

Maine Nonpoint Source Management Program Plan 2020 - 2024

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Photo Credit: Susan Atwood
Wilson Lake, Wilton

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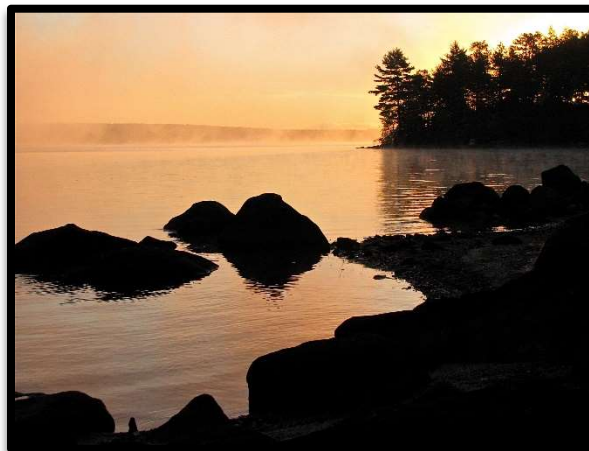


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Table of Contents

Acknowledgements.....	i
Acronyms Used	vi
I. Introduction	1
II. Maine NPS Program Mission, Goals and Guiding Principles.....	2
III. NPS Pollution Management Program Framework.....	4
A. Key State and Federal Laws.....	4
B. Statewide and Watershed-based Approaches.....	5
C. Restoring Impaired Waters and Protecting Unimpaired Waters Threatened by NPS.....	7
IV. Maine’s Water Resources.....	8
A. Summary of Waters Impaired by NPS Pollution	9
B. Water Quality Standards and Classification.....	11
C. TMDL Assessment Reports and TMDL Implementation	13
V. Statewide Watershed Prioritization	14
A. NPS Priority Watersheds List.....	14
B. DEP Targeted Watersheds.....	16
VI. Maine Watershed-based Approach.....	17
A. Targeted Assessment and Stressor Analysis	18
B. Watershed-based Plan Development	19
C. Watershed-based Plan Implementation	23
D. Measuring Success and Monitoring Environmental Results.....	26
VII. Statewide NPS Control Strategies by NPS Category.....	27
A. Developed Areas	28
B. Agriculture.....	32
C. Transportation.....	36
D. Forestry	40
E. Onsite Wastewater Disposal Systems.....	44
F. Hydrologic and Habitat Modification.....	46
G. Climate Change Adaptation.....	49
H. Emerging NPS Sources	52
I. Other NPS Sources.	60

VIII. NPS Programs and Partnerships	62
A. DEP NPS Programs.....	62
B. Integration with Other Government Programs that Protect Water Quality	68
C. Partnerships with Non-Governmental Organizations.....	74
IX. Funding Sources.....	77
X. NPS Program Five-Year Objectives, Actions and Annual Milestones	82
XI. Measuring Progress and Evaluating Maine’s NPS Program	103
A. Measuring Environmental Success.....	103
B. NPS Program Evaluation.....	106
References	108

Appendices

1. Key Components of an Effective State NPS Management Program, EPA	110
2. NPS Watershed Prioritization and NPS Priority Lists	111
3. Water Quality Monitoring and Assessment Strategies and Partners.....	133
4. Targeted Assessment and Stressor Analysis	139

List of Figures

Figure 1. Maine’s NPS Program Goals and Guiding Principles	3
Figure 2. Statewide & Watershed Approaches - Maine NPS Management Program.	6
Figure 3. Health of Maine’s Assessed Waters	7
Figure 4. Maine’s Landscape.....	8
Figure 5. Total Sizes of Impaired Maine Lakes by Source Category	10
Figure 6. Total Sizes of Impaired Maine Rivers and Streams by Source Category	10
Figure 7. Total Sizes of Impaired Maine Marine Waters by Source Category	11
Figure 8. Maine’s Integrated Report Listing Categories	12
Figure 9. Maine DEP’s Watershed-based Approach Steps	17
Figure 10. Watershed Planning Process	26

List of Tables

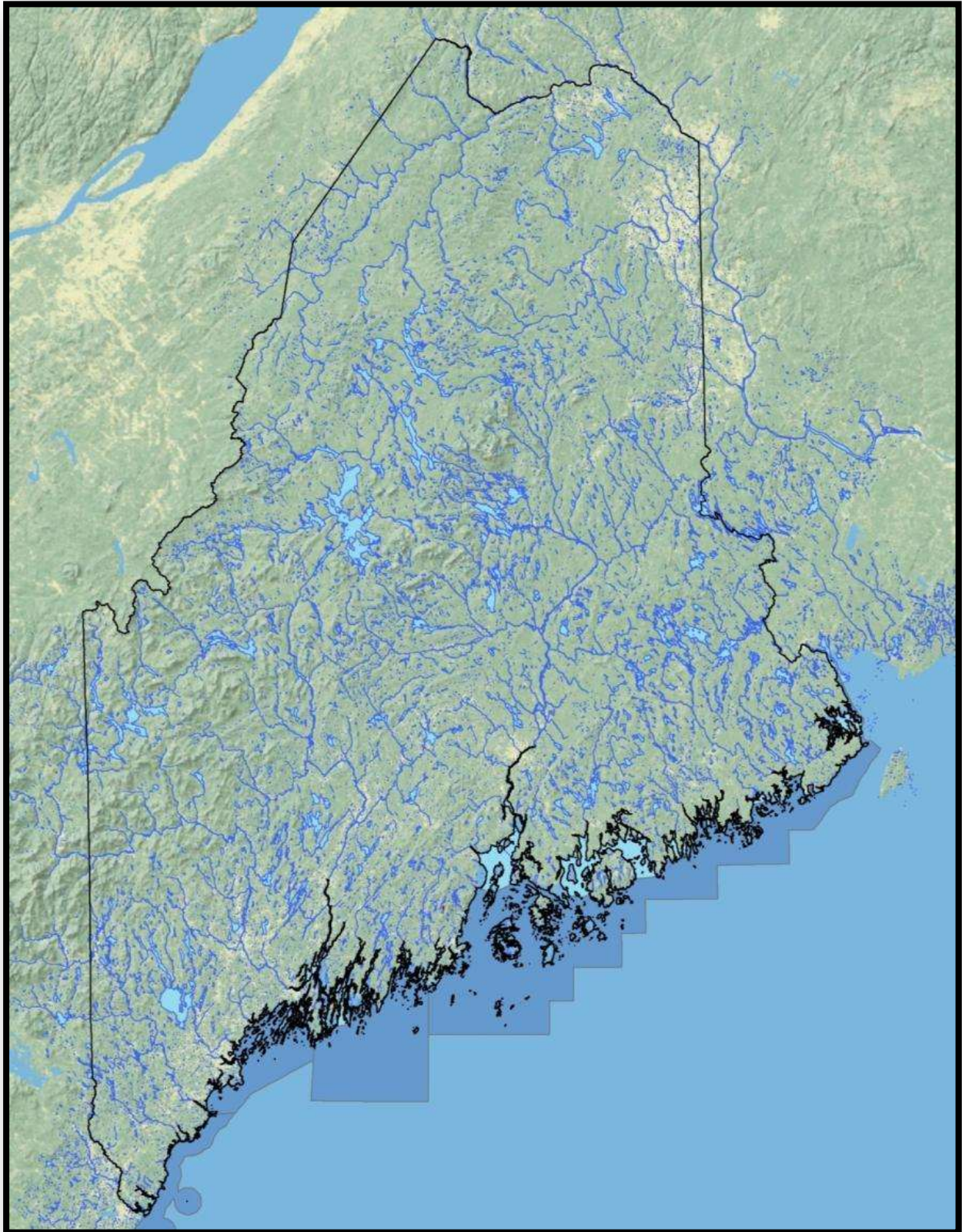
Table 1. Maine’s Population and Land Area	9
Table 2. Maine’s Waters	9
Table 3. Nine Element Watershed-based Plans Accepted by Maine DEP	22
Table 4. Lake Watershed-based Protection Plans Accepted by Maine DEP.....	23
Table 5. Lead Agencies for NPS Categories.....	27
Table 6. Climate Change Adaptation Objectives/Actions in Maine’s NPS Management Plan	51
Table 7. Key NPS Target Audiences and Current BMP Promotional Efforts.....	67
Table 8. Programs, Partners and Roles.....	74

Table 9. Partner Organizations and Roles.....	76
Table 10. Watershed Approach: Objectives, Actions and Milestones	82
Table 11. Developed Areas: Objectives, Actions and Milestones	87
Table 12. Agriculture: Objectives, Actions and Milestones	90
Table 13. Transportation: Objectives, Actions and Milestones	93
Table 14. Forestry: Objectives, Actions and Milestones	95
Table 15. Subsurface Wastewater Disposal: Objectives, Actions and Milestones	97
Table 16. Hydrologic and Habitat Modification: Objectives, Actions and Milestones	99
Table 17. NPS Program Coordination: Objectives, Actions and Milestones	100
Table 18. NPS Priority Watershed Selection Criteria Summary.....	112
Table 19. Impaired Lakes Priority List	114
Table 20. Threatened Lakes Priority List.....	117
Table 21. Impaired Streams Priority List.....	123
Table 22. Threatened Streams Priority List	126
Table 23. Impaired Marine Waters Priority List.....	130
Table 24. Threatened Marine Waters Priority List	132
Table 25. Monitoring and Assessment Activities.....	133

Acronyms Used

Acronym	Definition
ACOE	Army Corps of Engineers
AO	Agricultural Operation
AST	Aboveground Storage Tank
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CBEP	Casco Bay Estuary Partnership
CEO	Code Enforcement Officer
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CRP	Conservation Reserve Program
CSO	Combined Sewer Overflow
CVA	Clean Vessel Act
CWA	Clean Water Act
CWD	Coarse Woody Debris
CWSRF	Clean Water State Revolving Fund
CZARA	Coastal Zone Act Reauthorization Amendments
DACF	Maine Department of Agriculture, Conservation and Forestry
DEP	Maine Department of Environmental Protection
DHHS	Maine Department of Health and Human Services
DIFW	Department of Inland Fish and Wildlife
DMR	Maine Department of Marine Resources
DO	Dissolved oxygen
EGAD	Environmental and Geographic Analysis Database
EQIP	Environmental Quality Incentives Program
ESC	Erosion and Sediment Control
EPA	Environmental Protection Agency
FAME	Finance Authority of Maine
FERC	Federal Energy Regulatory Commission
FSA	Farm Service Agency, USDA
GRTS	Grant Reporting and Tracking System
IR	Integrated Report
LSM	Lake Stewards of Maine
LOP	Livestock Operation Permit
LUPC	Land Use Planning Commission
MaineDOT	Maine Department of Transportation
MEMA	Maine Emergency Management Agency
MFS	Maine Forest Service
MHB	Maine Healthy Beaches
MLRC	Maine Local Roads Center
MLS	Maine Lakes Society

Acronym	Definition
MMBB	Maine Municipal Bond Bank
MNRCP	Maine Natural Resource Conservation Program
MOA	Memorandum of Agreement
MOCA	Maine Ocean and Coastal Acidification
MRS	Maine Revised Statutes
MST	Microbial Source Testing
MTA	Maine Turnpike Authority
MERI	Marine and Environmental Research Institute
MS4	Municipal Separate Storm Sewer System
MSZA	Mandatory Shoreland Zoning Act
NEMO	Nonpoint Education for Municipal Officials
NMP	Nutrient Management Plan
NMRB	Nutrient Management Review Board
NOAA	National Oceanic and Atmospheric Administration
NPS	Nonpoint Source
NPSTRC	Nonpoint Source Training and Resource Center
NRPA	Natural Resources Protection Act
NRCS	Natural Resource Conservation Service, USDA
NWQI	National Water Quality Initiative
OSDS	Onsite Sewage Disposal System
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PPA	Performance Partnership Agreement
PREP	Piscataqua Region Estuaries Partnership
RFP	Request for Proposals
SFI	Sustainable Forestry Initiative
SHMP	State Hazard Mitigation Plan
SIC	State Implementation Committee
SSI	Sustainability Solutions Initiative
SSWD	Subsurface Wastewater Disposal
SWAT	Surface Water Ambient Toxics
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
UNH	University of New Hampshire
USDA	United State Department of Agriculture
UST	Underground Storage Tank
VRMP	Volunteer River Monitoring Program
WBP	Watershed-based Plan
WRF	Water Resources Forester
YCC	Youth Conservation Corps



I. Introduction

Nonpoint source pollution (NPS) has a major impact on Maine’s lakes, rivers, streams and marine waters. Unlike pollution from point sources, such as industrial and sewage treatment plants, NPS pollution comes from many diffuse sources. It is caused by rainfall or snowmelt moving over and through the ground and picking up natural and human-made pollutants, such as fertilizer, road salt, sediment, oil and bacteria, along the way. Eventually these contaminants end up in waterbodies, where they can threaten drinking water supplies, cause nuisance algal blooms, diminish recreational activities, and endanger aquatic life and habitat.

The Maine Department of Environmental Protection (DEP) coordinates the State of Maine Nonpoint Source Pollution Program (38 M.R.S. § 410) to restore and protect waters impaired and threatened¹ by nonpoint source pollution. In this NPS Program Plan, DEP establishes the overall strategy that Maine will use over the next five years (2020-2024) to control and prevent NPS pollution to the state’s waters. The Plan identifies:

- Programs, strategies and resources state agencies use to address Maine’s most pressing NPS water pollution control problems;
- DEP’s approach to strategically focus watershed protection and restoration work in NPS Priority watersheds;
- Funding opportunities and partnerships critical to protecting and improving Maine’s lakes, streams, rivers, and marine waters; and
- Five-year objectives, actions and milestones to make progress achieving the long-term goals of Maine’s NPS management program.

The U.S. Environmental Protection Agency (EPA) requires states to have an updated NPS Management Plan in place to qualify for federal Section 319 grant awards under the Clean Water Act (CWA). In 2013, EPA issued 319 program guidelines describing key components to be included in an effective state NPS management program. Appendix 1 summarizes how these key elements have been incorporated into Maine’s Plan.



¹ The use of the term ‘threatened’ in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine’s Integrated Report, where waters are listed as ‘threatened’ for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

II. Maine NPS Program Mission, Goals and Guiding Principles

Maine's NPS Program is guided by the following mission, goals and guiding principles. Section X of this Plan lists objectives, actions and milestones that will be used to achieve program goals to address Maine's priority NPS problems.

Maine's NPS Program Mission:

Maine's lead NPS agencies administer programs to help prevent, control, or abate water pollution caused by nonpoint sources so that waters attain or exceed their classification standards and beneficial uses of water resources are maintained or restored.

Maine's NPS Program Lead Agencies:

Department of Environmental Protection
Department of Agriculture, Conservation and Forestry (DACF)
Department of Marine Resources (DMR)
Department of Transportation
Department of Health and Human Services (DHHS)

Long-term Goals

The long-term goals of Maine's NPS program are:

- **Restoration of Waters** - To restore waterbodies that are impaired by nonpoint sources so that they meet water quality standards.
- **Protection of Waters** - To prevent NPS-related impairments of threatened water bodies.

Guiding Principles

Maine's lead NPS agencies will use the following six guiding principles to help implement strategies to achieve NPS management program goals and objectives (Figure 1):

1. Promote the use of state-agency defined "best management practice guidelines" (BMPs) throughout the entire state to control nonpoint sources and encourage the adoption of innovative strategies to address new challenges;
2. Promote voluntary, locally-led, incentive-based strategies to address NPS issues
3. Ensure informed compliance with applicable regulatory requirements;

4. Establish and strengthen partnerships among stakeholders at local, state, and federal levels in the management of NPS pollution sources;
5. Encourage proper management of wetlands, riparian corridors, floodplains, natural areas, and other green infrastructure resources in urban and rural watersheds to help restore or maintain healthy watersheds; and
6. Use a watershed-based management approach as a coordinating framework to organize public and private sector efforts to identify, prioritize, and implement activities to address NPS problems to restore NPS impaired waters or protect waters threatened by NPS pollution.

Figure 1. Maine's NPS Program Goals and Guiding Principles.



III. Maine NPS Management Program Framework

As Maine's lead water quality agency, DEP is responsible for developing and implementing water quality protection and improvement programs required under state and federal laws. DEP manages both regulatory and voluntary programs and collaborates with local, state, and federal agencies to plan and implement strategies to protect Maine's water quality. The following section summarizes key State and Federal laws that guide Maine's NPS program and Maine's overall approach to controlling NPS pollution.

A. Key State and Federal Laws

Three laws helped prompt the establishment and formalization of Maine's NPS program. These laws provide ongoing structure and guidance for the program and identify the agencies involved in program implementation.

Maine's NPS Pollution Program Statute

In 1991, Maine's Nonpoint Source Pollution Program was codified under State statute (38 M.R.S. Chapter 3, Subchapter 1, Article 1-F). The statute directs State agencies to promote the use of State agency-defined "best management practice guidelines" (BMPs) to prevent or reduce water pollution from nonpoint sources. DEP administers the State of Maine NPS program and coordinates their efforts with other state agencies. Under Maine's statute, DEP, the Department of Agriculture, Conservation, and Forestry, and the Department of Transportation (MaineDOT) are responsible for developing and promoting the use of BMPs in order to reduce and prevent NPS pollution from their associated pollution categories: Development (DEP); Transportation (MaineDOT); Agriculture (DACF) and Forestry (DACF).

Section 319 of the Federal Clean Water Act

Congress enacted Section 319 of the Clean Water Act in 1987 and thereby established a national program to control nonpoint sources of water pollution. Funding appropriated under Section 319 can be used to implement state NPS programs including, as appropriate, non-regulatory or regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, and demonstration projects to achieve implementation of best management practices and to meet water quality goals. EPA provides grants to states, tribes, and territories to implement programs that control and prevent nonpoint source pollution to waters. To be eligible for Section 319 funding, states must implement updated NPS Management Programs and follow other program guidelines (EPA, 2013).

Section 6217 of the Federal Coastal Zone Act Reauthorization Amendments (CZARA)

EPA and the National Oceanic and Atmospheric Administration (NOAA) jointly administer a program that establishes management measures designed to control runoff from six main sources: forestry, agriculture, urban areas, marinas, hydrologic modification and riparian areas. These measures are backed by enforceable state policies and actions ("state authorities") that

will ensure implementation of the program. All coastal and Great Lakes states and territories that participate in the Coastal Zone Management Program (CZMA) are required to develop coastal NPS control programs. In 2003 EPA and NOAA jointly approved the Maine Coastal NPS Pollution Control Program, which implements management measures in the whole state including the coastal zone.

B. Statewide and Watershed-based Approaches

Maine's NPS program uses a combination of statewide programs and targeted watershed projects to achieve its long-term goals of restoring and protecting waters.

Statewide Approach

Maine's statewide approach targets six major categories of NPS pollution identified in the state. These NPS pollution categories include developed areas, agriculture, transportation, forestry, onsite wastewater disposal systems and hydrologic and habitat modification. The State's lead NPS agencies and other cooperating agencies and partners implement an array of regulatory and non-regulatory programs to control pollution from these major NPS categories.

Regulatory programs (e.g., permitting, compliance assistance and enforcement) are administered under several core State of Maine environmental laws including but not limited to the Storm Water Management Law; the Site Location of Development Law; the Erosion and Sedimentation Control Law; the Natural Resources Protection Act (NRPA); the Mandatory Shoreland Zoning Act (MSZA); the Subsurface Wastewater Disposal Rules; Pesticide Control laws; the Nutrient Management Act; and the Forest Practices Act. These laws limit specific activities (e.g., soil disturbance, timber cutting and pesticide application) and require the use of BMPs to limit pollution transport to waterbodies. A number of these laws, including the Stormwater Management Law and NRPA, also provide enforceable policies of the Maine Coastal Program and are applicable to federal agency actions under the CZMA's consistency provision. Section VII in the Plan outlines how these core state environmental laws may apply to various NPS categories.

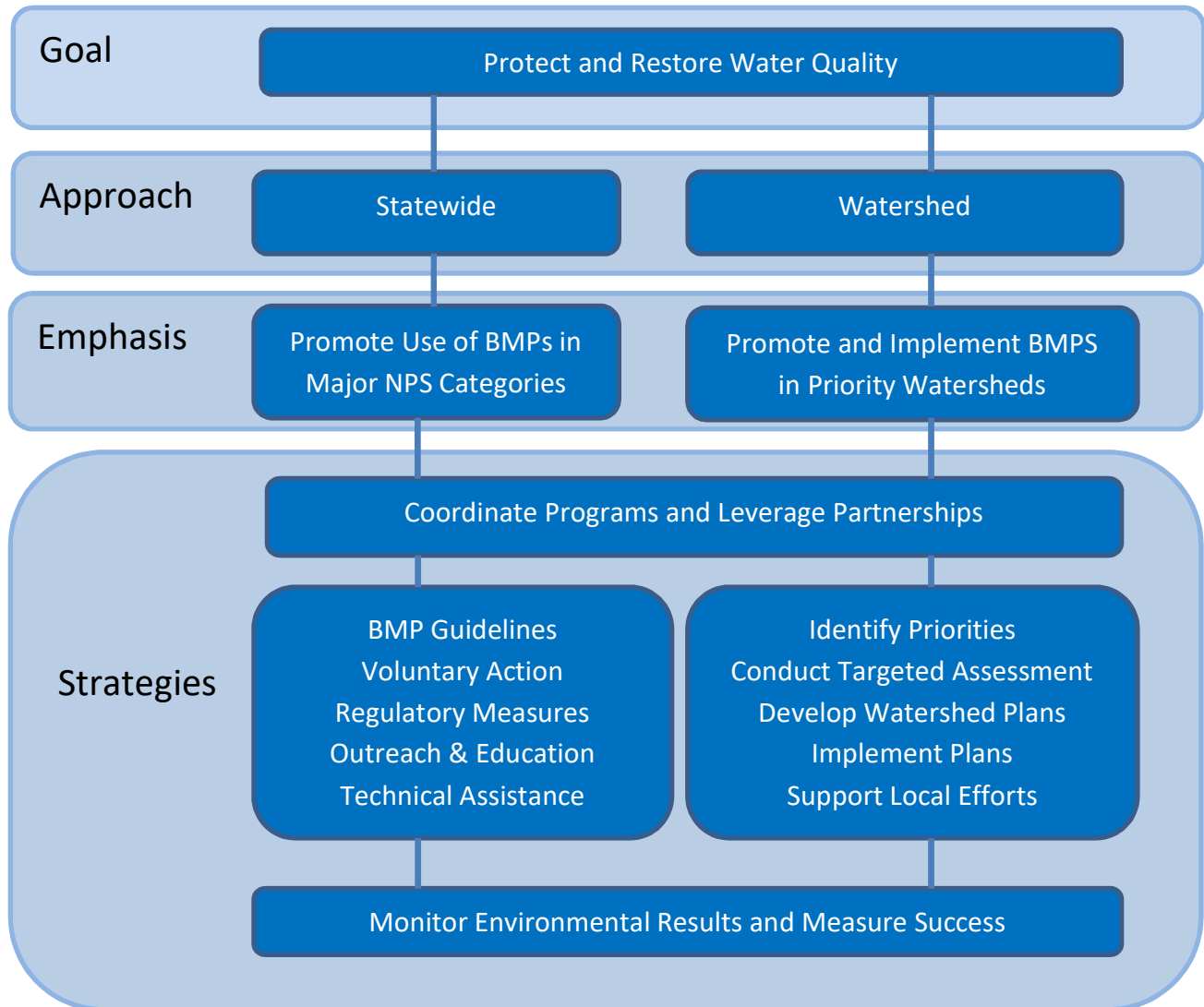
NPS pollution is oftentimes not adequately addressed by existing laws. As such, efforts to encourage more widespread voluntary use of BMPs are a vital component of Maine's NPS Program. Non-regulatory programs often involve providing technical assistance, BMP training, and outreach to municipalities, individuals, businesses, and non-governmental organizations. Recognition programs and demonstration projects are also used to recognize individuals and businesses and highlight projects that implement BMPs to prevent or reduce NPS pollution.

Watershed-based Approach

In addition to statewide programs, Maine also uses a targeted watershed approach to restore and protect waters. Through a priority-setting process, DEP identifies watersheds that are impaired or threatened by NPS pollution. Projects in these NPS Priority Watersheds typically follow four steps as they move towards the restoration or protection goals. Steps include conducting targeted assessment and stressor analysis; developing locally-supported watershed-

based management plans (WBP); implementing watershed-based plans; and measuring success and environmental results. Refer to Section VI for a description of Maine’s watershed approach.

Figure 2. Statewide and Watershed Approaches - Maine NPS Management Program.



Partnerships and Integration with Other Programs

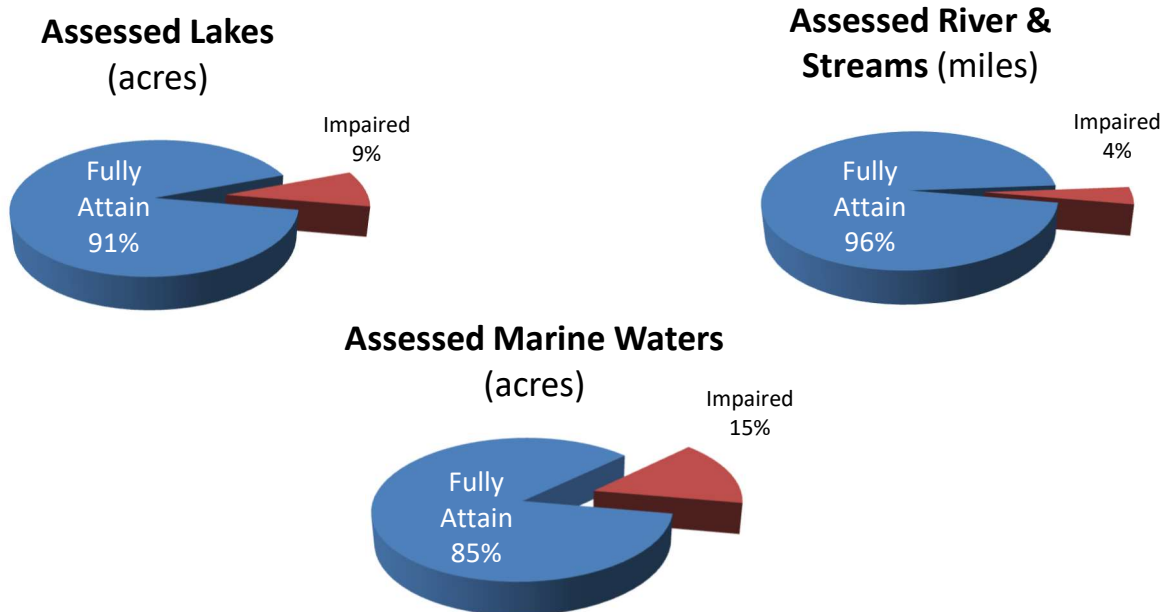
Success of the NPS program depends on maintaining existing and forging new partnerships with state, interstate, tribal, regional and local entities; private sector groups; citizens groups; and federal agencies. These partners and their affiliated programs have goals that align or overlap with the goals of the NPS Program, thus providing mutual benefits. Partnerships strengthen the program by bringing new ideas and resources, increasing understanding of NPS problems, and building commitment to implementing solutions. Maine’s lead NPS agencies use a variety of formal and informal means to develop and maintain these partnerships. Refer to Section VIII for information about partnerships.

C. Restoring Impaired Waters and Protecting Unimpaired Waters Threatened by NPS

This plan outlines approaches to restore the relatively small number of waters impaired by NPS pollution and protect the many unimpaired waters threatened by NPS pollution. Aside from statewide advisories for fish and lobster tomalley consumption, Maine’s 2016 Integrated Report (IR) indicates that state’s waters are very clean with 96% of assessed river and stream miles, 85% of marine waters and 91% of lake acres fully attaining water quality standards (Figure 3). Only 4% of assessed river and stream miles, 15% of marine waters and 9% of lake acres were listed as impaired. That said, many of Maine’s clean waters that attain standards are threatened due to NPS sources. For example, 244 lakes are threatened by excess nutrients associated with existing and future watershed development and are designated “Most at Risk” under Maine’s Stormwater Law.

Given the relatively high proportion of unimpaired waters and relatively low number of impaired waters in Maine, DEP prioritizes and balances the use of available NPS resources to protect and restore lakes, streams and marine waters. Prevention of water pollution is a daunting challenge for watersheds facing increased development pressures. Since prevention is far more feasible and less expensive than restoration of an already impaired waterbody, DEP allocates significant program resources for projects that help communities protect waters considered threatened or most at risk. The NPS Priority Watersheds list (Appendix 2) identifies impaired waters and unimpaired waters threatened by NPS pollution.

Figure 3. Health of Maine’s Assessed Waters (Maine DEP, 2016 Integrated Report).



IV. Maine's Water Resources

Maine is the largest state in New England with a total surface area of over 35,000 square miles (Table 1). The state has an abundance of fresh water resources with the larger surface waters occupying nearly 4,500 square miles (Table 2). Maine's 5,780 lakes and ponds cover 986,952 acres, an area larger than the State of Rhode Island. There are over 7,000 perennial brooks, streams, and rivers that extend nearly 55,000 miles. Fresh and saltwater wetlands cover an additional 5,196 square miles. Groundwater is considered plentiful with three basic types of aquifers (stratified drift deposits, till, and fractured bedrock). Stratified drift deposits, which provide large-volume water supply wells cover about 10% of the state, and bedrock aquifers underlie the entire state. Maine's coastline is 2,757 miles long, and its marine waters cover 2,846 square miles, including near shore waters, tidal rivers and the area to the "three mile" limit.



Figure 4. Maine's Landscape (Maine DEP, 2012).

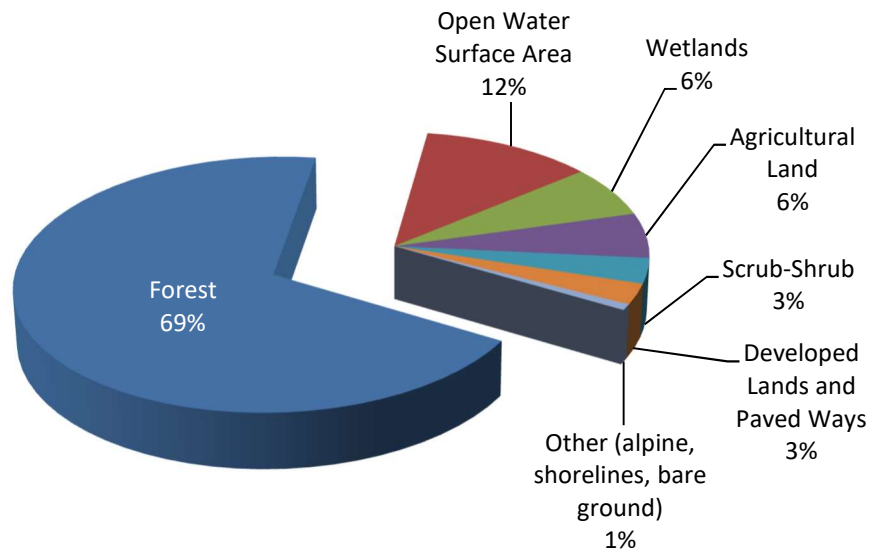


Table 1. Maine's Population and Land Area (Maine DEP, 2012).

State Population (2010 National Census data)	1,328,361	people
Rural population	552,638	people
Urban population	775,723	people
Land Area	35,236	sq miles

Table 2. Maine's Waters (Maine DEP, 2012).

Lakes, Ponds, and Reservoirs	1,542	sq miles
Number of lakes, ponds, and reservoirs	5,780	
Lakes greater than 10 acres	1,502	sq miles
Number of lakes greater than 10 acres	2,690	
Rivers and Streams	54,995	miles
Perennial streams	30,894	miles
Intermittent streams	16,375	miles
Rivers	7,726	miles
Coastline (including shorelines of tidal rivers and islands)	2,757	miles
Bays, estuaries, and harbors	2,717	sq miles
Tidal rivers	129	sq miles
Wetlands	5,196	sq miles
Saltwater wetlands	381	sq miles
Freshwater wetlands	4,815	sq miles
Sand and Gravel Aquifers	1,281	sq miles

A. Summary of Waters Impaired by NPS Pollution

Maine's 2016 Integrated Water Quality Monitoring and Assessment Report (IR) lists lakes, rivers, streams and marine waters impaired by point and/or nonpoint pollution sources. The cause of impairment is variable and site specific. All freshwaters in Maine are under a fish consumption advisory due to impairment caused by atmospheric deposition of mercury. Atmospheric deposition is the largest single source of mercury pollution. All marine waters are impaired for polychlorinated biphenyls (PCBs) and dioxins and fall under a statewide lobster tomalley consumption advisory. Also, bacterial contamination is a significant cause of impairment, affecting 430 square miles of marine waters (not including combined sewer overflow-affected waters).

The relative importance of pollution sources in different types of impaired waters varies considerably. Only one lake is impaired by a point source (Figure 5). Most lakes are affected by a mix of rural residential development, agriculture, internal recycling and urban stormwater. In streams, industrial point source discharges, unknown sources and NPS are of almost equal importance, each affecting approximately 400 river miles, and general agricultural NPS sources affect 489 miles (Figure 6). Municipal point source discharges, combined sewer overflows, overboard discharges and NPS are the primary sources causing impairment of marine waters (Figure 7). NPS contributes to bacterial impairments of marine waters.

Figure 5. Total Number and Area of Impaired Lakes by Source Category (Maine DEP, 2016).²

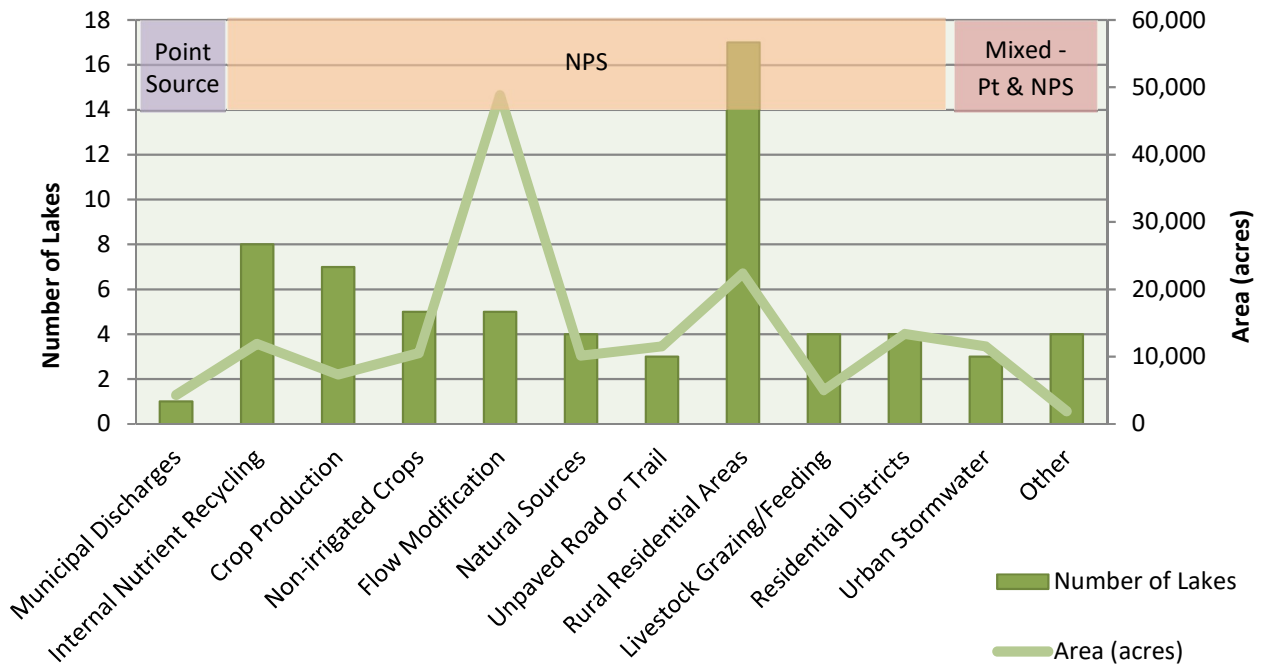


Figure 6. Total Miles of Impaired Rivers and Streams by Source Category (Maine DEP, 2016).²

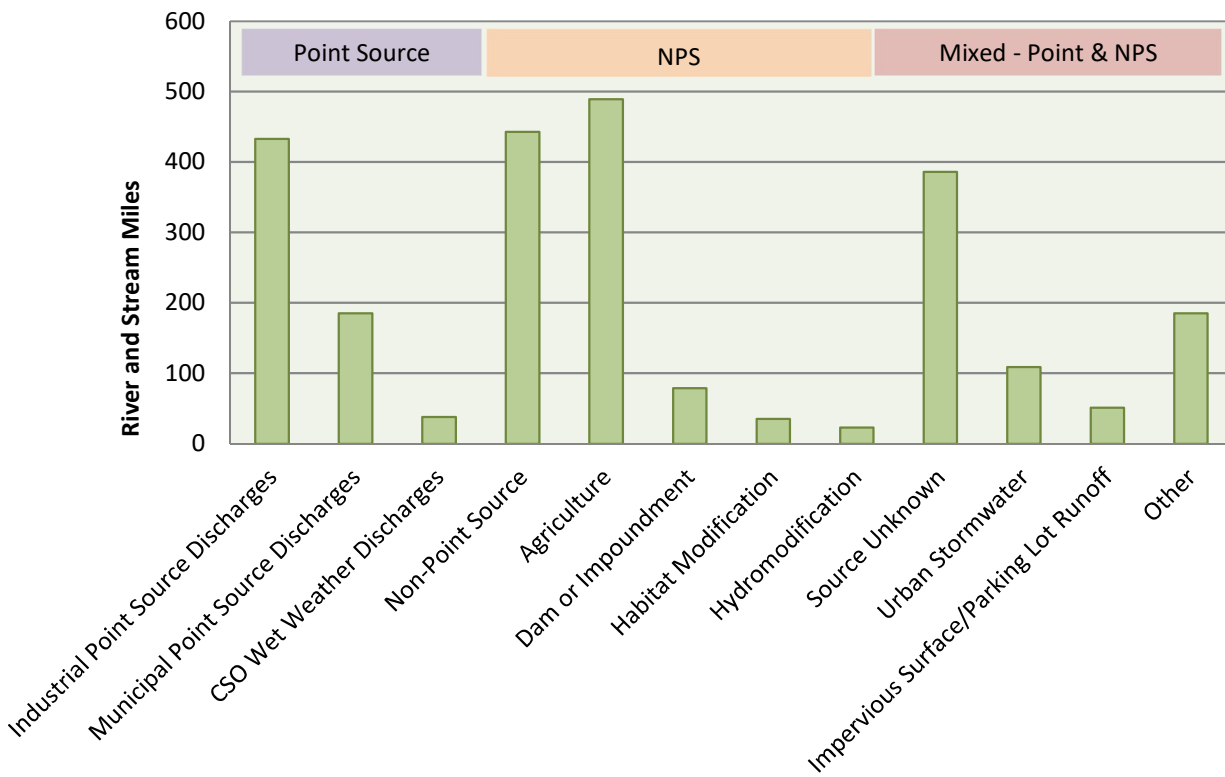
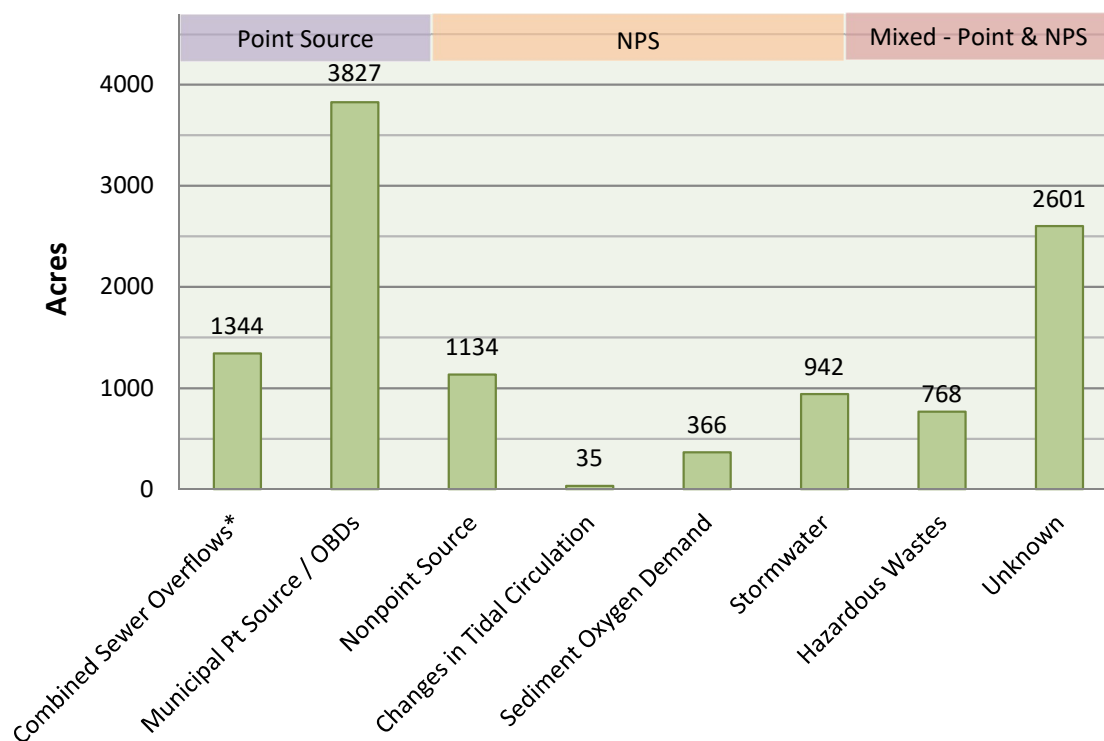


Figure 7. Total Acres of Impaired Estuarine and Marine Waters by Source Category (Maine DEP, 2016).²



*Variable miles from combined sewer overflows (CSO). Number reported above from Category 5-A. As of 2017, there were 31 communities with CSO discharge points in their sewerage systems (reduced from an original 60) with a total of 139 individual CSO discharge points (reduced from the original 340).

B. Water Quality Standards and Classification

The quality of Maine's waters is described in terms of physical, chemical, and biological characteristics associated with the state's water classification program. As established in Maine statute (38 M.R.S. § 464-470), the classification program consists of three components: designated uses (e.g., drinking water supply, recreation in and on the water, habitat for fish and other aquatic life); criteria (e.g., bacteria, dissolved oxygen and biological criteria); and an anti-degradation statement (e.g., natural, free flowing) that specify levels of water quality necessary to maintain the designated uses.

²The square miles, miles, or acreage attributed to causes and sources in these figures may be listed more than once if a waterbody is subjected to several different types of disturbance. For example, if a waterbody has both agricultural and NPS sources of impairment, the impaired acreage or miles will be listed in both the Agriculture and NPS categories. For more information on source categories, see the Maine Integrated Report.

All State waters have a classification assignment (Lakes: GPA. Rivers and streams: AA, A, B, C. Marine and estuarine: SA, SB, SC). Wetlands are classified the same as their associated surface waters. Wetlands that are part of great ponds or natural lakes and ponds less than 10 acres in size are GPA waters. All freshwater wetlands not classified as GPA waters are class AA, A, B or C under Sections 467 and 468 according to the watershed in which they occur. Coastal wetlands are classified SA, SB or SC according to the provisions of Section 469 (Classification of Estuarine and Marine Waters).

Groundwater is classified by its suitability for drinking water purposes. Under the Maine Water Classification Program Section 465-B, groundwater is classified as either potable (GW-A) or unpotable (GW-B). Water is unpotable when the concentrations of chemical compounds detected exceed either the Maximum Contaminant Levels (MCL) or the Maximum Exposure Guidelines (MEG) as defined in the Rules Relating to Drinking Water administered by the Maine Department of Health and Human Services (DHHS). Although there are localities where groundwater is unpotable and contaminated, no groundwater is currently classified GW-B.

The DEP is responsible for overall assessment of the State's waters. With support from partners, DEP biennially produces the IR that fulfills Clean Water Act reporting requirements under Section 305(b), Section 303(d) (list of impaired waters) and Section 314 (Clean Lakes Report). This Integrated Report provides a summary of the status of the State's waters and identifies impaired waters that are not meeting one or more of their designated uses. The IR lists waters in one of five categories of attainment (Figure 8).

Figure 8. Maine's Integrated Report Listing Categories (Maine DEP, 2016).

Category 1	<ul style="list-style-type: none">• Attaining all designated uses and water quality standards, and no use is threatened.
Category 2	<ul style="list-style-type: none">• Attains some of the designated uses; no use is threatened; and insufficient data and information is available to determine if the remaining uses are attained or threatened.
Category 3	<ul style="list-style-type: none">• Insufficient data and information to determine if designated uses are attained.
Category 4	<ul style="list-style-type: none">• Impaired or threatened for one or more designated uses, but does not require development of a TMDL (because TMDL is completed, other pollution controls are expected to result in attainment of standards, or impairment not caused by a pollutant).
Category 5	<ul style="list-style-type: none">• Waters impaired or threatened for one or more designated uses by a pollutant(s) and a TMDL is required.

For more information, go to <https://www.maine.gov/dep/water/monitoring/305b/>.

C. TMDL Assessment Reports and TMDL Implementation

DEP monitors the water quality conditions of Maine's rivers, lakes, and marine waters to determine if they meet designated uses for recreation, swimming, fishing, shellfish harvesting, and drinking water supply, and if the waters support healthy habitats for fish and wildlife. DEP places degraded waters (i.e., not attaining water quality standards needed to support designated uses) on the Section 303(d) list of impaired waters. A Total Maximum Daily Load (TMDL) assessment is required for nonattainment waters under state and federal water quality laws to determine the reductions needed from point and nonpoint pollution sources to meet standards. The fundamental goal of a TMDL assessment is to establish water pollution control targets and recommend actions needed for planning and implementation work.

In May 2016, Maine issued a “Vision for Assessment, Restoration and Protection of Maine’s Water Resources” that includes a list of 35 NPS-impaired waters for which a TMDL is required but had not yet been developed. In 2016, DEP received EPA approval for the *Maine Statewide TMDL for Nonpoint Source Pollution*, which included 21 streams on this list. DEP anticipates developing TMDLs for another 14 waters on the list by 2022. These may either be individual TMDLs or additions to existing state-wide TMDLs previously issued for impervious cover, bacteria or nonpoint sources. The list includes 12 streams and two great ponds.

Communities, agencies, and individuals are invited to provide input on the development of TMDLs. After TMDL assessments are completed, local stakeholders often consult TMDLs as they take action to eliminate or reduce NPS pollution sources. DEP staff involved with TMDLs provide limited technical assistance to assist communities to further scope out and identify problems.

Stormwater runoff from both point and nonpoint sources have long been recognized as a significant source of pollutants to surface waters. Historically, individual programs have been developed to address specific aspects of stormwater control. One such aspect is TMDL development. TMDLs typically cover one pollutant at a time and do not consider the other various programs that may impact stormwater runoff. While there may be several programs focusing on a specific location/waterbody, often coordination of activities is limited.

DEP will apply the watershed-based approach, described in Section IV, when it is appropriate to help ensure effective coordination of stormwater runoff control activities to restore impaired waters.

V. Statewide Watershed Prioritization

Given Maine's extensive water resources, statewide watershed prioritization is an important part of Maine's NPS program. Maine's first NPS priority watersheds list was developed in 1989 and substantially revised in 1998 and 2014 as part of a major update of the NPS management plan. Since 2015, DEP has reviewed and updated the NPS Priority Watersheds list on an annual basis. DEP plans to continue to review and update the list on a regular basis through a biennial update process or more often as new information becomes available.

In addition to this listing process, DEP staff also conduct an annual review of NPS priority watersheds and identify a small subset of highest priority waters. This annual review helps DEP direct NPS program funds and services to address compelling needs and opportunities to make progress restoring or protecting waters.

An overview of selection criteria and some of the tools available for targeted actions are described in this section. A full description of the selection criteria and current list are included in Appendix 2. Refer to the NPS Priority Watersheds webpage at https://www.maine.gov/dep/land/watershed/nps_priority_list/index.html for the most up to date criteria and list.

A. NPS Priority Watersheds List

The purpose of the NPS priority watersheds list is to encourage NPS abatement work in watersheds most vulnerable to NPS pollution. The list is used to help prioritize DEP NPS water pollution control efforts and encourage local communities to take action to restore or protect waters impaired or threatened³ by NPS pollution. Watersheds are evaluated using several guiding principles. The first principle is NPS priority waters must have NPS pollution as the primary source of impairment or threat. Watersheds with point sources or legacy pollutants as the primary source of pollution are not selected as priorities since the point source or legacy pollutant would have to be addressed for water quality to significantly improve. Second, watersheds are evaluated for the likelihood that NPS grant funds and support could make a difference in the water quality. Third, the number of NPS priority watersheds is kept reasonably focused so that resources can be invested where they are most needed and there is opportunity to effectively restore or protect waters vulnerable to NPS pollution.

Prioritization criteria have been developed to make selections as objective as possible, using monitoring data, analysis, and reports. To determine the waterbody-specific prioritization criteria, work groups consisting of DEP water resource professional staff knowledgeable in

³ The use of the term 'threatened' in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

statewide lake, stream, or marine water quality and management issues review available waterbody data and information. Priority lists and knowledge from partner agencies and regional monitoring organizations are also consulted. Waterbody-specific prioritization criteria are summarized below and described in detail in Appendix 2 and online at https://www.maine.gov/dep/land/watershed/nps_priority_list/index.html.

In addition to the NPS Priority Watersheds List, there are several other lists that help guide DEP efforts and regulatory programs. This includes impaired waters, waters with approved TMDLs, Chapter 502 Lakes Most at Risk from New Development, and Urban Impaired Streams. These lists were used to help develop prioritization criteria for NPS Priority Watersheds List.

Lake Watersheds

Impaired lakes are assessed as to whether reducing nonpoint sources would be likely to improve water quality over the long term. For lakes meeting water quality standards, threats to water quality and value of the resource are assessed. Threatened lakes includes lakes with a significant negative trend in water clarity, sensitivity to additional phosphorus inputs, or recent increased threat to the watershed by development or agriculture. Lakes on the DEP Watch List are also considered threatened. High value lakes include public drinking water supplies, designated priorities by a partner agency, or lakes with outstanding water quality in need of protection. Over 2600 lakes have been considered in the evaluation process. As of the writing of this plan, **21 impaired lakes and 162 unimpaired lakes were included on the priority list.**



Algal bloom on impaired lake.

Stream Watersheds

An NPS impaired stream watershed is added to the priority list if it has a TMDL, is identified as a priority watershed by a partner agency or organization or is assessed as having a high risk of future development due to its proximity to a highway exit. An unimpaired stream watershed is added to the priority list if it meets any of the criteria listed for the priority impaired streams, if it is on the DEP Watch List, or if recent increased impacts or significant potential threats from agriculture or development are evident. As of the writing of this plan, **72 impaired streams and 73 threatened streams were on the priority list.**



Stream with turbid water.

Marine Watersheds

Impaired and threatened marine waters are assessed by the same criteria. A watershed is added to the priority list if likely NPS sources are known and tied to shellfish harvest area closures. Watersheds are also added to the priority list if partner organizations have documented water quality indicators linked to NPS pollution, or if the waters are threatened by local agriculture or development that drains to public beaches or protected embayments. Additions to the marine priority list are anticipated as more information becomes available. As of the writing of this plan, **34 impaired and 2 threatened marine waters were on the priority list.**



Photo Credit: Alexis Burns, Intern
Friends of Casco Bay

Green algae bloom in Casco Bay.

B. DEP Targeted Watersheds

DEP conducts an annual evaluation that assigns elevated priority to a small subset of waters on the NPS Priority Watersheds List. DEP then identifies ways to focus staff or financial resources on restoration or protection efforts in these watersheds.

Criteria used to select DEP's targeted watersheds include those used to generate the NPS Priority Watersheds List as well as more strategic factors. Targeted watersheds have typically included impaired waters that DEP sees as having a high restoration potential based on water quality monitoring data and watershed needs. Targeted efforts also capitalize on strong local interest and support, leverage other available funding sources, jump-start new watershed efforts, prompt continued momentum on established projects and/or protect against an imminent NPS threat.

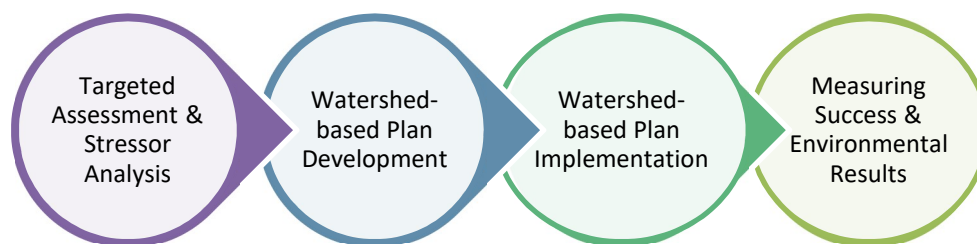
After a subset of priority waters is established, DEP considers and selects appropriate tools, such as NPS grants or staff services to prompt and complete additional protection or restoration work in these targeted watersheds. DEP may use a request for proposals (RFP) process to provide grants for projects in targeted watersheds. In addition, DEP may provide extra staff support in targeted watersheds. For example, DEP staff can conduct water quality monitoring and stormwater catchment mapping in an urban impaired stream to supplement an upcoming watershed-based planning effort in a targeted watershed. This investment of staff time leads to a better understanding of watershed stressors and needs and sets the stage for more effective watershed restoration efforts.

This internal prioritization process has been used on an informal basis for many years. DEP has provided direct funding and conducted water quality monitoring and catchment mapping in numerous watersheds. In the current plan, DEP also plans to identify a subset of most vulnerable lakes from the NPS Priority Watersheds list. Criteria for this listing will likely include sediment chemistry, land use and sensitivity to climate impacts. Once developed, DEP will evaluate ways to prevent future impairments in these waters.

VI. Maine Watershed-based Approach

The watershed-based approach is a coordinating framework for identifying, prioritizing, and fixing water quality problems. This approach seeks to organize both public and private sector efforts within a specified geographic area. The watershed-based approach allows DEP to focus resources on the waterbodies and watersheds most in need and to follow a systematic approach to meet water quality goals. There are four steps to this approach:

Figure 9. Maine DEP's Watershed-based Approach Steps.



- **Targeted Assessment and Stressor Analysis** - Once DEP or local groups focus attention on a priority water, it is critical to gather the information necessary to accurately characterize the NPS impairments and/or threats. Water quality monitoring, watershed surveys and other watershed information should be evaluated to determine the principal stressors and NPS sources that contribute to the impairment or threat.
- **Watershed-based Plan Development** – Stakeholders produce a locally-supported watershed-based plan that describes actions needed for NPS mitigation and water quality protection or restoration. To be eligible for Section 319 funding, plans must include specific elements required by EPA and DEP.
- **Watershed-based Plan Implementation** - Plan implementation is usually coordinated by a local entity such as a municipality, Soil and Water Conservation District (SWCD), or a local watershed group. Implementation typically involves several phased projects with funding from a mix of grants and local sources.
- **Measuring Success and Monitoring Environmental Results** - In addition to implementing the NPS pollution reduction measures identified in the plan, implementation includes ongoing or periodic evaluation to assess whether the plan is meeting its goals and objectives.

Abbreviated Watershed Approaches

Some watershed restoration and protection efforts may not incorporate all the steps outlined in this section. There is usually some element of assessment involved, but the planning process may be largely skipped, often because solutions are straight-forward and local groups plan to implement BMPs independently. Some examples follow:

- The source identification and fixes required to address a localized bacteria impairment may be quite simple, and elimination of the impairment may be accomplished without the development of a plan. Simply bringing the problem to the attention of the local sewer district or code enforcement officer would likely result in fixing the problem.
- Lake watershed surveys are often done informally and funded locally. They provide information to guide local efforts to address sources.
- BMP implementation work is also often done without formal planning. Municipalities may use local revenues or mitigation funds to address obvious pollutant sources. Locally supported Youth Conservation Corps (YCC) often provide the labor to implement BMPs in lake watersheds. Sometimes this is part of watershed based plan implementation, but often it proceeds independently due to local interest in water quality protection.



Documenting erosion during a watershed survey.



YCC at work.

A. Targeted Assessment and Stressor Analysis

The success of restoration and protection efforts hinges on understanding the principal environmental stressors connected to the water quality impairment or potential impairment and the watershed conditions associated with those stressors. The types and extent of assessment and stressor identification needed for a given watershed varies depending on the type of waterbody and available existing information. See Appendix 4 for more detailed information about this step.

For most lakes on the NPS Priority Watersheds list, there is a long record of water quality data and an understanding that phosphorus loading is the primary environmental stressor. As a result, this step primarily involves identifying phosphorus sources to the lake and opportunities to reduce these sources. Watershed surveys are the most common tools used to meet these needs. Over 180 surveys have been completed over the past 30 years, and the methodology is documented in the DEP's *Citizen's Guide to Volunteer Lake Watershed Surveys* (2012). During a watershed survey, DEP and other partners train local volunteers to document phosphorus sources (primarily in the form of soil erosion problems), develop recommendations to mitigate the sources, and rate the cost and priority of the sites. The resulting survey report and list of

watershed problems can then be used to develop watershed-based plans and guide implementation efforts.

Environmental stressors are often more challenging to identify in stream watersheds. This is particularly true in urban streams where there can be several stressors, which can change throughout the stream network. Stressors in a stream could include chloride, stream channel alterations, nutrient loading, legacy pollutants, poor instream habitat, riparian buffer disturbance, removal or alteration of the natural composition of riparian buffers and flow problems. Once the stressor(s) are pinpointed, specific sources must then be identified to help mitigate the impacts of the stressors. Targeted assessment usually includes a combination of water quality screening, biological assessments, stream habitat and corridor assessments and watershed assessments. The DEP's Stream Stressor Guidance (2019) helps lead watershed managers through the stressor identification process for streams with aquatic life impairments.

Bacteria are often the primary concern and stressor in marine waters. However, identification of bacteria sources is often quite challenging. There are several tools available to identify and prioritize potential bacteria sources including water quality monitoring, microbial source tracking (MST), DMR sanitary surveys, smoke and dye testing, and canine detection of human bacteria sources.

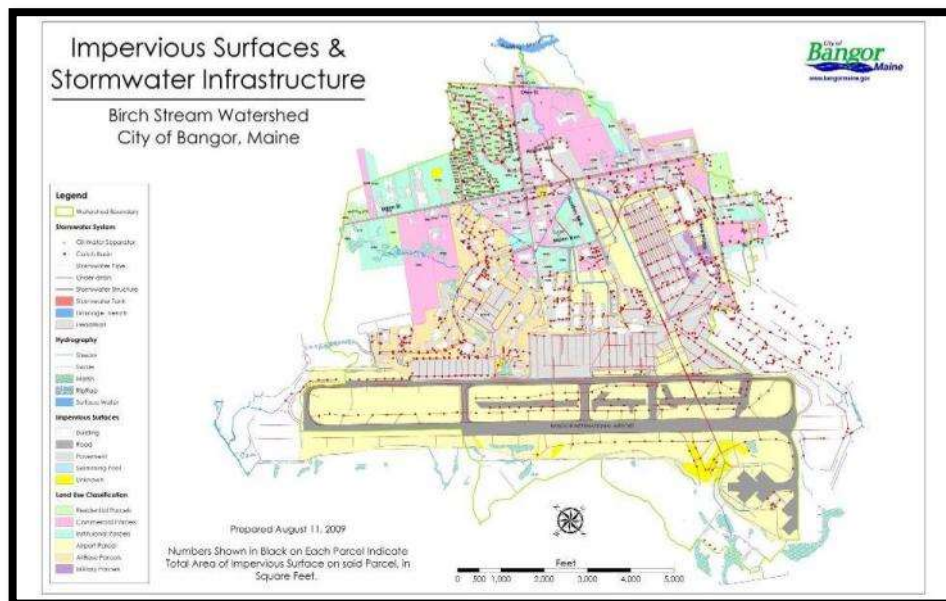
B. Watershed-based Plan Development

Effective planning is needed to guide successful watershed restoration and protection efforts. In general, a watershed plan describes actions needed to restore a waterbody that is impaired by NPS pollution or to protect unimpaired waters threatened by NPS pollution. An effective plan identifies and prioritizes the structural and non-structural practices necessary to address the environmental stressors and sources of NPS pollution that contribute to or threaten impairment of the water body. It identifies stakeholders and partners who can work on projects; pollutant reduction goals; cost estimates and strategies for funding plan implementation; and ways to measure results and water quality improvements. WBPs in Maine are typically written for a ten-year period.

Key Components of Successful Plans

Plans should be developed for a geographically-appropriate scale so that the planned implementation efforts can lead to measurable reductions in pollution and the achievement of water quality goals. Plans should reference an area large enough to address all the major sources and causes of impairments and threats to the water body of concern. However, the area should not be so large that chances of successful implementation are not feasible or practical. Several parts of the planning process are particularly important in development of effective watershed-based plans.

- Stakeholder Involvement** – To ensure support for implementation of a watershed-based plan, the planning process should include as many individuals and organizations that will have a role in plan implementation as possible. Every effort should be made to involve key landowners, municipal officials, representatives from relevant state agencies (e.g., Transportation, Agriculture), local resource and conservation groups, and local experts (e.g., engineering consultants, planners, realtors). An effective way to enhance involvement is by recruiting these people for the project steering committee and, in watersheds with complex issues, for any subcommittees (e.g., technical advisory, education and outreach, ordinance development) where plan decisions are made. Strong local participation leads to local buy-in, which is essential for successful plan implementation.



Sample stormwater infrastructure map for urban impaired stream.

- Clear Definition of Plan Objectives** - Early in the plan development process, the steering committee should come to agreement on the water quality, ecological and community-related objectives that the plan will seek to achieve. In some instances, these will be dictated by state water quality standards, but other objectives may also be identified. Failure to come to agreement on the goals of the plan will make the process of plan development inefficient and unnecessarily difficult.
- Financing** - For some watersheds the pollutant loading and other plan goals might be achieved with installation of a modest number of low-cost BMPs. In these watersheds, existing local resources and available grants might be able to achieve the plan goals in a ten-year period. More commonly, plans for impaired waterbodies (e.g., urban streams or highly agricultural watersheds) involve numerous and expensive BMPs that exceed existing funding resources. In such cases, planning projects need to consider other possible funding mechanisms (e.g., stormwater utilities, local bonds). Local involvement in this financial discussion is critical to ensure future public support of selected funding avenues.

EPA Nine-Element Plans

EPA requires a specific type of plan to guide Section 319-funded implementation work in impaired and threatened watersheds. These EPA plans are referred to as watershed-based plans or ‘*nine-element*’ plans because they must address nine key elements:

- An **identification of the causes and sources** that will need to be controlled to achieve the load reductions and goals in the plan;
- An **estimate of the load reductions expected** for the management measures in the plan;
- A **description of the NPS management measures** that will need to be implemented to achieve the load reductions estimated and an identification of the critical areas where those measures need to be implemented;
- An estimate of the **amounts of technical and financial assistance needed**, associated costs, and/or the sources and authorities that will be relied upon to implement the plan;
- An **information and education component** that will be used to enhance public understanding of the project;
- A **schedule** for implementing the NPS management measures;
- A description of interim, **measurable milestones** for determining whether NPS management measures or other control actions are being implemented;
- A **set of criteria** that can be used to determine whether loading reductions are being achieved over time and that substantial progress is being made towards water quality standards; and
- A **monitoring component** to evaluate the effectiveness of the implementation efforts

To date the DEP has accepted **31 nine-element plans** (Table 3). Of these, 30 plans are for impaired watersheds, and one plan is for threatened waters along the Maine-New Hampshire border. There are 19 plans for inland streams; six plans are for lakes; and six plans for coastal streams.

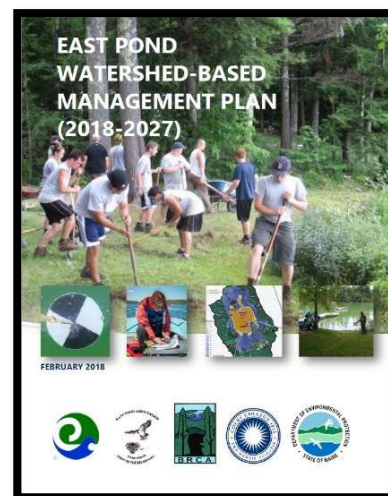
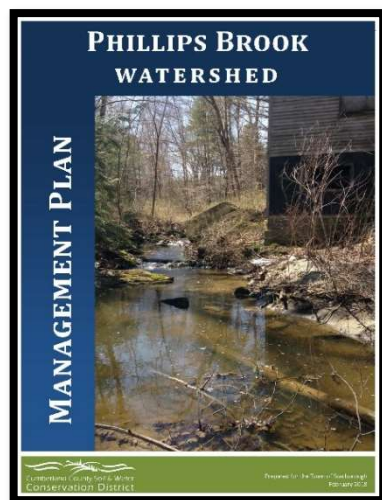


Table 3. Nine-Element Watershed-based Plans Accepted by Maine DEP.

Arctic Brook (2016)	Long Creek (2009)
Birch Stream (2010)	Long Pond & Great Pond (2010)
Bond Brook (2009)	Meduxnekeag River (2015)
Cape Neddick River (2014)	Ogunquit River (2013)
Capehart Brook (2011)	Pearce Brook (2012)
Capisc Brook (2011)	Phillips Brook (2018)
China Lake (2009)	Pleasant River (2011)
Cochnewagon Lake (2016)	Red Brook (2011)
Concord Gully Brook (2015)	Spruce Creek (2014)
Dudley Brook (2009)	Thatcher Brook (2015)
East Pond (2018)	Topsham Fair Mall Brook (2014)
Goodall Brook (2014)	Trout Brook (2012)
Goosefare Brook (2016)	Upper Prestile Stream (2009)
Great East, Wilson, Horne Ponds (2016)	Whitten Brook (2011)
Hart Brook (2019)	Wilson Pond (2009)
Kennedy Brook (2018)	

Lake Watershed-based Protection Plans

EPA NPS Program Guidelines (2013) recognized several cases where alternatives to nine-element plans may provide an effective approach toward achieving the water quality goals of Section 319-funded restoration or protection efforts. EPA outlined the elements required in alternative plans and the circumstances under which alternative plans may be accepted, including those pertaining to the protection of high quality and/or unimpaired waters.

DEP used the EPA guidelines as a basis to develop an alternative planning approach for unimpaired lakes. This approach is detailed in the document, *Guidance for Maine Lake Watershed-based Protection Plans* (2013). Most, if not all, watershed plans for unimpaired waters are expected to follow this guidance, instead of the more intensive nine-element planning guidelines required for impaired waters. A recent NPS watershed survey or equivalent assessment is a major component lake watershed-based protection plan. As such, lakes with surveys over five years old should not complete alternative plans until the survey data are validated or updated. To date, DEP has accepted **30 lake watershed-based protection plans** (Table 4).

Other Types of Alternative Plans

In addition to alternative plans for high quality or unimpaired waters, EPA guidelines (2013) list three other situations where alternative plans may be warranted. The first situation includes when the impairment is not specific to a pollutant. Nine-element plans emphasize identifying major NPS pollutant sources and ways to achieve load reduction. However, this is not possible if the impairment is not caused by a pollutant but by a water quality problem such as a dam and associated altered flow regimes. Next, EPA may find an alternative plan acceptable when there is a need to respond to an NPS pollution emergency or urgent NPS public health risk (e.g., to reduce pollution affecting drinking water safety). In Maine no such plans have been developed

to date. However, DEP will work with partners and EPA to help guide development of such alternative plans if the need arises.

Finally, EPA may find alternative plans acceptable in cases where a small-scale water quality impairment results from a few sources that are not caused by larger watershed-wide problems and can be fully addressed within one grant period. EPA (2013) stated: “In meeting these conditions, the state will ensure that multiple smaller problems are not dealt with in a piecemeal fashion when they are actually part of a larger water quality problem involving multiple pollution sources in the watershed.” In Maine, most NPS impairments occur from multiple sources within a watershed.

Table 4. Lake Watershed-based Protection Plans Accepted by DEP.

Abrams Pond (2017)	McGrath Pond & Salmon Lake (2018)
Adams & Knickerbocker Lake (2015)	Mousam Lake (2018)
Alamoosook Lake (2015)	North Pond, Buckfield (2016)
Bauneg Beg Lake (2019)	North Pond, Norway (2017)
Cobbossee Lake (2015)	North Pond, Smithfield (2017)
Cold Stream Pond (2016)	Panther Pond (2015)
Crescent Lake (2013)	Parker Pond (2018)
Damariscotta Lake (2015)	Phillips Lake (2014)
Ellis Pond (2015)	Sebago Lake & Crooked River (2015)
Forest Lake (2018)	Thompson Lake (2013)
Georges Pond (2018)	Toddy Pond (2013)
Great Pond (2016)	Varnum Pond (2018)
Hogan & Whitney Ponds (2018)	Whetstone Pond (2018)
Lake Auburn (2013)	Wilson Lake (2017)
Little Sebago Lake (2013)	Woods Pond (2013)

C. Watershed-based Plan Implementation

The next step of the watershed-based approach is to implement the WBP and actions that ultimately protect and/or restore the waterbody. WBPs are implemented by local entities such as municipalities, SWCDs or local associations. Plan implementation consists of a suite of actions described in the watershed-based plans. Actions may include getting ordinances passed, having the public works department install BMPs, retrofitting or installing structural stormwater BMPs, restoring riparian and aquatic habitat and implementing public outreach programs. Plan implementation usually takes place through a series of phased projects over period of ten or more years.

Typical funding sources for implementation is from the municipality, Section 319 and other federal funds, private grants, lake associations, and in certain cases stormwater utilities. In instances where the source reduction and prevention measures are relatively simple, and the cost is low, plans may be substantially implemented with financial support from grant programs

(e.g., EPA Section 319 grants) and local match. Plans aimed at protecting threatened lakes often fall into this category. When the measures identified in the plan are more complex and expensive (e.g., restoration of an impaired urban stream), funding mechanisms will likely need to be more diverse and include some level of local financial support such as a stormwater utility. In either case, plan implementation is likely to involve several phased projects. It may also involve the establishment of a local authority such as a watershed management district or a stormwater utility district to implement the plan over an extended period.



Watershed-based plan implementation - installation of bioretention swale.

Streams

In recent years, most of the NPS implementation work in stream watersheds has focused on impaired streams. This includes rural streams impaired by agricultural sources and urban impaired streams. Restoration work in rural stream watersheds usually includes strong involvement from local farmers, the SWCD and US Department of Agriculture (USDA)'s Natural Resource Conservation Service (NRCS) and includes construction of agricultural BMPs on a small number of farms. NRCS funding is also often leveraged to stretch resources and get more work done on the ground. Since 2013, the National Water Quality Initiative (NWQI) partnership between DEP, EPA and NRCS has also helped focus resources on three watersheds in Maine. This includes the Unity Pond watershed and portions of the Meduxnekeag River and Sebasticook Lake watersheds. In this plan, NWQI work will be shifting to the Cross Lake and Sheepscot River watersheds.

Restoration work in urban streams tends to include a diverse set of actions and partners. Municipalities typically start plan implementation with the 'low hanging fruit,' such as easy fixes on municipal properties and on outreach efforts. Larger more expensive aspects of the plan (e.g., major structural retrofits, ordinance implementation, and creation of stormwater utilities) are often phased in over time as funding sources and political support are secured. This has been done by reaching out to the planning board and elected officials, and incorporating relevant portions of WBP into the municipality's comprehensive plan. Restoration of urban streams may take decades and up to millions of dollars due to the complexities of multiple pollution sources and fixes.



DEP support assessing an urban impaired stream.

Lakes

Lake WBP implementation is usually less complex than urban stream implementation because phosphorus is often the only pollutant of concern. Implementation usually consists of BMP installations at eroding sites and/or agricultural properties, changes in ordinances, creation of or continued support of a Youth Conservation Corps, and outreach. Although municipalities are

also involved in lake watershed-based plan implementation, often the local lake association takes a leadership role and provides fuel for political support and action. The duration of implementation can range from a few years to decades, depending on the size of the watershed and amount and types of phosphorus sources.

In some lakes, internal phosphorus loading from lake sediments is also a significant NPS source. Some lakes with internal loading (e.g., Sabattus Pond and Sebasticook Lake) have their water levels lowered during late summer algal blooms to help export phosphorus and reduce internal loading over time. In some circumstances, in-lake treatment, with aluminum compounds (also known as an alum treatment), may be appropriate. In order to be a strong candidate for an alum treatment, there first needs to be widespread installation and maintenance of BMPs to address external watershed sources of phosphorus. The proportion of phosphorus from external and internal sources must also be determined, and the lake's water chemistry, sediment chemistry and physical characteristics need to be carefully considered to evaluate whether an alum treatment would be effective and provide lasting benefits (typically targeted for 15-20 years). Even when these considerations are all met, alum treatments can be prohibitively expensive depending on the dosing and area needing treatment and will depend largely on local funding.

Marine Waters

Implementation efforts in marine waters have been limited to a relatively small number of watersheds in recent years. However, interest in coastal NPS work has been increasing, particularly in southern Maine. The DEP's Maine Healthy Beaches (MHB) program works with communities to monitor bacteria levels at 63 beaches. NPS has been identified as a probable pollution source in many of the beaches with high bacteria levels. Several coastal communities regulated through the Municipal Separate Storm Sewers Systems (MS4) program have also targeted coastal stream watersheds for the stormwater abatement work required through their MS4 permits. Although implementation work funded through 319 grants cannot be used to complete MS4 permit requirements; it can complement their efforts to address stormwater and bacteria impacts.

DEP Support

DEP promotes and supports implementation of WBPs largely through DEP technical services and EPA Section 319 grants. Fifty-three percent (\$991,191) of Section 319 funds received by DEP in FFY 2018 (\$1,873,001) were used for implementation of WBPs. DEP provides technical assistance to assist municipalities or watershed groups in the design and installation of structural BMPs; shares lessons learned from other implementation projects; provides information to planning boards; and provides other resources as needed. Since implementation of WBPs is led by local entities, DEP's support is flexible and responsive to local needs. This assistance may be intensive and short-term, or spread-out over many phases, whichever is more appropriate and supportive of local plan implementation.

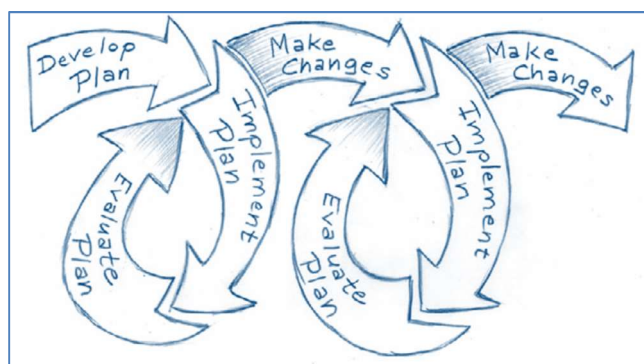
D. Measuring Success and Monitoring Environmental Results

Updating Watershed Plans

Restoration and protection of Maine's waters is an ongoing process (Figure 10). Restoration of impaired waters can take years or even decades, and protection work is never done. As such, watershed plans all become outdated over time. Plans should be periodically evaluated and updated so they remain relevant and useful. New issues may be identified, and alternative strategies may become available. In addition, as a plan is implemented the timeline, milestones and costs may need to be adjusted to be more realistic.

Local groups may choose to update their plans at any time. However, watershed plans are typically written to be implemented over a ten-year period and need to be updated every ten years to remain eligible for Section 319 grants. DEP's *Guidance for Updating Maine Watershed-based Plans* (2017) provides direction for groups as they update their aging or expired plans. In many cases, the update process is not overly involved, especially if the groups have been actively using and updating their NPS Site Tracker. Otherwise, the update process may include a watershed survey or other assessments to identify current NPS sources. About half of the 61 nine element and protection plans listed in Tables 3 and 4 will need to be updated during between 2020-2024.

Figure 10. Watershed Planning Process (EPA, 2008).



Environmental Monitoring

Watershed-based plans include a monitoring component to assess progress toward the plan's restoration or protection goals. This monitoring component typically involves estimating pollutant loading reductions and conducting water quality monitoring to track progress over time. Some of this work can be conducted by local stakeholders, and the resulting information can be used to assess incremental progress over time. For example, Trout Brook's monitoring efforts include water quality monitoring to look for improvements following the mitigation of a chloride source to the stream. In addition, biomonitoring using kicknet methods is being conducted by local volunteers to determine if the stream's macroinvertebrate population is improving as BMPs are installed in the watershed. Local groups also rely on DEP's monitoring programs to assess water quality conditions and report on the official attainment status. See Section XI for more detailed information on monitoring environmental success.

VII. Statewide NPS Control Strategies by NPS Category

Section 319 of the Clean Water Act requires each state to identify major NPS categories or subcategories and identify BMPs that may be used to reduce pollutant loadings for each. Maine's NPS Management Program has identified six major NPS categories in the State: Agriculture, Developed Areas, Transportation, Forestry, Onsite Wastewater Disposal Systems and Hydrologic and Habitat Modification (Table 5).

This section describes these six major NPS categories and provides descriptions of the associated management strategies, core law/regulatory authority, NPS pollution sources, BMP guidelines, and programs and projects. Refer to Section X. for tables listing NPS Program five-year objectives, actions and milestones for each major NPS category.

In addition to these major NPS sources, the plan identifies also describes three other categories of issues important to Maine's NPS Program: climate change adaptation; emerging NPS issues that may be further explored and addressed over the next five years; and other NPS categories that are addressed primarily through regulatory and nonregulatory programs.

Table 5. Major NPS Categories, Emerging NPS Issues and Other NPS Issues

Major Nonpoint Source Category	State of Maine Lead Agency
Developed Areas	Department of Environmental Protection
Agriculture	Department of Agriculture, Conservation & Forestry
Transportation	Department of Transportation
Forestry	Department of Agriculture, Conservation & Forestry
Onsite Wastewater Disposal Systems	Department of Health & Human Services
Hydrologic and Habitat Modification	Department of Environmental Protection

Emerging Nonpoint Source Issues

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

Aboveground and Underground Storage Tanks

Brownfields

Marine Debris, Microplastics and Trash

Other Nonpoint Source Issues

Boatyards, Marinas and Recreational Boating

Landfills

A. Developed Areas

Lead Agency: Maine Department of Environmental Protection (DEP)

Management Strategies

Encourage use of erosion and sediment controls and stormwater management BMPs through administration of land use laws and promotion of voluntary measures. Strategies include continuing to administer the Storm Water Management Law and Site Location of Development Laws; ensuring stormwater and ESC BMPs are in place and being maintained on permitted development sites; continuing to update the Stormwater BMP Manual to include latest technology options for stormwater treatment; continuing to train town officials, engineers, developers on ways to reduce NPS impacts; and limiting the sale and use of certain products (e.g., fertilizer, pesticides, coal tar sealants) that can impact water quality.

Core Law / Regulatory Authority

DEP is responsible for regulating point sources through the wastewater discharge law (38 M.R.S. Chapter 3, §413), which requires that a license be obtained for the discharge of pollutants to a stream, river, wetland, or lake of the state, or to the ocean. DEP also regulates nonpoint sources associated with development activity through administration of the Erosion & Sedimentation Control Law (38 M.R.S. Chapter 3, §420-C), the Storm Water Management Law (38 M.R.S. §420-D), the Site Location of Development Act (38 M.R.S. Chapter 3, §§481-490), and the Natural Resources Protection Act (38 M.R.S. Article 5-A). A major purpose of these laws is to protect Maine's water resources. This is accomplished by requiring developers to use proper erosion and sedimentation control and storm water treatment measures. In addition, DEP promotes voluntary use of best management practices for safe lawn care practices through signage (required under 38 M.R.S. §419) and other outreach. In 2019, the Maine legislature passed 38 M.R.S. §419E, which prohibits the sale and application of coal tar sealant products on driveways and parking lots starting in 2023.

Developed Areas & NPS Pollution Sources

The 2016 Integrated Report indicates that 23 lakes are impaired because of pollution from developed areas, and the Maine Stormwater Law lists 35 urban impaired streams that fail to meet water quality standards because of stormwater runoff impacts from developed land. Development impacts threaten water quality in many more waters throughout the State. Pervious natural landscapes like forests trap rainwater and snowmelt and allow water to slowly filter into the ground. Impervious landscapes like roads, parking lots, and buildings prevent rain and snowmelt from slowly percolating into the ground. Water instead flows across the land, and the runoff carries sediment, nutrients, pet waste, fertilizer and other pollutants. Large volumes of fast-moving runoff erode stream banks, widen stream channels, increase sediment loads, and thereby impact fish and other aquatic life. Removal or alteration of the natural composition of riparian buffers can result in unstable streambanks, compromise filtering of stormwater runoff and degrade habitat and food sources required by aquatic organisms.

<p>BMP Guidelines</p> <p>For erosion and sedimentation control: www.maine.gov/dep/land/erosion/escbmps/index.html</p> <p>For stormwater management: http://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html</p> <p>For pesticide and fertilizer use on turf: http://www.maine.gov/dacf/php/pesticides/applicators/best_management_practices.shtml</p>	
BMP Types	Areas Addressed by BMPs
<p>Non-Structural (planning)</p>	<p>Site specific erosion and sedimentation control plans, including temporary and permanent erosion control measures; Low Impact Development (Limit areas of clearing and grading, Minimize impervious area, Minimize directly-connected impervious area, Manage stormwater at its source); Use contractors certified in ESC; Inspection and maintenance including 5-year certification; Good housekeeping practices, including sweeping, Yardscaping (lawn care practices and lawn alternatives), turf BMPs for fertilizer and pesticides, and pet waste removal.</p>
<p>Structural (groundwork) Provide treatment measures to mitigate increased frequency and duration of channel erosive flows; allow for infiltration; provide treatment of pollutants in stormwater and/or mitigate potential temporary impacts; stabilize exposed soil.</p>	<p>Wetponds; Vegetated buffers; Infiltration BMPs; Under-drained soil filters; Detention ponds for flood control; Proprietary treatment systems; Sediment barriers, seed/mulch and other erosion control BMPs.</p>

Program/Project	Description
<p>Administration of laws</p>	<p>Maine DEP has regulatory authority over land use activities through five main statutes:</p>
<p>Erosion & Sedimentation Control Law</p>	<p>The Erosion and Sedimentation Control Law is a non-reporting program that applies to all development activity. DEP provides training to developers, consultants and contractors on how to conduct activities in a way that complies with the law’s requirement of preventing erosion and sedimentation at property boundaries.</p>
<p>Site Location of Development Law</p>	<p>The Site Location of Development Law applies to larger projects that may have a substantial effect on the environment and</p>

<p>Storm Water Management Law</p>	<p>include projects that occupy more than 20 acres or create three acres or more of structure (impervious areas).</p> <p>The Storm Water Management Law regulates development activity that disturbs one acre or more of land both during and after construction. Stormwater treatment BMPs are required for projects that involve more than 5 acres disturbance; 20,000 square feet of impervious area in watersheds of most at risk lakes or urban impaired streams; or 1 acre of impervious area in any other watershed. The Site Location of Development Law applies to projects that develop three acres or more of land (not revegetated).</p> <p>DEP adopted Stormwater Rules (Chapter 500) that apply to projects under both the Storm Water and Site Location Laws. These rules specify what types of BMPs must be utilized. The rules require inspection and maintenance of BMPs, including a provision that developers must certify every five years that the required BMPs are in place and being properly maintained.</p>
<p>Mandatory Shoreland Zoning Act</p>	<p>The Mandatory Shoreland Zoning Act (MSZA), administered by municipalities with DEP oversight, requires municipalities to adopt, administer, and enforce local ordinances that regulate land use activities in the shoreland zone. The shoreland zone is comprised of all land areas within 250 feet of the normal high-water line of any great pond or river; upland edge of a coastal wetland; the upland edge of defined freshwater wetlands; and all land areas within 75 feet of the normal high-water line of certain streams. The purposes of MSZA are: to prevent and control water pollution; to protect fish spawning grounds, bird and wildlife habitat; to protect buildings and lands from flooding and erosion; to protect archeological and historic resources; to protect fishing and maritime industries; to protect freshwater and coastal wetlands; to control building sites, placement of structures and land uses; to conserve shore cover, and visual as well as actual points of access to inland and marine waters; to conserve natural beauty and open space; and to anticipate & respond to impacts of development in shoreland areas.</p>
<p>Natural Resources Protection Act</p>	<p>NRPA requires a permit for any activity that is in, on, over, or adjacent to protected natural resources, which include wetlands, rivers, streams, brooks, ponds, significant wildlife habitat, and sand dune systems. Activities regulated under NRPA include: dredging, bulldozing, removing or displacing soil, sand, vegetation</p>

	<p>or other materials; draining or otherwise dewatering; filling, including adding sand or other material to a sand dune; or any construction, repair or alteration of any permanent structure. Protected natural resources include streams, lakes, freshwater and marine wetlands, sand dunes and significant wildlife habitats.</p>
<p>Contractor Certification Program</p>	<p>DEP has had a voluntary certification program for contractors on proper erosion and sedimentation control since 1997. In 2013, the program became mandatory for any contractor doing earth-moving work within 75 feet of streams and within 250 feet of other water bodies. As a result, the number of certified contractors in the state has risen from approximately 600 to nearly 2,500. A survey in 2004 found that certified contractors have had a much higher compliance rate with the ESC Law (>90%) versus non-certified contractors (50%).</p>
<p>Promotion of safe products and practices for homeowners</p>	<p>In an effort to reduce the use of fertilizer containing phosphorus in lake watersheds, Maine enacted a law in 2008 that restricts the sale of fertilizer with phosphorus to locations where signs are placed promoting the use of phosphorus-free fertilizer except for new lawns, or where a soil test indicates a phosphorus deficiency (38 M.R.S. §419).</p> <p>The Maine Yardscaping Partnership, overseen by the Maine Board of Pesticides Control at DACF, promotes healthier lawn care practices and less reliance on water, fertilizer and pesticides. www.maine.gov/dacf/php/pesticides/yardscaping/index.htm</p> <p>In 2019, Maine banned the sale and application of coal-tar sealants on driveways and parking areas due to the toxic nature of the product's polycyclic aromatic hydrocarbons (38 M.R.S. §419-E).</p>
<p>Training for municipal officials, engineers and developers</p>	<p>Communication with towns and the regulated community is vital to ensure compliance with regulatory requirements for erosion control, shoreland zoning, and stormwater management. The DEP provides training for the affected groups through the Nonpoint Source Training and Resource Center (NPSTRC), which conducts spring and fall training classes on erosion control, and periodic conferences and workshops on stormwater management, as well as other related topics. In addition, DEP works with municipal officials, including town engineers, on latest guidance on the regulatory program. This includes providing information on BMP manual updates to towns delegated to administer the state stormwater program.</p>

B. Agriculture

Lead Agency: Department of Agriculture, Conservation and Forestry (DACF)	
<p>Management Strategies</p> <p>Promote widespread use of agricultural BMPs for all agricultural operations through administration of the Nutrient Management Act and the Agricultural Compliance Program. Reduce the impact of agricultural operations on water bodies by promoting the continued implementation of site-specific BMPs. Focus efforts to help ensure that agricultural operations: have Nutrient Management Plans, if required; achieve updates to these Plans prior to expiration; and, obtain or maintain a Livestock Operations Permit, as required by statute. Continue to provide technical assistance to farms when needed, and continue to promote and conduct farmer educational programs related to BMPs and protecting water quality.</p>	
<p>Core Law / Regulatory Authority</p> <p>The NPS Management Program statute (38 M.R.S. §410 (J)) charged DACF with responsibility to develop and promote use of agricultural BMPs to prevent nonpoint source pollution. DACF has developed voluntary and regulatory programs and provided services that help farmers use BMPs. DACF has responsibility to regulate agricultural activity to control nonpoint source pollution through administration of the Right-To-Farm Law (Title 7, Chapter 6), the Nutrient Management Law (Title 7, Chapter 747) and other statutes.</p>	
<p>Agriculture & NPS Pollution Sources</p> <p>DEP's 2016 Integrated Report lists agriculture as a source of impaired water quality for 16 lakes (22,900 acres) and 489 miles of rivers and streams. NPS pollutants of concern associated with agriculture include bacteria, soil, fertilizers and pesticides. According to the 2017 USDA Census of Agriculture, the number of Maine farms decreased by 7 percent to 7,600 from 2012 to 2017. The average size of Maine farms decreased, from 178 to 172 acres. Maine has 1.31 million acres of farm land and leads the world in the production of wild blueberries. On a national scale, Maine is 1st in brown egg production, 2nd in maple syrup production and 8th in potato production. Significant livestock agriculture includes cattle (dairy and beef), sheep, goats, hogs, equine and poultry. Given the increase in the number of smaller farms and hobby farms there is a need for increased outreach, education, and technical assistance on the use of BMPs.</p>	
<p>BMP Guidelines</p> <p>Manual of Best Management Practices for Maine Agriculture (January 2007) https://www.maine.gov/dacf/php/nutrient_management/documents/BMP-Manual-Final-January-2007.pdf</p>	
BMP Types	Areas Addressed by BMPs
Sediment and Erosion Control BMPs	Contour plowing; row/strip/rotated/cover crops; buffer strips, crop residue, water diversions and stabilization; sediment basins; livestock access and stream crossings; farm equipment crossings.
Manure Management	Application rates/timing; buffers/setbacks; value; non-application areas; restrictions; storage, composting, cover crops and crop

	rotations, soil erosion; pest control, bedrock outcrops, shallow soils; barnyard and feedlot runoff; water access, soil infiltration capacity.
Pest Management	Field selection, disease-free seeds; crop disease resistance; natural pest controls; biological controls; cultural controls; pest scouting; weed control; pesticide application plan; calibrate pesticide equipment; pesticide label directions/safety data; federal/state laws; certified pesticide applicator; mixing/loading/storing/disposing of pesticides; spray drift; crop rotation and pesticides; crops and weeds; mechanical weed control; determining application levels; pesticide application techniques; weather conditions.
Nutrient Management	Application levels and uniformity; background nutrient/organic matter/soil amendment levels; determining yield; split fertilizer application; fertilizer release rate; soil characteristics; equipment calibration; accurate records; irrigation; crop rotation; cover crops; fertilization; plant tissue testing; leachable nutrients; soils to avoid applications; soil erosion; buffer strips; organic matter content; compost excess or spoiled crops. A seven-member Nutrient Management Review Board (NMRB) reviews and approves all proposed amendments to the Nutrient Management Rules and hears appeals of the commissioner's decisions regarding site-specific BMPs prescribed for a farm, livestock operations permits, and the issuance of variances to nutrient management planning and the winter manure spreading ban. www.maine.gov/dacf/php/nutrient_management/index.shtml
Irrigation Management	Irrigation water management plan for irrigation from streams and rivers.
Livestock Management	Housing facilities, waste management structures; environmental factors; livestock fencing; pasture and forage crop management.
Odor Control	Manure storage structures; coordinating with neighbors; cover field-stacked manure; incorporate manure; sod crop applications; weather conditions; injection; spreading activity & rates; minimize spillage; even application; solid manure; composting.
Insect Management	Proper sanitation; spilled feed and spoil piles; dead animals; feed bunks; waterers; animal diet; ventilation; poultry house manure removal; empty poultry houses; droppings boards; natural insect enemies; utilize physical fly removal methods; use pesticides sparingly and properly; use proper pesticide application techniques; pesticide feed additives; cover manure piles; compost; transporting manure; controlling barnyard exercise lots.
Noise Control	Irrigation pumps; farm equipment.

Farm Management	Animal carcass disposal, equipment exiting farm fields; watering livestock, livestock waterway crossings, insect and disease infestations; aesthetics; vermin control; wild animal damage; residual usage; feed storage; milk room waste; silage management; management of spoiled or excess crops; dust control; financial record keeping; soil health management; crop production guides.
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Program/Project	Description
Administration of Nutrient Management Law	The law requires that all farms with 50 animal units or more develop and implement a nutrient management plan (NMP). Also, an NMP must be developed for farms that use over 100 tons of manure not generated on the farm, farms that have a manure-related complaint, and farms that utilize sludge. The law requires new or existing livestock operations with greater than 300 animal units, that meet the EPA definition of a Concentrated Animal Feeding Operation (CAFO), or that plan on expanding beyond their land base or manure storage capacity, to obtain Livestock Operation Permits (LOP). The law prohibits the spreading of manure between December 1 st and March 15 th . Nutrient Management Rules establish standards for NMPs, the process for certifying persons to write and approve NMPs; requirements for obtaining a livestock operations permit; and procedures for implementing the law. www.maine.gov/dacf/php/nutrient_management/index.shtml
Agricultural Compliance Program	This program handles complaints concerning agricultural activities and assists with inspections required for issuance of LOP and CAFO permits. Staff conduct investigations to determine whether BMPs are being used, work with farmers to develop site specific BMPs, if necessary, to correct the situation, and take enforcement action as needed. Site visit reports are shared with DEP and compiled into annual summary reports. The Compliance Program also provides technical assistance to local communities or DEP related to agricultural problems and BMPs called for in watershed-based management plans.
Nutrient Management Loan Program	The program provides low interest loans for agricultural NPS pollution abatement projects. It is administered by the Finance Authority of Maine, and was developed in cooperation with the Maine Bond Bank, DAFC, DEP and EPA. EPA's Clean Water State Revolving Fund (CWSRF) program provides the funding, and Maine DACF determines eligibility for the loans.
Soil & Water	SWCDs are agencies of the state that help farmers, landowners, municipal officials, and others conserve and utilize their soil,

Conservation Districts	water, forestry and wildlife resources by providing local solutions to local natural resource problems. SWCDs are non-regulatory entities well-known for their ability to resolve issues efficiently at low cost. Districts reach out to local stakeholders in the community to determine priorities and set a course of action to solve natural resource problems. This is done by offering technical assistance and educational programs to these groups. These actions help prevent and reduce polluted runoff to waterbodies from agricultural and urban sites and protect drinking water sources. Districts collaborate with DEP on many NPS pollution prevention projects to achieve these positive outcomes.
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C. Transportation

Lead Agency: Maine Department of Transportation (MaineDOT)

Management Strategies

Continue to implement and promote use of erosion and sedimentation control (ESC) plans and the installation of effective ESC measures with the goal of water quality protection at all transportation projects with soil disturbance through the administration of the Stormwater Management Memorandum of Agreement (MOA) under Stormwater Management Rules and Chapter 500. Continue to apply post-construction best management practices through the Stormwater MOA in compliance with the Stormwater Law and the MS4 permit for new and re-development projects. Implement good housekeeping practices and manage hazardous materials and winter road sand/salt to reduce contamination of ground and surface waters. Promote and assist in training for the DEP Erosion Control Contractors Certification Program for all state, town, and contracted construction and maintenance crews.

The Maine Local Roads Center (MLRC) provides training, technical assistance and information to municipal and county staff responsible for constructing, maintaining, and managing local roads and bridges. The DEP's NPS Training Center (NPSTC) provides training and information for maintaining private gravel roads.

Core Law / Regulatory Authority

The NPS Program statute (38 M.R.S. §§ 410-J) charged MaineDOT with responsibility to develop BMP guidelines for transportation-related activities, encourage all state and federally funded projects to use BMPs, and provide technical assistance to municipalities. Chapter 574 governs the siting and operation of road salt and sand-salt storage areas. The program is a cooperative effort of MaineDOT and DEP. The Storm Water Management Law (38 M.R.S. §420-D) also includes provisions to manage runoff from some new roads.

Transportation & NPS Pollution Sources

MaineDOT has captial oversight of 8,818 miles of roadways (Interstate highway, principal arterials, and collector roads) and is responsible for maintaining 7,821 miles of those roadways. Erosion during and after construction of roads, highways, and bridges, can contribute sediment to waterbodies, which can adversely impact water quality. Contaminants including heavy metals, oils, other toxic substances, and debris from construction traffic and spillage can be absorbed by the construction site soils and carried with runoff water offsite to lakes, rivers, and marine waters. Inadequate road stream crossings can disrupt stream channel morphology, cause streambank erosion, and prevent natural passage of fish and other aquatic organisms. Winter road maintenance (salting and sanding, salt storage) is a significant source of chloride and sediment loading to fresh waters.

There are over 8,000 miles of private roads in Maine. Improper construction and maintenance of these 'camp roads' has long been recognized as a significant issue, particularly in lake watersheds. In DEP's Integrated Report, two lakes are listed with impairments associated with unpaved roads and trails, and camp roads typically account for many of the high impact sites identified in volunteer lake watershed surveys. Camp roads

contribute a disproportionate amount to lake water quality problems due to their proximity to the water and their sub-standard construction, which is largely because most camp roads were originally intended to only provide seasonal access. Typical problems identified on camp roads through DEP-supported watershed surveys include erosion of the road surface, road shoulders and ditches; unstable and undersized culverts; poor road surface material; and inadequate ditch size or lack of ditches. Many of these camp road problems can also be found on state and municipal roads, but there are fewer resources available to property owners on private roads.

BMP Guidelines

MaineDOT Best Management Practices for Erosion and Sedimentation Control

<https://www.maine.gov/mdot/env/documents/bmp/BMP2008full.pdf>

Maine Environmental Best Management Practices Manual for Snow and Ice Control

<https://www.maine.gov/mdot/mlrc/docs/technical/2015-08-17-June2015FINALversion.pdf>

Gravel Road Maintenance Manual

https://www.maine.gov/dep/land/watershed/camp/road/gravel_road_manual.pdf

BMP Types	Areas Addressed by BMPs
<p>Non-Structural (planning)</p>	<p>Clearly define transportation objectives and responsibilities; use sound construction planning and techniques; anticipate general and seasonal site conditions; plan to minimize and stabilize exposed soils during construction and for the long term; factor in and protect the integrity of nearby waterbodies; develop and implement a plan to safely handle on-site hazardous materials.</p> <p>Good Housekeeping: Annual street and Park and Ride sweeping and catch basin cleaning. Implement hazardous and universal waste management practices on all maintenance facilities.</p> <p>Handling of Hazardous Materials: Provide guidance and training. Provide containment for oil/gas/coolants to avoid leaks & spills.</p> <p>Salt Reduction: Provide training and equipment to reduce the use of sand and salt use. Cover sand/salt piles.</p>
<p>Structural (groundwork)</p>	<p>Minimize erosion during construction by protecting exposed soil, diverting or detaining runoff, stabilizing all water conveyances and install sedimentation control practices; install post-construction BMPs; and reduce sand/salt use.</p> <p>Bridges and Culverts: Replace deficient structures with those that are sized appropriately for long-term flows and stability of the crossing, and in keeping with new science (e.g. revising BMP standards and specifications to accommodate extreme weather events).</p> <p>Wetland Crossings: Protect existing water movement.</p> <p>Park and Rides: Provide stormwater management for quantity and quality of the runoff.</p>

Program/Project	Description
Program Management & Partnerships	The MaineDOT Environmental Office maintains one full-time environmental engineering position and one environmental planner to coordinate all surface water quality efforts. Seven environmental specialists work in the field to ensure ESC compliance and ground delivery of the program.
MaineDOT Erosion and Sedimentation Control Manual	MaineDOT revised its Best Management Practices for Erosion and Sedimentation Control manual in 2008. The manual serves as the basis to ensure on-the-ground use of erosion and sedimentation control BMPs during design, construction, and maintenance activities.
Stormwater Management Memorandum of Agreement	MaineDOT has a stormwater MOA with DEP whereby an erosion and sedimentation control plan is implemented for all projects, regardless of acreage disturbed and post construction stormwater management measures are installed when applicable (Storm Water Management Law, Chapter 500, MS4 Permit). MaineDOT provides an annual report to the DEP summarizing activities and projects.
Compliance with Erosion & Sedimentation Control Law	Since 1997, MaineDOT has emphasized the importance of erosion prevention, exposed soil stabilization, and compliance with the Erosion and Sedimentation Control Law that directs "adequate and timely temporary and permanent stabilization measures will be used to prevent unreasonable erosion and sedimentation", to department workers and contractors. MaineDOT Standard Specification 656 - Temporary Soil Erosion and Water Pollution Control requires all MaineDOT contractors to include an ESC plan for projects with fill or soil disturbance. MaineDOT also partners with the DEP NPS Training Center to promote the Erosion Control Contractor Certification Program and deliver erosion and sedimentation control training.
Maine Local Road Center	The Maine Local Roads Center provides training, technical assistance, and information to municipal and county staff who are responsible for constructing, maintaining, and managing local roads and bridges. Through MLRC newsletters and workshops, town officials and road maintenance crews receive information about the values (e.g., long term cost avoidance and protection of local water resources) of minimizing erosion and sedimentation from town roads and associated drainage features. MLRC also promotes snow and ice control BMPs to municipal public works staff.

<p>Road winter sand and salt management</p>	<p>MaineDOT management of road sanding practices has exceeded the established goal of 40 percent reduction of sand use since 1999. MaineDOT plans further winter sand reduction while maintaining safe winter driving conditions. Using an anti-icing approach instead of a de-icing approach significantly reduced the use of winter sand. The anti-icing approach uses mostly rock salt, but also includes salt brine, and “Ice-B-Gone” which DEP recognized under its Design for the Environment Formulator Program. MaineDOT will continue to research approaches, methods, and products to maintain safe roads and winter driving conditions with the least environmental impact. MaineDOT engaged Margaret Chase Smith Policy Center at the University of Maine to produce forthcoming studies.</p>
<p>Road winter sand and salt storage</p>	<p>The DEP’s Road Salt and Sand-Salt Storage Area Program helps mitigate the impacts of uncovered salt and mixed sand-salt on ground and drinking water. In coordination with MaineDOT, the program includes assistance with the siting of new salt storage areas; an on-going registration program for salt storage areas; implementation of siting and operational rules; and investigation of complaints involving chloride contamination of drinking water wells, as time and resources allow.</p> <p>In 1999, DEP prioritized known uncovered sand-salt piles. Towns with Priority 1-3 piles were required to construct a sand-salt storage building or move the site. With funding assistance from CWSRF and a state grant program (now discontinued), Priority 1, 2 and 3 piles have all been addressed. Approximately 100 Priority 4 and 5 piles still remain.</p> <p>MaineDOT road salt and sand/salt storage systems in all 5 regions comply with DEP regulations to protect ground and surface waters. All outdoor winter sand piles have been eliminated in Region 1, 2, and 4. There are 15 remaining outdoor piles in Region 3 and 5. The 15 remaining piles are treated with either hot sand or DT50 products to prevent water infiltration.</p>
<p>Watershed Projects</p>	<p>Recognizing the importance of placing stormwater management systems in areas most needed, MaineDOT has implemented several BMPs to help restore urban impaired streams. Examples include pervious pavement in the Long Creek watershed and Compost Amended Vegetative Buffers in the Red Brook watershed.</p>

D. Forestry

Lead Agency: Maine Forest Service (MFS)	
<p>Management Strategies Promote widespread use of forestry BMPs and BMP-based programs and projects on all timber harvest and forestry-based operations in Maine, with special emphasis on water quality protection. Improve consistency for the regulated community by working with towns to adopt statewide standards for timber harvesting in shoreland areas.</p>	
<p>Core Law / Regulatory Authority Under Maine’s Forest Practices Act (12 M.R.S. §§ 8867-A to 8888) landowners are required to notify the Maine Forest Service of planned timber harvest activities (with very limited exemptions for personal use and small acreage). Harvest plans are required for clearcuts over 20 acres. The NPS Management Program statute (38 M.R.S. Article 1-F) charged MFS with responsibility to develop and implement forestry BMPs. Since then MFS has developed programs and provided services that help landowners and wood harvesters use BMPs in accordance with MFS advisory and regulatory programs.</p>	
<p>Forestry and NPS Pollution Sources About 89 percent of Maine is forested, the highest percentage of any state. Forest products are key to Maine’s economy with roughly 200 forest products businesses employing 17,000 people. Approximately 450,000 acres are harvested annually via 5,500 to 6,000 harvest operations. Constructing forest roads, trails, landings, and drainage systems can reduce soil absorbency, divert or concentrate water flows, cause soil erosion, increase sediment and nutrients entering streams, and diminish the benefits of riparian vegetation. Harvesting may also reduce shade on the water’s surface, reduce the amount of natural woody debris, or eliminate food sources for aquatic life. Timber harvests that remove a significant percentage of trees can increase the water runoff into streams, in some cases increasing flooding. Forestry BMPs mimic or protect natural forest functions, absorb or disperse runoff, retain soil nutrients, filter sediment, and help maintain natural water temperature.</p>	
<p>BMP Guidelines Best Management Practices for Forestry: Protecting Maine’s Water Quality (2017) http://digitalmaine.com/for_docs/53/</p>	
BMP Types	Areas Addressed by BMPs
<p>Non-Structural (planning)</p>	<p>Clearly define harvest objectives & responsibilities; provide sound pre-harvest planning; anticipate general and seasonal site conditions; planning to control water flow; planning to minimize and stabilize exposed soil, including maintenance; planning to factor in and protect the integrity of nearby water bodies; planning to safely handle on-site hazardous materials.</p>
<p>Structural (groundwork) Ensure proper sizing/installation of bridges and culverts; control water and divert to filter areas.</p>	<p><u>Stream Crossings</u> (bridges, culverts, fords) Key issues include fish passage, crossing size, and crossing installation.</p>

	<p><u>Wetland Crossings</u> Key issues include rutting and water movement.</p> <p><u>Truck Roads</u> The key issue is water control.</p> <p><u>Log Landings</u> Key issues include safety, site stability, and public perception.</p> <p><u>Trails and Harvesting</u> Key issues are water control, soil exposure and proper closure ('putting sites to bed').</p> <p><u>Handling of Hazardous Materials</u> Key issues are storage and handling of oil/gas/coolants, avoiding leaks & spills, and accident training.</p>
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Programs/Projects	Description
Program Management & Partnerships	The MFS maintains one full time position, a Water Resources Forester (WRF), to coordinate the forestry NPS program. Due to limited staff dedicated to forestry NPS issues, MFS maintains partnerships which are important to program delivery. The Maine Sustainable Forestry Initiative (SFI) State Implementation Committee (SIC) is one such partner It includes landowners representing roughly 7 million acres of forest land in Maine and promotes mills that procure wood from practically every timber harvest in the state. Maine's WRF serves on the SIC's active education committee, which identifies relevant education topics and develops/delivers approximately 20-30 trainings per year, reaching 400-500 foresters, loggers and landowners. MFS also partners with several logger certification and professional organizations including the Certified Logging Professional Program, Northeast Master Logger, Qualified Logging Professional Program and the Professional Logging Contractors of Maine to deliver BMP training in conjunction with other scheduled trainings and events. These partnerships allow MFS to reach over 1000 loggers per year with BMP-related training.
Forestry BMPs for Water Quality - Manual & Training	The MFS made minor revisions to the state's forestry BMP manual in 2017 to include information on Stream Smart stream crossing designs. The manual is published in English and French language versions and has proven to be a useful program tool. Trainings are based on establishing a strong understanding of BMP principles to promote better in-the-field applications of specific practices detailed in the manual. The standard BMP training program was revised in 2012.
Training Programs	Specific forestry BMP training topic needs are identified via regular BMP monitoring and interaction with partners and other outside sources. Once needs are identified, MFS works with its partners to either develop training in-house or search for outside experts to deliver or assist with training development. MFS has an on-staff Natural Science Educator who assists with all MFS training

	development. Recent topic-specific training has included designing road stream crossings to allow fish passage, and BMP implementation at stream crossings.
Forestry BMPs, use and effectiveness Monitoring	MFS has conducted random statewide monitoring of BMPs on timber harvesting operations since 2000. The objective is to assess the use and effectiveness of forestry BMPs. Currently the MFS conducts BMP monitoring of approximately 120 harvest sites on a biennial basis. This effort has become part of MFS regular operations and is likely to continue as long as resources are available. The BMP protocol project was a cooperative effort of MFS, USDA, and the Northeastern Area Association of State Foresters–Water Resources Committee. Since Maine’s BMPs are voluntary and designed to be outcome-based, the protocol focuses on effectiveness and implementation rather than strict BMP compliance. This is done by recording measurable evidence and assessing a suite of BMPs rather than evaluating the installation of individual practices. The protocol evaluates: stream crossings and approaches; riparian buffers; chemical pollution; wetland crossings and approaches; haul roads, log landings, and rutted mineral soil in buffer/filter strips. Reports and protocol can be found at www.maine.gov/doc/mfs/fpm/water/bmp_monitoring.html .
MFS Direct-Link Loan Program	Since 2007 the MFS has partnered with the Maine Municipal Bond Bank, DEP, and several participating banks to provided low-interest incentive financing to loggers who purchase equipment capable of implementing BMPs to reduce NPS impacts on timber harvests. This program requires that participants maintain their certification by one of the state’s third-party logger certification programs. Participants are also subject to follow-up BMP inspections by the MFS. Over 145 loans totaling \$36 million have been issued to help loggers make equipment purchases. Funding for the program is through Maine’s Clean Water State Revolving Fund.
Portable Forestry Bridge Loaner Program	The MFS partners with SWCDs and several mills around the state to provide portable bridges to loggers on a loaner basis, free of charge. The program has five steel bridges and many wooden bridges in circulation around the state. These bridges allow loggers to ‘try out’ this BMP without cost, and several loggers have purchased or constructed their own bridges after using the loaners.
Watershed Projects	The MFS has hired interns in 2017, 2018 and 2019 to survey road-stream crossings for barriers to aquatic organism passage in coordination with The Nature Conservancy. Interns also assisted with the installation of coarse woody debris (CWD) in the Narraguagus River to enhance aquatic habitat in coordination with Project SHARE.
Coarse Woody Debris Program	The MFS has developed a program to increase the number of CWD addition projects in Maine. In 2012 it simplified the process for

	<p>implementing CWD projects by writing rules/standards allowing trained licensed foresters to oversee CWD projects without the need for a permit. The MFS in cooperation with the Department of Inland Fisheries and Wildlife (DIFW) has developed and delivered training to foresters who will oversee these projects.</p>
<p>Timber Harvest Inspection/Water Quality Enforcement</p>	<p>Although Maine BMPs are voluntary, there are state laws prohibiting landowners from allowing sediment to enter water bodies. Landowners must notify the MFS of all commercial harvesting activity, which allows Maine's 55 Forest Rangers to inspect the harvests for compliance with timber harvest regulations. Notifications must indicate whether harvests occur near waterbodies, allowing inspections to be prioritized by potential environmental risk. The MFS uses cooperative agreements with DEP and the Land Use Planning Commission whereby MFS rangers inspect harvests for compliance using environmental laws administered by these agencies. The MFS has also recently assumed regulatory jurisdiction of harvesting and related activities in shoreland areas for many areas of the state. This is part of the transition from a dual set of regulations in the unorganized and organized areas of the state, to a consistent set of statewide regulations and a single regulatory authority.</p>
<p>Demonstration Projects</p>	<p>MFS regularly helps organize technology transfer demonstration projects. Most demonstrate innovative stream crossing installations, particularly those involving designs promoting fish passage, including 'bottomless arch' and box culverts and low-cost bridge installations.</p>
<p>Forest Certification Programs & Initiatives</p>	<p>The MFS supports forest certification by any of the several organizations that certify forest land in Maine. These organizations include the Forest Stewardship Council, the Sustainable Forestry Initiative and the American Tree Farm System. About 9.4 million acres of Maine's forests are certified to one of the three major standards. Use of water quality BMPs is mandatory under all these systems. Lands certified under these systems undergo third-party audits, offering an added level of scrutiny regarding the implementation and effectiveness of BMP practices.</p>

E. Onsite Wastewater Disposal Systems

Lead Agency: Subsurface Wastewater Unit, Division of Environmental Health, Department of Health & Human Services

Management Strategies

Work with municipalities to implement the Subsurface Wastewater Disposal (SSWD) Rules. Improve the certification programs for septic system inspectors by adopting rules that include minimum standards for system inspections and increased knowledge and experience for inspection certification and continue to train and certify system installers (Voluntary Onsite Sewage Disposal System (OSDS) Inspection Program). Continue to encourage and expand point-of-sale septic system inspections. Revise and update the SSWD Rules as needed to address emerging issues and to reflect current technology in subsurface wastewater management and disposal.

Core Law / Regulatory Authority

By Maine statute (22 M.R.S. §42) DHHS is authorized to adopt rules providing for the inspection of plumbing and subsurface wastewater disposal systems. The rules are known as the Subsurface Wastewater Disposal Rules (10-144 CMR 241). Implementation and enforcement of the rules is the responsibility of municipalities. Municipalities are required to appoint plumbing inspectors to implement the rules. DHHS will adopt new rules in 2019 specifically for the inspection of subsurface wastewater disposal systems including those located in all shoreland zones in Maine and increase the minimum level of knowledge and experience required for certification as a system inspector.

Onsite Subsurface Wastewater Disposal Systems & NPS Pollution Sources

Onsite SSWDs are utilized for the treatment and disposal of domestic and commercial wastewater in areas that lack centralized municipal wastewater collection and treatment systems. Onsite SSWD systems, if improperly located, designed, or installed are subject to malfunction, which may cause adverse health effects and detrimental environmental impacts to land and water resources from untreated wastewater. Malfunctioning disposal systems can cause bacterial contamination and deliver nutrients to surface waters.

BMP Guidelines

Subsurface wastewater disposal rules govern the siting, design, construction, and inspection of subsurface wastewater disposal systems in order to protect the health, safety, and welfare of the citizens of Maine. Approved procedures, design, and siting requirements, materials, methods, and administrative polices are described in detail. These Rules provide minimum State design criteria for subsurface wastewater disposal to assure environmental sanitation and safety. These Rules are intended to complement municipal planning, zoning, and land use control. <http://www.maine.gov/dhhs/mecdc/environmental-health/plumb/rules.htm>

Program	Description
Subsurface Waste Water Disposal Rules (CMR 241)	Maintain copies of all plumbing and subsurface waste water permits issued statewide. Approximately 40,000 plumbing permits are processed annually, which generate approximately \$275,000 in

	dedicated revenue. The Program processes approximately 10,000 subsurface waste water permits annually. Provide reviews of engineering plans for compliance with or variance from departmental rules in support of the Division's various program areas. Provide interagency reviews and make recommendations for DEP, Maine Land Use Regulation Commission, Maine Department of Education, and Bureau of Public Improvements, among others. Conduct site inspections to assist site evaluators, local officials, and property owners.
Rules for Appointment and Administration of Local Plumbing Inspectors (CMR 240)	Oversee the appointment and administration of Local Plumbing Inspectors, including the eligibility, application, examination, and re-certification requirements.
Rules for Site Evaluators of Subsurface Wastewater Disposal Systems (CMR 245)	Oversee licensing of site evaluators that perform subsurface wastewater disposal evaluations for the purpose of designing onsite subsurface wastewater disposal systems. This includes the administration, examination and licensing roles.
Voluntary Onsite Sewage Disposal System Inspection Program	The Department oversees a Voluntary Onsite Sewage Disposal System Inspection Program for inspection of existing systems.
Certification of Subsurface Wastewater Disposal System Installers	The Department oversees a voluntary certification program for SWDS installers. The program involves training programs, review of actual performance and on-going 5-year recertification with continuing education and good performance.
Small Community Grants Program	DEP administers the Small Community Grant Program, which provides grants to towns to help replace malfunctioning septic systems that are polluting a waterbody or causing a public nuisance. Grants can be used to fund from 25% to 100% of the design and construction costs, depending upon the income of the owners of the property, and the property's use. An actual pollution problem must be documented to qualify for funding. The highest priority is given to problems that are polluting a public drinking water supply or a shellfishing area.

F. Hydrologic and Habitat Modification

Lead Agency: Maine Department of Environmental Protection

Management Strategies

Control hydrologic modification of rivers, streams, and lakes through administration of regulatory programs. Coordinate review and permitting of channel dredging with the Army Corps of Engineers (ACOE). Control impacts of hydropower dams through certification of Federal Energy Regulatory Commission (FERC) hydropower permits. Regulate impacts of other dams through state review of water level petitions and subsequent DEP water level orders. Encourage use of ESC and stormwater management BMPs through both administration of land use laws and promotion of voluntary measures by continued administration of the Storm Water Management and Site Location of Development Laws. Adopt new standards for stream crossings (new, repair, replacement, rehabilitation) designed to improve fish passage, hydraulic capacity and resiliency to larger storm events.

Core Law / Regulatory Authority

DEP regulates channel dredging through the NRPA in conjunction with the ACOE under Section 404 of the Clean Water Act. Licensing of hydropower dams is regulated by the FERC and conditions required by states under Section 401 of the CWA to ensure attainment of State Water Quality Standards. Non-hydropower dams are regulated under the Maine Waterway Development and Conservation Act (38 M.R.S. §§ 630-636, 640), Maine Water Level Act (38 M.R.S. §341-D, §§2), Municipal Regulation of Water Levels and Minimum Flows Act (30-A M.R.S. §4454-4457), and DEP's In-Stream Flows and Lake and Pond Water Levels rule. DEP is responsible for controlling runoff and erosion through the ESC Law, the Storm Water Management Law, the Site Location of Development Act and NRPA.

Hydrologic and Habitat Modification and NPS Pollution Sources

DEP's 2016 Integrated Report lists hydromodification as the source category for 85 miles of impaired rivers and streams and six impaired lakes (48,994 acres). Hydrologic modification activities include dams, channelization, channel modification, and streambank and shoreline erosion. Channelization, channel modification, and stream crossings may adversely impact suitability of instream and streamside habitat for fish and wildlife. Several watershed-level surveys of existing Maine stream crossings indicate that as many as 90% are barriers to fish passage and as many as 40% are impassable, causing significant loss of aquatic habitat. Hydrologic modification can alter instream water temperature, oxygen levels and sediment erosion, transport and deposition. The siting, construction and operation of dams can adversely impact the hydraulic regime, water levels, surface water quality and habitat of a lake, stream or river. Erosion caused by hydrologic modification can have adverse impacts on riparian habitat. Excessively high sediment loads can smother submerged aquatic vegetation, cover shellfish beds and tidal flats, fill in riffle pools, and increase levels of turbidity and nutrients.

BMP Guidelines	
For ESC: http://www.maine.gov/dep/land/erosion/escbmps/index.html For stormwater management: http://www.maine.gov/dep/land/stormwater/stormwaterbmps/index.html .	
BMP Types	Areas Addressed by BMPs
Non-Structural (planning)	Conduct planning to avoid adverse impacts on water quality. Site specific erosion and sedimentation control plans, including temporary and permanent erosion control measures. Low Impact Development: Limit areas of clearing and grading; minimize impervious area; minimize directly connected impervious area; and manage stormwater at its source. Use contractors certified in ESC. Inspection and maintenance including five-year certification
Structural (groundwork) Provide treatment measures to mitigate for the increased frequency and duration of channel erosive flows Install BMPs and culverts to restore resource form and function	Wet ponds; Vegetated buffers; Infiltration; Under-drained soil filters; Detention ponds for flood control; Proprietary treatment systems; Enlarged and embedded culverts to accommodate aquatic organism passage and accommodate larger storms; culvert and dam removal; installation of Coarse Woody Debris, living shorelines or other habitat enhancement features

Program/Project	Description
Maine Waterway Development and Conservation Act, 401 CWA Certification of Hydropower Projects	DEP reviews applications for 1) construction, re-construction or alteration of hydropower projects which change water level or flow, 2) maintenance and repair of existing hydropower projects involving dredging or filling below normal high water under the Maine Waterway Development and Conservation Act and 3) hydropower license from the FERC under section 401 of the Clean Water Act to ensure that operation of the project will not result in non-attainment of the state’s Water Quality Standards. DEP may certify the project with conditions, which FERC then incorporates into the project permit.
Maine Water Level Act Establishment of Water Levels	The DEP Commissioner may on the Commissioner's own motion and shall at the request of the owner, lessee or person in control of a dam, the Commissioner of Inland Fisheries and Wildlife, or the Commissioner of Marine Resources, or upon receipt of petitions from the lesser of at least 25 percent or 50 of the littoral or riparian proprietors or from a water utility having the right to withdraw water from the body of water for which the water level regime is

<p>Municipal Regulation of Water Levels,</p> <p>Minimum Flows</p> <p>Municipal Regulation</p>	<p>sought, conduct an adjudicatory hearing for the purpose of establishing a water level regime and, if applicable, minimum flow requirements for the body of water impounded by any dam that does not have a license for hydropower generation from FERC or other water level order from another entity. Municipalities may petition DEP for jurisdiction over water levels and minimum flows pending adoption of an appropriate ordinance.</p>
<p>In-stream Flows and Lakes and Ponds Water Levels</p> <p>DEP Rule 06-096</p> <p>CMR Ch. 587</p>	<p>This Chapter establishes river and stream flows and lake and pond water levels to protect natural aquatic life and other designated uses in Maine’s waters. Instream flow requirements for Class AA, A, B, and C waters are based on natural flows that occur in Maine waters, and the uses and characteristics assigned by the water quality classification program (38 M.R.S. Sections 464, 465) with attention given to protecting the outstanding natural resources associated with Class AA waters. Flow is managed to provide natural variation of flow described by seasonal aquatic base flows, or other seasonally variable flows, shown to protect aquatic life resources and water quality standards. Water level requirements for Class GPA waters consider natural variation of water levels that occur in Maine lakes and ponds, and the uses and characteristics assigned by the water quality classification program (38 M.R.S. Sections 464, 465-A). Water level is managed to provide variation that considers expected seasonal levels shown to protect aquatic resources and other water quality standards of Class GPA and downstream waters. Instream flows and water levels may be established by 3 methods: (1) standard allowable alteration, (2) by a site-specific flow designation developed through an Alternative Water Flow or Alternative Water Level, or (3) as part of a new or existing regulatory permit. A water use which fails to comply with the requirements of these rules is subject to penalties pursuant to Title 38, Section 349.</p>
<p>Development of new standards for stream crossings (new, repair or replacement) to improve fish passage, hydraulic capacity and resiliency to larger storms</p>	<p>New stream crossings, as well as the maintenance, repair, rehabilitation and replacement of existing crossings, are regulated under NRPA. Several watershed-level surveys of existing crossings revealed surprisingly consistent results indicating that as many as 90 percent are barriers to fish passage and as many as 40 percent are impassable. In an effort to reestablish the connectivity of Maine’s stream systems, the Legislature directed the Department, in concert with the Department of Transportation and other state natural resource agencies to develop an Aquatic Resource Management Strategy. Under the last NPS Management Plan (2014-2019), draft rules were developed.</p>

G. Climate Change Adaptation

Efforts to reduce greenhouse gas emissions and adapt to climate change are being pursued at the national, state and local levels. Many of these strategies are outside the scope of this plan. This section highlights some of the adaptation and resiliency planning efforts that will reduce NPS and water quality impacts from climate change. The plan's proposed actions and milestones related to climate change adaptation are summarized in Table 6 below and listed in Section X of this document.

<p>Lead Agency: Maine DEP</p>
<p>Management Strategies Collect data and develop models to identify areas most vulnerable to climate change impacts. Manage forested and agricultural working lands to protect soil health and offset greenhouse emissions. Develop and disseminate tools to support adaptation and mitigation planning. Remove or improve vulnerable infrastructure so that it can reduce impacts from larger storm events and rising sea level.</p>
<p>Core Law / Regulatory Authority In 2003, Maine established goals for the reduction of Greenhouse Gas (GHG) emissions statewide (38 M.R.S. § 576). The Maine Climate Action Plan was adopted in 2004 to meet the reduction goals specified in Maine law. The action plan contains recommended options that help meet reduction goals through cost-effective strategies and actions, and that allow for sustainably managed forestry, agriculture, and other natural resources to sequester greenhouse gas emissions. In 2019, Maine passed legislation that establishes new goals to reduce emissions to 45% below 1990 levels by 2036 and 80% below 1990 levels by 2050 and creates the Maine Climate Council to update to the Maine Climate Action Plan with both mitigation and adaptation strategies by 2020 (38 M.R.S. § 574-578).</p>
<p>Climate Change and NPS Pollution Sources In Maine, rising temperatures and shifting rainfall patterns are likely to increase the intensity of both floods and droughts. Average precipitation is likely to increase during winter and spring, but not change significantly during summer and fall. Rising temperatures will melt snow earlier in spring and increase evaporation, thereby drying the soil and lowering ground and surface water levels during summer and fall (EPA, 2016). Higher intensity storms can cause more erosion and transport more nutrients and other pollutants into waters. For lakes, this is already causing winter ice-out to take place earlier in the spring and ice-in to take place later in the fall. As a result, lakes that stratify may have greater oxygen depletion in the cooler bottom waters, which can stress coldwater fish, result in phosphorus being released from bottom sediments, and fuel algal growth. In rivers and streams, warmer temperatures can lower dissolved oxygen levels and impact brook trout and other coldwater species. Larger storms can erode stream channels and impact habitat. Low flow conditions in summer and fall are also more likely to stress organisms, especially in areas where groundwater is contaminated with chloride or other contaminants. Summer drought conditions will also lead to more water withdrawals for agricultural irrigation. In coastal areas, rising sea level and storm surge erode wetlands and beaches and damage infrastructure such as roads and</p>

wastewater treatment facilities. Rising sea levels may also lead to saltwater intrusion into freshwater surface waters and public and private drinking water systems. Increased freshwater runoff into coastal areas has also been found to contribute to coastal acidification.

Programs/Projects	Description
	<p>There are numerous programs underway related to climate mitigation and adaptation across State agencies. The following list highlights NPS-related efforts from <i>Maine Prepares for Climate Change</i> (2019). FMI - www.maine.gov/dep/sustainability/climate/MainePreparesforClimateChange2019Update.pdf</p>
<p>State Hazard Mitigation Plan</p>	<p>The State of Maine Hazard Mitigation Plan (SHMP) identifies risks and vulnerabilities associated with natural disasters to develop strategies to reduce the long-term effects of natural hazards. The risk assessment is the basis for the strategy, which provides the State’s blueprint for reducing the potential losses identified in the risk assessment. SHMPs must be updated every five years. The 2018 SHMP profiled the following natural hazards in the risk assessment process: wildfire, flooding, severe summer weather, severe winter weather, hurricane, drought, earthquake, erosion, and mass wasting (landslides). Major changes from the last plan included the incorporation of extreme heat under “severe summer weather” and drought as a unique hazard type. The 2018 update describes the potential impacts of climate change on these hazards, which will likely increase the extent and frequency of natural hazard events. The Maine Emergency Management Agency (MEMA) will continue to corroborate data with the scientific community in hopes of preparing a more climate change focused plan in 2023.</p>
<p>Hazard Mitigation and Pre-Disaster Mitigation Grant Programs</p>	<p>MEMA administers the Hazard Mitigation Grant Program and the Pre-Disaster Grant Program to fund projects identified in local hazard mitigation plans. The Disaster Relief and Recovery Act created a more sustainable and expanded source for hazard mitigation funding.</p>
<p>Maine Ocean and Coastal Acidification Partnership (MOCA)</p>	<p>DEP is a member of the voluntary Maine Ocean and Coastal Acidification (MOCA) partnership. MOCA is a partnership formed in March 2016 seeking (1) to implement recommendations of the Ocean Acidification Study Commission authorized by the 126th Legislature, as set forth in the study commission’s report and (2) to coordinate the work of governmental agencies and private organizations and citizens who are studying and implementing means to reduce the impacts of or help adapt to ocean and coastal acidification.</p>
<p>Maine Interagency Stream Temperature</p>	<p>The Maine Water Temperature Working Group was established in 2014 to develop a coordinated stream temperature monitoring network that can be integrated with regional and national efforts. The group is composed of multiple state agencies, academics, NGOs,</p>

Monitoring and Modeling Network	tribes, and federal agencies. The group has developed standardized monitoring protocols, conducted a comprehensive inventory of existing data for current and past water temperature monitoring efforts, and is monitoring stream temperature in >240 stations statewide. Maine DEP maintains 19 long-term temperature sensors in streams throughout the State.
Brook Trout Conservation and Management	Maine remains the last stronghold for wild Eastern Brook Trout in the United States. As a committed partner to the Eastern Brook Trout Joint Venture, the Maine DIFW collaborates on multiple research and assessment projects, including identifying strategies to mitigate climate change impacts to brook trout habitat by expanding habitats and accessibility to proximal habitats as much as possible by addressing stream/river connectivity issues.
Maine Healthy Forests Program	A healthy forest provides habitat for wildlife, clean water and air, recreational opportunities, and economic vitality to families. This Maine Forest Service program looks at climate-related impacts to forests, and how to manage forests to address and adapt to changing conditions.
Maine Climate Clearinghouse & Adaptation Toolkit	DEP's Climate Program houses the clearinghouse of information on climate change mitigation and adaptation pertinent to Maine communities.

Table 6. Climate Change Adaptation Objectives/Actions in Maine's NPS Management Plan

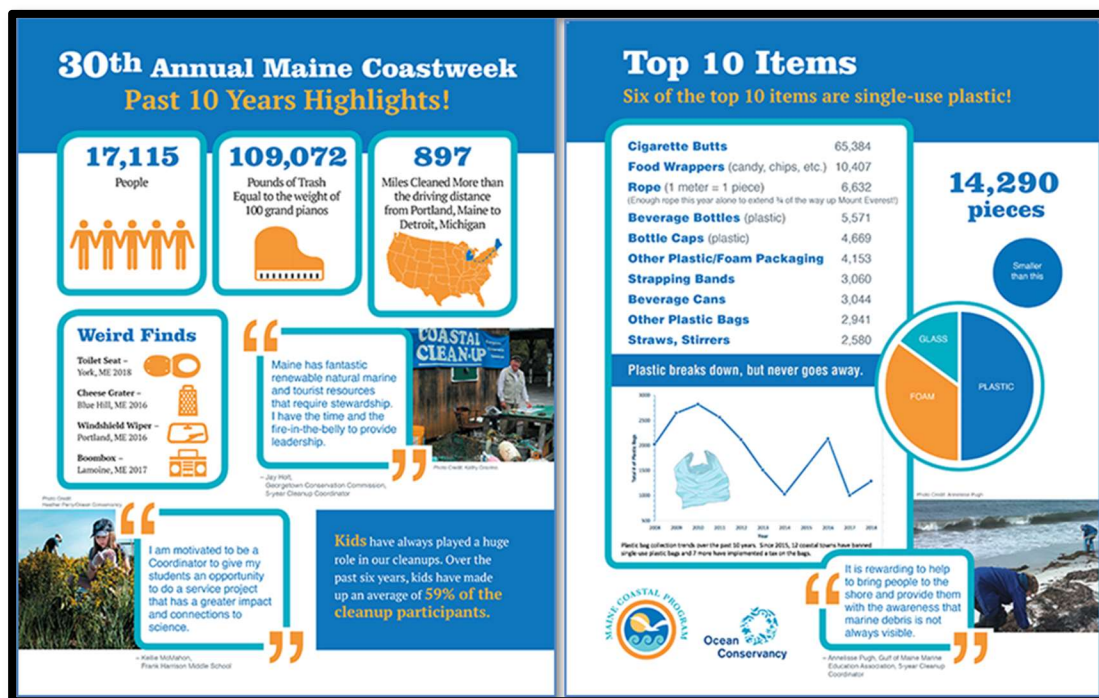
Objective/Action	Action Plan Table
Identify additional prioritization criteria and waters for addition to the NPS Priority Watersheds list and/or for targeted outreach.	Table 9. Watershed Approach
Incorporate climate change and resilience planning into watershed-based planning.	Table 9. Watershed Approach
Evaluate stormwater and ESC BMPs and develop guidance about climate change resiliency and adaptation planning.	Table 10. Developed Areas
Increase field crop agriculture's use of soil health practices to reduce soil erosion, improve water quality and offset carbon emissions.	Table 12. Agriculture
Adopt new standards for stream crossings to improve aquatic organism passage and improve hydraulic capacity and resiliency to larger storm events.	Table 15. Hydrologic and Habitat Modification
Administer DEP stream culvert grant program (culvert bond) that funds upgrades of municipal culverts.	Table 15. Hydrologic and Habitat Modification
Explore, promote and pursue FEMA hazard mitigation grants for installation of green infrastructure, stream/floodplain restoration and culvert replacements.	Table 16. NPS Program Coordination

H. Emerging NPS Issues

This section provides information about four emerging NPS issues that also impact Maine’s water resources and efforts to control NPS pollution:

- Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)
- Aboveground and Underground Storage Tanks
- Brownfields; and
- Marine Debris, Microplastics and Trash.

The first three of these emerging NPS issues deal with toxic contaminants. Numerous federal and state regulations and programs are in place to prevent the release of toxic substances to the environment and, when needed, to clean up contaminated areas. However, potential impacts and threats from PFAS, leaking tanks and contaminated runoff from brownfields are areas of concern that warrant both closer examination and proactive coordination with Maine’s NPS Management Program to help further reduce threats to human health, aquatic life and ground and surface water quality. Marine debris, trash and microplastics is another concern with potential toxic and habitat impacts.



The Maine Coastal Program sponsors an annual Coast Week Cleanup that helps raise awareness about marine debris and trash.

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

Lead Agency: Maine DEP

Core Law / Regulatory Authority

PFAS are considered emerging contaminants and are not currently regulated by EPA or DEP. However, in May 2016 the EPA issued a drinking water Health Advisory that recommended taking action to reduce exposure for water above 70 parts per trillion (ppt). Executive Order 5 FY 19/20 created the Governor's Task Force on the Threats of PFAS Contamination to Public Health and the Environment. The purpose of the Task Force is to identify the extent of PFAS exposure in Maine, examine the risks of PFAS to Maine residents and the environment; and recommend State approaches to most effectively address this risk.

Management Strategies

The Governor's PFAS Task Force is charged with developing a report with their findings and recommendations to address PFAS exposure and contamination in Maine.

PFAS and NPS Pollution Sources

PFAS are human-made chemicals that are stable and persistent in the environment, bioaccumulate, toxic at low concentrations, and easily transferred to groundwater and other media. Current evidence suggests that approximately 20% of a person's exposure to PFAS is associated with drinking water, and the remaining 80% is tied to diet, dust intake, and air. In Maine, there are limited data on PFAS. However, groundwater and later milk PFAS levels were found to be elevated at a York County dairy farm that had a history of land spreading wastewater treatment plant sludge. The practice of spreading sludge as a soil amendment has been a common practice in Maine and across the nation for decades.

Programs/Projects	Description
<p>Sludge Testing Program</p>	<p>Beginning in March 2019, DEP required PFAS testing of all wastewater treatment sludge material proposed for land application, compost or processing to ensure that all material is below regulatory levels before it can be applied.</p>

Aboveground and Underground Oil Storage Tanks

Lead Agency: Maine DEP

Management Strategies

Prevent surface and groundwater contamination from leaking aboveground storage tanks (ASTs) and underground storage tanks (USTs) by training and certifying tank installers, inspectors and system operators. Ensure tanks, piping and equipment are maintained and operated properly by requiring Annual Inspection Reports completed by Maine Certified Tank Installers and Inspectors. Replace aging tanks and install new tanks with double-walled tanks and piping, spill prevention and leak detection technologies. Minimize contamination of drinking water supplies by restricting locations for tank installations. Provide rapid spill response and fund cleanup of contaminated sites.

Core Law / Regulatory Authority

The Oil Storage Facilities and Groundwater Protection statute (38 M.R.S. §§ 561-A to 570M) includes numerous provisions to prevent and mitigate impacts associated with the storage and handling of oil and related activities. An Act to Prevent Contamination of Drinking Water Supplies (38 M.R.S. § 1391 through § 1399) provides authority for promulgation of Chapter 692 (Siting of Oil Storage Facilities) and Chapter 700 (Siting of Facilities that Pose a Significant Threat to Drinking Water). These rules establish prohibitions and waiver requirements for the siting of oil storage facilities, including requirements for USTs/ASTs to be at least 300 feet from private wells and at least 1000 feet from public wells and prohibited ASTs/USTs from mapped sand and gravel aquifers or source water protection areas unless a waiver with additional monitoring and/or engineering controls has been granted.

ASTs/USTs and NPS Pollution Sources

DEP's 2014 Integrated Report noted that most groundwater contamination in Maine originates from NPS pollution from eight types of contamination sources, including petroleum spill sites and leaking USTs. Since 1994, 2,442 sites associated with spills (typically from ASTs) and leaks from USTs have been placed on the Remediation Priority list. Of these sites, 1,982 sites have been remediated, but the remaining 460 sites have yet to be addressed. The 460 sites have contaminated 129 wells and two public water supplies and threatened 449 wells and six public water supplies.

Contamination of current and future drinking water supplies poses serious human health risks. A gallon of gasoline contains over one hundred constituents, including naphthalene, benzene and ethyl benzene and many others that are classified as carcinogenic or toxic to human health and aquatic life. Human exposure to the many carcinogenic constituents can result from inhalation of vapors, ingestion and adsorption. Polycyclic aromatic hydrocarbons (PAHs) and other organic chemicals in oil also have acute and chronic impacts on wildlife and other aquatic organisms. Since these toxics tend to accumulate in the sediments, the benthic organisms that serve as the base of the food chain are exposed to the highest levels of contamination. In Milford, Maine a leak from an UST impacted the Penobscot River and contaminated a drinking water supply. The clean-up cost and third-party damage award totaled \$1,170,416, not including the ongoing treatment of the water supply. In another case,

a bedrock aquifer that served a coastal community was impacted by petroleum that had leaked from several storage facilities at different locations. Due to the number of impacted residents, a new public water supply was constructed at a cost of over \$11.5 million dollars.

BMP Guidelines

Chapters 691 and 695 set standards for USTs, including registration requirements; design and installation requirements for tanks and piping; leak detection requirements; monitoring and operating procedures, discharge reporting, removal, investigation, and remediation procedures; a compliance schedule for existing facilities; and closure requirements. Many of the rules also extend to ASTs that include underground piping. Certain ASTs are also required to have Spill Prevention Containment and Countermeasure (SPCC) plans, which list the containment equipment and structures used to prevent spills from reaching ground water or surface water. Plans also identify the inspection, monitoring and oil transfer procedures that to prevent spills and specify steps to contain the spill and minimize environmental impacts.

Programs/Projects	Description
Spill Prevention, Containment and Countermeasure (SPCC) Plans	An oil SPCC plan is a plan prepared in accordance with good engineering practices to prevent and clean up spills from oil storage tanks. In 2002, the Maine Legislature enacted 38 M.R.S. § 570-K(5), giving the DEP authority to oversee compliance with the federal SPCC requirements (40 CFR Part 112) for ASTs that exceed the federal 1,320-gallon aggregate storage capacity threshold and are used to market and distribute oil. DEP provides program oversight and technical assistance with SPCC plans and spill containment structures.
TankSmart Program	Federal regulations and Maine law require USTs to have trained operators. DEP's TankSmart program provides online training and certification for operators. The program is accessed by entering a facility registration number, which directs the trainee to specific training modules containing information specific to the type of system installed at the registered location. A generic registration allows interested persons to train on all 27 modules and certifies an operator to operate any underground oil storage system in Maine. Program staff are creating a new module to train and certify delivery drivers.
Maine Board of Tank Installers	The Board was formed by the Maine Legislature in 1985 to certify underground oil tank installers and subsequently inspectors, to provide continuing education for certified persons and undertake disciplinary action when needed. Currently, there are 125 trained and certified individual tank installers and inspectors that play an integral role in preventing leaks from storage systems. Certified tank inspectors and installers must earn continuing education credits annually to maintain their certification. Underground tanks and piping may only be installed by a Maine Certified Tank Installer. Underground tanks and aboveground tanks with underground piping that store motor fuels are required to have a certified tank inspector

	<p>or installer submit an annual inspection report and certification that each tank and associated piping have been inspected and any deficiencies have been corrected. DEP can issue Notices of Violation with corrective action schedules at the time of inspection.</p>
<p>Maine Ground and Surface Water Cleanup and Response Fund</p>	<p>The purpose of the Ground and Surface Waters Clean-up and Response Fund is to provide for the investigation, mitigation and removal of discharges or threats of discharge of oil from underground and aboveground oil storage tank systems, including the restoration of contaminated water supplies. The Fund is administered by DEP with oversight from the Clean Up and Response Fund Review Board.</p>
<p>Home Heating Oil Tank Replacement Program</p>	<p>Maine averages over one heating oil spill per day from ASTs at single family residences. Approximately 78% of Maine households are heated with oil, and the vast majority of these households have 275-gallon ASTs located in the basement or outside the home. The biggest cause (23%) of spills is internal corrosion of the tank. Since it started in 1998, this program has replaced an average of 250 substandard ASTs annually at no cost for low income homes.</p>
<p>DEP Spill Response Program</p>	<p>DEP provides emergency oil spill response services. Responders are available on-call and provide advice about cleanup. Spill reports are created and available to the public on the DEP website.</p>
<p>Tank Replacement Loan Program</p>	<p>There are approximately 3,600 registered USTs located at approximately 2,300 underground oil storage facilities in the State of Maine. Most of these tanks were installed in the late 1980s through the mid 1990's. As tanks and equipment age, there is an increased risk of failure resulting in groundwater and surface water contamination. As a result, State law requires that USTs must be removed after 30 years. Currently, there are approximately 256 single walled tanks and 266 double walled tanks that are required to be removed prior to December 31, 2019. Approximately 45% of these USTs are in close proximity to existing and future drinking water supplies. DEP estimates potential replacement needs for smaller facilities to be as much as \$25 million over three years. In 2018, DEP, the Maine Municipal Bond Bank (MMBB) and the Finance Authority of Maine (FAME) established a loan program through the Clean Water State Revolving Fund for small businesses.</p>
<p>Tank Registration Database and Inspections</p>	<p>DEP maintains a database of registered oil storage facilities. The database is available on the DEP website and includes detailed information about each facility, including size, type, method of leak detection, installation date, location, owner, date of last annual inspection report, compliance history etc. An inspection report is required to be submitted annually to DEP for all registered tanks. Only passing inspection reports are accepted for review, and DEP conducts compliance inspections for tanks that do not submit reports.</p>

Brownfields

Lead Agency: Maine DEP

Management Strategies

Conduct site assessments to evaluate site conditions and, if needed, examine potential cleanup options and costs. Provide technical assistance, loans and grants to help remediate contaminated sites. Enable redevelopment of brownfield sites, which in turn can help reduce urban sprawl, increase efficiency of existing infrastructure (e.g., road, rail, water and sewer), create new jobs, provide increased tax revenues, and revitalize declining commercial/industrial-based communities.

Core Law / Regulatory Authority

The federal Small Business Liability Relief and Brownfields Revitalization Act (Public Law 107-118) provides funds to assess and clean up brownfields; clarifies CERCLA⁴ liability protections; and provides funds to enhance state and tribal response programs. In 1993, the Maine Legislature enacted 38 M.R.S. §343-E, which established a voluntary program at DEP whereby landowners receive technical assistance to assess potentially contaminated properties and liability protection from enforcement action for conducting voluntary cleanup actions.

Brownfields and NPS Pollution Sources

Brownfield sites are properties where redevelopment is impeded by the presence or potential presence of hazardous contaminants. These brownfield sites are often abandoned industrial sites like mills that were originally located near waterbodies for water-power, transportation, and waste discharge. The contamination from these sites poses a direct NPS threat to water bodies from contaminated runoff and underwater seeps. DEP has identified 2,410 potentially contaminated sites in Maine with dozens more discovered each year.

Investigations at brownfield sites have identified groundwater and surface discharges to waterbodies that are contaminated with toxic pollutants like heavy metals, polycyclic aromatic hydrocarbons (PAHs), dioxins, polycyclic biphenyls (PCBs), pesticides, and volatile organic compounds (VOCs) such as perchloroethylene (PCE) and trichloroethylene (TCE). Many of these toxic pollutants are persistent in the environment, and several bioaccumulate. In 2016, a DEP/EPA study of Goosefare Brook in Saco, Maine detected the presence of PCBs, heavy metals and other toxics in the stream from adjacent brownfield sites. NPS discharges of these pollutants pose a potential risk to aquatic life and ecosystems. They may also present a hazard to people that consume contaminated fish or the water near these sites. Without careful planning, soil disturbance, stormwater infiltration BMPs and other redevelopment activities at brownfield sites can also lead to the mobilization of toxic pollutants to ground and surface waters.

BMP Guidelines

The Maine DEP has developed Standard Operating Procedures and guidelines to supplement federal and industrial Best Management Practices for the investigation and remediation of sites contaminated with petroleum and/or hazardous substances. DEP has compiled these

⁴Comprehensive Environmental Response, Compensation and Liability Act, commonly called "Superfund".

BMPs on DEP's website at:

<http://www.maine.gov/dep/spills/publications/guidance/index.html>.

Programs/Projects	Description
EPA Brownfields Grants	EPA's Brownfields program provides technical assistance, tools and grant funding for Brownfields inventories, planning, environmental assessments, and community outreach. Maine uses a mixture of these funding sources to address Brownfield sites, including EPA Brownfield grants under section 128(a) and 104(k) of CERCLA. Under the Brownfield grants, the state, municipalities and non-profits have hired environmental contractors to take cleanup action at 392 sites. The grants also help leverage private funding for site cleanup and redevelopment.
Brownfields Revolving Loan Fund Program	<p>The Maine Department of Economic and Community Development and DEP oversee the Brownfields Revolving Loan Fund program. The primary goals of the program are to clean up sites, foster business redevelopment and sustain the program. Low interest program loans, along with DEP technical support, allow eligible parties to tackle costly contamination issues and help leverage private developer funds, municipal funds and/or state funds.</p> <p>DEP has identified over 20 sites posing NPS risk with high redevelopment potential and a completed brownfields assessment, but due to lack of funding these sites have not been cleaned up. Clean-up will be much more costly and difficult if redevelopment occurs before clean-up. DEP estimates a demand of \$1.25 million for Brownfields site assessments and cleanup over the next three years. DEP is currently exploring the possibility of supplementing the existing loan fund program with additional CWSRF funding to help finance loans for sites that are suspected of causing NPS impacts to ground or surface waters.</p>
Voluntary Response Action Program	DEP's Voluntary Response Action Program allows applicants to voluntarily investigate and cleanup properties, in exchange for certain liability protections. The program is intended to encourage the cleanup and redevelopment of contaminated properties within the state. Many program sites are also in the Brownfields program.

Marine Debris, Trash and Microplastics

Lead Agency: Maine DEP
<p>Core Law / Regulatory Authority</p> <p>In 2019, Maine enacted legislation that bans single use polystyrene foam containers for food and beverages (Sec. 1. 38 M.R.S. §1652-A) and single use plastic carry-out bags (Sec. 2. 38 M.R.S. §1611). In 2015, Maine enacted Sec. 1. 38 M.R.S. §419-D, which bans manufacture or sale of products containing microbeads.</p>
<p>Management Strategies</p> <p>Reduce sources of plastics and other debris that are transported to Maine waters. Raise public awareness about impacts of debris and ways to reduce personal impacts. Host cleanup events.</p>
<p>Marine Debris/Trash/Microplastics and NPS Pollution Sources</p> <p>When waste does not make it to a landfill or transfer station, it can become NPS pollution washing into streams, rivers, lakes and marine waters. While trash in Maine waterbodies has not been considered a major pollutant, there has been growing global concern about the amount and impact of trash ending up in water resources. Common trash from consumer goods makes up the majority of what eventually becomes marine debris, polluting our waterways and oceans. Plastics in the aquatic environment are of increasing concern because of their persistence and effect on the environment, wildlife, and human health. In 2013 and 2014, Maine’s Marine and Environmental Research Institute’s monitoring team detected an average of 17 plastic fragments in every liter of seawater in Blue Hill and Penobscot bays.</p>

Programs/Projects	Description
Coastweek Cleanup	The Maine Coastal Program organizes the annual Coastweek Cleanup. Each year over a thousand participants clear hundreds of miles and thousands of pounds of trash. The amount and types of debris is recorded and becomes part of the international ocean trash index, which is compiled by Ocean Conservancy. In 2018, 1,365 volunteers removed 4,472 pounds of trash from 74 miles of waterfront.
Trash Free Piscataqua	In 2017-2018 the Trash Free Piscataqua convened stakeholders from Maine and New Hampshire to help identify the waste streams of greatest concern to waters in the Piscataqua Region. The identified waste streams were single use plastics, derelict fishing gear and pet waste. The Piscataqua Region Estuaries Partnership (PREP) and partners are continuing to identify projects and partnerships to work to reduce these waste streams from entering inland and coastal waters in Maine and New Hampshire.

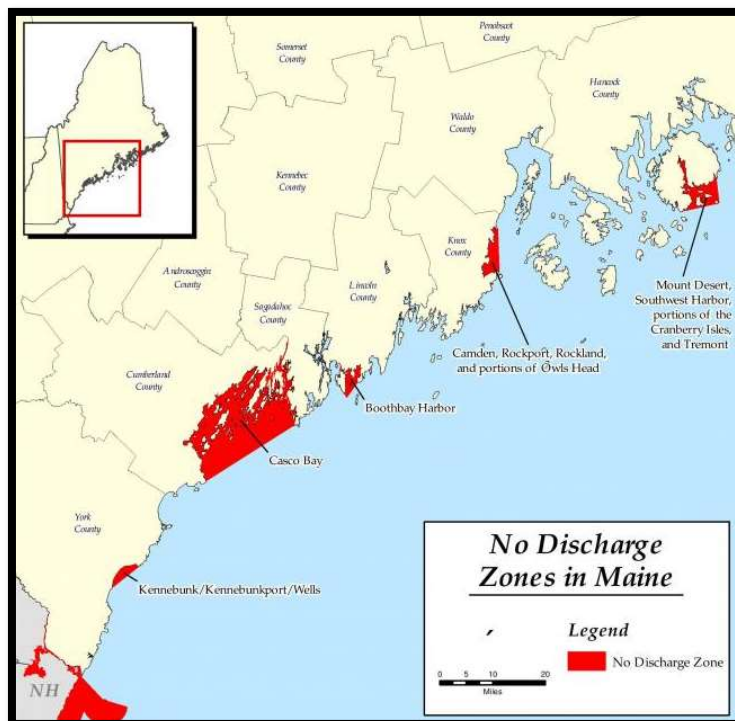
H. Other NPS Sources

The preceding sections describe six major NPS categories in Maine. Boatyards, Marinas and Recreational Boating and Land Disposal are no longer major sources of NPS pollution. Regulatory and nonregulatory programs have reduced the water quality threat from these two NPS categories.

Boatyards, Marinas and Recreational Boating

Because of their proximity to water, marine facilities including boat repair yards, marinas, commercial piers, and boat ramps can adversely affect water quality. Many types of pollutants including fuels, oils, grease, antifreeze, cleaning materials, fish waste and solid waste can get into nearby waters. In large part, marine facilities are regulated by the MEPDES program, through both the Industrial Multi-Sector General Permit and the Waste Discharge Program. In addition, marine facilities may be subject to regulation for fuel storage, hazardous, solid or sanitary waste, and air discharges. Commercial piers and municipal or state boat ramps are potential sources that are not regulated.

DEP plays the lead role in carrying out these regulatory programs and providing technical assistance and outreach efforts for boatyards and marinas. In conjunction with the Maine Marine Trade Association, DEP is updating its BMP manual, which provides guidance on various BMPs such as fish waste and bait management, boat cleaning, fuel spill prevention, solid waste management and sediment and erosion controls. The new manual, *Maine Marine Environmental Compliance Guide*, will be released in late 2019.



Recreational boating can cause NPS impacts in Maine's waters outside of the boatyards and marina facilities. Federal law prohibits discharges of untreated sewage (toilet waste) into waters within three miles of the coast; requires the use of marine sanitation devices to treat all sewage generated from boats; and provides a process for a State to create No Discharge Areas. Maine law prohibits the discharge of sewage from a vessel into inland waters, such as rivers and lakes, and requires pumpout stations at certain marinas.

Since 1999 DEP has managed the Maine Pumpout Grant Program funded by the United States Fish and Wildlife Service with funding from the Clean Vessel Act (CVA) Grant Program. Funds for the CVA program are provided annually from the Sport Fish Restoration and Boating Trust Fund and are derived from excise taxes on fishing equipment, motorboat and small engine fuels, import duties, and interest on the fund. Maine applies for grant funding every year through a nationally competitive process.

Maine's Pumpout Grant Program provides a 75% grant for the installation, operation and maintenance of boat holding tank pumpout equipment to marinas, boatyards, and municipalities, through a non-competitive program. Maine has developed a detailed plan to ensure that pumpouts are installed where they are needed. In addition, grant funding is used to produce educational materials for the boating public. Since 1999, Maine has received over \$4 million in CVA funds and has passed over \$3.3 million directly to Maine towns and businesses, resulting in nearly 100 pumpouts available to boaters on the coast and lakes.

States can apply to the EPA to designate an area as a No Discharge Area if the state concludes that additional protection from the impacts of boat sewage is needed to protect public health, sensitive environments and shellfish resources. There are five approved No Discharge Areas in Maine: the Kennebunk-Wells, Casco Bay, the Boothbay Region, West Penobscot Bay and the Southern Mount Desert.

Land Disposal

Waste disposal was historically a significant NPS problem in Maine. Waste and leachate delivered toxics and nutrients to surface and ground waters. Fortunately, several laws have been enacted over the past several decades, and waste disposal activities are now highly regulated and monitored. In fact, most of Maine's landfills are currently inactive or have been closed. There are now only a small number of highly regulated landfills, including 27 municipal operations.

The State of Maine supports an integrated approach to waste management. This includes programs to reduce the amount and toxicity of waste generated, promote reuse and recycling of waste, and compost and process waste to create safe and useful products. Disposal through incineration and landfilling is the least preferred option.

DEP's solid waste programs include solid waste facilities management, sludge and residuals management, scrap tire management, electronic waste and mercury product management, and the non-hazardous waste transporter program. These programs provide education and technical assistance and carry out regulatory activities including licensing, compliance and enforcement of the State's solid waste laws.

VIII. NPS Programs and Partnerships

A. DEP NPS Programs

DEP conducts focused work on NPS issues through the NPS Grants Program, NPS Technical Assistance Services and NPS Outreach. The following section describes these program areas and identified management strategies associated with each.

NPS Grants Program

DEP administers a pass-through grants program that awards and monitors sub-grants of EPA Section 319 & 604b funds (Clean Water Act) for watershed projects to help restore or protect lakes, streams, rivers, or marine waters from NPS pollution. These grants help communities identify nonpoint water pollution sources, prepare watershed-based management plans, and take action to reduce or prevent NPS pollution. DEP Agreement Administrators are assigned to each NPS project to monitor grantee progress in implementing the project and provide technical support to help grantees successfully carry out projects. DEP offers two types of grants to help communities:



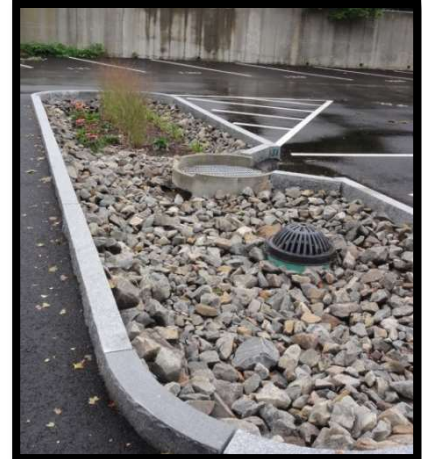
Sample 319 grant project: buffer planting on an eroding shoreline

- **Develop a watershed-based plan** - A WBP provides assessment and management information and describes actions needed over a ten-year period to restore NPS-impaired water bodies, or to protect water bodies threatened by NPS pollution. The extent of the planning area (watershed) needs to be a geographically-appropriate size so that implementing actions can lead to measurable reductions in pollution and achievement of water quality goals.
- **Implement a watershed-based plan** - Grants are available to help partners make progress carrying out NPS management measures (actions) described in the plan. A WBP accepted by the DEP is a prerequisite to be eligible to apply for NPS grant funds to help implement the plan.

DEP administers the Section 319 grant award received from EPA in accordance with the national EPA guidance for state NPS management programs and the EPA-DEP Performance Partnership Agreement (PPA). EPA guidelines designate the annual Section 319 award into two categories – NPS program funds and watershed project funds. States may use 50 percent of their Section 319 grant allocation (NPS program funds) to support any eligible NPS activities in the State NPS management plan. States are required to use at least 50 percent of funding (watershed project funds) to implement on-the-ground watershed projects guided by a watershed based plan. Watershed project funds are for restoring impaired waters through the

implementation of a WBP or to implement alternative plans approved by EPA, such as protecting unimpaired waters designated as a priority in a State NPS Plan. Project funds may not be used for planning activities such as WBP or TMDL development.

In Maine, Section 319 NPS program funds are used primarily to support DEP staff performing NPS program services and training programs through the NPS Training and Resources Center. DEP expects to use a limited amount of program funds to help develop new WBPs. Section 319 “Watershed project funds” will be used primarily for implementation of WBPs to help restore NPS impaired waters or alternative plans to protect unimpaired waters that are considered threatened. DEP plans to use up to 50 percent of watershed project funds for implementation of WBPs to help communities protect unimpaired waters that are considered threatened or most at risk.



Ogunquit River 319 grant project: installation of a FocalPoint bioretention system to treat runoff. A pre-treatment structure (Rain Guardian) was also installed to simplify maintenance and extend the life of the system.



Sample 319 grant project: Triple-barrel culvert causing bank erosion and impeding fish passage was replaced with a 16' pre-cast concrete bridge.

Technical Assistance Services

In addition to the support provided to active 319 projects, DEP invests considerable staff resources to provide technical support to watershed groups, municipalities and other partners. Some of the main areas of support are described below.

- **Watershed Association Support** – DEP staff support the work of lake and watershed associations through presentations, meetings and other technical assistance. DEP provides information to help groups understand their watershed’s NPS issues and evaluate available options for further assessment and remediation. Staff also promotes the use and adoption of the NPS Site Tracker, which helps groups manage information on erosion sites in their watersheds. The tool allows prioritization of erosion sites, tracking of sites as they are fixed, and listing of new sites as they are discovered.
- **Watershed Surveys** – Watershed Surveys find, document, and prioritize NPS pollution sources in a watershed and recommend BMPs needed at specific NPS sites. Most watershed survey projects are conducted with local funding, and DEP provides technical assistance and project oversight.
- **Watershed Roundtable** – DEP hosts an annual Watershed Roundtable for watershed managers from state agencies, municipalities, watershed organizations, SWCDs, and the private sector. This informal, day-long event provides an opportunity for networking, sharing lessons learned, and discussing common problems in both rural and urban watersheds across the state.
- **Youth Conservation Corps** – The DEP provides technical assistance and training to the State’s nine YCC programs. These YCC programs hire high school students to install buffers, erosion control measures, and other conservation practices in lake and river watersheds. Most of these programs originally started as part of 319 grant projects, but communities then secured local funding to continue the programs after the grants ended.
- **Municipal Comprehensive Plan Reviews** – DEP provides maps and waterbody information to municipalities working on comprehensive plans, which are required under the Comprehensive Growth Management Act (30-A M.R.S. § 4311). After plans are submitted to the state, DEP reviews the water resources sections of municipal comprehensive plans for consistency with agency goals, programs, and policies. Suggestions are also provided for possible strategies to address NPS threats and problems.



Volunteers for the Salmon Lake - McGrath Pond watershed survey.



30 Mile River Watershed Association’s YCC.

NPS Outreach

NPS pollution is the result of a myriad of individual actions throughout a watershed. While many important polluted runoff sources can be controlled through administration of local ordinances or state regulations, outreach promoting voluntary use of BMPs can effectively prompt more widespread use of BMPs. DEP carries out several programs that promote voluntary adoption and use of BMPs to address NPS pollution. Some of the main outreach activities are described below:

- **Nonpoint Source Training and Resource Center** – The NPSTRC provides training to various groups throughout the state to help them prevent NPS pollution. Training topics include erosion and sediment control; stormwater management; and septic system installation, design, and inspection. The NPS Training Center coordinates the Contractor Certification Program, which is required for contractors that disturb soil in the shoreland zone. The Center also coordinates conferences; develops and maintains various publications and a video lending library; and acts as a clearinghouse for NPS and BMP information.
- **Phosphorus-Free Fertilizer Effort** – Maine law (38 M.R.S. § 419) requires stores that sell fertilizer to post DEP-approved signs explaining when it is appropriate to use fertilizers with phosphorus. DEP helped coordinate the implementation of this law by providing retailers signs and other supporting materials about fertilizer use.
- **Outreach to Municipal Officials** – DEP offers NPS training for municipal officials to help provide services formerly provided by the non-profit program, Nonpoint Education for Municipal Officials (NEMO), which was discontinued in 2013. The NPS Training Center provides some training to fill this need through certification classes and online training modules. Limited assistance is also provided to municipalities that view the modules and would like additional information (e.g., ordinances changes).
- **School Outreach** – DEP provides support for student and teacher activities that enhance understanding of NPS and Maine’s water resources. Staff help support partner events including regional Envirothon competitions for high schools, classroom visits, trout releases and other water quality field trips. DEP helps plan and carry out the annual Southern Maine Children’s Water Festival and the biennial Northern Maine Children’s Water Festival. These events bring over 700 4th, 5th and 6th graders to the University of Southern Maine and University of Maine to learn about Maine waters, ecosystems, challenges and stewardship. DEP also provides middle and high school environmental education curricula, including modules on watersheds, wetlands and ocean acidification.



DEP-approved phosphorus-free sign posted at retailers.

- **Target Audience Analysis** - Effective outreach segments audiences into discrete groups of people with common characteristics and then facilitates a more effectively targeted outreach effort. DEP's NPS Outreach Program aims to understand key target audiences and then use this knowledge to effectively influence BMP use. DEP has funded and supported research efforts such as phone surveys, focus groups, and intercept surveys to gather information on current behavior, beliefs, values, and barriers to behavior adoption. DEP then provides this information to partners who are working to promote water quality efforts.



Municipal officials learn about BMPs.

- **NPS Outreach Assistance to 319 Grant Projects** – DEP provides outreach assistance to partners developing and implementing watershed based plans to make sure that outreach efforts are as effective and targeted as possible. The guidance document *Outreach Guidance for NPS Watershed Implementation Projects* (DEP, 2008) has been developed for grantees. DEP also provides staff support to help identify the target audiences that are key to advancing water quality improvement and protection. Once the audience is identified, projects can tap into existing programs or, if needed, design new ones based on the fundamentals of effective behavior change science.
- **NPS Outreach Assistance to Partners** - The most effective way to promote voluntary use of BMPs is through one-on-one contact and local outreach. Since DEP doesn't have the staffing or local reach to effectively accomplish voluntary BMP adoption on a statewide basis, DEP partners with and supports local organizations. These organizations and programs deliver local behavior change efforts through technical assistance, educational opportunities, and cost-sharing. The organizations include statewide organizations with a local presence such as Maine Lakes Society's LakeSmart program and the Maine Board of Pesticide Control's YardScaping program. DEP will also support public outreach efforts associated with the ban on coal tar sealant products on driveways and parking lots, which will go into effect starting in 2020.

DEP has identified a number of important target audiences who in one form or another can have a significant impact on the quality or quantity of stormwater runoff. These audiences typically need encouragement to voluntarily implement BMPs. BMP promotional efforts and programs for several target audiences are described below.

Table 7. Key NPS Target Audiences and Current BMP Promotional Efforts.

Target Audience/Activity	Prominent Organizations (Outreach Efforts)
Agriculture	USDA NRCS (voluntary technical assistance & funding for conservation practices/BMPs through EQIP, USDA Farm Services Agency (voluntary technical assistance & funding through CRP), and DACF (Maine nutrient management law administration)
Developers	DEP Nonpoint Source Training and Resource Center (NPSTRC) (limited outreach through occasional conferences)
Earthwork contractors	DEP NPSTRC (contractor certification program & courses)
Homeowners and residents	Think Blue Maine partnership (website, trainings, outreach materials), DEP (P-Free fertilizer effort, 319 project support), Maine Board of Pesticide Control (Yardscaping Program)
Local Public Road Maintenance	Maine Local Roads Center (training and technical assistance), NPSTRC (indirectly through Erosion & Sediment Control courses)
Municipal officials and employees	Nonpoint Source Education for Municipal Officials (limited workshops and presentations), NPSTRC (training for CEOs and planners on low impact development)
Shorefront property owners	Lakes – Maine Lake Society (LakeSmart Program), Lake Stewards of Maine (trainings, website), Regional groups; Streams/Rivers – Regional groups, Long Creek Restoration Project; Marine – Regional groups, Casco Bay Estuary Partnership, Piscataqua Region Estuaries Partnership
Winter snow/deicing contractors	Statewide Salt Task Force (policy development, partner outreach), NPSTRC (conference, trainings)
Forestry	Maine Forest Service (Certified Loggers program, BMP site inspections) and USDA NRCS (voluntary technical assistance and funding for forestry management practices, Forestry plans and water quality conservation practices through EQIP).

B. Integration with Other Government Programs that Protect Water Quality

In addition to the DEP programs mentioned in the previous section, there are many other DEP, state, federal and municipal programs that help protect and restore water quality. The most prominent NPS-related programs are described below.



Environmental Protection Agency

EPA provides annual funding through Section 319 of the Clean Water Act to help DEP carry out its NPS Programs. EPA personnel also provide extensive program guidance and technical assistance for the NPS Grants Program to ensure compliance with EPA guidelines and reporting requirements. In 2019 the annual Section 319 program grant to Maine was \$1,853,540. In addition to 319 funding, EPA provides other funds for water quality related programs and activities including Section 604(b) funds for water quality planning, the Maine Healthy Beaches Program and the National Estuary Program. EPA and DEP performance objectives, priorities and commitments are detailed in an annual Performance Partnership Agreement.

FMI - <http://www.maine.gov/dep/about/planning.html>



Maine Coastal Program

In 1978, NOAA approved the Maine Coastal Program (MCP) as the State's coastal zone management plan in accordance with the federal Coastal Zone Management Act (15 U.S.C. §, *et seq.*). The MCP works to improve the environmental and economic health of Maine's coastal areas in accordance with the CZMA and the general policies stated in the state's Coastal Management Policies Act (38 M.R.S. § 1801). DACF's Bureau of Geology, Natural Areas, and Coastal Resources is the lead agency for administration of the MCP. Several state agencies, primarily DEP and DMR, play key roles in implementing Maine's networked program. The MCP's activities center on the designated state "coastal area", which is comprised of the land area of all municipalities on tidally-influenced waters and coastal waters and all islands within them seaward to the three-mile limit of state ownership.

The MCP's NPS-related efforts focus primarily on planning related to the interaction of land uses and coastal water quality. Watersheds of shellfish growing areas are a major focus; as required by NOAA, MCP has a goal and indicator program to track progress in opening shellfish growing areas for harvesting. While DMR administers the shellfish classification program, MCP provides technical support to municipalities to develop municipal plans, policies and ordinances that address coastal pollution in shellfish growing area watersheds. MCP administers a competitive Coastal Community Grant program for municipalities and regional organizations that may fund NPS-related projects such as water quality monitoring, pollution source surveys, and habitat restoration; and assists coastal organizations applying for CWA Section 319 funds. MCP also provides limited funding to Regional Planning Councils in nine coastal regions that may assist coastal municipalities with NPS-related issues, among others. MCP's Municipal

Planning and Assistance Program, which supports smart growth strategies, low impact development, and other land use planning, and the MCP's outreach program, which educates the public about coastal issues and promotes good stewardship, also contribute to the state's approach to NPS management.

FMI - <https://www.maine.gov/dmr/mcp/index.htm>

Maine DEP Stormwater Program (Maine Pollutant Discharge Elimination System)

Since 1987, EPA has had authority under the federal Clean Water Act to regulate certain stormwater discharges as point source discharges through the National Pollution Discharge Elimination System. EPA developed specific stormwater requirements for construction sites, industrial activities and for discharges from municipal separate storm sewer systems. In 2001, EPA delegated authority to DEP to administer this program (now referred to as MEPDES).

- **Construction General Permits** - DEP issues general permits for point source stormwater discharges from construction activity. This general permit applies solely to construction activity and not to ongoing stormwater management following construction. The permit sets standards for managing stormwater that may pick up pollutants, including soil, and discharge them to waters of the State such as lakes, streams, and wetlands. The requirement for a permit is triggered by the amount of disturbed area created during construction, and whether the site will directly discharge to surface waters of the state.

FMI - <http://www.maine.gov/dep/land/stormwater/construction.html>

- **Municipal Separate Storm Sewer Systems (MS4)** - DEP issues general permits for discharges from MS4s in certain regulated communities. In 2013, there were 40 entities regulated through this program, including 30 municipalities, eight State or Federal-Owned facilities and two transportation agencies. Regulated entities are required to develop and implement a stormwater program management plan that addresses the following six Minimum Control Measures: public education and outreach on stormwater impacts; public involvement and participation; illicit discharge detection and elimination; construction site stormwater runoff control; post-construction stormwater management in new development and redevelopment; and pollution prevention/good housekeeping for municipal operations.

FMI - <http://www.maine.gov/dep/land/stormwater/MS4.html>

- **Industrial Multi-Sector General Permit** - In 2005, Maine's Multi-Sector General Permit was issued for point source stormwater discharges associated with industrial activity. Regulated entities are required to develop and implement a Stormwater Pollution Prevention Plan, which includes general guidelines as well as specific standards for each listed industrial activity. The Industrial Stormwater Unit provides technical assistance, training, outreach and support to help the Maine business community meet permit requirements.

FMI - <http://www.maine.gov/dep/land/stormwater/multisector.html>

- **Long Creek Watershed** - In 2009 and 2015, DEP issued a MEPDES general permits for post-construction discharges of stormwater from properties with one acre or more of impervious area in the Long Creek watershed, an urban impaired stream located in the municipalities of South Portland, Westbrook, Portland, and Scarborough. Operators of properties that have a designated discharge are required to obtain an Individual Waste Discharge License from the Department or file for coverage under the Long Creek General Permit which requires permittees to participate in and comply with implementation of the Long Creek Watershed Management Plan, which is being carried out by the Long Creek Watershed Management District.



FMI - http://www.maine.gov/dep/water/wd/long_creek/index.html



Maine Department of Marine Resources

DMR was established to conserve and develop marine and estuarine resources through scientific research, promotion of the coastal fishing industry, and implementation of laws and regulations. DMR's Shellfish Growing Area Program determines shellfish growing area classifications in all shellfish harvesting areas to ensure that only pollution-free areas are open to harvesting. Classifications are set through sanitary surveys that include a shoreline survey to identify pollution sources that may impact water quality, marine water sampling to determine fecal coliform bacteria levels, and analysis of how weather conditions, tides, currents, and other factors may affect the distribution of pollutants in the area. Water samples are collected monthly from January through December to determine bacteria levels. DMR sanitary surveys have identified NPS pollution as the likely sources of bacteria in numerous shellfish harvesting areas in the state. This information, in turn, has been used by DEP to help identify NPS Priority Watersheds.

FMI - http://www.maine.gov/dmr/rm/public_health/shellfishgrowingarea.htm

Maine Climate Change Adaptation

The report *People and Nature Adapting to a Changing Climate: Charting Maine's Course* (DEP, 2019) contains recommendations for action to plan for changes to Maine's climate. The report emphasized the need for planning and action at the local level and recognized that creation of an actionable state-level climate adaptation plan requires years of work and significant expenditure of resources to assure widespread acceptance and implementation. Recommendations in the report include providing climate change awareness education to municipalities and local planning organizations, evaluating and revising regulations, mapping areas of vulnerability, and estimating cost impacts of no-action alternatives for capital improvements.

FMI - <https://www.maine.gov/dep/sustainability/climate/adaptation-actions.html>



John E. Baldacci, Governor

Brenda M. Harvey, Commissioner

Maine Drinking Water Program (DWP)

The Maine Drinking Water Program, which is part of the Center for Disease Control and Prevention, implements the Safe Drinking Water Act. The program uses EPA's multiple barrier approach to help keep water safe and secure. Source protection is the program's primary focus since poorly planned and managed development represents the greatest risk to water quality and quantity. Key DWP partners include Public Water Systems and Maine Rural Water Association. None of these groups have authority to manage land use. However, the DWP, public water systems and DEP collaborate on projects in a number of drinking water watersheds. The DWP also provides input on state-wide priorities for 319 projects and provides public water systems with financial resources that can be used to enhance NPS projects. The DWP is also a key partner in the Salmon Falls Watershed Collaborative, which is an inter-state effort to protect drinking water supplies for over 47,000 residents in Maine and New Hampshire.

FMI - <http://www.maine.gov/dhhs/mecdc/environmental-health/water/>



Maine Healthy Beaches Program

The MHB program was established to ensure that Maine's salt-water beaches remain safe and clean. The program brings together communities to perform standardized monitoring of beach water quality, notify the public if bacteria levels threaten human health, and educate both residents and visitors on ways to keep Maine's beaches healthy. The MHB program is funded by EPA under the Federal Beaches Environmental Assessment and Coastal Health Act. There are 29 beach management entities in the MHB program. While the focus of the program is to monitor bacteria levels at beaches, entities finding high bacteria levels at beaches often expand testing into feeder streams to help determine bacteria sources.

FMI - <http://www.mainehealthybeaches.org/index.html>

Municipalities

Maine includes 488 organized municipalities that provide a wide range of services and responsibilities associated with self-government. Municipal roles related to NPS include road construction and maintenance, comprehensive planning, and growth management. Most municipalities have planning boards that carry out laws and ordinances related to comprehensive planning and growth management functions. The Municipal Subdivision Law (30-A M.R.S. § 4401) requires planning boards to review subdivisions using the criteria set out in the statute. The Comprehensive Growth Management Act (30-A M.R.S. § 4311) encourages municipalities to identify tools and resources to effectively plan for and manage future development within their jurisdictions. The Mandatory Shoreland Zoning Act (38 M.R.S. § 435) requires the adoption of local shoreland zoning ordinances that regulate lands within 250 feet of normal high water of certain water bodies and wetlands.

Since Maine is a 'home rule' state, municipalities have broad authority to adopt additional local land use ordinances. Site Plan Review Ordinances have been adopted by numerous

municipalities under the authority of home rule to regulate developments which normally cannot be reviewed as subdivisions. A smaller number of municipalities have also adopted ordinances limiting phosphorus export from single-lot development, promoting low impact development practices or creating set-backs along small headwater streams. In addition to local ordinance work, 30 municipalities are part of the MS4 program, which addresses NPS issues from municipal stormwater systems. The Maine Municipal Association is a non-profit organization that provides services such as advocacy, education and information, professional legal and personnel advisory services, and group insurance self-funded programs for member municipalities. Numerous municipalities have also become involved in and provided support for 319 grant projects and other community efforts to protect and restore local water quality.

FMI - <http://www.memun.org/>

Municipal Planning Assistance Program

This program, which is housed in the Maine DCF, helps municipalities manage growth to enhance economic development and natural resource protection. MPAP works with towns throughout the state's organized area. The Maine Coastal Program funds planning staff whose efforts focus on coastal communities and coastal issues. In addition to administering Maine's Growth Management Act, program staff regularly provide technical assistance to local and regional planners, other municipal officials, and volunteer boards on the development of land-use ordinances, interpretation of state land use laws, the local comprehensive planning process, and numerous other matters. The program also collaborates with other state agencies on the development of policies, rulemaking, comprehensive resource assessments, and other strategic state-level matters.

FMI - <http://www.maine.gov/dacf/municipalplanning/index.shtml>



Natural Resources Conservation Service, USDA

The NRCS administers multiple federal Farm Bill programs that provide technical and financial assistance for implementation of water quality practices. The 2018 Farm Bill provides added opportunities for leveraging funding and other resources to improve water quality affected by agricultural and silvicultural NPS pollution. The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat.

NWQI began in 2012 as a collaborative program between NRCS and EPA to help improve water quality where there is a critical concern. Two watersheds⁵ in Maine are enrolled in NWQI and have been receiving targeted NWQI funding for several years. After significant BMP installations in both watersheds, it is anticipated that both will withdraw from the program in 2020. DEP will continue to conduct monitoring in Oliver Brook within the Meduxnekeag River HUC to assess

⁵ Meduxnekeag River-Nickerson Lake in Aroostook County and Unity Pond Halfmoon Stream HUCs in Waldo County

whether there has been a resulting water quality improvement. In 2019, NRCS started preparing watershed assessments as part of the Readiness Phase for the Sheepscot River and Cross Lake HUCs. EPA, NRCS, and DEP will continue to implement encourage and facilitate program coordination in watersheds enrolled in the program. NRCS will coordinate with DEP on the selection and implementation. DEP will develop an assessment plan that collects data in one of the two new watersheds to evaluate the success of the work in the watershed in addressing the lake or stream's impairment.

FMI - <http://www.nrcs.usda.gov/wps/portal/nrcs/site/me/home/>

Soil and Water Conservation Districts

Maine's 16 SWCDs provide local conservation leadership, teach the value of natural resources, encourage conservation efforts and help plan and implement voluntary programs. Districts are governmental subdivisions of the state that are governed by a Board of Supervisors and funded in part by the DACF and their respective counties. Districts are part of the non-profit Maine Association of Conservation Districts, which helps coordinate and publicize District activities. Districts are heavily involved in DEP's 319 grant program because their mission of NPS abatement and close ties with the local community make them ideal partners.

FMI - https://www.maine.gov/dacf/about/commissioners/soil_water/index.shtml

State Universities

The University of Maine System supports NPS-related work through several programs. The George Mitchell Center's Water Institute and Sustainability Solutions Initiative conduct water-related research and promote sustainable policies and solutions through conferences, publications and local outreach. The University of Maine's Margaret Chase Smith Policy Center convened a wide range of stakeholders to examine winter salt issues and authored a comprehensive report that spurred the formation of the Winter Salt Task Force. In addition, professors and students at several campuses help with water quality monitoring and technical assistance on local projects. The University of New Hampshire's Stormwater Center (UNH) conducts research and outreach related to stormwater BMPs in cold climates.

FMI - University of Maine - <http://www.umaine.edu/sustainabilitysolutions/about/index.htm>

University of New Hampshire Stormwater Center - <http://www.unh.edu/unhsc/>

Tribal Governments

Five federally-recognized Native American tribes are located within the State of Maine. These include the Houlton Band of Maliseet Indians; the Penobscot Indian Nation; the Passamaquoddy Tribe of Indians at Pleasant Point Reservation; the Passamaquoddy Tribe of Indians at Indian Township Reservation; and the Aroostook Band of Micmacs. The Houlton Band of Maliseets, Passamaquoddy Tribe of Indians at Pleasant Point Reservation; Passamaquoddy Tribe of Indians at Indian Township Reservation; and Penobscot Nation have NPS programs. The Meduxnekeag River is an integral part of the Maliseet tribal culture. The tribe conducts regular water quality monitoring in the rivers and its tributaries, carried out an EPA Targeted Watershed Initiative project and is currently partnering with local organizations including the

Southern Aroostook Soil and Water Conservation District to carry out NPS mitigation work in the watershed. The Penobscot Nation's Water Resources Program is focused on the Penobscot River, water quality monitoring and partnerships to address NPS problems.

FMI – Houlton Band of Maliseets - http://www.maliseets.com/natural_resources.htm
 Penobscot Nation - <https://www.penobscotnation.org/departments/natural-resources>
 Passamaquoddy Tribe of Indians Indian Township Reservation - www.passamaquoddy.com
 Passamaquoddy Tribe of Indians Pleasant Point Reservation - www.wabanaki.com
 Aroostook Band of Micmacs - www.micmac-nsn.gov

Table 8. Programs, Partners, and Roles.

Program and Partner Names	Education & Outreach	Financial Assistance	Technical Assistance	Technology Transfer	Monitoring	Regulatory Enforcement	Policy & Planning
Maine Coastal Program		X	X	X			X
Maine DEP Stormwater Program			X			X	
Maine DMR					X		
Maine Drinking Water Program		X					X
Maine DEP MHB	X		X		X		
DACF MPAP							X
Municipalities	X	X				X	X
USDA NRCS		X	X	X			
SWCDs	X		X	X	X		
State Universities	X		X	X	X		X
Tribal Governments	X		X		X		
US EPA	X	X	X	X	X	X	X

C. Partnerships with Non-Governmental Organizations

DEP relies on local non-governmental organizations to carry out NPS assessment and remediation work at the local level. These groups provide local knowledge and expertise, carry out monitoring and stewardship, and provide in-kind support or direct funding to get work done. The most successful NPS projects typically are initiated and implemented by a dedicated local organization with support from other local, regional, or statewide groups. Although there are too many organizations to list each individually, the key non-governmental organizations and types of groups are described below.



Casco Bay Estuary Partnership (CBEP)

CBEP is part of the National Estuary Program established by EPA. CBEP works with partners to protect and restore the water quality and fish and wildlife habitat of the Casco Bay ecosystem, while

ensuring compatible human uses. CBEP's work is guided by the following five goals in the Casco Bay Plan: support projects to conserve and restore habitat, manage stormwater, monitor water quality, reduce toxic contamination, and promote active stewardship in the Casco Bay. CBEP's focus area is the Casco Bay watershed, which covers 986 square miles and includes 42 municipalities. CBEP provides financial support, collects scientific data, catalyzes project development and implementation, provides technical assistance, and promotes citizen involvement and awareness.

FMI - <http://www.cascobay.usm.maine.edu/index.html>

Maine Lakes Society

Maine Lakes Society (MLS)
MLS (formerly Maine Congress of Lake Associations) was formed in 1970 as a non-profit, charitable organization focused on protecting water quality and promoting sound land-use practices for the protection and preservation of Maine's lakes. MLS serves as an information clearinghouse and conducts education to lake associations through its website, annual conference, newsletter, floating classroom program, and other avenues. MLS also conducts legislative advocacy related to lake management issues. In 2012 the LakeSmart program was transferred from DEP to MLS. LakeSmart was established in 2002 to recognize lake-friendly properties and promote a new norm for lakefront development.

FMI - <https://mainelakessociety.org/>



Piscataqua Region Estuaries Partnership (PREP)

PREP is part of EPA's National Estuary Program. PREP's mission is to carry out the Comprehensive Conservation and Management Plan, which outlines 98 Action Items to improve water quality in the Great Bay Estuary and the Hampton-Seabrook Estuary. PREP provides financial assistance to partners and projects, conducts water quality and environmental monitoring, and conducts education and outreach programs. In 2007 the PREP Management Committee expanded PREP's focus area to the entire Great Bay Estuary watershed, including the 24 percent of the watershed in Maine. In total, the watersheds include 42 municipalities in New Hampshire and 10 municipalities in Maine. PREP receives its funding from the EPA and is administered by UNH.

FMI - <https://prepeestuaries.org/>



Lake Stewards of Maine (LSM)

LSM (formerly Volunteer Lake Monitoring Program) is a nonprofit organization that trains, certifies, and provides technical support to over 1,000 volunteers who monitor a wide range of indicators of water quality, assess watershed health, and screen over 500 lakes for invasive aquatic plants and animals. LSM volunteers monitor assigned lakes twice a month from May through October, and the resulting data are used by DEP to help determine lake health and attainment status. LSM also conducts outreach about water quality and watershed stewardship through its annual meeting, website, trainings, newsletters, and annual report. LSM and DEP jointly conduct an annual workshop on watershed surveys, and LSM has raised funds to help support a small number of watershed surveys.

FMI - <https://www.lakestewardsofmaine.org/>

Watershed Organizations

Local watershed organizations are key partners in NPS work including water quality monitoring, outreach, and watershed stewardship. Several regional groups focused on water resource protection include Friends of Casco Bay, Lakes Environmental Association, 7 Lakes Alliance, Cobbossee Watershed District, 30 Mile River Watershed Association, Raymond Waterways Protective Association, Acton Wakefield Watersheds Alliance, China Region Lakes Alliance, and Friends of the Cobbossee Watershed. These organizations tend to have some paid staff and often serve as resources for smaller organizations. In addition to these larger groups, there are over 200 lake associations that focus on individual lakes, and a smaller number of groups focused on rivers, streams, and marine areas.

wellsreserve Wells National Estuarine Reserve

at laudholm
WELLS NATIONAL ESTUARINE RESEARCH RESERVE Wells Reserve is one of 28 national estuarine reserves that partners with the National Oceanic and Atmospheric Administration to study and protect vital marine and estuarine resources. Wells Reserve conducts marine research and water quality monitoring and coordinates the volunteer monitoring efforts of the Mousam and Kennebunk River Alliance. They also provide education through school programs, decision-maker training, and work with partners to promote watershed protection in coastal watersheds in Southern Maine.

FMI - <http://www.wellsreserve.org/>

Table 9. Partner Organizations and Roles.

Partner Organizations and Roles	Education & Outreach	Financial Assistance	Technical Assistance	Technology Transfer	Monitoring	Policy & Planning
Casco Bay Estuary Partnership	X	X	X	X	X	
Maine Lakes Society	X					X
Piscataqua Region Estuaries Partnership	X	X				
Lake Stewards of Maine	X		X		X	
Watershed Organizations	X		X		X	
Wells National Estuarine Research Reserve	X			X	X	

IX. Funding

Many sources of funding are available to conduct NPS assessment and mitigation work. These include grants, loan programs, direct funding, and in-kind contributions. Many of these sources are highly competitive and have specific purposes and requirements. As a result, it is a significant challenge to garner the resources needed to restore and protect Maine's vast water resources. Successful NPS mitigation efforts often leverage multiple funding sources and also work to raise ongoing funding from the local community. Some of the main NPS funding sources are described in the following section.

Clean Water Act, Section 319 and 604(b) Grants

DEP administers a competitive grants program using Section 319 and 604(b) funding from EPA to help communities identify NPS sources, prepare WBPs, and take action to reduce or prevent NPS pollution. Maine public organizations such as state agencies, SWCDs, regional planning agencies, watershed districts, municipalities, and nonprofit (501c3) organizations are eligible to receive grants. An annual RFP process offers grants for developing watershed plans and implementing projects identified in the plans. Local project sponsors are required to provide match to the grant funds, and projects are typically conducted over a two-year period.

FMI - <http://www.maine.gov/dep/water/grants/319.html>

Clean Water State Revolving Fund

As noted by EPA, the CWSRF under Title VI of the Federal Water Pollution Control Act is the largest water quality financing source in the nation. Through the CWSRF program, each state and Puerto Rico maintain revolving loan funds to provide independent and permanent sources of low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the CWSRF programs are provided through federal government grants and state matching funds (equal to 20 percent of federal government grants). States may choose from a variety of assistance options, including loans, refinancing, purchasing, or guaranteeing local debt and purchasing bond insurance. States can also set specific loan terms, including interest rates from zero percent to market rate, and repayment periods up to 30 years or the useful life of the project, whichever is less. States have the flexibility to target resources to their particular environmental needs, including polluted runoff from urban and agricultural areas, wetlands restoration, groundwater protection, brownfields remediation, estuary management, and wastewater treatment. Additional information on the CWSRF program is available at http://water.epa.gov/grants_funding/cwsrf/cwsrf_index.cfm

In Maine, CWSRF funds nonpoint source projects through three different loan mechanisms; direct loans, pass-through loans, and linked-deposit loans. In an effort to provide additional funding for private nonpoint source projects, DEP expanded the traditional CWSRF direct loan

program into the other two loan programs. DEP and the MMBB jointly administer the CWSRF. DEP administers the technical aspects of the program and project eligibility; the MMBB is the financial manager of the fund.

- **Direct Loans** - Through direct loans from the CWSRF to municipal and quasi-municipal entities, low interest funding is provided for NPS abatement projects. The DEP funds NPS projects for stormwater (e.g., infiltration basins, bio-swales, and bioretention cells); the capping and other water-quality related closure activities for non-discharging municipal landfills; and the covering of sand/salt storage areas. In 2017 a MOU was signed by the DEP, MMBB, and the Finance Authority of Maine (FAME) to allow FAME to administer the Compliance Assistance Loan Program to commercial borrowers for the renovation, removal, disposal or replacement of underground or aboveground oil storage tanks or facilities.
- **Pass-Through Loans** - Maine's CWSRF coordinates a pass-through loan program that provides low interest funding for private nonpoint source pollution controls. Under this program the Maine's CWSRF provides funding to DACF, which in turn, makes low interest loans to private individuals for the projects.

The DEP in partnership with the MMBB, the Finance Authority of Maine, and DACF, implemented the Nutrient Management Loan Program for the construction of containment and handling facilities for manure and milk room waste. The program expanded to fund NPS abatement projects that reduce or treat agricultural runoff, conserve irrigation water, and reduce the impact of agricultural irrigation water withdrawals to stream flows and aquatic life by constructing irrigation reservoirs. The eligible projects now approved for funding align with agricultural NPS BMPs. Projects also need to comply with the Department's Chapter 587: In-Stream Flows and Lake and Pond Water Levels rule. Under this arrangement, the DACF will review the projects for program eligibility and ensure that the projects are completed in accordance with USDA NRCS design criteria. FAME provides the low interest loans to the borrowers.

- **Linked Deposit Loans** – To provide these low interest CWSRF loans, the MMBB works with a private lending institution to fund NPS control by accepting a reduced rate on a certificate of deposit (CD) investment and the lending institution agrees to provide a loan to the borrower at a similarly reduced rate. The Maine Forestry Direct Link Loan Program provides incentive financing to loggers that reduce NPS pollution risk on timber harvests. This program, which works in partnership with the MMBB and the Maine Forest Service, provides low interest loans for silviculture best management practices.

FMI - <http://www.maine.gov/dep/water/grants/srfparag.html>

Casco Bay Estuary Partnership Grant Programs

CBEP carries out two grant programs focused on NPS and water quality in the Casco Bay watershed. Non-profit conservation groups, towns, and state and federal conservation programs are eligible to apply for funds. The Habitat Protection Fund Grant supports land acquisition in targeted habitat areas in partnership with Maine Coast Heritage Trust, DIFW, and US Fish and Wildlife Service Gulf of Maine Coastal Program. The Community Grants Program

supports local community-based projects that combine habitat enhancement activities with strong education and stewardship components.

FMI - <http://www.cascobayestuary.org/about-us/grant-opportunities/>

Farm Service Agency (FSA) Conservation Reserve Program

The FSA carries out the Conservation Reserve Program, a voluntary program that provides funding for conservation practices on sensitive lands addressing water quality and wildlife management concerns. NRCS provides the technical assistance for the program.

FMI - <http://www.nrcs.usda.gov/wps/portal/nrcs/main/me/programs/financial/>

Lake Stormwater Phosphorus Compensation Fee Program

Under the Maine Storm Water Management Law, projects located in eligible lake watersheds may satisfy permit requirements for phosphorus reduction by paying a compensation fee into a Lakes Stormwater Phosphorus Compensation Fund for that same eligible lake watershed. The development project needs to be designed to provide at least 60 percent reduction in off-site export of phosphorus required by the permit. The fee rate is \$25,000 per pound of phosphorus. Compensation fund monies are used to implement Stormwater Compensation Projects to reduce phosphorus export from existing high phosphorus export land uses in the lake watershed. DEP staff works annually with seven partner organizations to identify and implement phosphorus mitigation projects in these watersheds.

FMI - <http://www.maine.gov/dep/water/grants/stormwatercomp/>

Local Funding

Local funding is key to fixing NPS problems and is often the source of match required by grant programs. Since grant funding is limited, it can also be the sole source of funding for projects that are important to local community but that don't fit in well with grant programs. Local funding can be in the form of in-kind services or direct funding, and come from municipalities, local organizations, private businesses, and individual citizens. Given the high costs associated with some restoration projects, certain communities are also exploring and pursuing stormwater utilities and other ways to raise dedicated funds for watershed restoration work.

Maine Coastal Program Grants

Towns and regional organizations in Maine's coastal zone are eligible to apply for small grants through the Maine Coastal Program. The Coastal Communities Grant Program provides funds to towns and regional organizations for projects designed to improve water quality, increase resiliency and adaptation to erosion and flooding, conserve coastal habitat, promote sustainable development, and enhance the coastal-dependent economy while preserving natural coastal resources. In Fiscal Year 2019, \$270,000 was awarded through this program. Grantees are required to provide at least 25 percent non-federal match. Education Grants provide up to \$10,000 to educational efforts relating to Maine coastal issues and projects that relate to greater ocean literacy.

FMI - <https://www.maine.gov/dmr/mcp/grants/index.html>

Maine Drinking Water Program Grants

The Drinking Water Program has several funding programs available to public water systems. Source Water Protection and Wellhead Protection Grants are available for planning or implementing projects that protect their surface or ground water sources, respectively. Awarded grants are typically up to \$5,000, with grants of \$10,000 available depending on the project scope. Eligible projects include: developing or updating Watershed Management Plans; establishing local protective ordinances or legal agreements in the source protection; developing or implementing drinking water education and public outreach programs; developing and/or implementing lake monitoring programs; and identifying and/or removing potential sources of contamination from the source protection area.

FMI - www.maine.gov/dhhs/mecdc/environmental-health/dwp/sitemap/financialResources.shtml

Maine Natural Resource Conservation Program

The MNRCP was created to manage the allocation of funds collected through DEP's In Lieu Fee Compensation Program. This voluntary program allows entities that are impacting natural resources, primarily wetlands, to make a payment directly to the DEP as an alternative to the traditional mitigation process. Fees collected by DEP are deposited in a Natural Resource Conservation Fund administered by The Nature Conservancy. Public agencies, non-profit conservation organizations, and private entities can apply through a competitive process for funds to restore, enhance, preserve, and create high quality natural resources throughout the State of Maine. Funding is available for land acquisition, habitat enhancement and restoration, and projects that restore watershed health.

FMI - https://www.maine.gov/dep/land/nrpa/ILF_and_NRCP/index.html

Maine Sea Grant

Maine Sea Grant at the University of Maine releases a biennial request for research proposals that link the scientific capacity of Maine with the needs of coastal stakeholders. The 2019 RFP anticipated that an estimated \$600,000 would be available to support research projects over the two-year funding period. Maine Sea Grant is administered by the University of Maine, but the research competition is open to faculty and staff at any public or private research or higher education institution in the state. In 2017, Sea Grant provided a \$5,000 grant to help fund Microbial Source Tracking in the Medomak River with the goal of identifying bacteria sources contributing to shellfish closures.

FMI - <http://www.seagrants.umaine.edu/funding/research>

Maine Small Community Grants Program

The program provides grants to towns to help replace malfunctioning septic systems that are polluting a waterbody or causing a public nuisance. Grants can be used to fund from 25 to 100 percent of the design and construction costs, depending upon the income of the owners of the property, and the property's use. An actual pollution problem must be documented in order to qualify for funding. The highest priority is given to problems that are polluting a public drinking water supply or a shellfishing area.

FMI - <https://www.maine.gov/dep/water/grants/scgp.html>

Natural Resource Conservation Service Programs

The NRCS carries out several programs that provide funding for conservation practices on agricultural lands. This includes the Wildlife Habitat Incentive Program the Regional Conservation Partnership Program and EQIP. The EQIP program aligns especially well with NPS mitigation. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air, and related resources. Projects located in watersheds selected through USDA and EPA's National Water Quality Initiative are designated as high EQIP funding priorities. The NWQI is a national program started in 2012 that provides targeted EQIP funding to help farmers install practices to reduce water quality impacts in priority watersheds. States work with NRCS to identify focus areas and conduct assessment to track restoration progress.

FMI –

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/financial/eqip/?cid=stelp_rdb1047761

Piscataqua Region Estuaries Partnership Grant Programs

PREP offers several grant programs to municipalities, community groups, watershed associations, and other organizations that conduct conservation work in PREP's coastal watershed. The annual Local Grants Program must relate to at least one Action Item from PREP's Management Plan. Eligible activity areas include water quality, land use and habitat protection, shellfish resources, habitat restoration, and public outreach. A request for proposals is issued each fall. The Community Technical Assistance Program provides assistance to communities on a wide range of regulatory and non-regulatory approaches to natural resources protection. The program is intended to be simple for communities; PREP pays for the assistance and manages the contract agreement with the Technical Assistance Providers.

FMI - <http://www.prep.unh.edu/programs/grant-programs.htm>

State General Fund

The State of Maine provides funding for two staff positions in the DEP's NPS Program. Funding is provided through the State's General Fund and fulfills part of the State's requirement to match EPA Section 319 funding.

X. NPS Program Five-year Objectives, Actions, and Annual Milestones

This section provides the five-year objectives, actions, and milestones for Maine’s NPS program for the years 2020 through 2024. Tables 10 and 17 focuses on DEP’s NPS Program administration and its watershed approach to improve and protect water quality. Tables 11 to 16 list objectives for Maine’s statewide approach to address six major NPS pollution categories: developed areas, agriculture, transportation, forestry, subsurface wastewater disposal, and hydrologic and habitat modification.

Table 10. Watershed Approach		Lead Agency: Maine DEP			Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024	
1. <u>Prioritization List</u> : Identify NPS Priority Watersheds and evaluate NPS priority lists biennially or more frequently as new information becomes available.	<ul style="list-style-type: none"> Evaluate NPS priority watersheds lists and criteria biennially or more frequently as needed. Announce public opportunity to submit requests and support for waterbodies to be added to the priority lists. Update priority lists and decision tree as needed - add or remove individual waterbodies as new information becomes available. Notify towns, planning commissions, shellfish committees and other stakeholders about new or removed NPS priority watersheds. Develop map and post on DEP webpage. Share with partners, including DEP Land Bureau. 	Amanda Pratt, DEP	1. Updated NPS priority watershed list and map.	X		X		X	
2. <u>Prioritization Criteria</u> : Identify additional prioritization criteria and waters for addition to the NPS Priority Watersheds list and/or for targeted outreach.	<ul style="list-style-type: none"> Develop Most Vulnerable Lakes list and associated criteria (considering factors including climate change, sediment chemistry, lake morphometry, anoxia potential and land use). Develop and document methods to evaluate waters that are particularly impacted or threatened by agriculture, forestry and other NPS sources. 	Amanda Pratt, DEP	2. Most Vulnerable Lakes list developed.		X				

Table 10. Watershed Approach				Lead Agency: Maine DEP					Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024					
3. <u>Assessment</u> : Conduct water quality monitoring to support future NPS watershed planning and project development.	<ul style="list-style-type: none"> Evaluate data collected by DEP, LSM and other partners. Coordinate with local partners to conduct supplemental water quality monitoring, biological monitoring and bracket sampling. Consult with partners and use Stream Stressor Guidance document to evaluate and identify primary stressors. 	Jeff Dennis, DEP	3. Supplemental monitoring conducted in at least three watersheds/year.	3	3	3	3	3					
4. <u>Assessment</u> : Develop State agency and partner capacity to use Microbial Source Tracking to identify and track bacteria sources in streams and marine waters.	<ul style="list-style-type: none"> Reach out to Maine and regional labs and compile list of ones with MST analysis capabilities. Consult with regional experts to create protocol needed to store and transport samples for future MST analysis. Assess existing DEP lab equipment and explore procurement of equipment needed to filter and freeze samples. Use above protocol to store/transport DEP and partner water samples. Use resulting MST data to investigate and address bacteria sources. 	Meagan Sims, DEP <i>Partners: DMR</i>	4. MST storage and transport SOP developed in 2020 and used by DEP starting in 2021.	X	X								
5. <u>Assessment</u> : Streamline and facilitate watershed survey data collection, sharing and analysis through expanded use of mobile apps.	<ul style="list-style-type: none"> Explore, promote and transition to using Survey123 or other mobile data collection tools during watershed surveys. 	Amanda Pratt, DEP	5. At least one survey in 2020, 2 surveys in 2021 and 50% of watershed surveys use mobile data collection tools by 2022.	1	2	X	X	X					
6. <u>Planning</u> : Incorporate climate change and resilience planning into watershed-based planning.	<ul style="list-style-type: none"> Review existing information (e.g., Hazard Mitigation Plans), assess stream culverts during watershed assessments and incorporate in WBPs. 	Greg Beane, DEP	6. Review tools and incorporate into pilot WBP planning project by 2021. All new WBPs		X	X	X	X					

Table 10. Watershed Approach				Lead Agency: Maine DEP					Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024					
	<ul style="list-style-type: none"> Use available planning tools and resources to identify other potential climate impacts to consider during WBP projects (e.g., sea level rise, vulnerable septic systems, marsh migration, coldwater refugia) and incorporate into WBPs. Incorporate information on climate change impacts into watershed survey training. 		include section on climate change by 2022.										
7. <u>Restoration Planning</u> : Approve nine-element watershed-based plans (new or updates) that guide local actions to restore impaired waters.	<ul style="list-style-type: none"> Provide decision makers with information needed to develop sound WBPs including data necessary to determine the dominant stressors contributing to the impairment and sufficient watershed and stream corridor information to identify and prioritize specific implementation activities needed to restore the waterbody. 	Wendy Garland, DEP	7. Ten nine-element WBPs approved.	2	2	2	2	2					
8. <u>Protection Planning</u> : Approve alternative WBPs (new or updates) that guide protection of unimpaired waters.	<ul style="list-style-type: none"> Working with partners, provide technical assistance for the development of lake watershed-based protection plans. Coordinate to secure EPA approval of alternative WBPs. 	Amanda Pratt, DEP	8. 15 alternative WBPs approved.	3	3	3	3	3					
9. <u>Planning</u> : Promote and support watershed assessment and planning for threatened streams.	<ul style="list-style-type: none"> Assess water quality data and watershed conditions to identify stressors for Falmouth’s threatened streams. Develop protection strategy for each stream that identify BMPs and actions for addressing existing and future likely stressors. Promote/pursue development of similar protection strategies with other communities with threatened streams. 	Kristin Feindel, DEP	9. Stream Protection Strategy developed for Falmouth streams by 2020.	X									

Table 10. Watershed Approach				Lead Agency: Maine DEP					Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024					
10. <u>Planning</u> : Promote collaboration and planning for projects that maintain open shellfish harvesting areas or restore closed shellfish harvesting areas, reduce coastal beach advisories, and mitigate other NPS impacts to coastal waters.	<ul style="list-style-type: none"> • Convene coastal work group and conduct annual meetings to share information and identify and collaborate on shared priorities. • DEP, DMR, Maine Coastal Program and MPAP will collaborate to support shared priorities through the NOAA-funded Coastal Community Grants program. DEP and DMR will review proposals and provide technical support to selected projects. 	Addie Halligan, DEP <i>Partners: MCP, DMR, MPAP</i>	10. CCG grant program funds at least one planning project per year in DEP NPS Priority Watersheds	1	1	1	1	1					
11. <u>Protection</u> : Focus NPS program on watershed protection priorities and highlight the value of these protection efforts.	<ul style="list-style-type: none"> • Work proactively with partners to protect lakes on DEP’s Watch List and Most Vulnerable Lakes list (see #2 above) with the goal of keeping off the impaired list. • Report to EPA annually on Maine’s protection efforts including work on Most Vulnerable Lakes. 	Amanda Pratt, DEP	11. Summary of work on protection priorities incorporated into NPS Annual Report.		X	X	X	X					
12. <u>Restoration</u> : Fully or partially restore four NPS impaired waterbodies and submit to EPA as NPS Success Stories.	<ul style="list-style-type: none"> • Provide technical support and funding through Section 319 grant program to support implementation of WBPs for waters with high potential to be restored. • Collect targeted water quality and biological information to determine if water classification standards have been met. • Prepare NPS Success Stories that document the restorations. 	Wendy Garland, DEP	12. Four NPS success stories approved for partially or fully restored waterbodies.		1		2	1					
13. <u>Substantial Improvement</u> : Demonstrate substantial improvement in water quality and/or	<ul style="list-style-type: none"> • Provide technical support and funding through NPS Section 319 grant program to support implementation of WBPs for impaired waters. 	Wendy Garland, DEP	13. Two NPS success stories approved that show progress toward achieving water quality		1		1						

Table 10. Watershed Approach				Lead Agency: Maine DEP					Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024					
ecological condition in two NPS impaired waterbodies.	<ul style="list-style-type: none"> Collect targeted water quality and biological information to determine the effectiveness of implementation efforts and guide WBP modifications. Evaluate data to determine if water classification standards have been met or if there has been substantial incremental improvement. Prepare NPS Success Stories that document the substantial improvement in water quality and/or ecological condition. 		goals (Type 2) or ecological restoration (Type 3).										
14. <u>Restoration/Protection</u> : Promote local efforts to maintain open shellfish harvesting areas or restore closed shellfish harvesting areas.	<ul style="list-style-type: none"> DMR meets with coastal towns, local shellfish committees and other partners to encourage local action (Fisherman’s Forum, shellfish committees or town meetings). DEP creates Medomak River case study and guidance for investigating and addressing bacteria sources. Materials incorporated into electronic version of Maine Shellfish Handbook. 	Addie Halligan, DEP	14. Medomak River case study and bacteria investigation/ mitigation guidance created.		X								

Table 11. Developed Areas Lead Agency: Maine DEP				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
1. Require and promote the use of effective erosion and sediment control BMPs during soil disturbance activities.	<ul style="list-style-type: none"> Update Chapter 305 of the Natural Resource Protection Act to improve erosion and sediment control standards for soil disturbance, instream work and other sections, as needed. Update ESC BMP Manual to reflect current approaches. Create in a format that can be easily accessed in the field. 	Mark Stebbins, DEP	1. NRPA rule-making completed in 2021 and ESC BMP Manual updated in 2022.		X	X		
2. Implementation and update of Chapter 1000 Shoreland Zoning to strengthen water quality protection at the local level.	<ul style="list-style-type: none"> Work with municipalities with older shoreland zoning ordinances to implement most recent standards. Review and update Chapter 1000 for areas of possible clarification and improvement, including ESC, buffer standards, contractor certification requirements. 	Colin Clark, DEP	2. Shoreland Zoning rule-making completed	X				
3. Update Chapter 500 Stormwater Rules to reduce water quality impacts from new or redevelopment projects.	<ul style="list-style-type: none"> Initiate stakeholder process to review Chapter 500 for areas for possible clarification and improvement, including natural hydrology and LID/green infrastructure, recertification, chloride. Develop draft rules and release for public comment with adoption by 2022. 	Mark Stebbins, DEP	3. Stakeholder process completed in 2021 and Revised rules adopted in 2022.	X		X		
4. Regularly update the Maine Stormwater BMP manual to reflect the current best management practices.	<ul style="list-style-type: none"> Evaluate proposals for new or modified BMPs for approval under Chapter 500 Stormwater Rules. Conduct annual review and regularly update the Maine Stormwater BMP manual to reflect current science and guidance. 	Dave Waddell, DEP	4. List of new approved BMPs.	X	X	X	X	X
5. Evaluate stormwater and ESC BMPs and develop guidance about climate	<ul style="list-style-type: none"> Review stormwater and ESC BMPs for climate resiliency and adaption considerations, including 	Kerem Gungor, DEP	5. Appendix created for Stormwater Manual.		X			

Table 11. Developed Areas Lead Agency: Maine DEP				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
change resiliency and adaptation planning.	storm sizing and modifications needed for areas with rising groundwater and sea level. <ul style="list-style-type: none"> • Create appendix for Stormwater Manual that includes design considerations and available tools. 							
6. Provide guidance to State and local regulators, developers and other partners about BMP selection to target specific localized resource concerns.	<ul style="list-style-type: none"> • Review stormwater BMPs for nitrogen removal efficiencies and identify additional BMPs to consider adding to the manual. • Develop a crosswalk to highlight BMPs most appropriate and inappropriate for different waterbodies and stressors (e.g., no infiltration for small streams with high commercial development, nitrogen removal BMPs for coastal watersheds). • Incorporate crosswalk into BMP manual and share with partners for use in WBPs and project reviews. 	Jeff Dennis, DEP	6. Crosswalk table completed in 2020. Training provided to DEP Land Bureau on using crosswalk for project reviews in 2021.	X	X			
7. Provide training and certification to encourage proper use of ESC BMPs by contractors and other installers.	<ul style="list-style-type: none"> • Conduct Basic and Advanced Sediment Control training workshops. • Administer the ESC Certification Program and maintain or increase the number of people certified to 2,500 (2,374 in 2019). 	John Maclaine, DEP	7. At least 500 people trained and at least 2,500 people with program certification each year.	500 trained/yr 2,500 certified/yr				
8. Develop additional trainings and supplemental training materials to enhance contractor and installer understanding and ability to properly install BMPs.	<ul style="list-style-type: none"> • Develop additional online trainings and approve/add third-party trainings to facilitate recertification process. • Create and post short instructional, demonstration videos about BMPs and NPS-related issues (e.g., silt fence installation). 	John Maclaine, DEP	8. One additional course added per year and three videos created in 2020 and 2023.	1 3	1	1 3	1	1

Table 11. Developed Areas Lead Agency: Maine DEP				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
9. Provide municipalities with NPS training, technical support and resources to prompt and improve water resource protection.	<ul style="list-style-type: none"> Develop training and certification program for municipal officials and inspectors. Certify municipal officials and inspectors to review BMPs for proper use and installation. 	John Maclaine, DEP	9. Certification program developed in 2020. At least 20 municipal officials certified per year beginning in 2021.	X	20	20	20	20
10. Encourage municipalities to consider water resources in local planning decisions.	<ul style="list-style-type: none"> Provide information to municipalities starting to develop or update Comprehensive Plans. Review draft Comp Plans for consistency and completeness and provide feedback about ways to strengthen local efforts to protect and restore water quality. 	Jeff Dennis, DEP	10. DEP feedback provided on at least four comp plans/year.	4	4	4	4	4

Table 12. Statewide Approach - Agriculture Lead Agency: Maine DACF				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
1. Monitor agricultural operations to ensure compliance with the requirement to implement approved nutrient management plans (NMP).	<ul style="list-style-type: none"> Evaluate agricultural operations (AOs) to determine if they need to develop and implement an approved NMP. Track existing AOs with an approved NMP to ensure that their NMP is up-to-date. Provide guidance for initial development of an NMP or for facilitating updates as needed. Continue to identify AOs that need an NMP and help AOs comply with the obligation to operate according to an NMP. Publicize updates to the Nutrient Management Rules, including stream exclusion requirement. Coordinate with NRCS and DEP Shoreland Zoning to align programs regarding stream exclusion. 	Mark Hedrich, DACF	1. 90% of NMPs that are due for renewal are updated within six months of expiration.	X	X	X	X	X
2. Coordinate training and certification program for Nutrient Management Planning Specialists.	<ul style="list-style-type: none"> Provide certification and recertification training opportunities for certified planners. Update test and training manual to reflect updated nutrient management rules. 	Mark Hedrich, DACF	2. NMP test updated in 2021 and NMP training manual updated by 2024.		X			X
3. Monitor livestock agricultural operations to ensure compliance with requirement to operate according to a Livestock Operations Permit (LOP).	<ul style="list-style-type: none"> Evaluate new or expanded agricultural operations (AOs) to determine their requirement for obtaining a LOP. Continue to identify AOs that need a LOP and help AOs comply with the obligation to operate according to a LOP. Evaluate farms to determine if they are considered a Concentrated Animal Feeding Operation (CAFO) as defined by state or federal regulations. 	Mark Hedrich, DACF	3. 75% of farms needing LOPs are developed within nine months.	X	X	X	X	X

Table 12. Statewide Approach - Agriculture Lead Agency: Maine DACF				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
	<ul style="list-style-type: none"> Initiate steps for appropriate permitting of these entities as needed. Conduct annual inspections of CAFOs to determine compliance with terms of the LOP. 							
4. Provide agricultural operations with up to date information on BMPs.	<ul style="list-style-type: none"> Update the Manual for Best Management Practices for Maine Agriculture. 	Mark Hedrich, DACF	4. Completed update of BMP manual.				X	
5. Implement the Agricultural Compliance Program to resolve water quality-related complaints (30 visits conducted in 2018).	<ul style="list-style-type: none"> Investigate complaints concerning farm operations that involve threats to human or animal health and safety, and to the environment. Prescribe new or modified site-specific BMPs where needed to resolve the issue, particularly water-quality-related matters. Complete site visit reports to document complaints received and resolutions. Provide reports to DEP semiannually. DEP prepares annual summary of water quality complaints received, investigated and resolved and shares with DMR, DEP, NRCS, NMRB. 	Matt Randall, DACF	5. 25% of sites with water quality issues are resolved within 30 days, 50% resolved within 90 days and 75% resolved within 180 days.	X	X	X	X	X
6. Promote the use of BMPs with horse farms and other small hobby farms.	<ul style="list-style-type: none"> Convene at least one meeting with DACF, Cooperative Extension, SWCDs, NRCS, DEP and other stakeholders to develop an outreach strategy for hobby farms. Implement at least one identified strategy. 	Wendy Garland, DEP	6. Stakeholder meeting held in 2020. At least one stakeholder-recommended outreach strategy pursued by 2022.	X		X		

Table 12. Statewide Approach - Agriculture Lead Agency: Maine DACF				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
7. Collaborate with NRCS and EPA in the NWQI program to make progress restoring impaired waters with agricultural NPS sources.	<ul style="list-style-type: none"> Evaluate water quality information for Oliver Brook and Meduxnekeag River NWQI. Provide information to NRCS for project close-out of the Unity Pond, Halfmoon Stream & Sandy Stream subwatersheds and Nickerson Lake - Meduxnekeag River subwatershed projects. Support development of NRCS Watershed Assessments for Readiness Phase of Sheepscot River and Cross Lake NWQI projects. Conduct monitoring before NWQI implementation in new NWQI watersheds. 	Wendy Garland, DEP	7. Oliver Brook water quality summary prepared (post implementation) in 2020. Monitoring plan developed for one Readiness Phase watershed in 2020 and water quality monitoring conducted in 2021.	X	X			
8. Coordinate and communicate with DACF, SWCDs, NRCS, and industry groups (e.g., Maine Potato Board) on water quality priorities.	<ul style="list-style-type: none"> Attend NRCS State Technical Committee meetings. Participate in SWCD local working group meetings and Natural Resource Assessments to share DEP priorities and opportunities for NRCS program support. Reach out to the various industry boards and councils to raise awareness of water quality issues related to their industry including nonattainment watersheds. 	Jeff Dennis, DEP	8. Attend at least five local working group meetings/year in a variety of regions in the state and meet with at least one industry group/year.	X	X	X	X	X
9. Increase field crop agriculture’s use of soil health practices to reduce soil erosion, improve water quality and offset carbon emissions.	<ul style="list-style-type: none"> Reach out to various stakeholders at the state and local level and explore ways to address agriculturally derived water quality impairment issues. 	Tom Gordon, DACF	9. Meeting held between DEP, DACF and NRCS to discuss agriculture and water quality impacts.	X				

Table 13. Statewide Approach - Transportation Lead Agency: MaineDOT				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
1. Continue using Erosion and Sedimentation Control BMPs on applicable MaineDOT projects.	<ul style="list-style-type: none"> Continue to implement and enforce MaineDOT Standard Specification 656. Continue ongoing ESC training for MaineDOT staff and contractors. Annual Stormwater MOA report submitted to MDEP summarizing MaineDOT activities as required by the Stormwater MOA between DEP and MaineDOT. 	Taylor LaBrecque, MaineDOT	1. At least 25 contractors trained/year and 100 DOT employees trained/year	25 contractors & 100 employees trained/yr				
2. Provide training and technical assistance to promote use of BMPs on town and county roads.	<ul style="list-style-type: none"> MLRC will provide training to towns through Maine Local Roads Center (MLRC). NPSTC will promote DEP Erosion and Sediment Control certification for Public Works staff. 	John Maclaine, DEP Peter Coughlin, MDOT	2. DEP will certify at least five DPW employees through the NPSTC per year.	5	5	5	5	5
3. Promote chloride salt reduction BMPs to protect water quality while maintaining safe roads for travelling public.	<ul style="list-style-type: none"> Continue MLRC training and BMP Task Force to promote snow and ice control BMPs to municipal Public Works. MaineDOT will continue to investigate new products, technologies, or efficiencies to reduce the use of chlorides. 	Peter Coughlin, MaineDOT	3. At least 30 workshops held/year, covering 4 different subjects for 150 different towns.	30	30	30	30	30
4. Identify chloride impacted or threatened streams and consider/promote salt reduction strategies in these areas.	<ul style="list-style-type: none"> DEP will identify high priority watersheds for salt reduction efforts and share with MaineDOT and towns. Provide chloride fact sheet to towns and provide technical assistance and/or training. Identify DEP priority area to implement alternative practices (e.g., catch basin to deliver chloride to stream instead of infiltration). 	Jeff Dennis, DEP	4. Chloride-impacted and threatened streams list developed.	X				

Table 13. Statewide Approach - Transportation Lead Agency: MaineDOT				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
5. Explore stakeholder interest, possible program funding options and feasibility of Green Snow Pro type program.	<ul style="list-style-type: none"> Meet with MS4 communities, MaineDOT, SWCDs, Long Creek Watershed Management District and other stakeholders to discuss Green Snow Pro program level of interest and any next steps. If support and funding exists, propose legislation to limit liability for certified snow removal contractors. 	Don Witherill, DEP	5. Limited liability legislation drafted (if supported).	X				
6. Promote reduction in the number of outdoor sand/salt piles.	<ul style="list-style-type: none"> MaineDOT will eliminate its remaining 10 outdoor sand/salt piles by 2024. MLRC will provide technical assistance to towns regarding town salt storage facilities. 	Taylor LaBrecque, MaineDOT	6. Maine DOT removes two sand/salt piles per year.	2	2	2	2	2
7. Address NPS problems identified by DEP on State roads through MaineDOT maintenance program and construction projects.	<ul style="list-style-type: none"> Annually, DEP will provide MaineDOT and Maine Turnpike Authority (MTA) with a GIS layer of priority watersheds and list of State road watershed survey sites. MDOT, MTA and DEP will meet annually to review DEP needs (above) and MaineDOT’s six-year plan to identify shared priorities and possible NPS projects that can be completed through MaineDOT and MTA maintenance or construction projects. 	Taylor LaBrecque, MaineDOT	7. MaineDOT completes at least one NPS project/year.	1	1	1	1	1
8. Provide technical assistance and training to prevent and mitigate NPS impacts from unpaved camp roads.	<ul style="list-style-type: none"> NPSTRC and partners will host workshops and online resources to promote gravel road BMPs. Promote the development of informal or formal road associations to coordinate road maintenance and improvement. 	John Maclaine, DEP	8. At least two NPSTC-approved workshops held per year.	2	2	2	2	2
9. Promote bluestone gravel for use on camp roads and driveways where available.	<ul style="list-style-type: none"> Compile a list of providers and post on NPSTC website and in Gravel Road Maintenance Manual. 	John Maclaine, DEP	9. List of bluestone suppliers compiled and posted online.	X				

Table 14. Statewide Approach – Forestry				Lead Agency: Maine Forest Service					Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024					
1. Increase overall effective BMP application on harvests from 76% to 85% or greater. Effective BMPs include all appropriately applied BMP practices, effective planning and avoiding waterbody crossings.	<ul style="list-style-type: none"> • Offer BMP training programs, with partners including the Maine Sustainable Forestry Initiative, Certified Logging Professional, Qualified Logging professional program and Northeast Master logger. • Deliver existing or develop new and topic specific trainings as needed to address problem areas when identified by monitoring, compliance inspections and industry consultation. • Work with DEP and Maine Municipal Bond Bank and EPA to maintain CWSRF funding and promote the Maine Forestry Direct Link Loan Program financing to reduce NPS risk at timber harvest sites. Apply northeast regional forestry BMP monitoring protocol on a biennial basis to assess use & effectiveness of forestry BMPs. 	Tom Gilbert, MFS	1. Maine Forestry BMPs Use and Effectiveness report documents effective BMP application on 85% of sites inspected	85		85		85					
2. Maintain the Forest Ranger-approved water quality inspections of timber harvest sites at over 90%.	<ul style="list-style-type: none"> • Forest rangers will continue routine inspections of timber harvests for environmental compliance. MFS field foresters will continue to provide technical assistance to prevent problems from occurring and quickly fix problems encountered during inspections. 	Tom Gilbert, MFS	2. Over 90% of sites exhibit environmental compliance during timber harvest inspections.	90	90	90	90	90					
3. Ensure agencies and staff responsible for protecting Maine’s water resources from potential degradation have a clear understanding of each’s roles and responsibilities including enforcement procedures.	<ul style="list-style-type: none"> • MFS will work with Land Use Planning Commission (LUPC) and DEP to clarify each agencies’ responsibility for permitting and enforcement of NRPA stream crossing and Chop and Drop activities. • MFS will work with LUPC and MDEP to develop and deliver timber harvest NRPA (stream crossing) training to agency staff, municipalities and the industry. 	Tom Gilbert, MFS	3. Interagency meeting held in 2020 and joint timber harvest NRPA (stream crossing) training event held in 2021.	X	X								

Table 14. Statewide Approach – Forestry		Lead Agency: Maine Forest Service		Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
	<ul style="list-style-type: none"> MFS will incorporate NRPA (stream crossing) education in their Certified Logger Program (CLP), Master Logger Program (MLP), and BMP monitoring program. 							
4. By 2024, improve consistency for the regulated community by increasing the number of critical mass municipalities that have adopted statewide standards for timber harvesting in shoreland areas to 252 (adoption by 224 towns in 2019).	<ul style="list-style-type: none"> DEP will support adoption of SWS by inviting MFS to participate in Shoreland Zoning trainings. DEP will support adoption of SWS by providing draft municipal Shoreland Zoning ordinances to MFS before issuing approvals and incorporating information about SWS adoption process in Shoreland Zoning training. MFS will proactively approach towns, provide technical assistance with ordinance updates and review draft ordinances to help align with SWS. 	Tom Gilbert, MFS	4. By December 2024, 27 new municipalities adopt statewide timber harvesting standards or DEP adopts ordinances for them.	6	6	5	5	5

Table 15. Statewide Approach – Subsurface Wastewater Disposal Lead Agency: Maine DHHS, Environmental Health				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
1. Ensure municipalities properly implement Subsurface Wastewater Disposal (SSWD) rules to protect public health and water quality.	<ul style="list-style-type: none"> Provide technical assistance and training to towns on the appropriate implementation of the subsurface rules. Assist in the training and licensing of Local Plumbing Inspectors. Develop resource for CEOs showing photos with a range of site conditions. 	Brent Lawson, DHHS	1. 200 visits to towns per year. Photo guide developed for CEOs in 2021.		200 visits/yr X			
2. Consider adjacent water resources when reviewing variance requests for Onsite Sewage Disposal System (OSDS).	<ul style="list-style-type: none"> Review advanced treatment systems and identify treatment efficiencies for phosphorus and nitrogen. Review variance requests for OSDS in shoreland zones and require that systems next to lakes install systems that remove phosphorus and systems next to coastal waters remove nitrogen. 	Brent Lawson, DHHS	2. List of advanced systems with phosphorus and nitrogen removal efficiency.				X	
3. Improve the State’s Voluntary OSDS Inspection Program and oversee expansion to all shoreland zones.	<ul style="list-style-type: none"> Update inspection program rules with requirements for inspectors to receive national certification, take a standard test, submit inspection forms, etc. Evaluate the current inspection program and needs before expanding statewide. Develop Legislative report as directed by LD543. Adjust inspection program in preparation for transition to OSDS Inspection Program expansion to all shoreland zones. 	David Braley, DHHS	3. Report submitted to Legislature and revised rules adopted in 2020.	X				
4. Conduct public outreach about new requirements in shoreland zone.	<ul style="list-style-type: none"> Conduct training for real estate professionals and incorporate information about new legislation re: property transfer inspections. 	John Maclaine, DEP	4. One realtor workshop conducted per year.	1	1	1	1	1

Table 15. Statewide Approach – Subsurface Wastewater Disposal Lead Agency: Maine DHHS, Environmental Health				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
5. Develop criteria for inspecting OSDS that are at risk for short-circuiting and impacting water resources.	<ul style="list-style-type: none"> • DEP and DACF will develop guidance on identifying OSDS at high-risk of short-circuiting due to age, soils and proximity to water. • Dave Rocque (DACF) will develop optional advanced inspection standards/methodology. • DEP and DACF will evaluate/refine through pilot program that uses methods on several types of systems. 	Amanda Pratt, DEP <i>Partners: Dave Rocque, DACF</i>	5. Guidance document developed in 2020. Draft advanced inspection standards developed by 2020 and tested by 2022.	X		X		
6. Review OSDS threats to water quality as part of watershed-based planning process.	<ul style="list-style-type: none"> • DEP will promote guidance with partners and incorporate into watershed planning projects. 	Wendy Garland, DEP	6. Septic system threat evaluated in all watershed-based management plans starting in 2021.		X	X	X	X

Table 16. Statewide Approach – Hydrologic and Habitat Modification				Lead Agency: Maine DEP				
Five-Year Objectives	Actions	Lead Contact	Milestones	Schedule				
				2020	2021	2022	2023	2024
1. Adopt new standards for stream crossings (new, repair and replacement) to improve aquatic organism passage and improve hydraulic capacity and resiliency to larger storms.	<ul style="list-style-type: none"> Adopt draft standards for stream crossings under Section 305 to better align with Stream Smart principles. 	Mark Stebbins, DEP	1. Revised standards adopted by Legislature.	X				
2. Provide training to minimize impacts during culvert installation/ replacement and ensure long term stability and proper function.	<ul style="list-style-type: none"> Develop curriculum and provide trainings on culvert installation/replacement. 	John Maclaine, DEP <i>Partners: MaineDOT DIFW ACOE</i>	2. Curriculum developed in 2020 and one multi-agency workshop held/year starting in 2021.	X	1	1	1	1
3. Administer DEP stream culvert grant program (culvert bond program) that funds upgrades of municipal culverts.	<ul style="list-style-type: none"> Projects selected and contracts implemented for two 2019 RFPs totaling \$5 million. Two RFPs released in 2020 and projects selected and contracts implemented for another \$5 million. Support partner efforts to secure additional program funding. Visit past culvert bond projects, document conditions and compare to proposed designs. 	John Maclaine, DEP	3. 100 culverts upgraded through 2019 and 2020 RFPs.	25	25	25	25	
4. Promote use of living shorelines and similar approaches to address NPS problems, restore impacted habitat and maintain existing habitat values.	<ul style="list-style-type: none"> Explore and develop policy to limit use of riprap on streambanks and lakeshores in NPS watershed projects. Evaluate living shorelines pilot projects. If appropriate, pursue revisions to Chapter 305 to accommodate living shoreline approaches in coastal and other shoreline areas. 	Wendy Garland, DEP	4. Shoreline riprap policy for NPS watershed projects developed in 2021.		X			

Table 17. Statewide Approach – NPS Program Coordination Lead Agency: Maine DEP				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
1. <u>Program Administration:</u> Continue to manage and implement the NPS Program to meet program goals and work towards addressing the State’s water quality problems as effectively and expeditiously as possible.	<ul style="list-style-type: none"> • DEP employs appropriate programmatic and financial systems that ensure section 319 funds are used efficiently and consistent with fiscal and legal obligations (Section 319 program guidelines, EPA-DEP Performance Partnership Agreement). • In keeping with CWA Section 319(h)(8) and (11), provide EPA with sufficient information, annual reports, GRTS data and other information about Maine’s 319 program to determine whether the State’s previous year progress was satisfactory. • Conduct sub-recipient monitoring according to program standard operation procedures using DEP’s NPS Grant Administration Guidelines (2016). Complete and close out all active grant projects within the contract period. 	Wendy Garland, DEP	1. Maine’s NPS Program submits annual report to EPA and continues to achieve Satisfactory Progress Determination from EPA.	X	X	X	X	X
2. <u>Program Administration:</u> Update the Maine NPS Management Program Plan by 2024.	<ul style="list-style-type: none"> • Consult with lead agencies and gather partner input to update the Maine NPS Management Program Plan for the next five-year cycle including milestones for 2025-2029. 	Wendy Garland, DEP	2. Maine NPS Management Program Plan approved by EPA 10/1/24.					X
3. <u>Education & Outreach:</u> Promote more effective awareness and behavior change methods and tools for DEP programs and NPS projects and partners.	<ul style="list-style-type: none"> • Provide technical assistance and training opportunities in <u>social marketing</u> by hosting or participating in Maine workshops, seminars and conferences. • Provide technical assistance and training opportunities in how to effectively use <u>social media</u> and other electronic platforms. 	Kathy Hoppe, DEP	3. Host or help coordinate at least two social marketing and two social media workshops.	1	1	1	1	

Table 17. Statewide Approach – NPS Program Coordination Lead Agency: Maine DEP				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
4. <u>Partnerships</u> : Build and strengthen coordination and communication between Maine’s NPS Program’s lead agencies.	<ul style="list-style-type: none"> • Convene meeting of NPS lead agencies and partners to review NPS Plan activities and determine need and frequency of future work group meetings. • Conduct regular outreach to lead agencies, request semiannual updates on NPS Plan action items and milestones and provide annual updates to lead agencies. • Continue to work with other government agencies to address and improve areas of environmental concern and seize opportunities for further collaboration. 	Wendy Garland, DEP	5. Meeting of NPS Plan lead agencies and partners held in 2020. NPS Plan status update sent to lead agencies annually.	X	X	X	X	X
5. <u>Partnerships</u> : Build and strengthen partnerships to promote collaboration and effective implementation of the Maine NPS Management Plan.	<ul style="list-style-type: none"> • Conduct the annual Watershed Roundtable to bring together watershed professionals to share information, network and foster collaboration. • Improve upon and continue to coordinate the watershed managers’ listserv to efficiently promote sharing between partners. 	Marianne Senechal, DEP	6. Host annual Watershed Roundtable and explore options and migrate listserv to improved platform in 2020.	X	X	X	X	X
6. <u>Funding</u> : Explore funding options to address NPS sources and program needs.	<ul style="list-style-type: none"> • Explore funding options for addressing malfunctioning onsite disposal systems where there are likely water quality impacts (e.g., CWSRF, SCG, Section 319 to replace OSDS, connect to public sewer, or extend sewer lines). • Explore and pursue additional funding to support development of WBPs and watershed implementation projects. • Explore, promote and pursue FEMA hazard mitigation grants for installation of green 	Wendy Garland, DEP	7. List of funding options developed.			X		

Table 17. Statewide Approach – NPS Program Coordination Lead Agency: Maine DEP				Schedule				
Five-Year Objectives	Actions	Lead Contact	Milestones	2020	2021	2022	2023	2024
	infrastructure, stream/floodplain restoration and culvert replacements. <ul style="list-style-type: none"> • Share information with partners about funding opportunities through listserv and WBP planning and implementation projects. 							
7. <u>Funding</u> : Promote CWSRF programs, track funding for NPS projects and explore new program opportunities.	<ul style="list-style-type: none"> • Track CWSRF projects and funding awarded to NPS projects and summarize in the NPS Annual Report. • Explore and promote ways for CWSRF to meet Maine’s NPS needs (e.g., salt reduction equipment, uncovered sand/salt piles. WBP development, brownfields, alum treatments, land protection). Review other State programs, meet with partners to explore needs and determine options and feasibility. • Publicize CWSRF opportunities through the watershed listserv and roundtable. 	John True, DEP	8. Summary of CWSRF-funded NPS projects included in the annual NPS Program Report. One new NPS program area developed using CWSRF by 2023.	X	X	X	X	X

XI. Measuring Progress and Evaluating Maine's NPS Program

A. Measuring Environmental Success

The long-term goals of Maine's NPS program are:

- **Restoration of Waters** - To restore the waterbodies which are impaired by nonpoint sources so that they meet water quality standards.
- **Protection of Waters** - To prevent nonpoint source related impairments of unimpaired waterbodies.

Evaluation of the effectiveness of Maine's NPS program must be based on assessments that quantify the progress the program has made in restoring and protecting waters. Discussion of evaluation strategies associated with the two long term goals follows.

Restoring Waters

DEP's ambient water quality monitoring programs for lakes, rivers and streams, wetlands, and marine waters provide the data necessary to evaluate success in restoring impaired waters. The Integrated Report reports the findings of monitoring and assessment programs.

- **Lakes** - Most lake impairments are due to violations of the lake trophic standards which state that lakes must be free of culturally induced blue green algal blooms and must have either stable or decreasing trophic states. The Lake Stewards of Maine in combination with the DEP's annual targeted baseline monitoring provide a strong data set for evaluating compliance with these standards. The combination of the LSM's bimonthly secchi disk readings and baseline sampling of chlorophyll and phosphorus concentrations are very effective in detecting blue green algal blooms. This monitoring also provides a long-term data set that can be used to monitor trends in a lake's trophic state. Lakes that have been impaired due to the presence of blue green algal blooms are considered restored if they are free of blooms for at least five years out of the most recent ten-year period. Additionally, trend analysis can show that even though a lake may still support occasional blooms, the water quality is improving because the frequency and duration of blooms is decreasing. Lakes that have never supported algal blooms but are impaired due to a documented trend of increasing trophic state are considered restored when the long-term data set shows a reversal of the trend.
- **Rivers and Streams** - The most critical impairments of rivers and streams are violations of the aquatic life criteria. With the exception of the bacteria standards, all other water quality criteria have the goal of supporting aquatic life. The DEP's Biomonitoring Program assesses rivers and streams on a five-year rotating schedule and determines their status in terms of

compliance with the aquatic life criteria. This evaluation indicates not only whether the river or stream segment in question meets the appropriate criteria for the segment's class, but also what class's criteria it does meet, if any. An impaired stream is considered restored if it meets its class's criteria and is considered improved if it meets a higher class's criteria than it had previously met. For instance, if a Class B stream segment historically had failed to meet even Class C criteria, but now consistently meets Class C criteria, it would be considered substantially improved. Assessment of impairments due to violations of the bacteria standards are treated similarly. If long term monitoring indicates that the standard is being met, the segment is considered restored. If the frequency and magnitude of the violations is significantly reduced, it is considered improved.

- **Wetlands** – Freshwater wetlands are also evaluated by the Biomonitoring Program and the means of determining restoration and/or improvement is parallel.
- **Marine Waters** - The most widespread impairment of marine waters are violations of bacterial standards for shellfish harvesting. Bacterial monitoring is done by several agencies including DMR, MHB and DEP.

Protecting Waters

The same data sets discussed above can be used to evaluate whether DEP is successful in preventing unimpaired waterbodies from becoming impaired. Simply stated, if no new waterbodies, particularly waterbodies that have historical records of meeting water quality standards, are added to the list of impaired waters, the State has succeeded in meeting this goal. If new waterbodies are added to the NPS impaired list, as will likely happen since many are considered threatened, evaluation of the success of protection efforts is more challenging. Program success must be based on an evaluation of how many waterbodies would have become impaired if preventative measures had not been taken. Evaluation of the success of protection efforts therefore requires not only documentation that degradation has not occurred, but also the more challenging quantification of the threat and the relative mitigation value of the protection measures that are taken. The mitigation value of protection measures can often be quantified through pollutant load reduction models and similar metrics. It is much more difficult, if not impossible, to project the changes that would have happened in the receiving water, and particularly in its biological community, if for example, the pollutant loads had not been reduced or the stream corridor had not been protected.

Defining Success

As stated above, the long-term goals of Maine's NPS Program are to restore NPS impaired waterbodies so that they meet applicable water quality standards and to prevent nonpoint source related impairments of unimpaired waterbodies. In most cases, attainment of the restoration goal is feasible, though in many instances it may take a long time and require commitment of a large amount of resources. The following discusses some of the particular challenges associated with restoring some lakes and urban streams, and the need to recognize not only the value of full restoration, but also the value of interim improvements in water quality and ecological condition.

The potential for restoration of impaired waters in Maine is influenced by a number of factors which must be considered when establishing realistic objectives. First, Maine's Water Classification system is a goal-oriented system that establishes high water quality standards. While the State aims to have its water meet those standards, it may not always be feasible to do so, especially in the short term. For example, the trophic state standard for lakes requires that lakes have stable or decreasing trophic states and that they be free of culturally-induced algal blooms that reduce water clarity below two meters. Meeting the first part of this standard, reversing a trend of increasing trophic state, is almost always feasible and can be accomplished with a combination of BMP implementation for existing phosphorus sources in the watershed and the adoption of a program that minimizes the phosphorus inputs from new development in the watershed. However, the second part of the standard, elimination of algal blooms, is not always feasible. This is because some algal blooms are fed not by phosphorus from the watershed, but by recycling of accumulated phosphorus in the lake's sediments. While in these cases addressing NPS sources in the watershed can result in reduction in the intensity and duration of the algal blooms, it often cannot eliminate the blooms without measures being taken to directly control the recycling of phosphorus from the bottom sediments. Such measures include treatment of the sediments with aluminum salts and enhanced seasonal flushing of the epilimnion during the peak of the algal bloom. These measures can be prohibitively expensive, and though aluminum treatments nearly always result in dramatic reductions in the intensity and duration of blooms, they may not always completely eliminate blooms.

The aquatic life standard for streams presents some different limitations, particularly for urban streams. When streams and rivers were originally classified in the 1970s and 1980s, the larger rivers with point discharges, for which much data had been collected, were classified with realistic goals. However, most smaller streams were given the default classification of B, unless they were located in pristine areas, in which case they were designated Class A or AA. This was appropriate in most cases, but in some urban and agricultural areas it may be unrealistic to expect the stream to be able to meet such a high aquatic life standard. If the only reason for the aquatic life impairment is the contribution of stormwater pollutants from the watershed, then attaining Class B standards is likely achievable through BMP retrofits, though it may be quite expensive. The exception to this is where the groundwater that feeds baseflow in an urban stream has been contaminated with chloride derived from infiltration of winter and early spring runoff draining surfaces that have been treated with deicing salts. In these cases, even if the salt discharge to the ground water is eliminated, a very challenging proposition in itself, it may take many years for the contaminated groundwater to flush through the system. Even if stormwater pollutants are not an issue, if the stream and its corridor have been significantly altered through physical manipulations (e.g., straightening and widening, channel hardening, and filling of flood plains) or simply as a result of the greatly increased storm flows that the stream must pass, the habitat may be so compromised that even when the pollutant loads are attenuated, the stream may not be able to meet Class B standards. Fixing stream channel and corridor issues may not be technically feasible or may be prohibitively expensive.

In the cases cited above – lakes with internal recycling of phosphorus and urban and/or agricultural streams with baseflow chloride contamination or serious alteration of the channel and corridor – it is almost always feasible to make the waterbody much healthier than it was. Even if algal blooms cannot be completely eliminated, their intensity and duration can be greatly reduced, and the people who use and enjoy these lakes greatly appreciate the change. Pollutant load reductions, storm flow attenuation, and simple habitat restoration measures can result in significant improvements in the composition and structure of the biological community in urban streams, even though the community may not fully meet aquatic life standards. Though the goal is to have these waters meet standards, it is important that the measures of success for the State’s NPS program not only recognize the value of restoring an impaired waterbody to fully meeting standards, but also appreciate the value of making significant improvements in an impaired water that enhance its ecological integrity and its value to the public when full restoration is not feasible, at least in the short term.

It is at least equally important to recognize the value of protecting threatened healthy waters so that they are not degraded to the point of violating water quality standards. However, since the goal of protection is to *maintain* current good water and habitat quality, it is more difficult to document success of protection efforts. One cannot document that watershed protection efforts have been effective because a waterbody has not been degraded without assuming that changes occurring in the watershed would have resulted in degradation if the watershed protection measures had not been taken. Evaluation of the success of protection efforts therefore requires not only documentation that degradation has not occurred, but also the more challenging quantification of the threat and the relative mitigation value of the implemented protection measures. The mitigation value of protection measures can often be quantified through pollutant load reduction models and similar metrics. It is much more difficult, if not impossible, to project the changes that would have happened in the receiving water, and particularly in its biological community, if, for example, the pollutant loads had not been reduced or the stream corridor had not been protected.

It is essential that the difficulties in documenting the success of protection efforts do not become a reason for lowering the priority that is given to protection. Many of the impaired streams in the State are in areas that have been urbanized relatively recently and were healthy resources two or three decades ago. There is no doubt that if protective measures had been taken as these watersheds were developed that much of the degradation could have been avoided. The same pressures for urbanization are still in play in other watersheds, so it is crucial that protection efforts be given highest priority, or we will replace restored waters with newly impaired ones. The effort required to restore a waterbody is always much greater than that required to avoid impairment.

B. NPS Program Evaluation

In addition to tracking progress with water quality restoration and protection goals, DEP will conduct other program evaluation on an ongoing basis as required by EPA’s 319 guidance (EPA,

2013). The following reporting requirements will help EPA measure Maine's progress in meeting annual milestones and NPS Plan success.

- **Milestone Tracking** – DEP will track NPS Plan milestone progress and completion. Progress will be submitted to EPA on an annual basis as part of the NPS Annual Report.
- **Annual Report** – DEP completes an annual NPS Program Report to report on NPS program activities, successes and completed grant projects. The report will be tailored to report on completed goals, objectives and measurable milestones from this Plan. Past annual reports are available at <http://www.maine.gov/dep/water/grants/319-documents/reports/>.
- **Grant Reporting and Tracking System (GRTS)** – DEP will continue to enter program information into EPA's GRTS database. Pollutant load reduction estimates resulting from project activities will be entered on an annual basis.
- **Federal Financial and Performance Reports** – Annual financial and performance reports will be completed annually as required by 40 CFR 31.40(b)(1) and 31.41(b).
- **Sub-recipient Monitoring** - DEP will continue to monitor grantees using established Standard Operating Practices including annual Office Visits and site visits to a subset of construction projects.
- **Satisfactory Progress Determination** – DEP will provide information EPA needs to conduct its annual progress and performance review under Section 319(h)(8).
- **NPS Plan Updates** – Maine's NPS Management Plan will be updated at least every five years. The next update will be prepared for 2025-2029.

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Appendix 1. EPA's Key Components of an Effective State NPS Management Program

Key Program Components	Maine NPS Plan Location
1. The state program contains explicit short- and long-term goals, objectives and strategies to restore and protect surface water and ground water, as appropriate.	Sections II, VII and X
2. The state strengthens its working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.	Section VIII
3. The state uses a combination of statewide programs and on-the-ground projects to achieve water quality benefits; efforts are well-integrated with other relevant state and federal programs.	Sections VI, VII and VIII
4. The state program describes how resources will be allocated between (a) abating known water quality impairments from NPS pollution and (b) protecting threatened and high-quality waters from significant threats caused by present and future NPS impacts.	Section III
5. The state program identifies waters and watersheds impaired by NPS pollution as well as priority unimpaired waters for protection. The state establishes a process to assign priority and to progressively address identified watersheds by conducting more detailed watershed assessments, developing watershed-based plans and implementing the plans.	Section IV and V Appendix 2
6. The state implements all program components required by Section 319(b) of the Clean Water Act and establishes strategic approaches and adaptive management to achieve and maintain water quality standards as expeditiously as practicable. The state reviews and upgrades program components as appropriate. The state program includes a mix of regulatory, nonregulatory, financial and technical assistance , as needed.	Sections III, VI, VII and XI
7. The state manages and implements its NPS management program efficiently and effectively , including necessary financial management.	Section X and XI
8. The state reviews and evaluates its NPS management program using environmental and functional measures of success and revises its NPS management program at least every five years.	Section XI

Appendix 2. NPS Watershed Prioritization and NPS Priority Lists

A. Guiding Principles for Selection of NPS Priority Watersheds

The purpose of the priority list is to guide Section 319 NPS grant funds and assistance and to encourage NPS abatement work in these watersheds. Watersheds are evaluated using several guiding principles. The first overall requirement is that NPS priority waters must have NPS pollution as the primary source of impairment or threat. Watersheds with point sources or legacy pollutants as the primary source of pollution are not selected as priorities since the point source or legacy pollutant would have to be addressed for water quality to significantly improve. Second, watersheds are evaluated for the likelihood that NPS grant funds and support could make a difference in the water quality. Another guiding principle is to keep the number of NPS priority watersheds reasonably focused so that so that limited resources would not be spread too thin and there would be the best opportunity for restoring and protecting the highest priorities.

The prioritization criteria were developed with the goal of making the selection process as objective as possible, using monitoring data, analysis, and reports. The priority lists of partner agencies and organizations are also used to assist with the prioritization process.

DEP water resource professional staff knowledgeable in statewide lake, stream, or marine water quality and management issues developed criteria for each waterbody type, reviewed available data and information and selected waters for each list. Partner agencies and regional monitoring organizations are also consulted in some cases. Specific criteria are listed in the table below and described in the following waterbody-specific sections. Since these criteria are periodically updated, please refer to DEP's website for the most current information (https://www.maine.gov/dep/land/watershed/nps_priority_list/index.html).

Table 18. NPS Priority Watershed Selection Criteria Summary.

Waterbody Type	Selection Criteria	Exclusion Criteria
Impaired Lakes	<ul style="list-style-type: none"> • Category 4A and 5A 	<ul style="list-style-type: none"> • Category 4C • Limited existing development • Legacy nutrient accumulations • Naturally eutrophic
Threatened⁶ Lakes	<ul style="list-style-type: none"> • DEP Watch List • Public water system • Negative water clarity trend • Sensitive to additional phosphorus inputs • Sensitive due to sediment chemistry • Priority watershed of partners • Outstanding water quality with watershed threats • Recent increased impacts or threats from agriculture or development 	<ul style="list-style-type: none"> • Negative water clarity trend not indicative of water quality shift • Watershed protected • Small lakes (≤50 acres) with limited development
Impaired Streams	<ul style="list-style-type: none"> • Impaired (Categories 4A, 5A, and 5B) due to NPS, and: • Has TMDL report: <ul style="list-style-type: none"> ○ Individual TMDL ○ IC TMDL or NPS TMDL ○ Bacteria TMDL and had only source of impairment as bacteria • Priority watershed of partners • High growth area • High risk for development due to proximity to highway access 	<ul style="list-style-type: none"> • Categories 4B, 4C, 5C, 5D • Impaired due to natural reasons • Legacy pollutant accumulations • Impaired due to point sources • Large rivers
Threatened⁹ Streams	<ul style="list-style-type: none"> • Watch List (Category 3) • Recent increased impacts or threats from agriculture or development 	<ul style="list-style-type: none"> • Wastewater discharges • Large rivers

⁶ The use of the term, 'threatened', in this document refers to unimpaired waters that are subject to potential impacts from NPS pollution. The term is not intended to be used as described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

	<ul style="list-style-type: none"> • Priority watershed of partners • High risk for development due to proximity to highway access 	
<p>Impaired and Threatened⁹ Marine Waters</p>	<ul style="list-style-type: none"> • Priority NPS-impacted watersheds of partners: <ul style="list-style-type: none"> ○ Maine Department of Marine Resources ○ Maine Healthy Beaches ○ Casco Bay Estuary Partnership ○ Maine Municipal Separate Storm Sewer Program • Documented negative water quality indicators 	<ul style="list-style-type: none"> • Impaired due to natural reasons • Legacy pollutant accumulations • Large or exposed areas with high flushing • Point sources such as wastewater discharges • Small watersheds with just a few failing septic or overboard discharges • Sources not clearly NPS or limited NPS sources

B. Lake Watersheds Prioritization

Impaired Lakes

As a starting point, all lakes on the 2016 Integrated Water Quality Monitoring and Assessment Report Impaired List (Categories 4A: Impaired Use other than Mercury, TMDL Completed; & 5A: Needing TMDLs) due to nonpoint source pollution were considered for inclusion on the priority list. Lakes on 2016 Integrated Water Quality Monitoring and Assessment Report Impaired List due to hydrologic reasons (Category 4C: Impairment not Caused by a Pollutant) were excluded from the priority list. These lakes are impaired primarily due to hydrologic reasons, such as a major dam. Lakes falling under this category are: Aziscohos Lake, Brassua Lake, Flagstaff Lake, Graham Lake, and Scopan Lake.

Several lakes were not added to the priority list if they are believed to have a **low feasibility** for restoration due to having limited existing watershed development or legacy nutrient accumulations in sediments. Lakes removed from the list for this reason are Arnold Brook Lake in Presque Isle, Lovejoy Pond in Albion, and Sewall Pond in Arrowsic.

Table 19. Impaired Lakes Priority List (21 lakes).

Lake	Town
Annabessacook Lake	Winthrop
China Lake	China
Christina Reservoir	Ft Fairfield
Cochnewagon Lake	Monmouth
Cross Lake	T17 R5 Wels
Daigle Pond	New Canada
East Pond	Smithfield
Great Pond	Belgrade & Rome
Lilly Pond	Rockport
Long Pond	Rome & Belgrade
Monson Pond	Fort Fairfield
Pleasant Pond	Richmond
Sabattus Pond	Greene
Sebasticook Lake	Newport
Threemile Pond	Windsor
Togus Pond	Augusta
Toothaker Pond	Phillips
Trafton Lake	Limestone
Unity Pond	Unity
Webber Pond	Vassalboro
Wilson Pond	Wayne

Threatened Lakes

Unimpaired lakes were assessed based on threats to water quality and value of the resource. Threatened lakes include lakes on the DEP Watch List, lakes having a recent or long-term significant negative trend in water clarity, lakes determined as being sensitive to additional phosphorus inputs, and lakes having a recent increased threat to the watershed by development or agriculture. Lake value was designated as 'high' if a drinking water supply, if designated a priority water body by a partner agency, or if determined to have outstanding water quality and being in need of protection. Lakes which had either a significant threat to water quality and/or significant value were added to the priority list. The details of these selection criteria are below.

Unimpaired lakes were determined to have priority threatened lake watersheds if they met one of the following criteria:

- Listed on the DEP's **watch list**. Lakes are included on the watch list if they were recently impaired and therefore still sensitive, or data suggests their water quality is near the impairment threshold.
- Licensed by the Maine CDC Drinking Water Program as a **public water system** with a lake or pond as the surface water source.
- Has a strong long or short-term **negative water clarity trend**. This was determined by running the lake water clarity trend analysis model for lakes with secchi disk transparency readings for a significant number of years. The model was run for the whole dataset for each lake to determine the long-term trend, and for the past 10 years for the short-term trend. Data was needed for eight years or more to run the short term trend model. Results of -0.5 or lower were deemed to be a significant negative trend. Lakes with a significant negative trend were then further analyzed to determine if the negative trend was likely the result of a natural cycle or an overall shift in water quality. See the exclusion criteria section below for a description of what was not included.
- Are **sensitive** to additional phosphorus inputs due to the lake's hydrology and threats in the watershed. A lake was determined to be sensitive if DEP's vulnerability modeling predicts the number of years for the lake's phosphorus concentration to increase by 1 ppb is 25 years or less. The vulnerability model predicts changes in lake phosphorus concentration using watershed growth projections to estimate changes in phosphorus loading and the 1976 version of Vollenweider's lake model to convert load to concentration. The model compensates for the influence of upstream lakes. If these sensitive lakes were determined to have watershed threats, they were then added to the priority list.
- Are **sensitive due to sediment chemistry**. Sediment chemistry has been analyzed in over 170 Maine lakes as a part of the cooperative undertaking to model lake vulnerability in connection. Studies have shown that lake sediment with ratios of aluminum to iron less than three to one ($Al:Fe < 3:1$) and aluminum to phosphorus less than 25 to one ($Al:P < 25:1$) are more vulnerable to the release of sediment-bound phosphorus, which can lead to internal phosphorus loading. Around 40 analyzed lakes were identified as having sediment meeting or being close to these chemistry vulnerability thresholds. Ten of

those lakes were not previously considered sensitive to additional phosphorus inputs through the DEP's vulnerability prediction model (see 'Sensitive' criteria above) and have watershed threats.

- Identified as a **priority watershed** by the Maine Natural Resources Conservation Service Environmental Quality Incentives Program (**EQIP**) National Water Quality Incentive or by Maine Municipal Separate Storm Sewer System (**MS4**) community plans.
- Having **outstanding water quality** in need of protection from threats in the watershed. The list of lakes with outstanding water quality was determined from review of long-term water quality data. Lakes with outstanding water quality were added to the priority list if they were on 1998 NPS Priority List or their watershed was known to have a significant threat of development.
- Have recent increased impacts or significant potential threats from **agriculture or development**. This was determined through use of best professional judgment of the impact or significant threat of impact due to recent activities in the watershed. The sensitivity of the lake to more phosphorus inputs, extent and location of the agriculture or development, and cumulative effect of other watershed activities were considered in this determination. The lakes added due to these criteria have had significant DEP involvement with the lake and the associated agriculture or development.

Some lakes were not included on the priority list even if they met some of the above criteria due to the following reasons:

- The water quality data for some lakes with a significant negative water clarity trend (-0.5 or lower) indicated it was **not indicative of a water quality shift**. Each lake that had a long- or short-term significant negative water clarity trend was analyzed to determine if the negative trend was likely an overall negative shift in water quality or not. This was determined by analyzing any available water quality history data, including water clarity, phosphorus, chlorophyll, and dissolved oxygen readings. Lakes having a short-term negative trend as a result of water clarity returning to a stable state after drought conditions in the early 2000's resulted in artificially 'improved' water quality, were not put on the priority list. Lakes whose negative trend were based on insufficient data or included multiple Secchi readings which hit the lake bottom were not put on the priority list.
 - Lakes having a significant portion of their watershed **protected** either by being part of Acadia National Park or by having other watershed protection were also not included on the priority list, since there did not seem to be a significant threat.
 - **Small lakes** (less than or equal to 50 acres) with limited existing watershed development were not included on the priority list, unless there was a compelling reason to add it to the list. Compelling reasons were if it is a public water supply or has outstanding water quality and is in need of protection from threats in the watershed.
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Table 20. Threatened Lakes Priority List (162 lakes)

Lake	Town	Priority List Reasoning
Abrams Pond	Eastbrook	Watch List
Adams Pond	Boothbay	Public Water System, Sensitive
Alamoosook Lake	Orland	Agriculture (Aquaculture) Threat
Allen Pond	Greene	Sensitive
Anasagunticook Lake	Canton	Public Water System
Androscoggin Lake	Leeds	Watch List
Battle Ave Ponds	Castine	Public Water System
Bauneg Beg Pond	Sanford	Sensitive
Bay Of Naples/Brandy	Naples	Public Water System, Sensitive
Beaver Pond	Bridgton	Sensitive
Beech Hill Pond	Otis	Outstanding Water Quality
Berry Pond	Winthrop	Sensitive
Big Wood Pond	Jackman	Public Water System
Bonny Eagle Lake	Buxton	Sensitive
Boyden Lake Stream Imp	Perry	Public Water System
Branch Lake	Ellsworth	Public Water System
Branch Pond	China	Sensitive
Brettuns Pond	Livermore	Sensitive
Buker Pond	Litchfield	Sensitive
Bunganut Pond	Lyman	Sensitive
Burnt Land Pond	Stonington	Public Water System
Carlton Pond	Winthrop	Public Water System
Center Pond	Sangerville	Sensitive – Sediment Chemistry
Chases Pond	York	Public Water System
Chickawaukie Pond	Rockport	Sensitive
Clary Lake	Whitefield	Negative clarity trend
Cobbossecontee Lake	Winthrop	Watch List, Sensitive
Coffee Pond	Casco	Sensitive
Cold Stream Pond	Enfield	Outstanding Water Quality
Crawford Pond	Warren	Sensitive
Crescent Pond	Raymond	Sensitive
Crystal Lake	Gray	Sensitive
Damariscotta Lake	Nobleboro	Sensitive
David Pond	Fayette	Sensitive – Sediment Chemistry
Dexter Pond	Winthrop	Sensitive
Dodge Pond	Rangeley	Sensitive
Duckpuddle Pond	Waldoboro	Watch List
Eagle Lake	Bar Harbor	Outstanding Water Quality, Public Water System
Echo Lake	Presque Isle	Watch List

Lake	Town	Priority List Reasoning
Echo Lake	Readfield	Sensitive – Sediment Chemistry
Estes Lake	Sanford	Watch List, Sensitive
Ferguson Lake	Millinocket	Public Water System
Floods Pond	Otis	Public Water System
Folly Pond	Vinalhaven	Public Water System
Forest Lake	Windham	Sensitive
Fresh Pond	North Haven	Public Water System
Georges Pond	Franklin	Watch List
Granny Kent Pond	Shapleigh	Negative clarity trend
Grassy Pond	Rockport	Public Water System, Sensitive
Great East Lake	Acton	Outstanding Water Quality, Development Threat
Great Pond	Franklin	Watch List
Hall Pond	Paris	Public Water System
Hancock Pond	Embden	Public Water System
Harriman Pond	Dedham	Outstanding Water Quality, Development Threat
Hatcase Pond	Dedham	Public Water System
Highland Lake	Bridgton	Watch List
Highland Lake	Windham	MS4 Priority Water, Watch List, Sensitive
Hogan Pond	Oxford	Sensitive
Holland Pond	Limerick	Sensitive
Horne Pond	Limington	Sensitive
Hosmer Pond	Camden	Sensitive
Indian Pond	Greenwood	Watch List
Ingalls Pond	Bridgton	Sensitive
Island Pond	Waterford	Sensitive
Jimmie (Jamies) Pond	Manchester	Sensitive
Kennebunk Pond	Lyman	Sensitive
Knickerbocker Pond	Boothbay	Public Water System
Lake Auburn	Auburn	Negative clarity trend, Watch List, Public Water System
Little Cobbossee	Winthrop	Watch List, Sensitive
Little Ossipee	Waterboro	Sensitive
Little Pond	Damariscotta	Public Water System
Little Pushaw	Hudson	Sensitive – Sediment Chemistry
Little Sebago Lake	Windham	Sensitive
Little Wilson Pond	Turner	Sensitive
Long Lake	Bridgton	Watch List
Long Lake	T17 R4 Wels	Watch List, Agriculture Threat

Lake	Town	Priority List Reasoning
Long Pond	Parsonsfield	Negative clarity trend
Long Pond	Bucksport	Sensitive
Long Pond	Sullivan	Public Water System
Lovejoy Pond	Wayne	Sensitive – Sediment Chemistry
Lower and Upper Ponds	Skowhegan	Public Water System
Lower Hadlock Pond	Mt Desert	Public Water System
Lower Narrows Pond	Winthrop	Sensitive
Lower Range Pond	Poland	Sensitive
Madawaska Lake	Westmanland	Watch List
Maranacook Lake	Winthrop	Sensitive
Mattakeunk Lake	Lee	Sensitive – Sediment Chemistry
Mcgrath Pond	Oakland	Sensitive
Meduxnekeag Lake	Oakfield	Development Threat
Megunticook Lake	Lincolnton	Sensitive
Messalonskee Lake	Sidney & Belgrade	Watch List
Middle Range Pond	Poland	Sensitive
Mirror Lake	Rockport	Public Water System
Molasses Pond	Eastbrook	Sensitive – Sediment Chemistry
Moose Hill Pond	Livermore Falls	Public Water System
Moose Pond	Bridgton	Development Threat
Mousam Lake	Shapleigh	Watch List
Nequasset Pond	Woolwich	Public Water System, Sensitive
Nickerson Lake	New Limerick	EQIP Priority Water
No Name Pond	Lewiston	Sensitive
Nokomis Pond	Newport	Public Water System
North Pond	Norway	Sensitive
North Pond	Sumner	Public Water System
North Pond	Smithfield	Development Threat
Norton Pond	Lincolnton	Sensitive
Notched Pond	Raymond	Sensitive
Oakes Pond	Skowhegan	Agriculture Threat
Otter Pond	Bridgton	Sensitive
Panther Pond	Raymond	Sensitive
Papoose Pond	Waterford	Watch List
Paradise Pond	Damariscotta	Negative clarity trend
Parker Pond	Casco	Sensitive
Parker Pond	Jay	Public Water System
Parker Pond	Vienna	Sensitive – Sediment Chemistry
Pattee Pond	Winslow	Sensitive

Lake	Town	Priority List Reasoning
Pease Pond	Wilton	Sensitive – Sediment Chemistry
Pemaquid Pond	Waldoboro	Sensitive
Pennesseewassee	Norway	Sensitive
Pleasant Lake	Otisfield	Outstanding Water Quality
Pleasant Pond	Turner	Sensitive
Pleasant Pond	T4 R3 Wels	Outstanding Water Quality
Province Lake	Parsonsfield, S. Effingham, NH	Development Threat (Listed as Impaired by New Hampshire DES)
Pushaw Lake	Orono	Development & Agriculture Threat
Quimby Pond	Rangeley	Sensitive
Raymond Pond	Raymond	Sensitive
Roberts Wadley Pond	Lyman	Sensitive
Round Pond	Rangeley	Sensitive
Round Pond	Vinalhaven	Public Water System
Roxbury Pond	Roxbury	Watch List
Sabbathday Lake	New Gloucester	Sensitive
Salmon L (Ellis P)	Belgrade	Watch List
Salmon Stream Pond	Guilford	Public Water System
Sand Pond	Monmouth	Sensitive
Sawyer Pond	Greenville	Negative clarity trend
Sebago Lake (including Crooked River)	Sebago	Outstanding Water Quality, Public Water System
Shaker Pond	Alfred	Sensitive
Silver Lake	Bucksport	Public Water System
Spectacle Pond	Vassalboro	Sensitive
Square Lake	T16 R5 Wels	Watch List, Development Threat
Square Pond	Acton	Sensitive – Sediment Chemistry
St George Lake	Liberty	Outstanding Water Quality
Swan Pond	Lyman	Sensitive
Taylor Pond	Auburn	Sensitive
Thomas Pond	Casco	Sensitive
Thompson Lake	Oxford	Outstanding Water Quality, Sensitive
Threecornered Pond	Augusta	Watch List, Sensitive
Torsey (Greeley) Pond	Mount Vernon	Agriculture Threat
Trickey Pond	Naples	Outstanding Water Quality, Sensitive
Tripp Pond	Poland	Sensitive
Upper Narrows Pond	Winthrop	Public Water System, Watch List, Sensitive
Upper Range Pond	Poland	Sensitive
Varnum Pond	Wilton	Public Water System
Ward Pond	Sidney	Sensitive

Lake	Town	Priority List Reasoning
Wassookeag Lake	Dexter	Negative clarity trend, Public Water System
Watchic Pond	Standish	Sensitive
West Harbor Pond	Boothbay Harbor	Sensitive
Whetstone Pond	Kingsbury Twp	Negative clarity trend
Whitney Pond	Oxford	Sensitive
Wilson Pond	Wilton	Watch List
Wood Pond	Bridgton	Sensitive
Woodbury Pond	Monmouth	Sensitive
Youngs Lake	Westfield	Public Water System

D. Stream Watershed Prioritization

Impaired Streams

As a starting point, all rivers and streams on the 2012 Integrated Water Quality Monitoring and Assessment Report Impaired List due to nonpoint source pollution (Categories 4-A: Rivers and Streams with Impaired Use, TMDL Completed; 5-A: Rivers and Streams Impaired by Pollutants Other Than Those Listed in 5-B Through 5-D (TMDL Required); & 5-B: Rivers and Streams Impaired for Bacteria Only, TMDL Required) were considered for inclusion on the priority list. To determine if a stream or river was impaired primarily due to NPS sources, the DEP water quality monitoring database (EGAD) was queried as to what were the major sources of the impairments. A stream was considered impaired primarily by NPS if the sources were listed as NPS, agriculture, stormwater, impervious surfaces, habitat modification, post-development erosion and sedimentation, or source unknown.

Streams on 2016 Integrated Water Quality Monitoring and Assessment Report Impaired List which are expected to result in attainment (Category 4-B: Rivers and Streams Impaired by Pollutants - Pollution Control Requirements Reasonably Expected to Result in Attainment) were not included on the priority list. These streams are believed to be impaired primarily due to non-NPS reasons and are being addressed by regulatory programs and remediation work.

Streams on the 2016 Integrated Water Quality Monitoring and Assessment Report Impaired List due to hydrologic reasons (Category 4-C: Rivers and Streams with Impairment not Caused by a Pollutant), mercury (Category 5-C: Waters Impaired by Atmospheric Deposition of Mercury), or legacy pollutants (Category 5-D: Rivers and Streams Impaired by Legacy Pollutants), were not included on the priority list. These streams are believed to be impaired primarily due to sources beyond the scope of the 319 NPS program.

Once the streams impaired by NPS were identified, they were determined to be priority stream watersheds if they met one of the following criteria:

- Had a Total Maximum Daily Load (**TMDL**) report completed or in development. This includes streams with an individual NPS-based TMDL and those included in the Maine Impervious Cover TMDL or Maine Statewide NPS TMDL (currently under development). These streams are impaired primarily due to NPS pollution and the TMDLs provide an analysis of the causes of the impairment, and therefore a first step in determining what needs to be done to improve the water quality. For streams included in the Maine Statewide Bacteria TMDL, only those whose impairment was only due to bacteria that was not caused by a point source were listed as priority streams.
- Identified as a priority watershed by the Maine Natural Resources Conservation Service Environmental Quality Incentives Program (**EQIP**) National Water Quality Incentive, by Maine Municipal Separate Storm Sewer System (**MS4**) community plans, or by the Maine Healthy Beaches (**MHB**) program.
- High risk of future development in watershed due to its location **near a highway exit**. These streams were determined by completing a risk assessment of the likelihood of development near each Maine Turnpike, Interstate 95, and Route 295 exit that had stream watersheds within a one-mile radius. Streams were categorized as having a high, medium, or low risk of development in their watershed due to Access-related development. A screening level field survey and water quality sampling was conducted on streams with a high risk of development where more information was needed. The goal of the screening was to see if the stream was showing signs of stress or not, and to assess whether it fit the NPS priority selection principles. High risk streams were added to the priority list unless the assessment showed the stream was not showing signs of stress and land use in the area did not appear to be a high threat.

Some streams were not included on the priority list even if they met some of the above criteria due to the following reasons:

- Believed to be impaired due to **'natural' reasons** such as being a backwater stream or having wetland effects which cause the stream to not meet its class.
 - Streams or rivers impaired mostly due to **legacy pollutants**, particularly legacy toxins. It is believed that the legacy pollutants would have to be addressed in order for the stream to meet class, so addressing the NPS sources would not be sufficient to have it meet class and therefore the stream is not added to the NPS priority list.
 - **Large rivers** (e.g., Kennebec River, Androscoggin River, Presumpscot River) were not included as priorities since the large size of their watershed makes measurable improvement in water quality due to implementation of NPS watershed-based plans very unlikely. Instead, tributaries to these larger watersheds were considered for the priority list based both on their own characteristics and their impact on the larger impaired watersheds.
 - Rivers whose impairment is primarily due to **point sources** such as combined sewer overflows or wastewater discharges were also not included on the priority list. It is believed that the point sources would need to be addressed for the water quality of these rivers to be improved significantly.
-

Table 21. Impaired Streams Priority List (72 streams)

Stream	Town	Priority List Reasoning
Adams Brook	Berwick	TMDL
Arctic Brook	Bangor	TMDL, Highway Access-related Development Threat
Barberry Creek	South Portland	TMDL
Birch Stream	Bangor	TMDL, MS4 Priority Water
Black Brook	Windham	TMDL
Bond Brook	Augusta	Highway Access-related Development Threat, Development Threat
Brackett Brook	Palmyra	TMDL
Burnham Brook	Garland	TMDL
Capehart Brook	Bangor	TMDL
Capisic Brook	Portland	TMDL, MS4 Priority Water
Card Brook	Ellsworth	TMDL
Chamberlain Brook	Whitefield	TMDL
Chandler River including East Branch	Pownal	TMDL
Cold Stream	Skowhegan	High Growth Area
Colley Wright Brook	Windham	TMDL
Coloney Brook	Fort Fairfield	TMDL
Concord Gully	Freeport	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Crooked Brook	Corinth	TMDL
Dole Brook	Portland	TMDL
Duck Brook	Arundel	Bacteria TMDL
Dudley Brook	Chapman	TMDL
Dyer River	Newcastle	Bacteria TMDL
Everett Brook	Fort Fairfield	TMDL
Fish Brook	Fairfield	TMDL
French Stream	Exeter	TMDL
Frost Gully Brook	Freeport	TMDL
Goodall Brook	Sanford	TMDL
Goosefare Brook	Saco	TMDL, Bacteria TMDL, Highway Access-related Development Threat
Hart (Dill) Brook	Lewiston	TMDL, MS4 Priority Water
Halfmoon Stream	Thorndike	TMDL
Hobbs Brook	Cumberland	TMDL
Inkhorn Brook	Westbrook	TMDL
Jock Stream	Wales	TMDL

Stream	Town	Priority List Reasoning
Kennebunk River	Arundel, Kennebunk	Bacteria TMDL, MHB Priority Water
Kennedy Brook	Augusta	TMDL
Kennedy Brook	Presque Isle	High Growth Area
Kimball Brook	South Portland	TMDL
Logan Brook	Auburn	TMDL, MS4 Priority Water
Long Creek	South Portland	Highway Access-related Development Threat, Development Threat
Mere Brook	Brunswick	TMDL
Meadow Brook	Bangor	Highway Access-related Development Threat
Meduxnekeag River	Houlton	EQIP Priority Water
Merrit Brook	Presque Isle	TMDL
Mill Stream	Albion	TMDL
Mosher Brook	Gorham	TMDL
Nasons Brook	Portland, Westbrook	TMDL
No Name Brook	Lewiston	TMDL
Otter Brook	Windham	TMDL
Otter Stream	Milford, Bradley	Bacteria TMDL, MS4 Priority Water
Penjajawoc Stream	Bangor	Highway Access-related Development Threat, MS4 Priority Water
Penley Brook	Auburn	TMDL
Phillips Brook	Scarborough	TMDL
Pleasant River	Windham	TMDL
Prestile Stream (Upper)	Mars Hill	TMDL
Red Brook	Scarborough, South Portland	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Shaw Brook	Bangor, Hampden	TMDL, Highway Access-related Development Threat
Stetson Brook	Lewiston	High Growth Area
Sucker Brook	Hampden	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Thatcher Brook	Biddeford	TMDL, Highway Access-related Development Threat, MS4 Priority Water
Thayer Brook	Gray	TMDL, Highway Access-related Development Threat
Topsham Fair Mall Stream	Topsham	TMDL, Highway Access-related Development Threat

Stream	Town	Priority List Reasoning
Topsham Fairgrounds Stream	Topsham	TMDL, Highway Access-related Development Threat
Trout Brook	South Portland	TMDL, MS4 Priority Water
Unnamed Stream (Rte 196)	Lisbon Falls	TMDL, MS4 Priority Water
Unnamed Trib to Androscoggin River (near Jordan Ave)	Brunswick	TMDL
Unnamed Trib to Androscoggin River (near River Rd)	Brunswick	TMDL
Unnamed Trib to Androscoggin River (near Water St)	Brunswick	TMDL
Unnamed Trib to Bond Brook (entering below I-95)	Augusta	TMDL, Highway Access-related Development Threat
Warren Brook	Belfast	TMDL
West Brook	North Berwick	TMDL
Whitney Brook	Augusta	TMDL
Whitten Brook	Skowhegan	TMDL

Threatened Streams

Non-impaired streams were assessed as to whether they are being significantly impacted or have the threat of significant impact from NPS pollution and whether the use of NPS 319 funds was likely to improve or protect water quality over the long term.

Non-impaired streams were determined to be priority threatened stream watersheds if they met one of the following criteria:

- Streams listed on the 2016 Integrated Water Quality Monitoring and Assessment Report '**Watch List**' Category 3 (Waters with Insufficient Data or Information to Determine if Designated Uses are Attained) for NPS issues. For streams, Category 3 is used as a 'Watch List' for streams of concern. Included on this list are streams that were recently impaired, and are therefore still sensitive, or if data shows it will likely be impaired in the future.
- Have recent increased impacts or significant potential threats from **agriculture** or **development**. This was determined through use of best professional judgment of the impact or significant threat of impact due to recent activities in the watershed. The sensitivity of the stream, extent and location of the agriculture or development, and cumulative effect of other watershed activities were considered in this determination.
- Identified as a priority watershed by partner organizations, such as the Maine Natural Resources Conservation Service Environmental Quality Incentives Program (**EQIP**) National

Water Quality Incentive, by Maine Municipal Separate Storm Sewer System (**MS4**) community plans, or by the Maine Healthy Beaches (**MHB**) program.

- High risk of future development in watershed due to location **near a highway exit**. These streams were determined by doing a risk assessment of the likelihood of development near each Maine Turnpike, Interstate 95, and Route 295 exit that had stream watersheds within a one mile radius. Streams were categorized as having a high, medium, or low risk of development in their watershed due to Access-related development. A screening level field survey and water quality sampling was conducted on streams with a high risk of development where more information was needed. The goal of the screening was to see if the stream was showing signs of stress or not, and to assess whether it fit the NPS priority selection principles. High risk streams were added to the priority list unless the assessment showed the stream was not showing signs of stress and land use in the area did not appear to be a high threat.

Even if streams or rivers met some of the above criteria, they were not included on the priority list if they are **large rivers** and/or the impairment is due to **wastewater discharges**. For these streams or rivers, it is believed that larger scale and/or point source-related work is necessary and smaller tributary work is a better fit with the current NPS program.

Table 22. Threatened Streams Priority List (73 streams)

Stream	Town	Priority List Reasoning
Alder Stream	Corinna	EQIP Priority Water
Amsden Brook	Ft. Fairfield	Agriculture Threat
Beaver Brook	Scarborough	Highway Access-related Development Threat
Birch Brook	Presque Isle	Agriculture Threat
Bobbin Mill Brook	Auburn	Watch List
Cape Neddick River	York	MS4 Priority Water
Caribou Stream	Caribou	Watch List
Cemetery Brook (unnamed trib to Penjajwoc/Meadow)	Veazie	MS4 Priority Water
Chenery Brook	Falmouth	Highway Access-related Development Threat
Chickering Creek	Kittery	Highway Access-related Development Threat
Currier Brook	Skowhegan	Bacteria TMDL
Deep Brook	Saco	Highway Access-related Development Threat
Depot Stream	Wells	Highway Access-related Development Threat
Duck Stream	Waterville	Development Threat
East Branch Piscataqua	Falmouth	Watch List, MS4 Priority Water

Stream	Town	Priority List Reasoning
Factory Brook	Caribou	Agriculture Threat
Farnham Brook	Pittsfield	Watch List
Felts Brook	Brewer	MS4 Priority Water
Great Works River	South Berwick	MS4 Priority Water
Grey Brook	Ft. Fairfield	Agriculture Threat
Hacker Brook	Ft. Fairfield	Agriculture Threat
Hardwood Brook	Caribou	Agriculture Threat
Hockenhull Brook	Ft. Fairfield	Agriculture Threat
Libby Brook	Ft. Fairfield	Agriculture Threat
Little River	York	Highway Access-related Development Threat
Maxwell Brook	Sabattus	Highway Access-related Development Threat
McDonald Brook	Ft. Fairfield	Agriculture Threat
Meadow Brook	Gray	Highway Access-related Development Threat
Medomak River	Waldoboro	Agriculture Threat
Merrill Brook	Freeport	Highway Access-related Development Threat
Mill Brook	Scarborough	Development Threat
Mill Brook	Westbrook	MS4 Priority Water
Mill Creek	Falmouth	Highway Access-related Development Threat, MS4 Priority Water
Moose Brook	Auburn	Highway Access-related Development Threat
Moulton Brook	York	Highway Access-related Development Threat
Nichols Brook	Caribou	Agriculture Threat
North Branch McLean Brook	St Agatha	Watch List
Norton Brook	Falmouth	Watch List, Highway Access- related Development Threat
Ogunquit River	Ogunquit	MHB Priority Water
Oliver Brook	Houlton	EQIP Priority Water
Pattie Brook	Ft. Fairfield	Agriculture Threat
Pearce Brook	Houlton	Agriculture Threat, Development Threat
Perley Brook	Fort Kent	Watch List
Piscataqua River (Falmouth)	Falmouth	Watch List
Pope Creek	Wells	Highway Access-related Development Threat
Prestile Brook	Caribou	Agriculture Threat

Stream	Town	Priority List Reasoning
Richardson Brook	Presque Isle	Agriculture Threat
Riggs Brook	Augusta	Watch List
Rockwood Brook	Augusta	Highway Access-related Development Threat
Rocky Brook	Mars Hill	Watch List
Rolling Dam Brook	Gardiner	Highway Access-related Development Threat
Salmon Brook	Washburn	Watch List
Scitterygusset Creek	Falmouth	Highway Access-related Development Threat
Spinney Creek	Eliot	MS4 Priority Water
Spring Brook	Caribou	Agriculture Threat
Spruce Creek	Kittery	MS4 Priority Water
Spurwink River	Cape Elizabeth	MHB Priority Water
Stone Brook	Augusta	Highway Access-related Development Threat
Stroudwater River	Portland, Westbrook	Watch List
Sunday River	Newry, Bethel	Watch List
Swan Pond Brook Tributary	Dayton, Biddeford	Watch List
Tannery Brook	Gorham	Watch List, MS4 Priority Water
Tanning Brook	Manchester	Watch List
Unnamed Stream at I-95 Exit 7, tributary to Moulton Brook	York	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 19, tributary to Webhannet River	Wells	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 75, tributary to Androscoggin River	Auburn	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 113, tributary to Kennebec River	Augusta	Highway Access-related Development Threat
Unnamed Stream at I-95 Exit 150, downtown tributary to Farnham Brook	Pittsfield	Highway Access-related Development Threat
Unnamed Trib below Merrit	Presque Isle	Agriculture Threat
Unnamed Trib to Piscataqua River, crosses Mountain Rd, I-95 & Gray Rd	Falmouth	Highway Access-related Development Threat
Unnamed Tribs to Long Lake near golf course	Madawaska	Agriculture Threat
Violette Stream	Van Buren	Development Threat
Willowdale Brook	Scarborough	Highway Access-related Development Threat

E. Marine Waters Watershed Prioritization Description

Marine areas were assessed on the impact or threat of NPS pollution, and the likelihood that NPS abatement work or support could make a short- or long-term improvement to water quality. The impact or threat was determined by whether there were impacted shellfish harvest areas of interest, beach swimming advisories or documented negative water quality indicators. It was considered likely that NPS abatement work or support could be effective if the primary pollutant sources were nonpoint and non-natural, and if the watershed likely had a significant water quality impact due to a lower degree of flushing.

Note that it is anticipated that whether a marine water is listed as a NPS Priority Impaired or Threatened Water will be dynamic as the Integrated Report continues to respond to shellfish closures and openings. It is not anticipated that the marine waters will be removed from the NPS Priority List as frequently, though they will be switched between the impaired or threatened categories as appropriate.

Impaired Marine Waters

Unlike the lake and stream prioritization, the marine waters listed as impaired waters on the 2012 Integrated Report were not used as a starting point for the NPS Priority list. Marine waters have fewer numeric criteria and rely more on narrative criteria (i.e., best professional judgment). The 2012 Integrated Report impaired marine waterbodies list does not align geographically with the DMR shellfish harvest closure lists, and it does not clearly distinguish between NPS and point source contributions. To keep prioritization criteria objective, the work group instead focused on data associated with bacterial closures and relied on data, knowledge, and priorities from other organizations. This resulted in a more exclusive and smaller list for marine waters than for lakes and streams. Additions to the marine priority list are anticipated as more information becomes available.

Marine watersheds or coves/segments of the listed waters were added to the priority list if they met at least one of the following criteria:

- Marine waters or beaches that **Maine Healthy Beaches (MHB)** has identified as likely areas with NPS sources of bacteria at levels that are concerning for primary contact recreation.
- Marine waters that the **Casco Bay Estuary Partnership (CBEP)** has identified with high/moderate value shellfish beds, high/moderate harvester interest, and associated NPS sources documented in the CBEP report, *Expanding and Sustaining the Shellfisheries of Casco Bay 2011* (2012).
- Marine waters associated with a **Maine Municipal Separate Storm Sewer Program (MS4)** priority watershed.
- Nearshore waters and intertidal clam flats where partners (e.g., CBEP, Friends of Casco Bay, Marine Environmental Research Institute (MERI), Wells Reserve) have documented **water quality indicators** with suspected NPS links. Indicators included documented eelgrass loss

(only limited availability) or recurring macroalgae blooms, chronically high nitrogen relative to comparable ambient conditions and/or chronically low dissolved oxygen (<5 mg/l).

- Marine waters that the **Maine Department of Marine Resources (DMR)** has identified as having shellfish harvest closures related primarily to NPS threat, and that are protected embayments with limited assimilative capacity. Information available from sanitary surveys, watershed surveys, and local research and knowledge were used to determine if NPS threats were the dominant contributors to documented impairment or anticipated future impairment.

Some marine waters were not included on the priority list even if they met one or more of the above criteria due to the following reasons.

- Believed to have negative water quality indicators for **'natural' reasons**, such as high bacteria from wildlife, or having low dissolved oxygen as a result of high sediment oxygen demand in shallow, productive, low flushing coves.
- Believed to be impaired by **legacy pollutants**, particularly legacy toxics. If legacy pollutants would have to be addressed in order for the waterbody to meet class, then reducing NPS sources would not be sufficient for attainment of standards.
- **Large or exposed estuaries, coastal embayments, or coastal shorelines** with relatively high degree of flushing likely. The large scale of the area and influence of tides and surface currents make measureable improvement in water quality due to implementation of NPS watershed-based plans very unlikely.
- Source of pollution is tied primarily to **wastewater discharges**, a small number of failing **septic systems** or **overboard discharges**, or other **point sources**. While failing septic systems and overboard discharges are in the realm of NPS, NPS grant program does not fund replacing sewage systems, so small watersheds with just a few septic issues are a better fit to be addressed by the town.
- Sources of pollution are **not clearly of nonpoint origin or have limited NPS sources**. More information on probable sources is needed in order for prioritization for NPS.

Table 23. Impaired Marine Waters Priority List (34 marine waters)

Marine Water	Area/Town	Priority List Reasoning
Anthoine Creek & Cove	South Portland	Negative Water Quality Indicators (FOCB)
Broad Cove	Cushing	DMR/NPS Threat
Bunganuc Creek	Brunswick	CBEP Priority Water
Cape Neddick River	York	MS4 Priority Water
Churches Rock	So. Thomaston	DMR/NPS Threat
Egypt Bay	Hancock/Franklin	DMR/NPS Threat
Goosefare Bay	Kennebunkport	MHB Priority Water, MS4 Priority Water

Marine Water	Area/Town	Priority List Reasoning
Harpswell Cove	Brunswick	CBEP Priority Water
Harraseeket River	Freeport	DMR/NPS Threat
Hutchins Cove	Bagaduce River/Northern Bay (Penobscot)	DMR/NPS Threat
Hyder Cove	Cushing	DMR/NPS Threat
Kennebunk River	Kennebunk	MHB Priority Water
Little River and Bay	Freeport	CBEP Priority Water
Littlefield Cove	Bagaduce River / Northern Bay (Penobscot)	DMR/NPS Threat
Maquoit Bay	Brunswick	CBEP Priority Water
Martin Cove	Lamoine	DMR/NPS Threat
Medomak River Estuary	Waldoboro	DMR/NPS Threat
Mill Cove	South Portland	Negative Water Quality Indicators
Mill Pond/Parker Head	Phippsburg	DMR/NPS Threat
Mussell Cove	Falmouth	CBEP Priority Water, DMR/NPS Threat
North Fogg Point	Freeport	CBEP Priority Water
Northeast Creek	Bar Harbor	DMR/NPS Threat
Oakhurst Island	Harpswell	CBEP Priority Water
Ogunquit River Estuary	Ogunquit	MHB Priority Water, DMR/NPS Threat
Pemaquid River	Bristol	DMR/NPS Threat
Salt Pond	Blue Hill/Sedgwick	DMR/NPS Threat, MERI
Scarborough River Estuary	Scarborough	DMR/NPS Threat
Spinney Creek	Eliot	MS4 Priority Water, Negative Water Quality Indicators
Spruce Creek	Kittery	MS4 Priority Water, Negative Water Quality Indicators
Spurwink River	Scarborough	MHB Priority Water, DMR/NPS Threat
St. George River Estuary from Rte 1 crossing to head of tide	Warren, Thomaston	DMR/NPS Threat, Negative Water Quality Indicators
Upper New Meadows River upstream from Howard Point, including lakes	Brunswick, Bath	Negative Water Quality Indicators, CBEP Priority Water
Weskeag River	S. Thomaston	DMR/NPS Threat
Willard Beach	South Portland	MHB Priority Water

Threatened Marine Waters⁷

Marine waters that are not listed as impaired waters on the 2016 Integrated Report but that meet the criteria listed above were also included on the list.

Table 24. Threatened Marine Waters Priority List (2 marine waters)

Marine Water	Town	Priority List Reasoning
Biddeford Pool	Biddeford	Negative Water Quality Indicators
Jordan River	Trenton/Lamoine	DMR/NPS Threat

⁷ The use of the term, 'threatened', in this document refers to unimpaired waters that are facing potential impacts from NPS pollution. The term is not intended to be used in the way described in Maine's Integrated Report, where waters are listed as 'threatened' for Clean Water Act §303(d) listing purposes if those waters are anticipated to fall into non-attainment with the next listing cycle of two years.

Appendix 3. Water Resource Monitoring and Assessment Strategies and Partners

A. Types of Water Quality Monitoring and Assessment

Monitoring and assessment work by DEP is conducted for a variety of purposes (Table 24). Much of DEP’s monitoring and assessment work is conducted to determine if the State’s waterbodies meet their designated classification. Other types of monitoring are also integral to the NPS program. Water quality problem identification and assessment of conditions is needed to target NPS program efforts. The methods, scale and the expertise needed to carry out monitoring and assessment depends on the objective, such as ambient water quality monitoring, development of a new assessment tool, stressor analysis, or determining the sources of pollution.

Water Quality Monitoring:

The repeated sampling of environmental conditions at predetermined locations in order to provide a set of data to conduct assessments.

Water Quality Assessment:

The overall process of evaluating the physical, chemical, and/or biological nature of water in relation to natural quality, human effects, and intended uses.

Table 25. Monitoring and Assessment Activities.

Activity	Purpose	Monitoring/Assessment Methods	Scale	Activity Initiator
Ambient Water Quality Monitoring	<ul style="list-style-type: none"> Identify water quality problems Evaluate waters of the State to determine if water quality standards are being met 	<ul style="list-style-type: none"> In-situ water quality monitoring Data assessment 	<ul style="list-style-type: none"> Statewide Regional Watershed 	<ul style="list-style-type: none"> DEP Partners
Trends Analyses	<ul style="list-style-type: none"> Determine if water quality changing positively or negatively due to land use changes, natural conditions or restoration activities 	<ul style="list-style-type: none"> Statistical Analyses 	<ul style="list-style-type: none"> Statewide Waterbody 	<ul style="list-style-type: none"> DEP Partners

Activity	Purpose	Monitoring/Assessment Methods	Scale	Activity Initiator
TMDL Development	<ul style="list-style-type: none"> Develop TMDL for impaired waters Define impairment, causes and sources of pollution, loading and reductions needed to restore waterbody 		<ul style="list-style-type: none"> Targeted Waterbodies 	<ul style="list-style-type: none"> DEP EPA Consultants
Water Quality Monitoring Tools and Assessment Methods	<ul style="list-style-type: none"> Develop new or refine existing monitoring methods used to determine if water quality standards are being met Develop new water quality criteria 	<ul style="list-style-type: none"> In-situ water quality monitoring Statistical methods and models 	<ul style="list-style-type: none"> Statewide Regional 	<ul style="list-style-type: none"> DEP EPA Universities
NPS Project Effectiveness	<ul style="list-style-type: none"> Monitor and/or evaluate the effectiveness of NPS projects 	<ul style="list-style-type: none"> Watershed evaluation to track BMPs implemented and/or calculate pollutant load reductions In-situ water quality monitoring Trend Analyses 	<ul style="list-style-type: none"> Watershed Waterbody 	<ul style="list-style-type: none"> DEP Partners
Watershed Assessment	<ul style="list-style-type: none"> Determine specific sources of pollution or stressors in order to develop management plans and implementation projects 	<ul style="list-style-type: none"> Watershed or Stream Corridor Surveys that identify sources of pollution Waterbody specific monitoring 	<ul style="list-style-type: none"> Watershed Waterbody 	<ul style="list-style-type: none"> DEP Partners Consultants
Research	<ul style="list-style-type: none"> Provide answers to specific theories, problems and questions 	<ul style="list-style-type: none"> Research methods 	<ul style="list-style-type: none"> Statewide Regional Watershed Waterbody 	<ul style="list-style-type: none"> DEP Universities

B. Monitoring and Assessment by Waterbody Type

Rivers and Streams

The DEP assesses the water quality of rivers and streams primarily through its Biomonitoring Program on a 5-year rotating basin schedule (Aroostook County, Androscoggin basin, Kennebec basin, Penobscot basin/Downeast and Southern Maine). The Program has had a macroinvertebrate biomonitoring program for 35 years and in 2000, initiated an algal biomonitoring program. Stream macroinvertebrate communities are assessed using a statistical model that predicts the likelihood of a waterbody attaining the aquatic life criteria of its assigned class of AA/A, B, or C. Numeric biocriteria that describe the macroinvertebrate classification decision process were adopted into rule (Chapter 579) in 2003. Biological assessment methods and a statistical model for algal communities have been completed, but not yet implemented. The algal data is however being interpreted to determine narrative aquatic life criteria for the integrated report.

Additional monitoring by DEP occurs through the Salmon Habitat Monitoring Program. This program includes water quality and biological monitoring, in collaboration with partners, of Maine's Atlantic salmon rivers/streams. The Surface Water Ambient Toxics Program also conducts monitoring in rivers/streams as well as lakes and marine waters.

In 2009, DEP started the Volunteer River Monitoring Program (VRMP). Volunteer groups monitor under a Quality Assurance Program Plan and DEP provides training and equipment loan, technical support, data management and reporting. All the volunteer groups collect chemistry data (i.e., dissolved oxygen, temperature and specific conductivity) and about half of the groups also do bacteria monitoring.

The primary cause of impairment for rivers and streams is toxic contamination from organics and pesticides, as well as legacy pollutants such as DDT, dioxin and PCBs. Other causes of impairment are oxygen depletion, affecting aquatic life uses and biological effects on aquatic life criteria. Nutrients and pathogens are also notable causes.

The impairment sources are about equally divided between industrial point source discharges, unknown sources, and non-point sources. The primary non-point sources are agriculture, development and urban stormwater. Also, all freshwaters in Maine have an advisory for fish consumption due to presence of mercury presumed to be from atmospheric deposition. (Source: Integrated Water Quality Monitoring and Assessment Report)

Wetlands

DEP's Biological Monitoring Program is primarily responsible for monitoring and assessing wetlands. In 1998, DEP began developing a biomonitoring program for wetlands which focuses on emergent and aquatic bed wetland habitat, including freshwater lacustrine and riverine fringe wetlands. Monitoring includes biological monitoring of macroinvertebrates, attached algae, and phytoplankton. In addition, ecological conditions are documented, and a rapid assessment of stressors is completed. A model that assesses freshwater wetland macroinvertebrate communities to predict attainment of tiered aquatic life use criteria in

Maine's water quality standards has been completed, but not fully implemented. The data are being interpreted to determine attainment narrative aquatic life criteria for the Integrated Report.

The primary causes of wetlands impairment are point and nonpoint sources including agriculture, development and urban stormwater.

Lakes

Monitoring and assessment of lakes is achieved primarily through the Lake Stewards of Maine (LSM). Water quality data is collected by volunteers and associated lake organizations/regional entities as described in the "Collaborators and Partners" section. The DEP Lakes Assessment Unit provides quality assurance oversight of LSM. The Lakes Unit also conducts baseline monitoring on about 100 lakes in late summer each year. Additional monitoring by DEP includes monitoring of priority lakes and working with partners on probability-based monitoring for cyanotoxins and lake vulnerability.

The cause of impairment for most of the impaired lakes is dissolved oxygen, total phosphorus, secchi disk transparency and habitat assessment. Nonpoint sources affecting lakes are due primarily to agricultural sources and development/urban stormwater. A subset of lakes is impaired due to non-attainment of aquatic life (habitat) standards due to hydromodification (drawdown).

Estuaries/Marine Waters

Monitoring and assessment for marine waters is done by the Marine Unit, along with a number of partners (other governmental agencies, academic institutions and nonprofits). DEP monitoring is accomplished through two programs: Maine Environmental Monitoring Program (MEMP) established in 1991 and the Surface Water Ambient Toxics (SWAT) established in 1993. The focus of the MEMP is on monitoring industrial contaminants and pollutants in wastewater discharges and determining attainment of water quality standards. This is accomplished through monitoring ambient water quality, nutrients and eutrophication indicators. Nutrient monitoring includes mapping the extent and changes in eelgrass as an indicator of excess nitrogen in Casco Bay. The SWAT program analyzes blue mussel, softshell clam, lobster and other species' tissue for the presence of toxic contaminants affecting human and ecological health. Bacterial monitoring is through the Maine Healthy Beaches program for swimming beach quality, and Department of Marine Resources to determine shellfish closures.

Causes of impairment include bacteria, low dissolved oxygen, nutrients/eutrophication, biological indicators and toxics. Bacterial contamination is a significant cause of impairment affecting both recreational use and shellfish closures. Toxics are also a primary cause of impairment (lobster tomalley and certain saltwater finfish consumption advisory). Sources of toxic contamination include historic industrial loads for dioxin, and for some harbor areas past activities have left dioxins as well as pesticides, metals, and PCBs. More recent toxic contamination originates from several sources. These sources include urban development (PAHs and metals), boat-related activities, combined sewer overflows, and atmospheric deposition.

Groundwater

The DEP, DHHS Division of Environmental Health, DACF Maine Geological Survey, and the U.S. Geological Survey share responsibility for the protection and assessment of groundwater. Groundwater monitoring consists of two types of monitoring, site-specific or generalized. Most groundwater data are site-specific and are gathered as part of permit conditions, enforcement, or impact assessments. General ambient monitoring is done by the Maine Geological Survey and U.S. Geological Survey. These two agencies monitor changes in water quality and quantity through a network of observation wells. DHHS also maintains a database of public water supply well water quality data.

Maine's groundwater efforts emphasize resource protection through three efforts. These are interagency coordination of groundwater programs, assessment of protection problems that include enhancement of the Environmental and Geographic Analysis Database (EGAD), and statutory changes to enable building upon state groundwater protection programs. The purpose is to increase groundwater protection and risk reduction.

Assessment of groundwater impairment is not currently done as part of the DEP "Integrated Report" assessment. However, contamination likely threatens a significant area of Maine's groundwater in developed areas of the State. Nonpoint source pollution is responsible for most groundwater pollution. Primary sources are agriculture, hazardous substance sites, spills, landfills, leaking above ground storage tanks, septic systems, shallow well injection, spray irrigation, stormwater runoff from development, and winter salt application.

C. Collaborators and Partners

Much of the water quality data that is collected and assessed for the integrated report is collected through DEP monitoring programs. However, data are also largely provided from numerous other agencies, organizations and volunteer monitoring groups. Data collected by volunteer monitoring groups or conservation organizations must meet quality assurance/quality control requirements to be accepted by DEP. Volunteer groups that are part of the Lake Stewards of Maine or Volunteer River Monitoring Program work under a Quality Assurance Project Plan and their data is directly managed by DEP. Conservation groups not under the umbrella of one of these programs must have an EPA approved QAPP or Department approved sampling plan.

Rivers and Streams

DEP generates much of the State's river and stream water quality data through its Biomonitoring Program, SWAT Monitoring Program, Salmon Habitat Monitoring Program as well as specific studies done for waste load allocations and TMDLs. Monitoring partners include the following:

- Federal agencies: U.S. Environmental Protection Agency, U.S. Fish & Wildlife Service, U.S. Geological Survey, NOAA, and Acadia National Park
- State agencies: Department of Inland Fisheries and Wildlife, Department of Health and Human Services, Department of Marine Resources

- Other governmental agencies: Saco River Corridor Commission
- Academic institutions: University of Maine
- Conservation organizations: Atlantic Salmon Federation, Downeast Salmon Federation, Midcoast Conservancy, Nature Conservancy
- Tribes: Penobscot Indian Nation, Houlton Band of Maliseet Indians
- Volunteer and watershed groups working under the Volunteer River Monitoring Program

Lakes

The DEP Lake Assessment Unit coordinates and conducts lake monitoring. Much of the lake data is collected by volunteers through the Lake Stewards of Maine. Monitoring partners include the following:

- Federal agencies: U.S. Environmental Protection Agency, Acadia National Park
- State agencies: Department of Inland Fisheries and Wildlife
- Academic institutions: Colby College, Unity College, University of Maine
- Local lake associations
- Regional entities: Allagash Wilderness Waterway, Auburn Water District, Cobbossee Watershed District, Lakes Environmental Association, Midcoast Conservancy, Portland Water District, Rangeley Lakes Heritage Trust, 7 Lakes Alliance and 30 Mile River Watershed Association
- Tribes: Passamaquoddy Tribe at Indian Township, Penobscot Indian Nation

Marine and Estuarine Waters

The DEP Marine Program generates data from its own environmental and toxics monitoring programs-MEMP for ambient water quality, nutrients and eutrophication and SWAT for toxics. Much of the data, however, is provided by a variety of partners including:

- Federal Agencies: U.S. Environmental Protection Agency
- Federally funded programs: Casco Bay Estuary Partnership, Wells National Estuarine Research Reserve, Maine Healthy Beaches Program
- State agencies: Maine Department of Marine Resources, New Hampshire Department of Environmental Services
- Academic institutions: University of Maine Darling Center
- Nonprofits: Mount Desert Island Biological Laboratory
- Regional Entities: Boothbay Region Land Trust, Friends of Casco Bay, Kennebec Estuary Land Trust, Maine Coastal Observing Alliance

Appendix 4. Targeted Assessment and Stressor Analysis

The success of restoration and protection efforts hinges on understanding the environmental stressors that are causing or could cause the impairment, and the watershed conditions that are generating those stressors. The purpose of this step is to inform the development of an effective watershed-based plan by identifying and characterizing the relevant stressors and watershed conditions. The information required to accomplish this varies with the waterbody type and in many instances, whether or not the waterbody is impaired.

A. Lake Watersheds

The water quality standard that is most likely to be violated in lakes and ponds is the trophic standard, which states that lakes and ponds (a) shall have a stable or decreasing trophic state, subject only to natural fluctuations; and (b) shall be free of culturally induced algal blooms which impair their use and enjoyment. Since the limiting factor for algal production in Maine lakes is the concentration of phosphorus in the water, the stressor of most concern for lakes is phosphorus loading. Hence, assessment efforts are focused on evaluating the lake's trophic state; characterizing important current and potential phosphorus sources to the lake from both the lake's watershed and its bottom sediments; and, as specifically as possible, identifying opportunities to reduce phosphorus loading to the lake.

- **Water Quality** - DEP's Lake Assessment Section, in combination with Lake Stewards of Maine volunteers, collect information on the trophic state of many of the State's developed lakes. The data are used to evaluate the stability of trophic state in each lake; the incidence of algal blooms; and, especially in cases of lakes with increasing trophic state or algal blooms, the amount of phosphorus being recycled into the water column from the lake's bottom sediments.
- **Watershed Surveys** - The method most often used to identify watershed phosphorus sources is the Lake Watershed Survey, in which volunteers, under the guidance of professionals, canvas the watershed to find specific, usually stormwater-related sources of phosphorus (e.g., unstable roads, eroding ditches, agricultural operations). The identified sources are then evaluated by professionals for the severity of the problem and the probable cost of repair, creating a very specific prioritized list of opportunities to reduce phosphorus loading to the lake.
- **Internal Recycling Evaluation** - Ongoing evaluation of the lake's trophic state and a watershed survey that identifies opportunities to reduce phosphorus load to the lake are likely the only assessment efforts that will be used if the lake currently meets trophic standards. If the lake does not meet standards, assessment is likely to include intensive monitoring of the phosphorus mass in the water column over the period from May through September, and also the phosphorus, iron and aluminum content in the bottom sediments. The purpose of this monitoring is to quantify the amount of internal recycling of

phosphorus from the lake's bottom sediments and to evaluate and plan for in-lake treatment strategies.

B. Stream Watersheds

Stream watersheds typically present more complex challenges than lakes, especially if they are in urban settings and the aquatic life standard is violated or threatened. In Maine, each Class of river and stream has an aquatic life standard that describes the health of the biotic community that the stream must achieve. For Class AA and A streams, the community must be as naturally occurs; for Class B streams, the stream must support all indigenous aquatic species without detrimental change to the resident biological community; and for Class C streams, the stream must support all indigenous species of fish and the structure and function of the biological community must be maintained. There are many stressors that can cause or contribute to violation of this standard, so effective restoration and/or protection requires identification of which stressors are most important, or could become important, for any given stream situation. Given this, the suite of water quality, biological condition, habitat, stream corridor and watershed assessment tools employed varies depending on the condition of the stream and its watershed, and which stressors are most likely to contribute to impairment of the community.

Stream Restoration

Several different assessment tools are utilized when the stream in question is impaired, and particularly when the stream fails to meet its aquatic life standard. In most cases the assessment work is performed by several entities, with some elements done by DEP staff and others by the municipality, their consultants, or other local partners.

- **Water Quality** - Water quality is always monitored to some degree, and usually includes a mix of base flow and storm event monitoring at several stations. Typical parameters include temperature, dissolved oxygen (DO), specific conductance, chloride, phosphorus, heavy metals and hydrocarbons. Rising stage samplers are often used during storm events, and data sondes are routinely used to obtain continuous measurements of temperature, DO and specific conductance. In order to focus in on discrete sources, conductivity screening, where many measurements are taken along the stream, may also be used. In some Aroostook County agricultural watersheds where baseflow release of sediment phosphorus is a potential issue, baseflow screening for pH and phosphorus may be required.
- **Biological Assessment** - As part of the DEP's ambient water quality assessment program, biological assessments of the macroinvertebrate and the periphyton communities are made to define the impairment. There is often a signature in the community composition that indicates which stressors are in play and this can influence the direction in which other assessment efforts are focused. Biological assessments usually continue at regular intervals throughout the restoration process to assess effectiveness.
- **Stream Habitat and Corridor Assessment** - In-stream habitat and the condition of the stream corridor are also usually evaluated. Various habitat assessment and riparian corridor

assessment tools are used and often volunteers assist in these assessments. This helps local citizens become familiar with the issues affecting their stream. Habitat condition is characterized and areas where habitat is damaged are identified. Bank stability, flood plain integrity and the condition of riparian vegetation are also assessed. In cases where the stream receives excess storm flow from impervious surfaces in the watershed or where historic alterations have affected habitat integrity or flow regime, a fluvial geomorphological assessment is performed. This assessment describes the processes that are dominant in each reach of the stream channel, identifies and characterizes areas of channel instability, provides direction for watershed storm flow management and identifies opportunities for in-stream habitat improvement projects.

- **Watershed Assessment** - Targeted assessment always includes some level of watershed assessment. It is important to understand where the water in various reaches of the stream comes from and what it comes into contact with on its way to the stream. In urban settings, it is often necessary to map the drainage infrastructure in order to accurately map the boundaries of the watershed, as well as the boundaries of catchments that drain to each stormwater outfall. Analysis of land use, particularly imperviousness, in each outfall catchment is helpful when identifying and prioritizing BMP retrofit opportunities in the watershed. In addition to watershed mapping, watershed surveys are often employed, sometimes using volunteers. The types of sources surveyed will vary depending on the dominant land uses in the watershed and which stressors are likely contributing to the impairment. In a rural impaired watershed, agricultural hotspots might be the focus of the survey, while in an urban setting, hotspots such as road intersections, gas stations, and high- turnover parking areas as well as areas of high salt use may be the focus.

Stream Protection

When the stream in question is threatened but not yet impaired, the assessment regime is usually limited and aimed at (a) ongoing evaluation of the biological community to insure it continues to meet appropriate aquatic life standards and (2) identifying the stressors most likely to become issues in the watershed. The latter is often accomplished with conductivity screening and continuous measurement of temperature, dissolved oxygen and specific conductance with data sondes and loggers. Stream corridor and habitat assessments may also be performed, with particular emphasis on identifying areas critical for riparian protection. A limited watershed survey may be performed to identify opportunities for retrofits of existing sources, but the main focus of assessment is often to guide development of local policies, ordinances, practices, and infrastructure improvement strategies that can be incorporated into an effective watershed protection plan.

C. Marine Watersheds

Coastal watersheds demonstrate considerable diversity in physical, chemical, and biological characteristics as they encompass estuarine waters ranging from barely measurable salinity to fully saline seawater in marine areas. Marine waters are influenced to varying degrees by freshwater inflows from rivers and streams as well as marine waters during flood tides and

periods of offshore wind. Urban settings and large watersheds provide different sources, types, concentrations, and mechanisms of pollutant loading than do rural settings or small watersheds. Additionally, characteristics of biological communities in marine waters differ based on tolerance to the physical and chemical environment. Because of this diversity, and also the variety of standards that may apply in certain situations, assessment strategies for marine waters will vary depending on the nature of the impairment or threat.

- **Shellfish closures** - The Maine Department of Marine Resources' Shellfish Growing Area Program determines shellfish growing area classifications in all shellfish harvesting areas to ensure that only pollution-free areas are open to harvesting. Classifications are set through sanitary surveys that include a shoreline survey to identify pollution sources that may impact water quality; marine water sampling to determine fecal coliform bacterial levels in the marine water; and analysis of how weather conditions, tides, currents, and other factors may affect the distribution of pollutants in the area. Water samples are collected monthly from January through December. DMR sanitary surveys have identified NPS pollution as the likely source of bacterial contamination in numerous shellfish harvesting areas in the state. DMR's assessments are supported and complimented by a number of other organizations including the CBEP, the Friends of Casco Bay, the MERI, the Wells Reserve, the Maine Clammers Association and many of the coastal municipalities.
- **Contact Recreation** - The Maine Healthy Beaches Program is a partnership between the University of Maine Cooperative Extension/Sea Grant, DEP, and local municipalities that brings together communities to perform standardized monitoring of beach water quality and notifies the public if health risks are detected. Each year the program selects a few beaches with chronic bacterial contamination to do supplemental assessments to identify the source of the contamination. These "special projects" incorporate several assessment tools including circulation studies, bracket sampling for bacteria and whiteners, and in rare cases, microbial source tracking.
- **Algal Blooms** - In recent years there have been an increasing number of localized blooms of the macroalgae *Ulva* (formerly *Enteromorpha*) on coastal mudflats. These blooms can be detrimental to the native biological community. In some instances, the blooms are fed by land-based nutrient sources from the watershed that drains to the flats. Assessments similar to the lake watershed survey can be effective in identifying the likely sources of nitrogen and/or phosphorus that are driving the blooms.
- **Other Impairments of the Biological Community** - As with rivers and streams, each class of estuarine and marine waters has narrative biological criteria. The criteria are the same for the marine Classes SA, SB and SC as they are for the riverine Classes A, B and C respectively. There are many different stressors that can cause a biological impairment so assessment strategies must be aimed first at identifying the stressors responsible for the impairment and next, at identifying the watershed conditions that are contributing to the impairment. When the marine waterbody in question is impaired, threatened, or in need of protection, many different assessment tools and methods may be employed. These include water quality monitoring, biological assessments, habitat assessments and source identification.

Additionally, comparisons with historical data may indicate meaningful changes over time, and local knowledge of landowners, municipal officials and fishermen can inform site selection and focused study. Furthermore, knowledge of waterbody characteristics can help to identify comparable waterbodies for use as reference.

- **Water Quality** - Monitoring efforts generally include measuring temperature, salinity, D.O., pH, turbidity, chlorophyll a throughout the water column, water clarity, inorganic and total nitrogen, and phosphorus in the surface water. In the water column, light attenuation and organic nutrients, including carbon, can also be monitored to address specific research questions. Studies of sediments may include chemistry of pore water. Data sondes and sensors use discretely or unattended permit acquisition of the above data types and chemistry is completed with grab samples analyzed by qualified labs.
- **Biological Assessments** - Assessments of benthic floral and faunal communities assist in characterization of the impact on the resident biological community and can demonstrate communities where invasive species could dominate. Biological community assessments can include inventorying the distribution, abundance, and density of individuals as well as species and higher order level diversity of marine macrophytes (seagrasses, macroalgae), epifauna, and infauna. Presence and proliferation of particular organisms, especially those in areas of chronic or temporal high temperature, low pH, hypoxia or anoxia, and persistent nutrient or pollutant loading can indicate biological responses to stressors that support impairment of numeric or narrative criteria. The absence or low abundance and diversity of particular species can similarly indicate the influence of stressors.
- **Habitat Assessments** - Habitat assessments assist in determining suitability of water or sediment for the native biological community. Characterization of habitats can include chemical analysis of water or sediment pore water, particle size analysis, habitat complexity, and in-water structure including man-made (e.g., docks, anchors and mooring buoys) and natural features (e.g., cobble and boulders, macrophyte substrate). Mapping of habitat types relative to watershed characteristics and point and NPS influences can also explain sensitivity of habitats to change based on suspected anthropogenic influences. Degraded habitat is often identified by hypoxic or anoxic and acidic waters, surface sediments with high sulfide concentrations and corresponding bacterial community, scarring from dragging or erosion, fragmented macrophyte distribution with a high occurrence of invasive species, or the absence of life.
- **Pollution Source Evaluation** - Targeted assessment also includes some evaluation of watershed, offshore, and atmospheric influences to determine relative contributions of pollution sources. Watershed influences consider location and intensity of adjacent and upstream land use, change over time in land uses, minimization of impacts and use of BMPs, seasonal and year-round population, and proximity of point source discharges and their effluent quality and quantity. In-water influences consider extent of tidal magnitude and associated flows, and size and type of inflows, whether regulated or naturally flowing.

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