation in organic soils and peat is another pathway of BT wetlands protecting water quality.
Sediment/Shoreline Stabilization (SS)	Riverine and palustrine wetlands aligned along the south shore of the Dead River buffer and protect the adjoining upland shoreline from scour and erosion (Photos 7.1 and 7.2).
Wildlife Habitat (WH)	In addition to direct observation as well as tracks, droppings and other sign, moose, bear, deer, coyote, beaver, otter, mink and other smaller mammals are abundant on BT. Based on the location and vegetative cover in the location of P-FW (060030) on the LUPC map (Figure 6.2), a Deer Wintering Area is located along the riparian corridor across the center of the Tract and along west boundary which also extends upstream along the Dead River to GFT.
Educational/ Scientific Value (ED)	Although there appear to be no records of educational use or scientific research attributes of BT including, the baseline of mapped resources and remote location along riparian corridors of Enchanted Stream and the Dead River could be relevant to further study.
Recreation (REC)	Established camps sites occur on BT (Photo 7.3) and the MHT network is on the opposite shore of the Dead River and traveled by day, and through hikers and also used for camping, cross country skiing and snowshoeing. Commercial river rafting on the Dead River passes along the shoreline of the Tract. The Dead River is also regarded for trout and salmon fishing. Hunting opportunities are another recreational value of the Tract and its wetlands.

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7.8 Compensation

As part of the compensation package for NECEC, the approximately 697.06-acre Basin Tract will be permanently protected by a conservation easement or similar instrument. Preservation of BT will permanently protect 4.16 miles of intact and unaltered riparian buffer along the south side of the Dead River that is designated as an Outstanding River Segment (Ch 200 §403). Approximately one mile south of the Tract is more than 10,000 contiguous acres of Conserved Lands that encompass at least eight essentially unaltered or sparsely developed "great ponds." In addition, approximately nine percent (63.37 acres) of the 697.06-acre BT are comprised of a mix of PSS and PFO wetland types.

BT is accessible by Bowtown Road and most of the Tract is zoned M-GN. Development of this otherwise undeveloped Tract could therefore occur. Preservation of GFT would provide permanent protection from development and preserve the existing deer wintering area, wetland based wildlife, vernal pool, fish and shellfish habitats, water quality benefits, and recreational and educational opportunities.

7.9 Photographs

PHOTO 7-1 THE BASIN TRACT HAS APPROXIMATELY 4.2 MILES OF RIVER FRONTAGE ON THE SOUTHERN BANK OF THE DEAD RIVER

PHOTO 7-2 WHITEWATER RAPIDS OF VARYING DIFFICULTY GRADES OCCUR ALONG THE DEAD RIVER JUST NORTH OF THE BASIN TRACT PROPERTY BOUNDARY

PHOTO 7-3 A LOGGING ROAD LEADS FROM THE SOUTHERN PROPERTY BOUNDARY DOWNHILL TO AN ACTIVE CAMPSITE ALONG THE DEAD RIVER

PHOTO 7-4 FIRE PERMITS FROM THE MAINE FOREST SERVICE FOREST ARE REQUIRED AT THE CAMPSITE IN THE PREVIOUS PHOTOGRAPH

PHOTO 7-5 PIT AND MOUND MICRO-RELIEF OF THE FORESTED WETLANDS (PFO) PROVIDE POTENTIAL TOPOGRAPHIC CHARACTERISTICS SUITABLE TO VERNAL POOLS

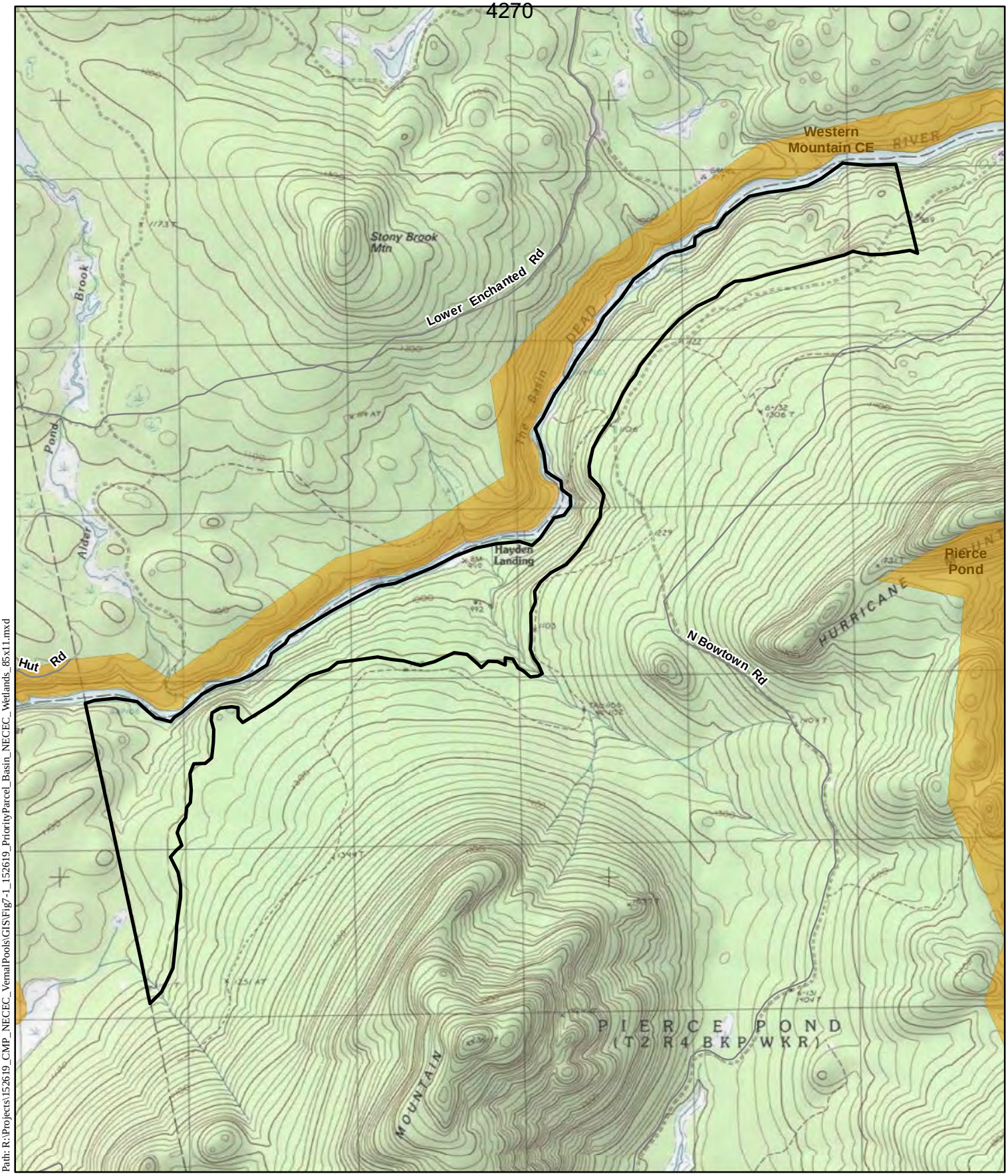
PHOTO 7-6 HYDROPHYTIC GRAMINOIDS ARE COMMON UNDERSTORY PLANTS IN THE FLOODPLAIN FOREST NEAR THE BANKS OF THE DEAD RIVER

PHOTO 7-7 EPHEMERAL CHANNELS CROSSING THE STEEP SLOPES ON THE SOUTHERN EDGE OF THE BASIN TRACT CONVEY DRAINAGE FROM THE LOGGED AREA TO THE DEAD RIVER

PHOTO 7-8 CEDAR AND YELLOW BIRCH FORESTS (PFO1/4), ABUNDANT ON THE BASIN TRACT, ARE OFTEN ASSOCIATED WITH SEEPS HAVING PIT AND MOUND MICRO-TOPOGRAPHY CHARACTERISTIC OF FORESTED WETLANDS

PHOTO 7-9 SCRUB-SHRUB WETLAND (PSS) DOMINATED BY SPECKLED ALDER AVERAGE APPROXIMATELY 30 FEET IN WIDTH ALONG THE DEAD RIVER SHORELINE

PHOTO 7-10 THE RIPARIAN CORRIDOR ALONG THIS PERENNIAL STREAM, LOCATED IN THE CENTER OF THE TRACT, IS IDENTIFIED BY THE LAND USE PLANNING COMMISSION AS PART OF A SIGNIFICANT FISH AND WILDLIFE USAGE AREA (P-FW 060030)



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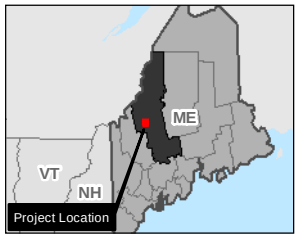

Road
Conserved Lands
Survey Boundary

N
W E
S

SCALE: 1 " = 2,500 '

0 1,250 2,500
Feet

Figure 7.1: Locus
Basin Tract

Somerset County
Maine

Date:8/6/2018
Author: KK
Project: 152619

Central Maine Power

NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER
POWER ENGINEERS

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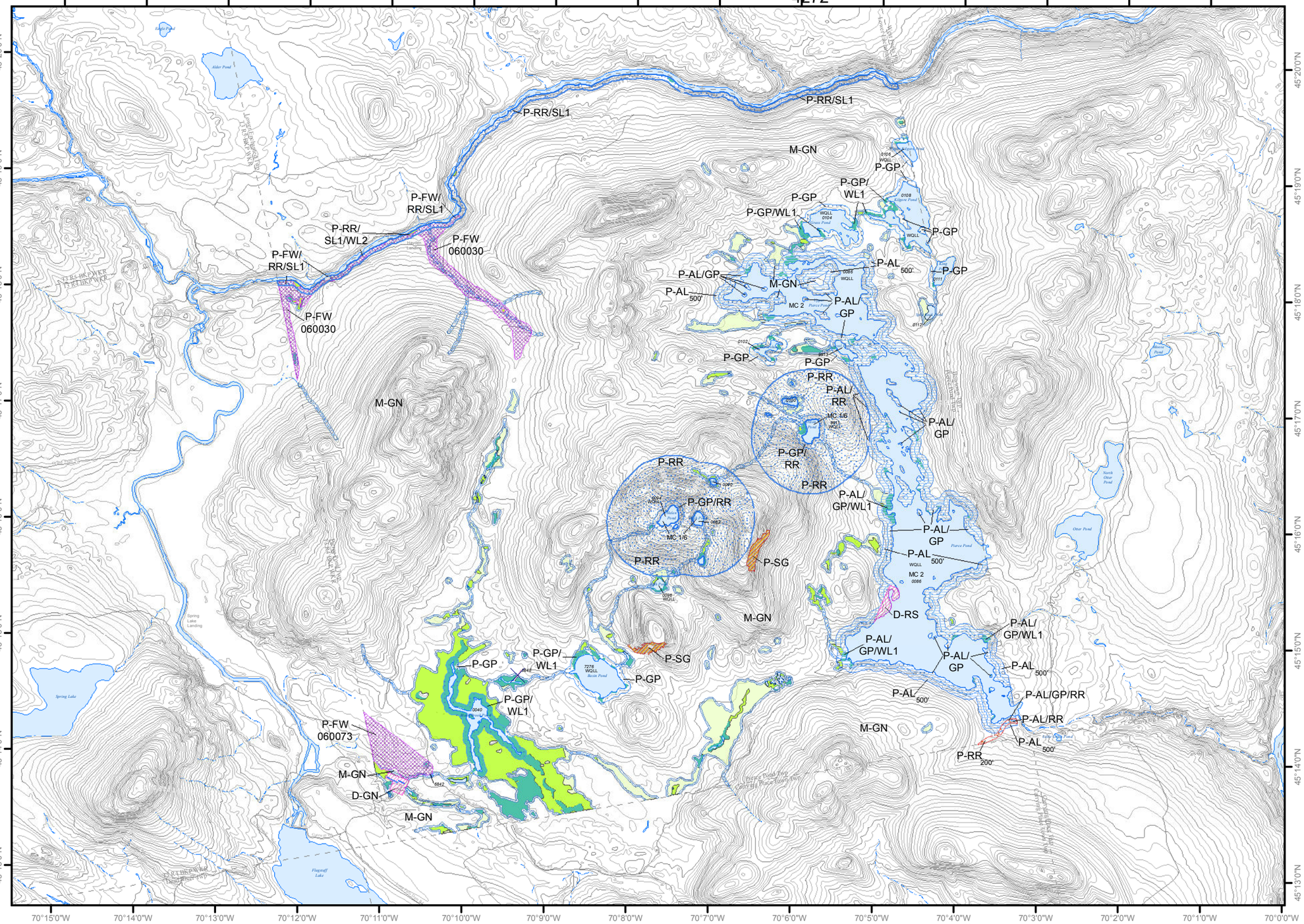
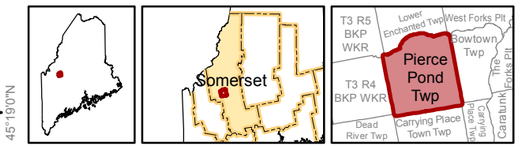
Pierce Pond Twp.

T2 R4 BKP WKR

Somerset County





Land Use Guidance Map

Department of Agriculture, Conservation and Forestry

Maine Land Use Planning Commission

Legend

DEVELOPMENT SUBDISTRICTS

- D-GN: General

MANAGEMENT SUBDISTRICTS

- M-GN: General

PROTECTION SUBDISTRICTS

- P-AL: Accessible Lake
- P-FW: Fish and Wildlife
- P-GP: Great Pond
- P-RR200: Recreation - 200'
- P-RR: Recreation
- P-SG: Soils and Geology
- P-SL1: Shoreland - 250'
- P-SL2: Shoreland - 75'
- P-WL1: Wetlands of Special Significance
- P-WL2: Scrub-shrub Wetlands
- P-WL3: Forested Wetlands

This map does not show all designated P-WL Subdistricts, such as non-tidal water bodies and freshwater wetlands within 25 feet of flowing waters.

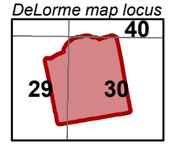
This map is a reducedsize version and should not be considered definitive. Full sized, official Land Use Guidance Maps are available on the LUPC website or by request.

Amendments			
Location #	Zoning Permit	Effective Date	Remarks
		08/18/2005	Adoption of digital NWI wetlands

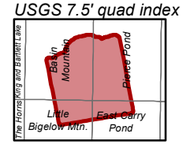
0 1,500 3,000 4,500 6,000 Meters

0 5,200 10,400 15,600 20,800 Feet

DeLorme map locus



USGS 7.5' quad index



(1) Map amendment location

▲ Point at which a river drains 25 square miles - symbol points upstream (12 M.R.S. Sec. 682-B(4))

9999 MIDAS number: Unique number assigned to each standing body of water in Maine.

WQLL Water Quality Limiting Lake - Refer to Section 10.23,E,3,g of the Commission's Land Use Districts and Standards.

MC# Lake Management Classes - Refer to Section 10.02 (Definitions) of the Commission's Land Use Districts and Standards.

SOURCES: Maine Land Use Planning Commission, USGS

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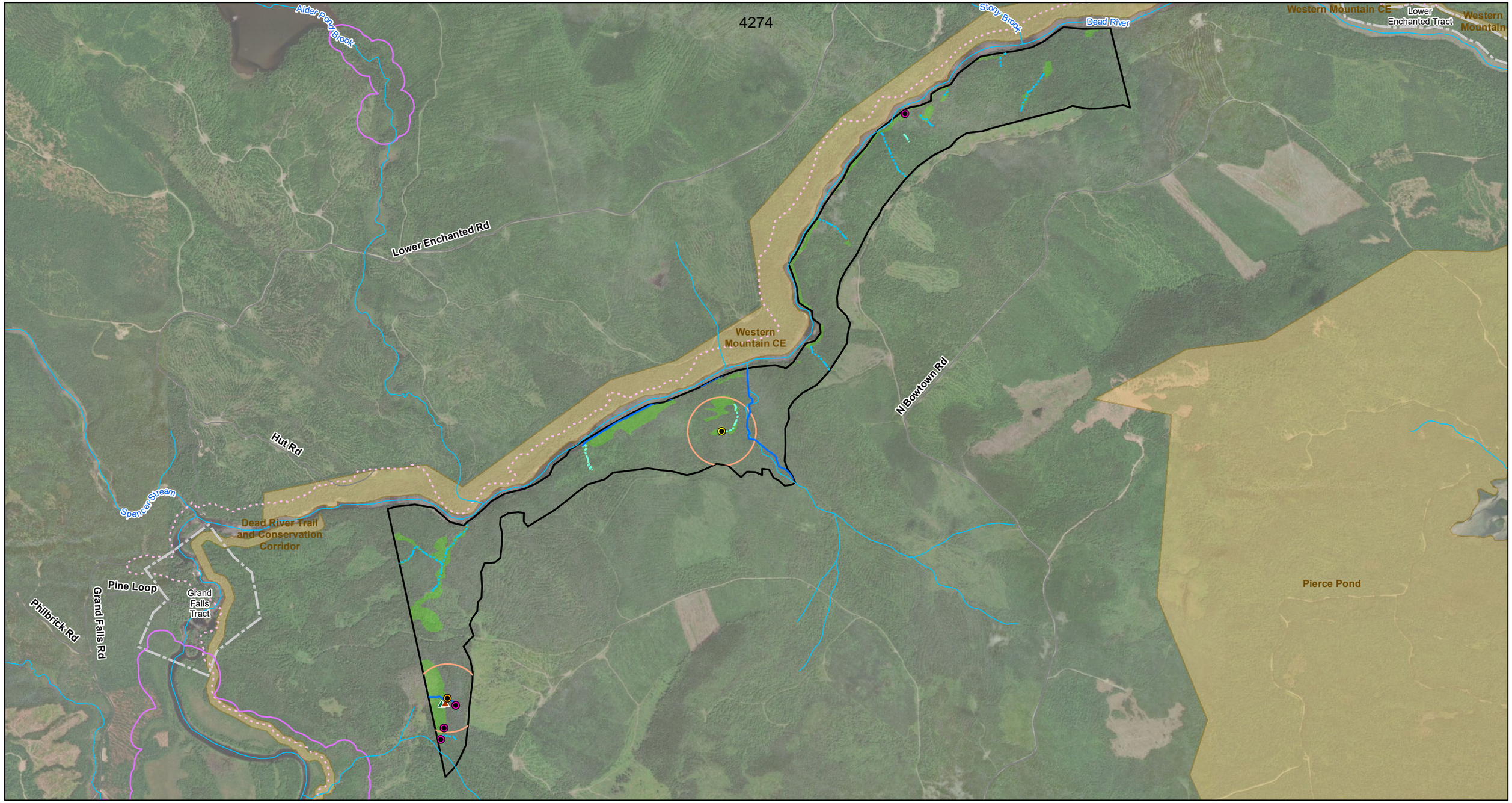

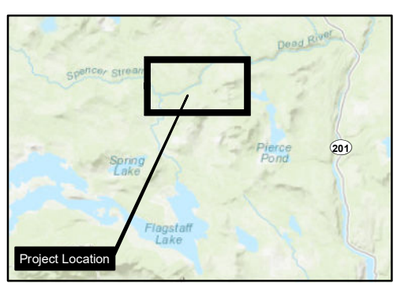

- Corps Vernal Pool
- Vernal Pool
- Potential Vernal Pool
- Wetland Data Point
- Upland Data Point
- Delineated Ephemeral Stream
- Delineated Intermittent Stream
- Delineated Perennial Stream
- Stream (NHD)
- Critical Terrestrial Habitat (750')
- Maine Huts & Trails Main Trail
- Road
- Inland Waterfowl and Wading Bird Habitat
- Survey Area
- Other Tract
- Delineated Wetland
- Conservation Land

Figure 7.3: Natural Resources
Basin Tract

Somerset County, Maine

DRAFT

0 1,000 2,000 4,000
Feet

1 " = 2,000 '

Page 1 of 1

Central Maine Power
NECEC Compensation Parcels
Natural Resource Survey Results

CENTRAL MAINE POWER

POWER ENGINEERS

Date: 8/6/2018; Author: KK; Project: 152619

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APPENDIX 7A IPAC RESULTS: BASIN TRACT

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Project information

NAME

Compensatory Mitigation

LOCATION

Somerset County, Maine

DESCRIPTION

BT

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

NOT FOR CONSULTATION

Canada Lynx Lynx canadensis There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Fishes

NAME	STATUS
Atlantic Salmon Salmo salar There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2097	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

NOT FOR CONSULTATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

THERE ARE NO MIGRATORY BIRDS OF CONSERVATION CONCERN EXPECTED TO OCCUR AT THIS LOCATION.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

NOT FOR CONSULTATION

3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

NOT FOR CONSULTATION

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

PEM1E

FRESHWATER FORESTED/SHRUB WETLAND

PSS1E
PFO4E

RIVERINE

R3UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

NOT FOR CONSULTATION

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

APPENDIX 7B VEGETATION LIST: BASIN TRACT

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Abies balsamea	Balsam Fir	Pinaceae	FAC
Acer pennsylvanicum	Striped Maple	Sapindaceae	FACU
Acer rubrum	Red Maple	Sapindaceae	FAC
Acer spicatum	Mountain Maple	Sapindaceae	FACU
Actaea rubra	Red Baneberry	Ranunculaceae	FACU
Agrostis capillaris	Colonial Bentgrass	Poaceae	FAC
Alnus incana ssp. *rugosa*	Speckled Alder	Betulaceae	FACW
Amelanchier laevis	Smooth Shadbush	Rosaceae	N/A
Anemone quinquefolia	Nightcaps	Ranunculaceae	FACU
Anthoxanthum odoratum	Sweet Vernal Grass	Poaceae	FACU
Apocynum cannabinum	Indian Hemp	Apocynaceae	FAC
Aralia nudicaulis	Wild Sarsaparilla	Araliaceae	FACU
Arctium minus	Common Burdock	Asteraceae	FACU
Arisaema triphyllum	Jack-in-the-Pulpit	Araceae	FAC
Betula alleghaniensis	Yellow Birch	Betulaceae	FAC
Betula payrifera	Paper Birch	Betulaceae	FACU
Betula populifolia	Gray Birch	Betulaceae	FAC
Brachyelytrum aristosum	Northern Long-Awned Wood Grass	Poaceae	FACU
Campanula rotundifolia	Scotch Bellflower	Campanulaceae	FACU
Carex cryptolepis	Northeastern Sedge	Cyperaceae	OBL
Carex debilis	White-Edged Sedge	Cyperaceae	FACW
Carex disperma	Soft-Leaf Sedge	Cyperaceae	FACW
Carex gracillima	Graceful Sedge	Cyperaceae	FACU
Carex gynandra	Nodding Sedge	Cyperaceae	OBL
Carex intumescens	Greater Bladder Sedge	Cyperaceae	FACW
Carex stipata	Stalk-Grain Sedge	Cyperaceae	OBL
Chamaepericlymenum canadense	Bunchberry	Cornaceae	FAC
Chamerion angustifolium	Narrow-Leaved Fireweed	Onagraceae	N/A
Circaea alpina	Small Enchanter's Nightshade	Onagraceae	FACW
Clematis virginiana	Virginia Virgin's Bower	Ranunculaceae	FAC
Clintonia borealis	Yellow Bluebead Lily	Liliaceae	FAC
Coptis trifolia	Three-Leaf Goldthread	Ranunculaceae	FACW
Corylus cornuta	Beaked Hazelnut	Betulaceae	FACU
Crataegus sp.	Hawthorne	Rosaceae	N/A
Diervilla lonicera	Bush-Honeysuckle	Caprifoliaceae	N/A
Dryopteris intermedia	Evergreen Wood Fern	Dryopteridaceae	FAC

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Epipactis helleborine	Broad-Leaved Helleborine	Orchidaceae	UPL
Equisetum arvense	Field Horsetail	Equisetaceae	FAC
Equisetum scirpoides	Dwarf Scouring Rush	Equisetaceae	FAC
Equisetum sylvaticum	Woodland Horsetail	Equisetaceae	FACW
Euthamia graminifolia	Flat-Top Goldentop	Asteraceae	FAC
Fragaria virginiana	Common Strawberry	Rosaceae	FACU
Fraxinus americana	White Ash	Oleaceae	FACU
Fraxinus nigra	Black Ash	Oleaceae	FACW
Galium aparine	Scratch Bedstraw	Rubiaceae	FACU
Galium odoratum	Sweet-Scented Bedstraw	Rubiaceae	N/A
Galium triflorum	Fragrant Bedstraw	Rubiaceae	FACU
Gaultheria hispidula	Creeping Snowberry	Ericaceae	FACW
Glyceria striata	Fowl Manna Grass	Poaceae	OBL
Gymnocarpium dryopteris	Northern Oak Fern	Woodsiaceae	FACU
Hieracium aurantiacum	Orange Hawkweed	Asteraceae	N/A
Hypericum perforatum	Common St. John's Wort	Hypericaceae	FACW
Impatiens capensis	Spotted Touch-Me-Not	Balsaminaceae	FACW
Lonicera canadensis	American Fly-Honeysuckle	Caprifoliaceae	FACU
Lysimachia borealis	Starflower	Myrsinaceae	N/A
Lysimachia terrestris	Swamp Candles	Myrsinaceae	OBL
Matteuccia struthiopteris	Ostrich Fern	Onocleaceae	FAC
Medeola virginiana	Indian Cucumber Root	Liliaceae	FACU
Mitchella repens	Partridge Berry	Rubiaceae	FACU
Oclemena acuminata	Whorled Aster	Asteraceae	FACU
Onoclea sensibilis	Sensitive Fern	Onocleaceae	FACW
Osmunda claytonia	Interrupted Fern	Osmundaceae	FAC
Osmunda regalis	Royal Fern	Osmundaceae	OBL
Osmundastrum cinnamomeum	Cinnamon Fern	Osmundaceae	FACW
Oxalis montana	Northern Wood Sorrel	Oxalidaceae	FACU
Parathelypteris novaborecensis	New York Fern	Thelypteridaceae	FAC
Phegopteris connectilis	Long Beech Fern	Thelypteridaceae	FACU
Phleum pratense	Common Timothy	Poaceae	FACU
Picea rubens	Red Spruce	Pinaceae	FACU
Plantanthera aquilonis	North Wind Bog-Orchid	Orchidaceae	FACW
Poa pratensis ssp. *pratensis*	Kentucky Blue Grass	Poaceae	FACU
Populus balsamifera	Balsam Poplar	Salicaceae	FACW
Populus tremuloides	Quaking Aspen	Salicaceae	FACU
Prunella vulgaris	Common Self-Heal	Lamiaceae	FAC

SCIENTIFIC NAME	COMMON NAME	FAMILY	WETLAND PLANT INDICATOR RATING [1, 2]
Prunus nigra	Canada Plum	Rosaceae	FACU
Pyrola elliptica	Elliptic-Leaved Shinleaf	Ericaceae	FACU
Ranunculus spp.	Crowfoot	Ranunculaceae	N/A
Ribes glandulosum	Skunk Currant	Grossulariaceae	FACW
Ribes lacustre	Bristly Swamp Currant	Grossulariaceae	FACW
Rosa blanda	Smooth Rose	Rosaceae	FACU
Rubus hispidus	Bristly Dewberry	Rosaceae	FACW
Rubus idaeus	Red Raspberry	Rosaceae	FACU
Sambucus racemosa ssp. *pubens*	Red Elderberry	Adoxaceae	FACU
Sanicula marilandica	Maryland Sanicle	Apiaceaea	FACU
Scutellaria lateriflora	Mad Dog Skullcap	Lamiaceae	OBL
Solidago canadensis	Canadian Goldenrod	Asteraceae	FACU
Solidago rugosa	Wrinkle-Leaf Goldenrod	Asteraceae	FACU
Sorbus americana	American Mountain Ash	Rosaceae	FAC
Spinulum annotinum	Bristly Clubmoss	Lycopodiaceae	FAC
Streptopus lanceolatus	Rosy Bells	Liliaceae	FACU
Swida alternifolia	Alternate-Leaved Dogwood	Cornaceae	FACU
Swida sericea	Red Osier Dogwood	Cornaceae	FACW
Symphyotrichum lateriflorum	Calico American Aster	Asteraceae	FAC
Thalictrum pubescens	Tall Meadow-Rue	Ranunculaceae	FACW
Thuja occidentalis	Northern White Cedar	Cupressaceae	FACW
Trillium erectum	Stinking Benjamin	Melanthiaceae	FACU
Trillium undulatum	Painted Trillium	Melanthiaceae	FACU
Tsuga canadensis	Eastern Hemlock	Pinaceae	FACU
Vaccinium angustifolium	Common Lowbush Blueberry	Ericaceae	FACU
Viburnum lantanoides	Hobblebush	Adoxaceae	FACU
Viola spp.	Violets	Violaceae	N/A
INDICATOR STATUS	OCCURRENCE IN WETLANDS (% per Reed, 1998)		
Obligate (OBL)	Almost always occurs in wetlands under natural conditions (99%)		
Facultative Wetland (FACW)	Usually in wetlands, occasionally found in non-wetlands (67- 99%)		
Facultative (FAC)	Equally likely to occur in wetlands and non-wetlands. (33-67%)		
Facultative Upland (FACU)	Usually in non-wetlands, occasionally found in wetlands (1-33%)		
Upland (UPL)	Almost always in non-wetlands under natural conditions (1%)		

[1] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. USACE National Wetland Plant List. Web.20 June 2018.
[2] Lichvar, R.W., N.C. Melvin, M.L. Butterwick, and W.N. Kirchner. 2012. National Wetland Plant List Indicator Rating Definitions. ERDC/CRREL TN-12-1, USACE Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH. Available at https://www.fws.gov/wetlands/documents/national-wetland-plant-list-indicator-rating-definitions.pdf [Verified 20 June 2018].

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8.0 SUMMARY AND CONCLUSIONS

8.1 Potential Compensation Tracts Summary

The extent and composition of the surveyed natural resources on the six potential compensation tracts displayed on Figures 2.2 (LJPT), 3.3 (FLT), 4.3 (PPT), 5.3 (GFT) 6.3 (LET) and 7.3 (BT) are summarized in Table 8.1.

TABLE 8-1 NECEC POTENTIAL COMPENSATION TRACTS NATURAL RESOURCE SUMMARY

WETLAND TYPE (acres)	LJPT	FLT	PPT	GFT	LET	BT
PUB	-	-	8.40	-	-	-
PEM	50.11	16.48	3.13	0.46	-	-
PSS	-	94.71	4.80	2.97	8.18	14.72
PFO	18.36	312.77	2.00	11.08	4.79	48.65
Total Palustrine Wetland Area (acres)	68.46	423.96	18.33	14.51	12.97	63.37
Total Palustrine Wetland Percentage of Tract (%)	62.37	50.99	22.56	12.00	5.46	9.09
R2 (river-miles)	0.12	1.52	0.78	1.11	-	-
R3 (river-miles)	-	-	-	0.45	5.13	4.21
R4 (river-miles)	-	0.52	-	-	-	-
Total Riverine Frontage (miles)	0.12	2.04	0.78	1.56	5.13	4.21
R2 (acres)	-	-	-	14.92	-	-
R3 (acres)	-	-	-	3.74	6.67	-
Total Riverine Area (acres)	N/A	N/A	N/A	18.66	6.67	N/A
Total Riverine Wetland Percentage of Tract (%)	N/A	N/A	N/A	15.44	10.24	N/A
L1UB (miles)	-	8.50	-	-	-	-
Total Lacustrine Frontage (miles)	N/A	8.50	N/A	N/A	N/A	N/A
Total Lacustrine Frontage and Wetland Percentage of Tract (%)	62.73	50.99	22.56	27.44	15.70	9.90

Additional information describing the surveyed natural resources on the six Compensation Tracts displayed on Figures 2.2 (LJPT), 3.3 (FLT), 4.3 (PPT), 5.3 (GFT) 6.3 (LET) and 7.3 (BT) is presented in Table 8.2.

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TABLE 8-2 NECEC POTENTIAL COMPENSATION TRACTS SUMMARY

	PHYSICAL ATTRIBUTES	WETLAND CLASSIFICATION	FUNCTIONS AND VALUES	SWH / JUXTAPOSITION	DEVELOPMENT
Little Jimmie Pond –Harwood (LJPT) 109.77 Acres	Wetlands: 68.46 acres Streams: 3,030 feet (ft) (0.58 miles [mi]) Frontage: 0.17 mi Hutchinson Pond	NWI: L1UB, PFO4/1, PSS, PEM WOSS: SWH (moderate value IWWH), GP250, FP, PT, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, ED, REC	SWH: 211.5-acre medium ranked IWWH, candidate DWA, 2 PSVPs Conserved Land: 886-acre Jamie's Pond WMA, 81-acre Hutchinson Pond (KLT)	Zoning: Rural/Residential (R1) – 2.0-acre Shoreland Zone Resource Protection Aquifer Overlay
Flagstaff Lake (FLT) 831.39 Acres (76.31 Acres Leased)	Wetlands: 423.96 acres Streams: 10,790 ft (2.04 mi) Frontage: 8.5 miles Flagstaff Lake	NWI: L1UB, PFO1/4 PSS, PEM, PUB WOSS: SWH (high value IWWH), GP 250, 20k POW/PEM, FP, PT, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, ED, REC	SWH: 36.5-acre high value IWWH, 1 PSVP Conserved Land: Bigelow Preserve, Dead River Peninsula, Dead River Trail & Conservation Corridor, Appalachian Trail Corridor	Zoning: M-GN P-AL, P-GP, P-SL2 P-WL1, P-WL2, P-WL3
Pooler Ponds (PPT) 81.24 Acres	Wetlands: 18.33 acres Streams: 4,480 ft (0.85 mi) Frontage: 0.8 mi Kennebec River	NWI: R2UB, PFO1/4, PSS, PEM, PUB WOSS: SWH (moderate value IWWH), GP 250, 20k POW/PEM, FP, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, ED, REC	SWH: 31.39 moderate value IWWH Conserved Land: none within 1.0 mile Appalachian Trail Corridor 3.4 miles to south	Zoning: M-GN P-GP, P-SL1, P-SL2, P-WL1, WQLL
Grand Falls (GFT) 120.84 Acres (< 1 acre leased)	Wetlands: 14.51 acres Streams: 5,610 ft (1.06 mi) Frontage: 0.7 mi Dead River	NWI: R3UB, PFO1/4, PSS, PEM WOSS: SWH (moderate value IWWH), 20k POW/PEM, FP, PT, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, ED, REC	SWH: 16.01 acres of 1,542-acre moderate value IWWH, DWA (LUPC): 1 SVP, 1 PSVP Conserved Land: Dead River Trail & Conservation Corridor	Zoning: M-GN P-FP, P-FW 0600300 P-RR, P-SL1, P-UA P-WL1, P-WL2, P-WL3

	PHYSICAL ATTRIBUTES	WETLAND CLASSIFICATION	FUNCTIONS AND VALUES	SWH / JUXTAPOSITION	DEVELOPMENT
Lower Enchanted (LET) 235.60 Acres	Wetlands: 12.97 acres Streams: 22,620 ft (4.28 mi) Frontage: 2.3 mi Dead River 1.33 mi Enchanted Stream	NWI: R3UB, PFO1/4, PSS WOSS: FP, PT, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, REC	SWH: w/in 150 ft of 276-acre moderate value IWWH, 1 PSVP Conserved Land: Western Mountain Charitable Foundation Easement	Zoning: M-GN P-RR, P-SL1, P-SL2 P-WL2, P-WL3
Basin (BT) 697.06 Acres	Wetlands: 63.37 acres Streams: 35,210 ft (6.67 mi) Frontage: 4.2 mi Dead River	NWI: R3UB, PFO1/4, PSS, PEM WOSS: FP, PT, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, REC	SWH: DWA (LUPC) Conserved Land: 10,000+ contiguous acres one mile to the south	Zoning: M-GN P-FW 060030, P-RR PSL-1, P-SL2 P-WL1, P-WL2
SUMMARY: 2,075.90 ACRES	Wetlands: 601.6 acres Streams: 81,740 ft (15.48 mi) Frontage: 8.0 mi Rivers 8.67 mile Lakes	NWI: L1UB, R2UB, R3UB, PFO1/4, PSS, PEM, PUB WOSS: SWH (M/H value IWWH, SVP), GP 250, 20k POW/PEM, FP, PT, RSB	Principal: GW, FF, WH, FH, PE, STPR, NR, SS, ED, REC	SWH: 211.54 acres moderate / high value IWWH, 1 SVP, 5 PSVPs Contiguous Conserved Land: > 41,600 acres	Zoning: All 6 Tracts suitable for residential development

Code explanations can be found at: NWI – page 7; WOSS – page 8; Functions & Values – pages 11-12; SWH/IWWH – page 8; Vernal Pools – pages 8-10; Development – page 124.

8.2 Developability of LUPC Compensation Tracts

LJPT located in Manchester, is therefore subject to the Town of Manchester local zoning and development requirements. A brief, preliminary overview of potential developability requirement for LJPT is presented in related Section 2.5 on page 15.

Similar zoning and development requirements are identified on Land Use Guidance Maps. by the Maine Land Use Planning Commission for the remaining five Tracts and displayed as Figures 4.2, 5.2, 6.2 and 7.2 for FLT, PPT, GFT, LET and BT, respectively. Land Use Subdistricts for each of the five Compensation Tracts are listed under Development on Table 8.1. Portions of all five Tracts are identified as General Management (**M-GN**) Subdistricts as well as the following Protection Subdistricts:

- Shoreland Protection (**P-SL**)
    - **P-SL1** – areas within 250 feet of the normal high-water mark of flowing waters upstream of a 50-square mile drainage area.
    - **P-SL2** – areas within 75 feet of the normal high-water mark of flowing waters downstream of a 50-square mile drainage area, and the upland edge of freshwater wetlands designated as P-WL1, P-WL2 and P-WL3.
- Wetland Protection (**P-WL**), obtained from NWI maps prepared by the USFWS (Nichols 1984; Tiner 2007), is comprised of:
    - **P-WL1** – wetlands of special significance (WOSS),
    - **P-WL2** – scrub shrub and other non-forested wetlands, or
    - **P-WL3** – forested wetlands (excluding those covered under PWL-1, PWL-2).

The following additional Protection Subdistricts are also present on four specific Tracts:

- Accessible Lake (**P-AL**) - FLT
- Flood Prone areas (**P-FP**) – GFT,
- Fish and Wildlife (**P-FW**) – GFT, BT
- Great Pond (**P-GP**) – FLT, PPT
- Unusual Area (**P-UA**) – FLT, GFT

In accordance with MLUPC's Chapter 10, Sub-Chapter II provisions, various land uses in General Management Districts (**M-GN**) are:

1. permissible without a permit, such as (but not limited to) – primitive recreational uses such as fishing, hiking, and wildlife study, forest management activities
2. permissible without a permit subject to standards, including (but not limited to) – Level A road projects, accessory structures; or are
3. specific uses requiring a permit ranging from residential construction (single to multi-family dwellings, and subdivisions to shoreland alterations.

8.3 Potential Compensation Tracts Suitability for the NECEC Project Impacts

As described in greater detail in Section 2.0, Alternatives Analysis, and Section 13.0, Compensatory Mitigation, of the September 27, 2017 NRPA application, the 146.5-mile long NECEC Project Preferred Alternative (Figure 1) will include and require:

- 53.5 miles of undeveloped ROW
- 1,823 acres of clearing, of which 149.07 acres will result in permanent cover type conversion of forested wetland
- 115 stream crossings
- 47.21 acres of temporary (in place less than 18 months. i.e., crane mats) wetland fill
- 0.85 acres of fill in WOSS (includes fill in IWWH and SVPH)
- 4.47 acres of permanent wetland (non-WOSS) fill
- 0.01 acre of permanent upland fill into IWWH
- 31.31 acres permanent upland cover type conversion of SVPH
- 13.31 acres permanent upland cover type conversion of IWWH
- 0.72 acre of permanent upland fill in SVP habitat
- 4.7 acres in or within 100 ft of 250 USACE compensable vernal pools with 56 of high value, 122 medium value, and 72 low value

The Pooler Ponds, Little Jimmie Pond, Grand Falls, Lower Enchanted, Basin and Flagstaff Lake Compensation Tracts (Figure 1), range in size between 81.24 and 831.39 acres, for an aggregate area of 2,075.90 acres and encompass:

- 8.5 miles along the east shore of Flagstaff Lake (Focus Area of Statewide Ecological Significance)
- 1.33 miles of intact, unaltered riparian corridor along each side of Enchanted Stream
- 7.2 miles of intact, unaltered riparian corridor along the Dead River
- 7.16 miles of Outstanding River Segments of the Dead River, encompassing both sides on GFT (Ch 200 §403)
- Grand Falls, the largest horseshoe waterfalls in Maine
- 0.78 mile of intact riparian habitat along the Kennebec River
- 6.15 miles of ephemeral, intermittent and perennial streams (excluding Enchanted Stream and Dead and Kennebec Rivers)
- 601.6 acres of palustrine wetlands (PFO, PSS, PEM, PUB) that provide a suite of principal functions and values including: Groundwater Recharge/Discharge, Floodflow Alteration, Fisheries and Shellfish Habitat, Sediment/Toxicant/Pathogen, Nutrient Removal/Retention, Production (Nutrient) Export, Sediment/Shoreline Stabilization and Wildlife Habitat and Recreation, Educational and Scientific values

- 120.16 acres of moderate or high value IWWH
- At least one high value SVP, four high value PSVPs, 11 medium value, seven low value VPs, 10 medium to low value CVPs, and at least 43 PVP/ABAs
- Associated 516.33 acres of Vernal Pool Critical Terrestrial Habitat (750 feet)
- 220 acres of Deer Wintering Area
- Direct connectivity with more than 41,600 acres of presently permanently-conserved public lands

The relationship of these attributes to the New England District Compensatory Mitigation Guidance discussed in Section 2.1 is summarized in Table 8.3

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TABLE 8-3 USACE NEW ENGLAND DISTRICT COMPENSATORY GUIDANCE (9/1/2016)

(See Section 1.2 on page 5)	LJPT 109.77 acres	FLT 831.39 acres	PPT 81.24 acres	GFT 120.84 acres	LET 235.60 acres	BT 697.0 acres
MITIGATION SITE SELECTION						
Ecologic Suitability:						
hydrologic conditions, soil characteristics and other physical and chemical characteristics,	✓	✓	✓	✓	✓	✓
watershed–scale features such as habitat diversity, connectivity and other landscape scale functions,	Figure 2.3	Figure3.3	Figure 4.3	Figure 5.3	Figure 6.3	Figure 7.3
size and location relative to hydrologic sources and other ecologic features,	Figure 2.1	Figure3.1	Figure 4.1	Figure 5.1	Figure 6.1	Figure 7.1
compatibility with adjacent land use and watershed management	Figure 2.3	Figure3.3	Figure 4.3	Figure 5.3	Figure 6.3	Figure 7.3
reasonably foreseeable effects on ecologically important aquatic or terrestrial resources,	Table 2.1	Table 3.1	Table 4.1	Table 5.1	Table 6.1	Table 7.1
other relevant factors such as: development trends, anticipated land use changes, habitat status and trends, location in stream network, local or regional goals for protection of particular habitat, and water quality and floodplain management goals;	886-acre Jamies Pond WMA, Cobbossee-Annabessacook Focus Area	50,000-acre Bigelow Mtn Flagstaff Lk N Branch Dead River Focus Area	Mod. value IWWH	Outstanding River Segment, Mod value IWWH, DWA	Outstanding River Segment, MHTs	Outstanding River Segment, DWA
Landscape Position (similar setting and wetland types as of the impacted aquatic resource(s)	Figure 2.1	Figure3.1	Figure 4.1	Figure 5.1	Figure 6.1	Figure 7.1
Resistance to Disturbance (located near refuges, buffers, green spaces and other preserved natural elements of the landscape)	Figure 2.1	Figure3.1	Figure 4.1	Figure 5.1	Figure 6.1	Figure 7.1
Sustainability Considerations (current and future hydrology and preference for locations in areas that will remain as open space not to be severely impacted by clearly predictable development)	Figure 2.1 Figure 2.3 Figure 2.3	Figure3.1 Figure 3.2 Figure 3.3	Figure 4.1 Figure 4.2 Figure 4.3	Figure 5.1 Figure 5.2 Figure 5.3	Figure 6.1 Figure 6.2 Figure 6.3	Figure 7.1 Figure 7.2 Figure 7.3
Surrounding land use/plans, including probable future land use	Figure 2.2	Figure3.2	Figure 4.2	Figure 5.2	Figure 6.2	Figure 7.2
FOR PRESERVATION AS COMPENSATORY MITIGATION IN PARTICULAR:						
Resources to be preserved provide important physical, chemical or biological function for the watershed;	Table 2.1	Table 3.1	Table 4.1	Table 5.1	Table 6.1	Table 7.1
Resources to be preserved contribute to the ecological sustainability of the watershed;	HUC 01030003	HUC 01030000	HUC 01030003	HUC 0103002	HUC 01030002	HUC 01030002
Resources are under threat of destruction or adverse modifications;	R-1	M-GN	M-GN	M-GN	M-GN	M-GN
Site will be permanently protected through an appropriate real estate or other legal instrument	✓	✓	✓	✓	✓	✓

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Exhibit 1-10: Title, Right or Interest for the NECEC Preservation Tracts

Exhibit 1-10: Title, Right or Interest for the NECEC Preservation Tracts

Parcel	Town	County	Grantor	Book/Page	Date
Pooler Pond	The Forks	Somerset	Joseph Durgin	631-384	11-18-1960
“	“	“	Herbert Durgin	387-295	6-14-1926
“	“	“	Augusta Trust	391-291	4-1-1927
Little Jimmie Pond	Manchester	Kennebec	Julian Harwood	10775-49	7-1-2011
“	“	“	Herbert Rollins	11147-275	8-24-2012
“	“	“	Julian Harwood et al.	10488-209	7-30-2010
Grand Falls	Spring Lake	Somerset	Edna Page Bunker	396-127	6-30-1927
“	“	“	Albert Clark et al.	397-483	5-19-1928
“	“	“	Charles Clark	396-129	6-24-1927
“	“	“	Ethel Clark	394-555	11-8-1927
“	“	“	Ethel Clark	397-145	11-8-1927
“	“	“	Ethel Clark	401-61	9-29-1928
“	“	“	Wilkie Clark	387-529	9-3-1926
“	“	“	Blinn Page	389-564	2-8-1927
“	“	“	Blinn Page et al.	397-492	5-19-1928
“	“	“	Nellie Toune et al.	396-128	6-24-1927
“	“	“	Blain Viles	387-437	8-5-1926
“	“	“	Helen Wentworth	396-133	7-19-1927
Flagstaff Lake	Dead River Plt. Carrying Place	“	Guy P. Gannet	453-431	1-24-1941
“	“	“	First National Granite Bank	457-457	11-27-1940
“	“	“	Fidelity Trust Company	480-397	3-29-1945
“	“	“	Augusta Trust Company	480-265	2-1-1945
Lower Enchanted	Lower Enchanted	“	Oxford Paper Company	2165-339	12-22-1995
“	“	“	Willie Snow	373-250	5-3-1923
Basin Tract	Pierce Pond	“	Kennebec Land Company	413-221	6-17-1931
“	“	“	Augusta Trust Company	418-131	1-27-1933
The Forks 8/11	The Forks	“	Joseph Durgin	820-865	7-6-1972
“	“	“	Lyford Bean	389-201	5/25/1926
”	“	“	Joseph Durgin	820-865	7/6/1972
”	“	“	Thought to be E. Durgin	-	-
The Forks 11/2	The Forks	“	William and Oscar Jones	380-510	11/1/1923

Parcel	Town	“	Grantor	Book/Page	Date
The Forks 11/9	The Forks	“	Susie Goodwin	536-177	6/14/1951
”	“	“	Alice Kennedy	539-449	12/27/1951
”	“	“	Glenice Merrill	541-538	9/29/1952
Carry Brook	Moxie Gore	“	T-M Corporation	1921-327	8/25/1993
Moxie Stream Lower	Moxie Gore	“	Bessemer Securities Corporation	536-131	5/15/1951
”	“	“	Park, Edward C (Executor of Henry Harriman)	536-138	5/18/1951
”	“	“	Realty Operators Corporation	536-135	5/14/1951
”	“	“	Harriman, Gordon D.	536-141	5/16/1951
Squaretown	Squaretown	“	J.M. Huber Corporation	1932-248	5/31/1993
”	“	“	J.M. Huber Corporation	539-99	10/10/1931
”	“	“	Wyman, W.S., et al	434-89	9/19/1935
Indian Stream	Indian Stream	“	J.M Huber Corporation	1932-248	5/31/1993
”	“	“	J.M. Huber Corporation	539-99	10/10/1931
”	“	“	Wyman, W.S. et al	434-89	9/19/1935

Exhibit 1-11: NECEC Culvert Replacement Program

New England Clean Energy Connect (NECEC) Project
Culvert Replacement Program
October 19, 2018

Introduction

As a component of the NECEC Compensation Plan (submitted August 2018), Central Maine Power Company (CMP) committed to developing a program to address missing, non-functional, damaged, undersized, and improperly installed culverts as mitigation for indirect impacts to coldwater fisheries. The following plan outlines a three-tiered approach to improve habitat connectivity in coldwater fisheries within the project area.

Background

The Maine Department of Environmental Protection (MDEP) and Maine Department of Inland Fisheries and Wildlife (MDIFW) have determined, through review of the NECEC Site Location of Development Law and Natural Resources Protection Act applications, that construction, maintenance, and operation of the project will have unavoidable impacts to coldwater fisheries in the project area, and are requiring CMP to provide mitigation for these impacts. Specifically, MDEP in its General Questions on CMP's application dated December 11, 2017 stated:

> *"the project crosses 67 rivers, streams, or brooks which contain brook trout habitat and five Outstanding River Segments and according to the vegetation management plan all vegetation over ten feet tall will be removed. While the Department has not yet made a determination whether the impacts to these resources are unreasonable there will certainly be impacts to these resources. Please provide a mitigation package to compensate for these impacts."*

Additionally, the MDIFW in its March 15, 2018 environmental review comments on CMP's application noted that the construction of the NECEC has "drastically minimized the amount of linear impact to streams" by utilizing existing logging roads. Should the need arise for modification or replacement of the logging roads or associated culverts, MDIFW makes the following recommendations:

> *"that culverts be replaced with appropriately-sized structures that will restore lost stream connectivity and significantly enhance life history requirements in these streams. MDIFW recommends that any new, modified, and replacement stream crossings, including temporary crossings, be sized to span 1.2 times the bankfull width of the stream. In addition, we recommend that stream crossings be open bottomed (i.e. natural bottom). Any proposed permanent replacement structures should be reviewed and approved by MDIFW fisheries staff prior to installation."*

The MDEP, during an April 3, 2018 compensation working session with CMP and the U.S. Army Corps of Engineers (USACE), informed CMP that in addition to CMP's proposal to make a contribution to the Maine In-Lieu Fee (ILF) Program, land preservation and/or habitat enhancement must also be considered as part of the mitigation package to address all project related impacts. As a result, CMP's compensation plan submitted on August 14, 2018, included a multifaceted proposal consisting of: 1) a contribution to the ILF Program, 2) three compensation tracts, totaling 1,022.4 acres, to offset impacts to wetlands and Inland Wading Bird and Waterfowl habitat (IWWH), 3) three preservation tracts, totaling 1,053.5 acres, to augment existing conserved lands, protect habitat connectivity, and protect 8.1 miles of frontage on the Dead River, to preserve recreational interests associated with Outstanding River segments, 4) habitat mitigation and enhancement proposals for streams containing Roaring Brook Mayfly and Northern Spring Salamander, 5) habitat enhancement for deer wintering areas (DWA) by revegetating disturbed upland areas with a Wildlife Seed Mix, 6) proposed habitat enhancement for indirect impact to coldwater

fisheries in the form of wood addition or "chop and drop" (no longer being considered due to MDIFW guidance), and 7) culvert replacements.

On the recommendation of environmental advocacy groups, CMP turned its attention to the Maine Aquatic Connectivity Restoration Project (MACRP). The MACRP focuses Natural Resources Conservation Service (NRCS) and partner resources to target and improve aquatic organism passage issues in the State of Maine. Through this effort the MACRP partnership developed a geographic information systems (GIS) application named the Maine Stream Habitat Viewer which includes an extensive inventory of culverts throughout the state and their status as it relates to aquatic passage, i.e., no barrier, potential barrier, barrier, unknown. CMP intends to use this application to identify culverts whose replacement would have the most beneficial impact by removal of barriers and improved habitat connectivity on its lands (e.g. within transmission line corridors) and along unimproved project access roads (e.g. off-corridor logging roads) to be used by CMP construction contractors to access the transmission line corridor during construction.

Mitigation
CMP will contact MACRP and request GIS data of culvert locations that have been deemed as barriers or potential barriers to fish passage. CMP will evaluate this information and determine the number and locations of culverts that would be potential candidates for replacement on unimproved roads that will be used during the construction of the NECEC. Priority will be given to culverts that act as barriers to fish passage and that provide habitat connectivity to large stream networks with dendritic watersheds. Only culverts with ½ mile or more of quality upstream stream habitat will be considered. Culverts will be assessed both on CMP controlled lands and on lands that provide off corridor access to the Project. In instances where debris is the sole barrier, i.e., clogging, CMP will simply remove the debris and dispose of it properly. CMP will secure landowner permission for replacements of culverts on private properties prior to performing any work, including surveys to establish existing conditions.

CMP will develop a field variance process, in cooperation with the MDEP and USACE and similar to the process implemented during the 2010 to 2015 construction of the Maine Power Reliability Program (MPRP), to allow for informal review and approval of minor modifications during Project construction. These field variances would then be packaged and included for formal approval through a future permit revision request. Culvert replacements would be consolidated into batches and submitted as a field variance request for review and approval prior to implementation.

Culvert Replacements on CMP Controlled Lands
CMP will replace or remove all culverts that are deemed to be barriers to fish passage on CMP controlled lands associated with the NECEC. This includes the transmission line corridors, mitigation parcels, and access easements held by CMP. CMP will evaluate the condition of all culverts within the Project right-of-way during pre-construction walkovers with the contractor(s), CMP environmental inspector, construction inspector, and MDEP third-party inspector. Culverts identified to be a barrier to fish passage will be documented, flagged with a distinctive color, and GPS located. All parties present on the pre-construction walkover will form a consensus as to whether the culvert merits replacement during access road preparation or during the restoration phase. If it is determined that the culvert is in sufficient condition to be spanned or matted over during construction with little to no risk of waterbody impacts, in areas where extensive construction traffic is anticipated, a decision might be made to replace or remove the culvert during project restoration. In some instances, CMP may determine that the culvert can be removed and the stream restored to a free-flowing condition with no replacement of the culvert necessary.

Off corridor Culvert Replacements
In addition to replacing culverts within CMP controlled lands associated with the Project, CMP will dedicate up to $200,000, sufficient to replace approximately 20-35 culverts on lands outside of CMP's

ownership. CMP proposes to work with MDEP, MDIFW, and interested environmental non-governmental organizations to grant this money to the appropriate entities who can identify those culverts most beneficial to replace, and to manage and oversee their replacement.

Culvert Installation Methodology
A CMP environmental inspector will be present to monitor all culvert removals and installations. CMP will install replacement culverts consistent with Stream Smart principles to improve or maintain habitat connectivity. This includes spanning the entire stream channel, a minimum of 1.2 times the bank full width to eliminate concentrated and accelerated flow; setting the culvert at the correct elevation (i.e., below the elevation of the original stream channel); matching the slope gradient to the stream bottom at the upstream and downstream portions of the crossing; and properly sizing and embedding the culverts to allow for natural streambed substrate in the culvert.

Culvert replacement activities will be avoided during periods of high water and forecasted inclement weather. CMP will replace the culvert under dry conditions by installing temporary coffer dams upstream and downstream of the crossing and pumping the stream flow around the construction area to maintain downstream flows and prevent sedimentation during the culvert installation process. An energy dissipater will be placed at the discharge of the pump-around to prevent stream scour. All pumps will be placed in a secondary containment structure to prevent contaminants from entering the water during pump operation or refueling. In addition, a sufficient number of backup pumps will be available in the event of a pump failure. Spoil piles associated with excavation of the existing culvert will be placed a minimum of 10 feet back from the top of the stream bank and erosion and sedimentation controls will be installed as appropriate on both the upstream and downstream sides of the stream. The new culvert will be installed according to the Stream Smart principles and backfilled using native material or clean stone as appropriate. The downstream coffer dam, followed by the upstream coffer dam, will be removed and water returned to the culvert following the completion of backfill and stabilization of all disturbed areas adjacent to the replacement project.

Culvert Removals and Stream Restoration
It may be determined that an existing culvert is a candidate for removal (without replacement), in order to restore the natural course of a waterbody. In this case, culvert removal will be conducted as described above, temporarily installing coffer dams and pumping the stream flow around the work site. After removal, cobble or clean stone will be used to restore the stream bottom and both stream banks will be sloped to match the existing grade and contour. Disturbed areas will be seeded and stabilized with an erosion control fabric or similar approved erosion control measure. To prevent wildlife entrapment, CMP will not use erosion control fabrics containing monofilament mesh. The use of stone riprap for bank stabilization will be avoided unless otherwise approved by MDEP and the USACE. Silt fence or a functional equivalent shall be installed on both sides of the crossing between the temporarily stabilized banks and any adjacent disturbed areas associated with transmission line construction. After the stream bottom and both banks have been properly stabilized with temporary erosion and sedimentation control measures, pump-around will be halted, coffer dams will be removed, and water will be allowed to flow through the restored area.

Reporting and Post-Construction Monitoring
CMP will document each culvert replacement or removal and will submit a summary report for Condition Compliance to the MDEP and the USACE following construction. In addition, CMP will monitor the conditions of replaced culverts for a period of 1 year following construction and will report any deficiencies and recommended corrective actions to the MDEP and USACE.

Beyer, Jim R

From: Stratton, Robert D
Sent: Tuesday, January 22, 2019 4:23 PM
To: Beyer, Jim R
Cc: Connolly, James; Overlock, Joe; Perry, John
Subject: Region E brook trout streams

Jim,

Region E Fisheries indicates, "I'm quite certain that all the perennial streams in Region E contain wild BKT. All those brooks in Beattie, Appleton, Johnson Mtn, and Bradstreet Twps are full of BKT. I'm not sure about the intermittent streams, but anything connected to the Moose River, Gold Bk, Barrett Bk, Cold Stream, Baker Bk, Tomhegan Stream, Bog Bk, Smart Bk, Number One Bk, Mill Bk, and Piel Bk would have potential. I really think we are safe ground by assuming all the Region E streams (all headwaters) have BKT. South of The Forks might be a different story…"

By my review of CMP's table, this adds brook trout information for 154 streams, forty-six of them are perennial streams within the "greenfield" section which would not be affected by increased buffer impact calculations. The remaining 108 streams would be affected however.

Thank you,

Bob Stratton
Environmental Program Manager
Fisheries and Wildlife Program Support Section Supervisor
Maine Department of Inland Fisheries & Wildlife
284 State Street; 41 State House Station
Augusta, Maine 04333-0041
Tel: (207) 287-5659; Cell: (207) 592-5446
mefishwildlife.com

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Beyer, Jim R

From: Stratton, Robert D
Sent: Tuesday, January 22, 2019 1:45 PM
To: Beyer, Jim R
Subject: RE: Region B brook trout streams

You may be right. From CMP's table (Exh. 7-7), it looks like it's all Segment 5 with no clearing. Thanks,

Bob Stratton
MDIFW

From: Beyer, Jim R
Sent: Tuesday, January 22, 2019 12:46 PM
To: Stratton, Robert D <Robert.D.Stratton@maine.gov>
Subject: RE: Region B brook trout streams

Bob,
That section of the line, if my memory is correct, is almost exclusively a rebuild or the addition of line inside the existing cleared corridor. I will double check though

James R. Beyer
Regional Licensing and Compliance Manager
Bureau of Land Resources - Eastern Maine Regional Office
Maine Department of Environmental Protection
(207) 446-9026
www.maine.gov/dep

From: Stratton, Robert D
Sent: Tuesday, January 22, 2019 12:13 PM
To: Beyer, Jim R <Jim.R.Beyer@maine.gov>
Cc: Connolly, James <James.Connolly@maine.gov>; Overlock, Joe <Joe.Overlock@maine.gov>; Perry, John <John.Perry@maine.gov>
Subject: Region B brook trout streams

Jim,

Region B Fisheries notes that many of the streams to be crossed by the NECEC powerline within their region are in the Sheepscot River watershed. "This area is rich with wild trout resources and should receive as much protection as possible." The streams in the Whitefield/Windsor area are especially significant.

I will provide more information for Region E as it becomes available. Thank you,

Bob Stratton
Environmental Program Manager
Fisheries and Wildlife Program Support Section Supervisor
Maine Department of Inland Fisheries & Wildlife
284 State Street; 41 State House Station
Augusta, Maine 04333-0041

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Beyer, Jim R

From: Stratton, Robert D
Sent: Friday, February 01, 2019 5:10 PM
To: Beyer, Jim R; Bergeron, Mark
Cc: Connolly, James; Peabody, Timothy E
Subject: NECEC stream buffer impact and compensation plan

Good afternoon Jim,

MDIFW is reviewing the January 30, 2019 revised NECEC Compensation Plan in regards to previous natural resource discussions involving MDIFW, MDEP, and CMP. I wanted to respond to you today specifically in reference to stream buffers, an important issue of recent discussion. In previous NECEC compensation plans, CMP committed to 100-foot buffers for all perennial streams in the "Greenfield" portion of the proposed powerline and for all streams containing Threatened or Endangered species and Outstanding River Segments. In our meeting of 1/22/19, MDEP indicated to CMP support of 100-foot buffers for these resources as well as for all intermittent and perennial streams that contain brook trout (cold water fisheries). MDEP supported 75-foot buffers on all other streams. CMP incorporated these provisions in its 1/30/19 revision. CMP had utilized a partial data set of surveyed wild brook trout waters from MDIFW in 2017. On 1/24/19, I sent two emails to you with an updated NECEC Waterbody Crossing Table (Exhibit 7-7) that included further brook trout information obtained from MDIFW regional fisheries staff.

Upon preliminary review of the 1/30/19 Revised Compensation Plan, MDIFW finds that the proposed package of three conservation parcels (Grand Falls, Lower Enchanted, Basin Tracts) with stream habitats and associated buffers, and monetary contributions ($180,000 to Maine Nongame Wildlife Fund, $200,000 for aquatic passage upgrades) appears to adequately address and mitigate for impacts based on MDEP's 1/22/19 guidance, updated brook trout information, and MDIFW's consistent recommendations for 100-foot vegetated buffers for all intermittent and perennial streams and associated floodplain wetlands. MDIFW looks forward to further discussions to finalize the details. Thank you,

Bob Stratton
Environmental Program Manager
Fisheries and Wildlife Program Support Section Supervisor
Maine Department of Inland Fisheries & Wildlife
284 State Street; 41 State House Station
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