Review of the Bowers Wind Project Visual Impact Assessment

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1. Introduction

On March 11, 2011, Champlain Wind LLC submitted a permit application for the Bowers Wind Project with a proposed nameplate capacity of 69.1 megawatt (MW). The turbines are located on the ridges of Bowers Mountain and "South Peak" in Carroll Plantation, Penobscot County, and Dill Hill in Kossuth Township, Washington County, Maine. The project is within the area designated for expedited grid-scale wind development. The generation facilities include:

- **Turbines**. Twenty-seven Siemens wind turbines, 10 with a nameplate capacity of up to 3.0 MW each and 17 with a nameplate capacity of 23 MW each. For both types of turbines, the height to the hub center is 80 meters (approximately 279 feet), plus 50.5 meters (approximately 166 feet) for the rotor blades, resulting in a total potential height of 130.5 meters (428 feet) to the tip of an upright blade. The turbines will be painted white. Red warning lights will be installed according to Federal Aviation Administration (FAA) guidelines. Typically lights are placed on the ends of a turbine string, and on alternating turbines between them.
- **Collector line and substation**. An above ground 34.5 kV collector line system will bring power from the towers to the "express collector" line. The poles will be 35 to 60 feet tall, and require an 80-foot cleared right-of-way.

Associated facilities include:

- **Roads**. The access road from Route 6 will be 20 feet wide and the ridgeline crane path will be 35 feet wide. A total of 9.83 miles of new road and 1.31 miles of improved road will be constructed. The roads will not be reseeded (Stantec 2011, page 13).
- **Turbine pads**. An area between 2.25 and 3.30 acres will be cleared around each turbine to facilitate construction. Following construction, stock pilled topsoil will be spread on all but a typical 0.43 acres area around each turbine and will be revegetated using both seeding and natural revegetation. Areas will be monitored and maintained until vegetation is established.
- **Building**. An approximately 7,000 square foot single-story Operations and Maintenance building is located north of Route 6, adjacent to the express collector line.
- **Meteorological towers**. There will be four permanent 80-meter (262-foot) guyed lattice meteorological (met) towers. The met towers will have a triangular cross section of approximately 18 inches on a side. Met towers will require FAA safety lighting and will be painted a distinctive color pattern.
- **"Express collector" line**. The express collector line will bring power 5.2± miles to a new substation where it connects to an existing 115 kV transmission line. It will be located in a 100-foot wide cleared transmission corridor.

The report entitled *Visual Impact Assessment for the Bowers Wind Project* by LandWorks was submitted as part of Champlain Wind, LLC's permit application (LandWorks 2011). This review was prepared to evaluate the adequacy of the visual impact assessment (VIA).[1] In addition, it

[1] For the purposes of this review, aesthetic, scenic and visual impacts will be considered synonymous.

presents the findings of additional analyses of the Bowers Wind Project's potential visual impacts. This is followed by an independent evaluation of the potential visual impacts to state and nationally significant scenic resources, using the Evaluation Criteria presented in the Wind Energy Act. These criteria are described Appendix 1. The final section of this report presents the Conclusions of this review.

2. Adequacy of the Report

There is a standard process that is followed by all VIAs, which includes: (1) project description, (2) landscape character, (3) visibility analysis, (4) significant scenic resources, (5) public use and expectations, and (6) evaluation of potential impacts. This section reviews what the *Visual Impact Assessment* for the *Bowers Wind Project* and the *Visibility of Associated Facilities from Local Public Viewpoints* by LandWorks (2011a, 2011b) reported for each portion of the standard VIA process. This will include a telephone survey of people who participated in outdoor activities in Maine during the past year, focusing on those who used the lakes within 8 miles of the Bowers Wind Project (Portland Research Group 2011a). There was also an onsite survey of people who attended the Second Annual Stetson Wind Snowmobile Ride-in (Portland Research Group 2011b). In addition, the geographic information system (GIS) data used for the VIA were reviewed and additional analysis conducted. In particular, a standard visibility analysis was performed using ArcMap software, and the visual simulations were compared to a three-dimensional ArcScene model to determine representational accuracy.

2.1 Project Description

The project's elements are described (LandWorks 2011a, pages 14-15), but some useful descriptive details are left out. For instance, what color will the turbines be painted? What color will the met towers be painted—it is not just a "light color," since FAA regulations will require that they be painted two contrasting colors. What type of night lighting is used on the met towers? What is the length of roads that will be built, and how much of that is upgrading existing roads, and will they be revegetated? How large is the clearing around the turbine (i.e., turbine pads), and will they be revegetated?

2.2 Landscape Character

The VIA describes the landform, water resources, vegetative patterns and cultural character of the area surrounding the proposed project (LandWorks 2011a, pages 15-18). The major features are identified, including each of the state or nationally significant scenic resources, as well as some locally significant scenic resources.

2.3 Visibility Analysis

In the VIA, topographic and forested visibility analysis is reported for both turbine blade tips and turbine hubs (LandWorks 2011a, Exhibit 1-4). On these maps, the number of visible turbines is shown in groups of three (i.e., 1-3, 4-6, 7-9 … turbines visible). The VIA supplement includes forested visibility maps for the tops of the express collector, O&M building, and met tower. On these maps, the associated facility is shown as either visible or not without an indication of number visible (e.g., number of met towers).

It appears that the visibility analysis used the National Elevation Dataset 1/3 Arc-Second (NED 1/3), which is "the best available raster elevation data for the conterminous United States" (USGS 2009a). The NED 1/3 arc-second data has a resolution of about 10 meters with a with ≤ 4 meter absolute vertical height accuracy (USGS 2009b).

The visibility map that takes into account the screening effect of forest trees used Maine Land Cover Data (MELCD) (LandWorks 2011a, Exhibits 3 and 4). In this case, 45 feet are added to

"areas identified as forest, which further limits and provides a better representation of potential visibility" (LandWorks 2011a, page 6). Areas considered "forest" included the following land cover classes: (9) deciduous forest, (10) evergreen forest, (11) mixed forest, (12) scrub-shrub areas, and (13) forested wetland (Steen 2011). In my experience, professionals conducting visibility analyses in the northeast have used 40 feet as the forest canopy height rather than 45 feet. However, they often do not assign a height to forested wetlands. These areas are dominated by trees that are 16 feet high but the total vegetation coverage need only be 20 percent. One assumes that the 80 percent not covered by vegetation could be low wetland plants. In addition, they do not include shrub-scrub, which describes areas dominated by shrubs less than 5 meters tall.

A "conservative" viewshed analysis would only include forested areas with mature trees and a full canopy. A more appropriate way to demonstrate the screening effect of other land cover classes would be to measure the height of these classes at specific locations in the field where their screening effect could be observed and then illustrate this screening effect by drawing a scaled cross-section.

In addition to the two visibility maps, Table 1 lists all of the great ponds with significant or outstanding scenic value and whether they have a potential view of the project, how many turbines are potentially visible, and the distance to the nearest turbine. The visibility reported in these tables seems to be informed by the field work as well as the visibility maps (e.g., the visibility maps indicate potential visibility on Norway Lake, Horseshoe Lake and West Musquash Lake, yet Table 1 indicates there will be no visibility).

There are a couple of issues that should be mentioned in relation to the visibility analysis. First, an error was observed in all four visibility maps—they include turbines that are greater than 8-miles from the viewer. The Wind Energy Act stipulates that beyond 8 miles, the scenic impact of turbines is insignificant.[2] The number of visible turbines should drop off as viewpoints approach the edge of the 8-mile study area as shown in this review's Map 1 Topographic Viewshed for Blade Tip, and in the VIA's they do not. Second, the VIA's treatment of associated facilities is simply inadequate. However, this is largely address in the *Visibility of Associated Facilities from Local Public Viewpoints,* a supplement to the VIA. This supplement presents visibility maps for the express collector poles, O&M building and substation, and the met towers. However, these maps include the screening effect of both topography and vegetation, and visibility based only on topography is not presented.

Distance zones. The concept of distance zones is presented in section 2.4 of the VIA. The USDA Forest Service proposed fixed distances for foreground, middle ground and background, which are slightly revised here. However, it is the perceptual definition of distance zones that really matters, and large scale and smooth surface of wind turbines confound these traditional thresholds. So, the foreground for a wind turbine may be less than a half-mile because they are composed of smooth materials without much apparent texture, and foreground is defined as the "distance from which details can be perceived" (LandWorks 2011, Page 12), such as the "small boughs of leaf clusters… clumps of wild flowers… movement of tree boughs and tree tops in moderate winds" (USFS 1995, page 4-10). However, the middle distance may extend further than

[2] 35-A MRSA, § 3452, §§ 3

5 miles because the basic elements of a turbine are so large that they remain recognizable at distances where most naturally occurring landscape elements (e.g., trees) have ceased to be individually recognizable. “This is the distance at which landscape are predominately seen. Individual forms are still distinguishable” (LandWorks 2011, page 13). I believe that this is fundamentally the reason why the threshold where wind turbines were determined to no longer have a significant potential impact was set at 8 miles by the Wind Energy Act. This is the beginning distance of the background for the current generation of grid-scale wind turbines, where atmospheric effects and distance result in a simplified image—“texture has disappeared and color has flattened, but large patterns of vegetation or rock are still distinguished, and landform ridgelines and horizon lines are the dominant visual characteristics” (USDA 1995, p. 4-11). While turbines may be visible beyond 8 miles, they will be relatively indistinct and it may not be possible to detect the motion of the blades.

2.4 Significant Scenic Resources

The VIA identifies all of the state and nationally significant scenic resources within 8 miles of the proposed wind turbines (LandWorks 2011a, pages 20-22). The state and nationally significant scenic resources includes three Great Ponds with outstanding and ten with significant scenic quality. In addition, there is one site listed on the National Register of Historic Places, which was verified by the Maine Historic Preservation Commission (Mitchell 2011). Table 1 below summarizes visibility information from the VIA for the state and nationally significant scenic resources, including name, distance to nearest turbine, and number of turbines potentially visible. While not explicitly stated, the number of turbines visible within 8 miles appears to be based on both the topographic and vegetation viewshed map (LandWorks 2011a, Exhibit 3) and filed observation. Table 1 indicates that there will be no visibility from Horseshoe, West Musquash and Norway Lakes, yet Exhibit 3 also indicates that there may be small areas where turbines may be visible.

2.5 Visual Simulations

Visual simulations are prepared for most scenic resources that appear to have a potential view of turbine blade tips within 8 miles of the viewer based on the results of Exhibit 3 Viewshed Map Topography and Vegetation, supplemented by field investigation. The major exception is that no simulation is created from Sysladobsis Lake, which will have views of the project turbine hubs.

Visual simulations are a primary tool to investigate the impact to significant scenic resources. LandWorks prepared eight photosimulations as part of their VIA, two of which are from the Pleasant Lake. Two different cameras were used, a Canon EOS Rebel XT capable of capturing an image that is 3456-by-2304 pixels, and an Olympus Stylus 7010 set to capture images that are 1200-by-900 pixels. The Rebel XT use a prime lens that assures all the images had the same focal length. In this case the lens’ focal length was 35 mm with a 35.2° horizontal angle of view, which is close to the convention for a “normal” lens. The Olympus camera used a zoom lens with a variable focal length. There is no way to assure precisely what focal length is being used, as there is with a prime lens. In this case the lens was at a mild telephoto setting. Basic information about the photographs used for the simulations and their appropriate viewing distance is presented in Table 2.

Table 1. Summary of Scenic Resources of State and National Significance within 8 Miles of the Generating Facilities as Identified by LandWorks†

Scenic Resources of State or National Significance in the Surrounding Area	Distance to Nearest Visible Turbine (miles)	Number of Turbines Visible w/in 8 miles
Historic Sites		
Springfield Congregational Church	NA	0
Great Ponds		
Bottle Lake	5.1	0-13
Duck Lake	2.7	0-18
Horseshoe Lake	NA	0
Junior Lake	2.99	0-23
Keg Lake	3.78	0-18
Lombard Lake	NA	0
Norway Lake	NA	0
Pleasant Lake	2.16	0-27
Scraggley Lake	3.3	0-26
Shaw Lake	2.6	0-25
Sysladobsis Lake	6.34	0-22
Upper Sysladobsis Lake	NA	0
West Musquash Lake	NA	0

† **Source**: LandWorks (2011a, page 20)

Table 2. Establishing Viewing Distance for the VIA Photosimulations

Simulation	Camera	Focal Length	Equivalent Focal Lens†	Horizon-tal Angle	Simulation Width*	Viewing Distance§
Bottle Lake	Rebel XT	35 mm	56.8 mm	35.2°	11.25"	17.7"
Duck Lake	Rebel XT	35 mm	56.8 mm	35.2°	12.15"	19.2"
Junior Lake	Rebel XT	35 mm	56.8 mm	35.2°	12.15"	19.2
Keg Lake	Olympus 7010	16 mm	89.6 mm‡	22.7°	7.40"	18.4
Pleasant Lake Boat Launch	Rebel XT	35 mm	56.8 mm	35.2°	11.60"	18.3"
Pleasant Lake, Near Northern Shore	Rebel XT	35 mm	56.8 mm	35.2°	11.75"	18.5"
Scraggly Lake	Rebel XT	35 mm	56.8 mm	35.2°	11.70"	18.4"
Shaw Lake	Rebel XT	35 mm	56.8 mm	35.2°	11.56"	18.2"

† Using Canon APS-C format (22.2mm-by-14.8mm). http://www.isotton.com/misc/lens-angle-calculator/

‡ Based on the specification in the Olympus Digital Camera Stylus-7010/μ-7010 Instruction Manual, page 67. http://www.olympusamerica.com/files/oima_cckb/STYLUS-7020_MJU-7020_STYLUS-7010_MJU-7010_Instruction_Manual_EN.pdf (Accessed April 23, 2011).

* Simulations are a multi-frame panorama, the single frame portion is an approximation based on images provided (Prescott 2011).

§ Viewing distance is calculated using the method described by Sheppard (1989, page 185).

Photosimulations begin with the photographs described in Table 2. Field notes indicate that a GPS was used to locate simulation viewpoints, and the longitude and latitude are included with the simulations (Exhibits 6 through 13). LandWorks then built a 3-dimensional representation of the turbines as they would appear in the landscape using a CAD program (VectorWorks). This representation is registered to the location and camera setting used of the photograph. The photograph and CAD representation of the turbines are brought together in the image editing program (PhotoShop). The visual effect of clearing for roads, crane paths and turbine pads appears to have been explored using ArcScene, the same program used for the visualizations included with this review. While I have not watched LandWorks employees walk through this process, the description follows what is commonly considered best professional practice for creating photosimulations. While there is some interpretation that must be made to create photosimulations, those presented in the VIA appear generally accurate and well-constructed, as is apparent when compared to the ArcScene Visualizations in Appendix 3.

Bottle Lake. The scope and scale of Visualization 1 is very similar to the photosimulation in the VIA's Exhibit 6. This supports the accuracy of the photosimulation.

Duck Lake. The scope and scale of the left half of Visualization 2 is very similar to the photosimulation in the VIA's Exhibit 7. This supports the accuracy of the photosimulation. However on the right half there are turbines apparent in the visualization that are screened in the photosimulation. This appears to be because the shoreline vegetation is much higher than represented by the visualization. In the photograph, the tops of these trees are as high as the base of the sixth turbine from the left; it is clear that the shoreline vegetation is much lower in visualization. An approximation of the area that is screened by the shoreline vegetation is outlined by a scalloped green line. Considering this adjustment, the whole photosimulation appears to be accurate.

Junior Lake. The scope and scale of Visualization 3 is very similar to the photosimulation in the VIA's Exhibit 8. This supports the accuracy of the photosimulation.

Keg Lake. The scope and scale of Visualization 4 is very similar to the photosimulation in the VIA's Exhibit 9. Shore vegetation at the far right side of the photosimulation is not present in the visualization, but it does not affect turbine visibility. This supports the accuracy of the photosimulation.

Pleasant Lake Boat Launch. The scope and scale of Visualization 5 is very similar to the photosimulation in the VIA's Exhibit 10. This supports the accuracy of the photosimulation.

Pleasant Lake, Near Northern Shore. The scope and scale of the left and center portions of Visualization 6 is very similar to the photosimulation in the VIA's Exhibit 11. This supports the accuracy of the photosimulation. However on the right portion there are turbines apparent in the visualization that are screened in the photosimulation. This is because near-by shoreline vegetation not represented in the visualization will screen the turbines. An approximation of the area that is screened by the shoreline vegetation is outlined by a scalloped green line in the visualization. Considering this adjustment, the whole photosimulation appears to be accurate.

Scraggly Lake. The scope and scale of Visualization 7 is very similar to the photosimulation in the VIA's Exhibit 11. While the shoreline vegetation in the photograph is slightly higher than shown on the right side of the visualization, this will not significantly change the visual exposure of the turbines from this viewpoint. This supports the accuracy of the photosimulation.

Shaw Lake. The scope and scale for most of Visualization 8a is very similar to the photosimulation in the VIA's Exhibit 13. However, shoreline vegetation will screen one turbine on the far left. This supports the accuracy of the photosimulation. Another issue concerns whether the photosimulation is too narrow to show all of the turbines that may be visible to the right. The photosimulation only extends on the right to turbine 22 and there is the possibility that turbines 23 through 27 are also visible to the right of the photosimulation, as illustrated in Visualization 8b: Shaw Lake.

2.5.1 Observations about the visual simulations.

I do have several criticisms of the visual simulations prepared for this VIA. First, there is no photograph of existing conditions that is comparable to the simulation. While there is a small image of the existing condition below the simulation, it is inadequate for careful comparison. Second, the VIA uses panoramic images composed of two or three photographs for each simulation. This makes it very difficult to check the appropriate distance at which to view the simulations. The "simulation information" that accompanies each simulation states that the appropriate simulation viewing distance is approximately 11 inches. By my calculations, as shown in Table 2 above, the simulations will appear in appropriate perspective when viewed 18 to 19 inches from the eye. The effect of this change is to reduce the apparent size of the turbines to the viewer; the viewing instructions in the VIA lead one to think of the turbines as having a larger presence that they will. Third, the photographs used for Keg Lake simulation are not taken at a "normal" lens setting and the image resolution is low.

A final criticism is that the VIA's treatment of associated facilities is simply inadequate.[3] However, this this shortcoming is largely address in the *Visibility of Associated Facilities from Local Public Viewpoints,* a supplement to the VIA. The visibility of these associated facilities is summarized in Table 1, but this is only for locally significant scenic viewpoints (LandWorks 2011b, pages 3-4). A similar table should be prepared for the state and nationally significant scenic resources. Additional simulations are not provided in this supplement; rather there are photographs of existing associated facilities (e.g., a met tower and a transmission line right of way). I think this is an approach that should be used much more. I would be particularly interested in how crane paths and turbine pads appear after they have begun to revegetate. These should be high resolution photographs printed at 9-by-6 inches with information about the distance of the associated facility from the camera, and the appropriated distance to view the photograph.

2.6 Public Use and Expectations

The VIA discusses public perception of wind development (section 4.2) and viewer expectations (section 4.3). However, most of this discussion is general and unsupported by citations. Apparently the results from the two surveys conducted by Portland Research Group (2011a and 2011b) for Bowers Wind were not available for use in the VIA.

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[3] I do recognize that the clearing for crane paths and turbine pads are shown in some of the VIA simulations, but the supporting visibility analysis and explanation is not provided.

Telephone survey.[4] This survey is based on a list of telephone numbers of people interested in outdoor activities provided by InfoUSA. The sample included 1,000 records for Maine and 800 for each of the remaining New England states. This list included a significant proportion of inappropriate numbers (non-residential, fax, business, etc.). A very large number of people who were contacted declined to be interviewed. Another significant portion did not qualify because they did not meet four conditions for participating in the interview:

A. Respondents must be at least 18 years old.

B. Respondents must have participated in outdoor activities in Maine during the past 3 years.

C. Respondents must have volunteered that this included at least one of 12 specific activities.

In addition, there were two quotas that were used to help better target the respondents and make it more useful for the client:

D. There was a quota to maintain at least a 45%/55% gender balance.

E. There was a quoted of approximately 50 respondents who had not participated recreated on or beside one of the state or nationally significant scenic lakes within 8 miles of the Bowers Wind Project

Only 9 of the respondents used the state or nationally significant scenic lakes within 8 miles of the Bowers Wind Project at least somewhat frequently. Therefore, a "booster" sample of 1,000 records was added of phone numbers for people residing within 50 miles of the proposed Project. An effort was made to contact all 6,000 phone numbers. A total of 191 interviews were completed; 31 of whom used the study area at least somewhat frequently.

The survey asked a number of questions relevant to the Wind Energy Act's Evaluation Criteria. However, it did not include simulations of how the project would look from specific viewpoints. Some relevant results include:

1. 88% of those answering have seen wind turbines somewhere; 50% have seen wind turbines in Maine.

2. 16% of respondents use (rating 4-10) and 71% never (rating 1) use one of the significant scenic lakes.

Of those who use these lakes and have seen wind turbines:

3. Seeing energy facilities, such as wind turbines, is thought likely (rating 8-10) by 10% unlikely (rating 1-3) by 61%.[5]

[4] Details of the sample were obtained through a telephone conversation with Bruce Lockwood and Joy Prescott (2011).
[5] 35-A MRSA, § 3452, sub-§3(C)

4. The top activities are fishing (42%) and hiking or walking (29%).
5. Seeing wind turbines would effect the enjoyment of 48% negatively (rating 1-3) and 16% positively (rating 8-10).[6]
6. Seeing wind turbines would effect the likelihood of their returning for 32% negatively (rating 1-3) and 23% positively (rating 8-10).[7]

This survey is particularly interesting because it is the first among the surveys conducted in response to the Wind Energy Act's Evaluation Criteria where fishing was the primary activity of interest to respondents using the affected area. However, there are several aspects to the survey that are problematic and significantly reduce its usefulness:

- The sample is not random. The original list is only included people who engage in outdoor activities and the actual size of this population is unknown. There are also other restrictions to eligibility. Then a "booster" sample or local residents was merged with the New England group. As a result, the survey cannot be used to estimate the "extent, nature, and duration of potential affected public uses" [8] of the area.
- The number of people between 18 and 44 years old are significantly under represented compared to those who are 45 years old and older. Compare the age distribution from the survey and Maine's SCORP (Maine DOC 2009, page A-36) for the two most commonly reported activities from the survey: fishing and hiking or walking. The survey data are participation in these two activities during the past 3 years somewhere in Maine. The SCORP data are also for participation somewhere in the state.

	Fishing *		Hiking or Walking †	
Age ‡	SCORP	Survey	SCORP	Survey
under 25	13.7	0.0	16.4	1.0
25-34	22.0	1.6	20.2	1.0
35-44	26.5	9.5	25.5	7.0
45-54	21.3	34.9	17.7	22.0
55-64	9.2	38.1	8.4	34.0
65 and older	7.2	15.9	11.8	35.0

* "Fishing" in the survey (n = 63) and "freshwater fishing" in the SCORP.
† "Hiking or walking" in the survey (n = 100) and "day hiking" in the SCORP.
‡ The youngest age in the survey is 18 and in the SCORP it is 16.

- Respondents do not have the benefit of seeing visual simulations of the Bowers Wind Project from specific locations. Rather they must imagine the affect of seeing turbines based on their memory of seeing turbines elsewhere. As a result, their understanding of the "scope and scale of the potential effect of views of the generating facilities"[9] is unknown and could be distorted.

[6] 35-A MRSA, § 3452, sub-§3(E)
[7] 35-A MRSA, § 3452, sub-§3(E)
[8] 35-A MRSA, § 3452, sub-§3(E)
[9] 35-A MRSA, § 3452, sub-§3(F)

- Because there are no visual simulations, there is no information about the scenic value of the existing conditions in this area, or the perceived visual impact if the Bower Wind Project were constructed.

- Without a clear understanding of the visual scope and scale of the turbines, it is difficult to see how respondents can accurately determine how the turbines would effect their "continued use and enjoyment of the scenic resource."[10]

Snowmobiler survey. This was an intercept survey of adults who attended the Second Annual Stetson Wind Snowmobile Ride-In at First Wind's Stetson Mountain facility. It is estimated that 150 people were in attendance, though an unknown number of these were younger than 18 years old. A total of 69 useable responses were obtained.

This survey is of particular interest because it is the first attempt to understand how snowmobilers might experience wind projects and their scenic impacts. However, the survey is sponsored by and conducted in the shadow of a large wind project. Therefore the respondents are primarily a self-selected group that is willing to at least tolerate the presence of grid-scale wind turbines. Because of this flaw, it is unclear what can be about how typical snowmobilers might experience wind power projects or scenic quality of the surroundings.

2.7 Evaluation of Potential Scenic Impacts

Logically, the information about the project, surrounding area, and scenic resources' character and use should be presented first in a VIA. Then the scenic impact and whether it is Not Adverse, Adverse, or Unreasonably Adverse can be systematically evaluated by applying the Evaluation Criteria to what is presented about each scenic area and their views of the proposed development.

Essentially, this is what the *Visual Impact Assessment for the Bowers Wind Project* has done, though they have simplified the assessment to just four evaluation criteria.

1. **Significance** - The significance of the potentially affected scenic resource of state or national significance;

2. **Character** - The existing character and context of the surrounding area;

3. **Use** - The expectations of the typical viewer and the extent, nature and duration of potentially affected public uses of the scenic resource of state or national significance and the potential effect of the generating facilities' presence on the public's continued use and enjoyment of the scenic resource of state or national significance (Note that a general description of use is provided under each lake and then a detailed evaluation of expectations is provided in 4.2); and,

4. **Visibility** - The scope and scale of the potential effect of views of the generating facilities on the scenic resource of state or national significance, including but not limited to issues related to the number and extent of turbines visible from the

[10] 35-A MRSA, § 3452, sub-§3(E)

> scenic resource of state or national significance, the distance from the scenic resource of state or national significance and the effect of prominent features of the development on the landscape (LandWorks 2011a, page 22).

The VIA evaluates eight of the fourteen state or nationally significant scenic resources within 8 miles of the proposed turbines. The six not evaluated are those listed in Table 1 (LandWorks 2011a, Page 20) as not having any visibility of turbines: Springfield Congregational Church, Horseshoe Lake, Lombard Lake, West Musquash Lake, and Norway Lake. It should be noted that Exhibits 3 and 4, the viewshed maps for blade tips and turbine hubs based on the screening effect of topography and vegetation indicate small areas with potential turbine visibility on Horseshoe, West Musquash and Norway Lakes. It is possible is that these turbines are further than 8 miles away—these visibility maps do not exclude a turbine once it is 8 miles from the viewpoint, as describe above in section 2.3 Visibility Analysis. Another possibility is that the field investigation determined that there was no visibility from these areas, though there is not description that this is so.

2.7.1 Bottle Lake

Significance: Bottle Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Bottle Lake**
Relief (30)	Low (10)
Physical features (25)	Med (15)
Shore configuration (15)	Low (5)
Vegetation diversity (15)	Low (5)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	35

A "Significant" scenic lake would fall to the level of being not significant if its rating were below 20 points. Therefore Bottle Lake's status is safe, since the maximum number of points that could be subtracted for the potentially inharmonious wind turbine visibility would be 10—the additional 10 are for drastic fluctuations in water level (Jones 1986, page 13).

The VIA also indicates that Bottle Lake has been assigned a Management Class of 5 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (258 acres), land cover (mixed forest), topography (low-lying hills and mountains), and distance to the nearest proposed turbines (4.7-5.3 miles) are stated. The direction of the most prominent view is identified (northwest), and its characteristic features

described (Lombard and Almanac Mountains). From where Bowers Mountain is visible is also identified (small southwestern portion of the lake).

Bottle Lake is described as the most densely developed lake in the study area, with roughly 100 camps or homes along the shoreline, many with little screening. The resulting character is described as "rural recreational, developed lake." Other signs of development include power lines and a communications tower, though their prominence is uncertain. Based on the photographs in the VIA and Photo Inventory, is seems reasonable that Bottle Lake would now be assigned negative points for Inharmonious Development. On the other hand, the presence of many docks and recreations equipment is an indication that Bottle Lake may be more heavily used when compared to the other lakes.

Use: Bottle Lake has a public motorboat launch and is connected to Junior Lake by a 2-mile stream. Because it does not have its own boat launch, Bottle Lake is the primary access point to Junior Lake. The VIA also indicates that there is a half-mile portage to Lower Sysladobsis Lake.

Visibility: The VIA identifies that up to 13 turbine blade tips may be visible at a distance of over 5 miles from the southern side of the lake, while there will be no visibility from the northern side. The photosimulation in Exhibit 6 shows seven turbine hubs and an additional blade tip that are seen from one of the locations with the highest potential visibility. This reduced visibility appears to be from the presence of tall shoreline vegetation that is not represented in the viewshed models.

2.7.2 Duck Lake

Significance: Duck Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Duck Lake**
Relief (30)	Low (10)
Physical features (25)	Med (15)
Shore configuration (15)	Low (5)
Vegetation diversity (15)	None (0)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	25

A "Significant" scenic lake is one with 20 or more points. If the turbines were to be considered "Inharmonious Development," the effect could be to demote Duck Lake to the status of not having significant scenic value.

The VIA also indicates that Duck Lake has been assigned a Management Class approaching 5 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (262 acres), land cover (mixed forest), topography (low-lying hills and mountains), and distance to the nearest proposed turbines (2.5-3.2 miles) are stated. The direction of the most prominent view is identified (north), and its characteristic feature described (Getchell Mountain). From where Bowers Mountain is visible is also identified (southern shoreline). Duck Lake also has approximately 37 camps along is wooded shoreline. This character also sounds like "rural recreational developed lake."

Use: Duck Lake has a public motorboat launch. A quarter-mile stretch of shallow stream connects Duck Lake to Junior Lake, but is generally only passable by light water craft. Because it does not have its own boat launch, Bottle Lake is the primary access point to Junior Lake.

Visibility: The VIA identifies that up to 18 turbine blade tips may be visible from the southern side of the lake, while there will be no visibility from the northern side. The photosimulation in Exhibit 7 shows the ridge of Bowers Mountain and six turbine at a distance of 3-4 miles from one of the points of highest visibility on the lake. Clearing from the crane paths and turbine pads will be apparent as breaks in the tree line along the ridge. The tops of an additional four turbines are seen just above the top of shoreline trees to the east. This reduced visibility appears to be from the presence of tall shoreline vegetation that is not represented in the viewshed models.

Visibility from the public boat launch, at the northwestern point of the lake is likely reduced to six or fewer blade tips that are behind a viewer facing the water.

2.7.3 Junior Lake

Significance: Junior Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Junior Lake**
Relief (30)	Low (10)
Physical features (25)	Med (15)
Shore configuration (15)	Med (10)
Vegetation diversity (15)	Med (10)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	45

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A "Significant" scenic lake would fall to the level of being not significant if its rating were below 20 points. Therefore Junior Lake's status is safe, since the maximum number of points that could

be subtracted for the potentially inharmonious wind turbine visibility would be 10—the additional 10 are for drastic fluctuations in water level (Jones 1986, page 13).

The VIA also indicates that Junior Lake has been assigned a Management Class of 7 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (4,000 acres), land cover (mixed forest), and topography (low-lying hills and mountains). There are approximately 87 camps and homes many of them recent construction with screened set-backs, mostly along the western shore. The sports camp formerly known as Wild Fox Resort is located in a cove at the southeastern corner of the lake. It does not appear to be currently open, and was for sale last summer.[11]

Use: Junior Lake does not have its own boat launch, and is accessed primary through Bottle Lake, which has a public motorboat launch and is connected to Junior Lake by a 2-mile stream.

Visibility: The VIA identifies that up to 23 turbines at a distance of 4.5 to 5 miles from the southern end of the lake. As one travels to the northern side, the number of visible turbines is reduced, with a relatively small area having no visibility. The photosimulation in Exhibit 8 shows the ridges of Bowers Mountain and South Peak with 12 turbines and an additional hub that are seen from one of the closer locations with high potential visibility. Clearing from the crane paths and turbine pads will be apparent as breaks in the tree line along the ridge. While more turbines will be visible to the south, they will also be further away from the viewer.

2.7.4 Keg Lake

Significance: Keg Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Keg Lake**
Relief (30)	Low (10)
Physical features (25)	Med (15)
Shore configuration (15)	Low (5)
Vegetation diversity (15)	None (0)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	30

A "Significant" scenic lake would fall to the level of being not significant if its rating were below 20 points. Therefore Keg Lake's status is safe, since the maximum number of points that could be

[11] http://www.farmauctionguide.com/cgi-bin/guide.cgi?sec=v&type=l&loc=ME&by=state&anum=1276939718

subtracted for the potentially inharmonious wind turbine visibility would be 10—the additional 10 are for drastic fluctuations in water level (Jones 1986, page 13).

The VIA also indicates that Keg Lake has been assigned a Management Class of 7 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (371 acres), land cover (mixed forest), topography (low-lying hills), and distance to the nearest proposed turbines (3.6-5.1 miles) are stated. There are approximately 15 camps along the most western shore.

Use: Keg Lake does not have a boat launch, but is connected by a short marshy stream. A road overpass also restricts passage to very light water craft.

Visibility: The VIA identifies that up to 18 turbines may be visible, primarily from the western portion of the lake. Along the northern side and south end of the lake, no turbines are visible. The photosimulation in Exhibit 9 shows the ridges of Bowers Hill and South Peak and 13 turbines are clearly visible. It is unclear whether there was an attempt to simulate the effect of clearing from crane paths and turbine pads. The resolution of the image and the lighting conditions in this simulation make it difficult to see details that might be visible under better viewing conditions..

2.7.5 Pleasant Lake

Significance: Pleasant Lake is listed as a Great Pond with an outstanding scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Pleasant Lake**
Relief (30)	10
Physical features (25)	15
Shore configuration (15)	5
Vegetation diversity (15)	10
Special features (15)	10
Inharmonious development (-20)	0
Total (100)	50

An Outstanding scenic lake is one with 50 or more points. If the turbines were to be considered "Inharmonious Development," the effect would be to demote Pleasant Lake to a "Significant" scenic lake.

The VIA also indicates that Pleasant Lake has been assigned a Management Class of 7 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (1,550 acres), land cover (mixed forest), topography (low rolling hills), and distance to the nearest proposed turbines (2-5 miles) are stated. Most of the shoreline is undeveloped; Maine Wilderness Camps is located on the northeastern shore and a few camps are clustered on the southeastern shore. The area has a substantial amount of harvesting activity, including some visible on nearby Bowers Mountain.

Use: There is a public motorboat launch at the southern end of the lake, and a private motorboat launch at Maine Wilderness Camps on the northern shore, where boats may be rented. Scraggley Lake is accessed by a short portage to the south, and thereby to Junior Lake and the 40-mile Grand Lake Chain of lakes.

While "interviews conducted by LandWorks [indicate that] Pleasant Lake gets a moderate amount of use for the area" (LandWorks 2011a, page 29), the Telephone Survey indicated that Pleasant Lakes was the most frequently used lake in the area (Portland Research Group 2011a, page 10).

Visibility: The VIA identifies that 25 to 27 turbines will be visible at a distance of 3 to 5 miles from a large part of the lake. The photosimulation in Exhibit 10 shows the ridges of Bowers Mountain, South Peak and Dill Hill with 23 turbines and hubs that are seen from the boat launch at the southern end of the lake. Most of these are 5 to 6 miles distant. Clearing from the crane paths and turbine pads should be apparent as breaks in the tree line along the ridge, though it is difficult to see this in the simulation. Exhibit 11 represents a view from near the northern shore, where 9 turbines are visible on South Peak and Bowers Mountain. Additional turbines are screened to the right by the near shore vegetation.

2.7.6 Scraggley Lake

Significance: Scraggley Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Scraggley Lake**
Relief (30)	Low (10)
Physical features (25)	Low (10)
Shore configuration (15)	Med (10)
Vegetation diversity (15)	High (15)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	45

A "Significant" scenic lake would fall to the level of being not significant if its rating were below 20 points. Therefore Scraggley Lake's status is safe, since the maximum number of points that could be subtracted for the potentially inharmonious wind turbine visibility would be 10—the additional 10 are for drastic fluctuations in water level (Jones 1986, page 13).

The VIA also indicates that Bottle Lake has been assigned a Management Class of 7 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (1,641 acres), land cover (mixed forest), topography (low rolling hills), and distance to the nearest proposed turbines (3-6 miles) are stated. There a perhaps half a dozen camps or residences scattered around the lake. Poor access and a lack of development give the lake a feeling of relative remoteness. Evidence of harvesting activity is visible on Bowers Mountain.

Use: There is a hand-carry boat launch in the middle of the eastern shore. The lake is also accessed from Junior Lake and a short portage from Pleasant Lake. Bass fishing is reputed to be good, but the shallow nature of the lake makes it more suitable for paddlers.

While the VIA indicates that the lake receives a "moderate amount of fishing, boating, paddling and camping" (LandWorks 2011a, page 31), the Telephone Survey indicated that Pleasant Lakes was the least used lakes in the area (Portland Research Group 2011a, page 10).

Visibility: The VIA identifies that up to 26 turbines will be visible. Visibility is greatest along the southern shore, but only areas near the northern shore will be free of views of some turbines. The photosimulation in Exhibit 12 shows the ridge of Bowers Mountain, but South Peak and Dill Hill are hidden behind nearer hills. Sixteen turbines, seven hubs and a blade tip are visible from in this photosimulation. Most of these are 4.5 to 5.5 miles distant.

2.7.7 Shaw Lake

Significance: Shaw Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Shaw Lake**
Relief (30)	Low (10)
Physical features (25)	Med (15)
Shore configuration (15)	Low (5)
Vegetation diversity (15)	Med (10)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	40

A "Significant" scenic lake would fall to the level of being not significant if its rating were below 20 points. Therefore Shaw Lake's status is safe, since the maximum number of points that could be subtracted for the potentially inharmonious wind turbine visibility would be 10—the additional 10 are for drastic fluctuations in water level (Jones 1986, page 13).

The VIA also indicates that Bottle Lake has been assigned a Management Class of 7 by LURC. While this may be useful contextual information, it is not directly relevant to the Wind Energy Act's first Evaluation Criterion.

Character: The lake's location, size (251 acres), land cover (mixed forest), topography (low rolling hills), and distance to the nearest proposed turbines (2.5-3.7 miles) are stated. Views of Bowers Mountain and a portion of Dill Ridge are blocked by intervening topography.

Use: The VIA indicates that the use of this lake is unknown and likely limited to adventurous, inveterate paddlers and anglers" (LandWorks 2011a, page 32). The Telephone Survey indicates that Shaw Lake is one of the least used lakes in the area (Portland Research Group 2011a, page 10).

Visibility: The VIA identifies that up to 25 turbines will be visible. Visibility is greatest along the southern shore, but only areas near the northern shore will be free of views of some turbines. The photosimulation in Exhibit 12 shows 18 turbines; mostly hubs and blades that are 3.5 to 4.5 miles distant.

2.7.8 Sysladobsis Lake

Significance: Sysladobsis Lake is listed as a Great Pond with a significant scenic resource in the *Maine Wildlands Lake Assessment* (Giffen et al. 1987). It also describes the attribute ratings from the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns* (Jones 1986).

Scenic Attributes	**Rating for Sysladobsis Lake**
Relief (30)	Low (10)
Physical features (25)	Med (15)
Shore configuration (15)	High (15)
Vegetation diversity (15)	Low (5)
Special features (15)	None (0)
Inharmonious development (-20)	Lo/N (0)
Total (100)	45

A "Significant" scenic lake would fall to the level of being not significant if its rating were below 20 points. Therefore Sysladobsis Lake's status is safe, since the maximum number of points that could be subtracted for the potentially inharmonious wind turbine visibility would be 10—the additional 10 are for drastic fluctuations in water level (Jones 1986, page 13).

Character: The lake's location, size (5,401 acres, 691 within 8 miles of a proposed turbine), land cover (mixed forest), topography (low-lying hills), and distance to the nearest proposed turbines (5.8-13.6 miles) are stated. The shoreline is rocky, but interspersed with sandy beaches. There are several islands. There are approximately 58 camps scattered along the shore within 8 miles of the proposed turbines.

Use: There is a public boat launch at the northern end of the lake, within 8 miles of the proposed turbines; there are several additional boats launches outside this area. The VIA reports that "a local fishing and hunting guide confirmed that this lake receives medium to high frequency of use by anglers, notably in the spring during salmon fishing season" (LandWorks 2011a, page 34). This assessment is confirmed by the Telephone Survey results which indicate that Sysladobsis Lake is second only to Pleasant Lake in frequency of use.

Visibility: The VIA identifies that up to 22 turbines will be visible. However, there are only 15 turbines within 8 miles of the northern tip of the lake, and in the center of the lake, where visibility is greatest, there are only 12 turbines within 8 miles. No photosimulation was prepared to show the potential scenic impacts to this lake.

2.7.7 Visual Impact of Associated Facilities

As mentioned in section 2.5 Visual Simulations, associated facilities are hardly mentioned as part of the VIA (LandWorks 2011a, pages 46-48). It is asserted that the substation, O&M building and express collector line will not be visible from any state or nationally significant scenic resources because they are on the northern side of the project ridgelines. This seems logical to me, and is also supported by the visibility maps prepared for the VIA supplement (LandWorks 2011b). The surface of the crane paths and turbine pads will not be visible, because all the significant scenic resources are 130 to over 200 meters below the project ridgelines. However, the clearing associated with them may be visible. Three viewpoints were selected to illustrate the visual impact of this clearing because "they represent a sampling of the full range of viewing angles f5rom the various lakes, and they are located at a range of viewing distances" (LandWorks 2011a, page 46). They are Duck Lake, Junior Lake, and Pleasant Lake at the Boat Launch. The photosimulations show how the cleared areas would create "notches" in the forest canopy visible at the horizon line. While this change in the horizon line is something that we are sensitive to, it does not draw particular attention in these simulations because the eye is focusing on the turbines, which have a greater visual presence.

This abbreviated treatment of the visual impacts caused by the associated facilities is partially corrected through a supplement to the VIA (LandWorks 2011b). However, the focus of the supplement is locally significant scenic resources, so that a full treatment of the potential scenic impact from associated facilities to state and nationally significant scenic resources is never given.

One might reasonably ask, "So why is this a problem? Doesn't the major scenic impact come from the turbines?" Of course the turbines will have the greatest overall visual presence, but the Wind Energy Act anticipates that "the generating facilities are a highly visible feature in the landscape [and this] is not a solely sufficient basis for determination that an expedited wind project has an unreasonable adverse effect on the scenic character and existing uses."[12] However, the Wind Energy Act does not anticipate that associated facilities will be highly visible. It is therefore necessary that full attention be given to evaluating the potential scenic impacts from associated facilities, whether applying the Wind Energy Act's criteria or LURC's traditional criteria. If a developer were proposing a 9.5± electric power line, LURC would require a complete

[12] 35-A MRSA, § 3452, sub-§3

VIA, not a short statement that lacks rigor and completeness. The same concern applies to any of the associated facilities—each warrants its own thorough investigation, though they may be presented as a single report.

2.7.8 Overall Impact Evaluation

In section 4.1.9 Overall Impact Evaluation, LandWorks describes their process to synthesize this information and report the results using an evaluation matrix, similar to what I have used in previous wind project reviews for LURC and DEP. Oddly the criteria used in this matrix are not all drawn directly from the Wind Energy Act's Evaluation Criteria, and other introduce new terms and concepts that do not seem to follow the approach to evaluation taken by the Wind Energy Act.

Significance is one of the criteria that is reinterpreted to be a function of uniqueness, vividness, unity, intactness and level of development. The VIA states that "this evaluation criterion is derived from the USFS articulation of 'scenic attractiveness' as part of its overall Scenery Management System set forth in the publication *Landscape Aesthetics*" (LandWorks 2011a, page 36). However none of this has anything to do with the Wind Energy Act's definition of how to identify scenic resources of state or national significance. The Significance criterion should concern why a scenic resource was actually designated; not a new analysis using a new process and new criteria.

Character seems to be just another way to describe scenic attractiveness, which is LandWork's basis for Significance. Terms like "highest quality," "undeveloped"," exceptional" and "unique" are used.

Level of Use corresponds to the first half of the Wind Energy Act's fifth criterion, "the extent, nature and duration… of public uses. "[13] It recognizes that such information is difficult to come by, and indicates that anecdotal information is acceptable.

View Expectations is understood to mean the expectations concerning scenic quality that must be met for a satisfactory recreation experience by people engaged in the predominant types of recreation use of the resources considered. I believe that this is the intent of the Wind Energy Act's third criterion.[14]

Proximity/Distance Zones seems to apply the concept as described by the US Forest Service to individual turbines. While the Wind Energy Act does mention distance, the reason for this concern is stated to be with the "scope and scale of the potential effect on views of the generation facilities."[15] It is whether people experience individual turbines and all the visible turbines collectively as dominating the view (i.e., their scope and scale in the view). This rather inflexible application of a tool designed to describe impacts to forests seems inappropriate here. A new approach needs to be developed that captures our experience of grid-scale wind energy projects.

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[13] 35-A MRSA, § 3452, sub-§3(E)
[14] 35-A MRSA, § 3452, sub-§3(C)
[15] 35-A MRSA, § 3452, sub-§3(F)

Extent and Nature of Visibility refers to the "number of turbines visible and… how much of the individual structures and rotors are visible." This seems to capture another portion of the Wind Energy Act's sixth criterion.[16]

Duration of View considers "whether or not a user of the resource of viewer will have an extended and involuntary view of the project." It is not explicitly included in the Wind Energy Act's Evaluation Criteria. However, this is a cumulative dynamic extension of the static Extent and Nature of Visibility and also reflects the Wind Energy Act's concern with duration of use.[17]

Impact to Enjoyment is explicitly part of the Wind Energy Act's fifth criterion. LandWorks states that "this is a more difficult category for objective assessment." However, it is relatively a straight forward question to incorporate in an onsite intercept survey that is organized visual simulations. In general, public survey of this type have been shown to be more reliable than professional appraisals using the types of assessment criteria that LandWorks would use to determine Significance (Palmer 2000, Palmer and Hoffman 2001).

There is a discussion of how to reason one's way to an appropriate evaluation of this criterion based on other known conditions, such as extent of turbine visibility from a scenic resource, or supposed sensitivity of a recreation activity to scenic quality. However, no empirical basis is cited to support any of this reasoning, so it would seem of marginal value. In any case, it Impact to Enjoyment is simply a function of other evaluation criteria, why do we need it. Actually we need it because it is directly relevant to the effect of proposed development and I suspect that it is not a simple function of existing criteria.

Visual Absorption is a criterion added by LandWorks that is not found in the Wind Energy Act. It comes from the US Forest Service's Scenery Management System (USDA 1995). However, this is a planning concept, and we are beyond that stage now. Since we have a concrete design proposal for a project, we can conduct a visibility analysis which shows us directly how well the project is absorbed into a particular landscape. Visual absorption as a criterion to evaluate grid-scale wind energy projects has no direct basis in the Wind Energy Act and overlaps significantly with the Extent and Nature of Visibility criterion.

Likelihood to return if the project is built is a Wind Energy Act evaluation criterion that that is not included in LandWork's list.[18] It is like Impact to Enjoyment; a bottom line criteria that are central to deciding the reasonableness or unreasonableness of a scenic impact. For instance we would not want to deny a project that dominated views from a popular scenic resource if it also turned out that users thought that it would enhance their enjoyment and make it more likely that they would return.

Overall Scenic Impact is the synthesis of all the preceding evaluation criteria. To use a sports analogy, LandWorks has punted. They determined that the "overall scenic impact is determined by averaging the 9 categories [i.e., criteria] for each resource" and overall project impact is

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[16] 35-A MRSA, § 3452, sub-§3(F)
[17] 35-A MRSA, § 3452, sub-§3(E)
[18] Referred to as "the public's continued use" in 35-A MRSA, § 3452, sub-§3(E).

determined by averaging the overall scenic impact for the 14 [state or nationally significant scenic] resources" evaluated by this VIA (LandWorks 2011a, page 40).

This is potentially a very complicated process. For instance, if there is no visibility of any project facilities from a significant scenic resource, then can be no scenic impact, irrespective of the average of the other criteria. On the other hand, some opponents to other wind energy projects have argued that certain scenic resources have such a high significance (e.g., the Appalachian Trail) that the reasonableness of an adverse scenic impact cannot be demonstrated by relatively modest use and even evidence that actual hikers after seeing constructed photo simulations believe the project would not meaningfully degrade their enjoyment of the scenic resource or the likelihood that they would return again.

The approach taken by LandWorks gives to determine the overall project impact also seems unworkable. It assumes that all significant scenic resources have equal importance, which we know is not the case. In some situations it may take only a single significant scenic resource to make a proposed project Unreasonably Adverse (again, this is what opponents are claiming for the Appalachian Trail). Alternately, a project could have dozens of significant scenic resources within the 8-mile limit that are very close to being Unreasonably Adversely impacted, and still be found acceptable.

2.8 Observations about the Application of the Evaluation Criteria in the VIA

Several observations can be drawn from this review of how LandWorks has addressed the Wind Energy Act's Evaluation Criteria.

LandWorks chose not to address each Evaluating Criteria individually, an approach I have advocated in an effort to be complete as well as not include extraneous criteria. However, I see some advantage to the approach taken by LandWorks. In particular their evaluation has helped me better understand what indicators should be used to describe these criteria. Here is my suggestion:

1. Significance of the scenic resource should include:
    - Source of designation and level of importance, if it is given (e.g., nomination forms for the National Register of Historic Places identify resources as having local, state or national significance; Great Ponds can be designated as either significant or Outstanding).
    - Role of scenic quality in the designation (e.g., most sites on the National Register of Historic Places are designated for their historical importance, and scenic quality plays no role).
    - The results of any scenic analysis that was used to determine the designation (e.g., the ratings from *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*).
    - Additional support for the resource's scenic importance may also be included, with the understanding that such material is likely outside of the Wind Energy Act's description how significant scenic resources are identified (e.g., resource management plans or authoritative guide books).

2. Character of the area surrounding the scenic resource and project area should include:

- Simple descriptive measurements of the scenic resource, such as its location, size length, and distance to proposed facilities.
- A description of the landscape visible from the scenic resource, including both its typical and distinguishing features. In general this will include landform and land cover, as well as the extent and pattern of development within and near the scenic resource (e.g., probable Recreation Opportunity Spectrum (ROS)[19] class or number of residences along a lake's shoreline and whether they are screen by vegetation or not).
- Describe the most prominent desirable views from within the scenic resource, including the specific features and characteristics that make these views desirable. What is the direction of these views?
- Describe the view toward the proposed project, including prominent features and characteristics.

Illustrative photographs should be included with the descriptions, or photographs from the appendix referenced in a way that makes them easy to find.

3. Use and User Experience should include:
    - Simple descriptive statistics, such as the numbers of people who use the scenic resource and in what activities they engage. It is recognized that this information may not be readily available. It may be necessary to interview resource managers or conduct a small data collection to make a reasonable estimate. Report the basis for the description.
    - Describe the pattern of use of each scenic resource, including how the resource is accessed and any places of concentrated use.
    - Describe the visual exposure to views of the project for a user based on typical activity patterns. This will require use of information from the Visibility criterion described next.
    - Describe the role and importance of scenic quality in the typical user's experience for the primary activities found at the scenic resource. This information may not be readily available and it may be necessary to conduct a small sample of interviews to provide some understanding.
    - Describe how the visible change attributable to the project's construction may effect the typical user's enjoyment for the primary activities found at the scenic resource.
    - Describe how the visible change attributable to the project's construction may effect the typical user's likelihood of returning to the scenic resource for the primary activities found at the scenic resource.
4. Visibility should include:
    - A map of the 8-mile project area that locates and names the primary project facilities, all of the significant scenic resources, and other landscape features used to orient the reader (e.g., roads and water features). The map must have a graphic scale and a north arrow.

[19] ROS was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region.

- Maps that indicate the potential visibility of project elements from the scenic resource. One of these maps must represent a topographic viewshed to the highest point of the various project facilities. Documented the assumptions used to create these maps.
- At least one photographic simulation of a "worst case" view from each of the significant scenic resources that will have a view of some portion of the Project. A worst case view takes into account the number and extent of project facilities that are visible, their proximity to the viewer, the potential number of viewers, and the scenic sensitivity of the activities in which a typical viewer is likely engaged. Describe why the particular simulation viewpoint was selected.
- The description accompanying each photosimulation must provide:
    - a unique name for the viewpoint,
    - time and date of the original photograph,
    - compass direction, latitude and longitude of the viewpoint,
    - camera model and lens focal length used to take the photograph,
    - horizontal angle of view encompassed by the simulation;
    - elevation of the camera above sea level,
    - the turbine model, and its height to the hub center and the rotor diameter,
    - distance to the nearest turbine, and number of visible turbines within 8 miles,
    - appropriate viewing distance when printed at a given size, or as a function of the simulation's width,
    - software used to create the simulation.

- Description of the visual presence of the proposed project as seen in the photosimulation, such as whether the facilities rise above the horizon line, the horizontal arc occupied by turbines within 8-miles of the viewer, and the relative visual dominance of the turbines (e.g., O'Shea's (1991) "thumb's rule test" or the steradians occupied by the turbines in the visual field).

2.8.1 Concluding Comment about the Adequacy Review

I am questioning the professional integrity of LandWorks' VIA; nothing could be further from the truth. I am frankly impressed by many aspects of their VIA and it has led to an evolution in my thinking about how to apply the Wind Energy Act Evaluation Criteria. But the process must be more sophisticated than simply averaging the numbers in the Evaluation Matrix. This is the reason that I have changed from numbers to clearly ordinal categories of high, medium, low and no impact.

What is needed is a procedure that is based on reliably measured (or described) indicators for each of the Wind Energy Act's Evaluation Criteria; that is the procedure must be evidence based. It must also systematically combine these indicators to reach a valid determination of whether a project will have a scenic impact that is Not Adverse, Adverse or Unreasonably Adverse. This procedure needs to be sufficiently well defined that any qualified dis-interested person can apply it and reach the same conclusion as any other qualified dis-interested person. The only way I know of to demonstrate the validity of any procedure is to conduct an evaluation of the project

after it is built. For instance, this is what currently is happening with the procedures to evaluate impacts form the sound created by grid-scale wind projects at specific sites. Developers are required to conduct post-construction monitoring at regular intervals to verify that their modeled sound effects are accurate, and if the sound impacts a reach an Unreasonably Adverse level, then to implement corrective measures. I hope that LURC will consider a similar requirement for monitoring scenic impacts from grid-scale wind energy development.

3. Field Review and Additional Analysis

This section of the review presents my independent analysis of the potential scenic impacts that may be caused by the Bowers Wind Project. The analysis may not be as thorough as a complete VIA. Its primary purpose it to present the analysis that was used to conduct the assessment of the VIA's adequacy, and to share any additional analyses that were pursued.

3.1 Determination of the Area of Potential Effects and State and Nationally Significant Scenic Resources

Area of Potential Effects (APE). The VIA must evaluate potential scenic impacts to all state or nationally significant scenic resources within 3 miles of generating facilities (i.e., turbines and transmission line) and an unspecified distance from associated facilities. The permitting authority may require within 30 days of its acceptance of the application as complete for processing the evaluation of potential scenic impacts to state or nationally significant scenic resources within 8 miles of generating facilities. It may also require within the 30 day period the evaluation of scenic impacts from associated facilities (e.g., buildings, access roads, and substations) using the "traditional" approach applied to non-wind energy projects.

In practice, no one has requested that the APE be extended to 8 miles from the wind turbines, but all VIAs have used the 8-mile APE. Typically, the transmission line has not explicitly effected determination of the APE because it joined an existing transmission line well within this zone, as is the case for this project. That is, the transmission line and the associated facilities have typically been at least 3 miles from the 8-mile APE boundary.

State and Nationally Significant Scenic Resources. The VIA correctly identifies the potential scenic resources of state and national significances under the Wind Energy Act. These are listed in Table 1.

3.2 Visibility Analysis

Visibility analysis determines whether a line-of-sight exists between two specified points. Typically a geographic information system (GIS) is used to map the viewshed from which specified targets are visible. In principle this is an objective exercise in geometry highly suited to a computer application. In practice however, since the data are only approximations of the actual condition and may include errors or require assumptions, the resulting viewshed maps are best considered a preliminary analysis of potential visibility under simplified conditions. The maps are useful for providing a preliminary investigation of the overall potential visual impact, and particularly for comparing alternatives. If potential visual impacts appear to exist for significant scenic resources, they need to be confirmed through field investigation and other visualization techniques.

For this review, visibility analyses were performed using ArcGIS 10 software (ESRI 2010). The digital data were provided by Stantec Consulting (2011) and appear to be the same as those available from the Maine Office of GIS. The original elevation data used for this review are based on a 10-by-10 meter grid, and have ≤ 4 meter absolute vertical height accuracy, the same as used in the VIA. However, in our visibility analysis, we resampled these data to correspond to the same 5-by-5 meter grid used for the Maine Land Cover Data dataset. The analysis procedure is relatively

standardized, though analysts can reasonably make different assumptions about the analysis variables, and the results can be presented in a variety of ways.

In addition to investigating visibility limited only by landform, the VIA conducted a vegetated viewshed analysis that assigned a height of 45 feet to upland forest, forested wetlands and areas dominated by shrub-scrub vegetation, as previously described in section 2.3 Visibility Analysis. This visibility analysis of the VIA is replicated here and is called the LW Forested visibility analysis. For this review a second Forested visibility analysis was conducted that assumes a dense 40-foot high visual screen where upland forested cover occurs—that is deciduous, evergreen and mixed forest, but not in areas harvested since 1995 or wetlands. Forty feet is commonly used by professionals in the northeast as a conservative, but reasonable forest canopy height in a visibility analysis.

Visibility of the Bowers Wind Project. The six viewshed maps prepared to investigate several issues associated with the Bowers Wind Project are included in Appendix 2. The first three maps investigate the greatest possible area from which a part of any turbine could possibly be visible. In this case it is an upraised blade tip 428 feet (130.5 meters) above the ground. Three different constraints on visibility are considered: (1) just bare topography, (2) topography with forest cover, and (3) topography with forest cover, harvested forest, and forested wetlands as used by LandWorks in the VIA. The resulting viewshed maps are:

Map 1: Topographic Viewshed for Blade Tip

Map 2: Forested Viewshed for Blade Tip

Map 3: Forested Viewshed for Blade Tip Using LandWorks Forest Heights

While there may be a line-of-sight to just an upraised blade tip, it may not be noticeable and would never be visually dominant. Therefore another analysis investigates the area from which a significant portion of a turbine could possibly be visible. In this case it is visibility of the turbine hub, located 262.5 feet (80 meters) above the ground. The same three constraints on visibility resulted in the following viewshed maps:

Map 4: Topographic Viewshed for Turbine Hub

Map 5: Forested Viewshed for Turbine Hub

Map 6: Forested Viewshed for Turbine Hub Using LandWorks Forest Heights

All six maps are included in Appendix 2 of this review.

Visual inspection indicates that this review's topographic viewshed of blade tips shows the same area as LandWorks's (2011a) Exhibit 1:Viewshed Map (topography only/from the tip), and that this review's forested viewshed map using LandWork's vegetation cover and height assumptions is the same as LandWorks's (2011a) Exhibit 3: Viewshed Map (topography and vegetation/from the tip). However, the maps from the VIA include turbines that are further away from the viewer than 8 miles. For instance look at the northeastern part of the study area. The VIA's Exhibit 1, shows that there are potentially 25 to 27 visible turbines right up to the 8 mile study area boundary. However, the Wind Energy Act specifies that "the effects of portions of the development's generating facilities located more than 8 miles, measured horizontally, from a

scenic resource of state or national significance" are "insignificant."[20] If the 8-mile threshold is incorporated into the analysis, then the edges of the viewshed map will appear "feathered" as turbines drop out of range for consideration as having a significant scenic impact, as seen in the first viewshed map prepared for this review.

Table 3 reports the size of the area from which upright turbine blade tips may be visible given the assumptions used for each of the six visibility maps created for this review. Thirty-three percent of the study area is screened from a potential view of an upright blade tip by landform topography. It is very unlikely that anyone at ground-level looking toward the Bowers Wind Project will see any portion of a wind turbine if they are inside this area. Maine Historic Preservation Commission agreed that any potential historic resources outside the area or topographic visibility need not be surveyed for indirect visual effects from the proposed project. **This guidance to only evaluate state or nationally significant scenic resources with potential views of a turbine tip as indicated by the topographic visibility analysis is reasonable and should be adopted by others.**

It is frequently argued that accounting for the screening effect of forest cover provides a more realistic assessment of a wind project's visibility. Approximately 17 percent of the study area has a potential view of a turbine tip if one assumes the a screening effect from assigning a height of 40 feet to the deciduous, evergreen and mixed forest land cover types. LandWorks assumed a canopy height of 45 feet and included forested wetlands and scrub-shrub area as part of the forested canopy, as described above in section 2.3 Visibility Analysis. The visibility analysis using these screening assumptions from the VIA indicate that less than 12 percent of the study area has potential views of blade tips. This difference demonstrates that assumptions about screening—what land cover types to include and what heights to assign to them—can significantly affect the results of a visibility analysis. For this reason we should be cautious about relying heavily on the results of visibility analysis using forest screening to make decisions about visual impacts. **Potentially "worst case" viewpoints at all state or nationally significant scenic resource need to be investigated in the field, and should also be investigated though geometrically accurate visual simulations and perhaps cross sections that include tree heights measured in the field.**

[20] 35-A MRSA, § 3452, § 3

Table 3. Area of Bowers Wind Turbine Visibility*

Visibility Analysis	Potentially Visible Area (square miles)	Percent Study Area†
Turbine Tip Visible		
Topographic	187.6	66.8
Forested	46.8	16.7
LandWorks	33.0	11.7
Turbine Hub Visible		
Topographic	171.2	60.9
Forested	42.1	15.0
LandWorks	29.6	10.5

* Visibility is based on an ArcGIS analysis before field verification.
† The area within 8 miles of a turbine is 281 square miles.

Table 4 summarizes the maximum number of Bowers blade tips and turbine hubs that may possibly be visible from the significant scenic resources within 8 miles of the turbines using the following visibility constraints: topographic, forested, and forested with forested wetlands and scrub-shrub area, as used by LandWorks in the VIA.

Table 4. Maximum Number of Bowers Wind Turbines Visible within 8 Miles of Significant Scenic Resources

Significant Scenic Resource	Nearest Turbine (miles)	Blade Tip Visible			Turbine Hub Visible		
		Topographic	Forested	VIA	Topographic	Forested	VIA
Historic Sites							
Springfield Congregational Church †	5.2	0	0	0	0	0	0
Great Ponds							
Bottle Lake	4.7	25	20	20	23	16	16
Duck Lake	2.5	25	24	24	19	18	18
Horseshoe Lake	7.4	5	2	1	5	1	1
Junior Lake	2.9	25	23	23	22	19	19
Keg Lake	3.6	26	26	25	21	21	17
Lombard Lake †	5.3	0	0	0	0	0	0
Norway Lake	7.1	5	2	2	4	1	1
Pleasant Lake	2.1	27	27	27	27	27	27
Scraggley Lake	3.1	27	27	27	27	26	26
Shaw Lake	2.5	27	27	27	25	25	25
Sysladobsis Lake	5.8	13	13	13	13	13	13
Upper Sysladobsis Lake †	6.6	0	0	0	0	0	0
West Musquash Lake	7.2	3	1	1	0	0	0

† Topography screens all visibility of the project from these sites.

3.3 ArcScene Visualizations

This review used ArcScene, the perspective representation tool from the GIS program ArcMap, to construct visualizations from the same viewpoints and camera lens as LandWorks used to create their photosimulations. These visualizations are primarily used to evaluate the reasonableness with which the photosimulations are representing the "scope and scale of the potential effect of view of the generating facilities on the scenic resource of state or national significance."[21] When considering the scene represented by the visualizations, it is important to remember that the forest canopy is set to only 40 feet, though mature trees could be 20 to 30 feet taller. In the absence of field data about tree height, it is generally accepted to use this lower value. In addition, only areas of upland forest cover are represented; there are other areas that may also have trees of varying density and heights, including forested wetlands and areas harvested after 1995. Some of these limitations become apparent when one compares the visualization to the photograph used in the photosimulation. In particular, shoreline vegetation may obscure more of the view than is represented by the visualizations. These visualizations are presented in Appendix 3 at the end of this review. Additional information about the visualizations and photosimulations can be found in section 2.5 Visual Simulations.

3.3.1 Visualizations for which there is no Photosimulation

There is only one state or nationally significant scenic resource with possible views of the proposed project for which a photosimulation has not been prepared—Sysladobsis Lake.

Sysladobsis Lake. Visualization 9 portrays the possible view from the north point on the large island in Sysladobsis Lake. Based on this visualization, thirteen turbines and several blade tips have the potential to be visible from this viewpoint. However, this is a tentative analysis that does not include accurate information about forest cover, which can only be obtained in the field.

3.4 Field Review

It has not been possible to conduct a fieldwork because local conditions have been impassable. It is expected that a field investigation will be completed before

3.5 Bowers Mountain Wind Project Outdoor Activities Users Surveys

A Snowmobiler Survey and Telephone Survey were conducted to understand how the presence of the Bowers Mountain Wind Project might effect users of the surrounding area. I have had the opportunity to evaluate the data, and as described in 2.6 Public Uses and Expectations, I am not quite sure how to use these surveys.

The Second Annual Stetson Wind Snowmobile Ride-In attracted approximately 150 snowmobilers. An Associated Press (2011) news release described the event this way:

> DANFORTH, Maine (AP) - Snowmobilers are getting a close view of one of Maine wind power sites this weekend.

[21] 35-A MRSA, § 3452, sub-§3(F)

> The Second Annual Stetson Wind Snowmobile Ride-In is being held Saturday at First Wind's project at Stetson Mountain in eastern Maine.
>
> Riders have the opportunity to see the project's wind turbines up-close. The Ride-In ends next to Stetson's Operations and Maintenance building with a barbecue lunch reception. First Wind, builder of the Stetson project, and Quad County Snowmobile Club are hosts of the event. Seven other snowmobile clubs are invited.

An effort was made to invite all participants to complete the survey. Sixty-nine responded, of which 44 indicated they use the study area within 8-miles of the proposed Bowers Wind Project.

However this is not an unbiased random sample. These respondents had already declared by their presence at the Ride-In that they could have fun recreating in and around a wind power project. One suspects that many of them had also attended the first Ride-In. It should be no surprise that 50% indicated the presence of energy facilities such as wind farms would positively affect their overall enjoyment their most frequent outdoor activity or that 77% would return to the area if the Bowers Wind Project were build. Only 5% indicated that the Bowers Wind Project would have a negative affect on their enjoyment or likelihood of returning. I do not see what role this survey can play as a responsible decision making tool.

The Telephone Survey is a more difficult matter. It might have contributed two data requirements of the Wind Energy Act. There is a need to have good estimates for the" extent, nature and duration" of recreation use of the scenic pond in the study area. The survey did obtain information about the nature of recreation use in the area, but the way the sample was created makes it impossible to reliably estimate the extent of use (this is discussed more fully in section 2.6 Public Use and Expectations). The problem is that the sample was not random; it begins with a list of outdoor activity participants. In addition, some people were excluded from the survey, which had a quota to balance gender and limit the number of respondents who rare or never used the scenic lakes in the study area. These responses were needed estimate the extent, nature and duration of recreation use. However, based on what is given, it is possible to say that while these lakes are not heavily used, Duck, Pleasant and Sysladobsis lakes are used slightly more.

A second problem is that respondents did not see simulations of what the Bowers Wind Project turbines would look like from the study area. It is therefore highly unlikely that they could have an accurate mental image of the "scope and scale" of the turbines from any particular viewpoint. Without this, how could anyone give an accurate response to questions about how the project's scenic impact might affect their enjoyment and likelihood to return?

4. Evaluation of Scenic Impacts

4.1 Evaluation Criteria

Fourteen places were identified as potential state or nationally significant scenic resources under the Wind Energy Act criteria. This section evaluates the scenic impact to these resources based on my understanding of the Wind Energy Act's scenic impact Evaluation Criteria. [22]

A **Significance of resource**: Consider the role of scenic quality in designation, and the level of significance relative to similar designations. Indicators may be obtained from the designation reports or forms, supplemented by descriptions from widely used guide books.

B **Character of surrounding area**: Describe the landscape visible from the scenic resource and how it may be experienced by the viewer. Consider contrasts within the existing landscape and the presence of other contrasting elements. User surveys may provide a direct measure of the existing scenic quality. This may also be based on a descriptive landscape characterization, typically prepared by a landscape professional.

C **Typical viewer expectation**: Consider the resource's scenic reputation, and the centrality of scenic quality in its designation. User surveys may provide an indicator of expectations. In the absence of direct empirical data, distance traveled or descriptions from widely used guide books may provide alternative indicators.

D **Development's purpose and context**: This criterion incorporates the Wind Energy Act's goal of achieving significant wind energy development into consideration of scenic impacts. Consider site quality—wind suitability, proximity to transmission line, and potential power generation if all potential turbine sites in the area are used. Low evaluation means that if all sites in the area are developed, it makes a major contribution to Wind Energy Act's goals. High evaluation means the area makes a minor contribution when all potential sites are developed.

E.1 **Extent, nature & duration of uses**: Consider the number of users, role of scenic quality in use of the resource, and typical length of stay. User surveys provide the most direct indicators, but trail logs or traffic counters may also be useful. Potential accessibility may be an indicator in the absence of empirical data.

E.2 **Effect on continued use and enjoyment**: If the project were built, what is the likelihood of users returning, and the impact on their enjoyment of the scenic resource? User surveys incorporation accurate photographic visual simulations may provide indicators.

F **Scope and scale of project views**: Consider the relative magnitude of project elements, and the proportion of total angle of view occupied by project. Accurate photographic simulations and visibility analyses may provide indicators.

[22] 35-A MRSA, § 3452, sub-§3

The levels of severity for the Evaluation Criteria are as follows:

- **None.** The Evaluation Criterion makes no contribution to scenic impact. For some criteria a rating of None means that there is No Adverse Impact (e.g., there are no people present—Criterion E, or the project is not visible—Criterion F).

- **Low**. The severity of the contribution is low. While the scenic impact may be Adverse, it appears to be within the acceptable range for any type of development (e.g., only one or two turbines will be partially visible at a distance of nearly 8 miles—Criterion F).

- **Medium**. The severity of the contribution is medium, which is Adverse but typical of wind energy development, and within the range of impacts that the Wind Energy Act anticipates (e.g., other towers or large scale structures are present that contrast highly with the surrounding landscape).

- **High**. The severity of the contribution is high from this criterion, which in association with other criteria may make the overall scenic impact Unreasonably Adverse (e.g., a possible scenario suggesting an Unreasonable Adverse impact might be that the scenic resource is a national icon—Criterion A is High, though there are only modest numbers of viewers—Criteria E.1 is Low—to a person their enjoyment will seriously decline—Criteria E.2 is High).

The Evaluation Criteria for each of the state or nationally significant scenic resources are discussed below, and summarizes in Table 6 the Evaluation Criteria ratings for the Bowers Wind Project. The VIA has employed a very similar approach using slightly different criteria to summarizing the impacts to the state and nationally significant scenic resources (LandWorks 2011, pages 34-40).

4.2 Springfield Congregational Church

Criterion F: Scope and scale of project views. Topography will screen views of the project. Without visibility there can be no visual impact. Therefore it will not be considered further.

Overall scenic impact. None, since there is no possible project visibility.

4.3 Bottle Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 35. It is somewhat surprising that there are no points taken off for Inharmonious Development, since there are a great number of residences along the shore and many of the older ones are unscreened. Its rating is Low.

Criterion B: Character of surrounding area. This is a small lake[23] surrounded by low-lying hills covered with a mixed forest. Views from on the lake are in all directions; the lake's small size and surrounding topography and shoreline trees provide a sense of enclosure. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are approximately 100 camps or full size homes along the lakeshore, many of which are visually open to the lake.[24] Because of the density of second homes, docks and a public boat launch that can accommodate trailers, the probable Water-ROS class for the lake is Rural Developed Setting.[25] The rating is Low.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[26] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is heavily developed, one suspects that people come to their camps to get away and be closer to nature. Nothing in this suggests that the scenic expectations would be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. However, there a boat launch that can be used by trailers which is one of the access points for Junior and Keg Lakes. In addition, there are 100 camps and homes, many with docks on the shoreline of this small lake.

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[23] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[24] Reported in the VIA on page 22 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[25] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[26] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

Fishing, boating, hiking, and paddling are common activities, but it appears that on Bottle Lake there is also swimming, water play equipment, water skiing, and perhaps jet skiing. In addition to any general use by the public, if the 100 camps are all active then the lake should receive substantial use for its size. The rating is Medium.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[27] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the northeast. The nearest visible turbine from the Bottle Lake photosimulation viewpoint is 5.3 miles and elsewhere on the lake there may be turbines visible as close as 5.0 miles. The forested viewshed analysis indicates that as many as 20 turbine blade tips and 16 hubs will potentially be visible from a small patch of the lake; there will be no turbines visible from over half of the lake. The photosimulation and visualization from a viewpoint expected to provide a "worst case" view shows 6 turbine hubs and a blade tip. These turbines occupy a horizontal arc of about 7°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). While the turbines will have a significant visual presence, neither their scale nor their scope will dominate the view. The rating is Low.

Overall scenic impact. There will be no visibility of turbines from over half of Bottle Lake. While there are locations were a number of turbine hubs will be visible above the horizon line from a distance of at least 5 miles, they will not be visually dominant. It is anticipated that there is a substantial level of recreation use on Bottle Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Low-Medium.

4.4 Duck Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 25. It is somewhat surprising that there are no points taken off for Inharmonious Development, since there are a great number of residences along the shore and many of the older ones are unscreened. Its rating is Low.

[27] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

Criterion B: Character of surrounding area. This is a small lake[28] surrounded by low-lying hills covered with a mixed forest. Views from on the lake are in all directions; the lake's small size and surrounding topography and shoreline trees provide a sense of enclosure. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are approximately 37 camps or full size homes, many with docks along the lakeshore; a few are visually open to the lake, but most appear to be at least partially screened by trees.[29] Because of the density of second homes, docks and a public boat launch that can accommodate trailers, the probable Water-ROS class for the lake is Rural Developed Setting.[30] The rating is Low.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[31] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is heavily developed, one suspects that people come to their camps to get away and be closer to nature. Nothing in this suggests that the scenic expectations would be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. However, there a boat launch that can be used by trailers; light water craft can access Junior Lake from here. In addition, there are 37 camps and homes, many with docks on the shoreline of this small lake. Fishing, boating,

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[28] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[29] Reported in the VIA on page 24 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[30] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[31] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

hiking, and paddling are common activities, but it is also likely that there is swimming, water play equipment, and perhaps water skiing and jet skiing. In addition to any general use by the public, if the 37 camps are all active then the lake should receive substantial use for its size. The rating is Medium.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[32] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the northeast. The nearest visible turbine from the Duck Lake photosimulation viewpoint is 3.1 miles and elsewhere on the lake there may be turbines visible as close as 2.6 miles. The forested viewshed analysis indicates that as many as 24 turbine blade tips and 18 hubs will potentially be visible from the lake's southern cove; there will be no turbines visible from perhaps a third of the lake. The photosimulation viewpoint is a bit to the north of where the visibility map suggests the "worst case" view would be.

The photosimulation and visualization show 6 turbines, a couple hubs and a couple blade tips. Just the full turbines occupy a horizontal arc of about8°; with the addition of the hubs and tip it will be 26°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). This is a bit greater than the area that would be blocked if the fingers and thumbs of both hands were held side-by-side at arm's length with the palms facing outward. As one moves from the northern to the southern shore the shoreline vegetation will screen turbines, as represented in Visualization 2. The turbines will have a significant visual presence, but from most portions of the lake it will be limited to turbine blades and a few hubs. The rating is Medium.

Overall scenic impact. There will be no visibility of turbines from less than half of the lake. While there are locations were a number of turbine hubs will be visible above the horizon line from a distance as close as 2.5 miles, they will not be visually dominant. There is a substantial level of recreation use on Duck Lake, however scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Low to Medium.

4.5 Horseshoe Lake

[32] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

Horseshoe Lake was not evaluated by LandWorks, because they indicated that there were no turbines visible from it. The visibility map for this review indicates that there may be visibility from nearly 8 miles. However I was unable to create a visualization in ArcScene that showed this visibility. Given this situation and that at this distance it is unlikely that a blade tip will be recognizable, I have decided to agree with LandWorks' determination that there will be no visibility.

Criterion F: Scope and scale of project views. Topography will screen views of the project. Without visibility there can be no visual impact. Therefore it will not be considered further.

Overall scenic impact. None, since there is no possible project visibility.

4.6 Junior Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 45. No points were taken off for Inharmonious Development. While there are a great number of residences along its western shore, they are generally screened by vegetation. Its rating is Medium.

Criterion B: Character of surrounding area. This is a large lake[33] surrounded by low-lying hills covered with a mixed forest. Views from on the lake are in all directions. A string of islands across the middle of the lake contribute to the sense that there are two or three spatially separate rooms. Even so, the lake's large size provides a sense of openness. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are approximately 87 camps or full size homes, primarily along the western shore; generally they are partially screened by trees.[34] Because of the lower density higher screening of second homes, docks and the lack of a public boat launch, the probable Water-ROS class for the lake is Rural Natural Setting.[35] The rating is Low to Medium.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[36] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

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[33] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[34] Reported in the VIA on page 26 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[35] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[36] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is somewhat developed, one suspects that people come to their camps to get away and be closer to nature. Nothing in this suggests that the scenic expectations would be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. There no boat launch on Junior Lake; the public access Junior Lake with motor boats from Bottle Lake or with light water craft from Duck Lake. However, there are 87 camps and homes, many with docks on the shoreline of this large lake. Fishing, boating, hiking, camping, swimming and paddling are common activities. In addition to any general use by the public, if the 87 camps are all active then the lake should receive substantial use for its size. The rating is Medium.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[37] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the north. The nearest visible turbine from the Junior Lake photosimulation viewpoint is 4.5 miles and elsewhere on the lake there may be turbines visible as close as 3.2 miles. The forested viewshed analysis indicates that as many as 23 turbine blade tips and 19 turbine hubs will potentially be visible from the lake's northwest cove and the center of the southern half of the lake; the only areas without turbine visibility are close to the northeastern shore, in the visual

[37] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

shadow of the shoreline vegetation. The photosimulation viewpoint is a bit to the south of where the visibility map suggests the "worst case" view would be.

The photosimulation and visualization show 13 turbines on the horizon that occupy a horizontal arc of about 20°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). This is a bit greater than the area that would be blocked if the fingers and thumbs of both hands were held side-by-side at arm's length with the palms facing outward. The turbines will have a significant visual presence, and several turbines or hubs will be visible from most areas of the lake. The rating is Medium to High.

Overall scenic impact. The turbines will have a significant visual presence above the horizon line from almost all of Junior Lake, including as close as 3.2 miles. It is anticipated that there is a substantial level of recreation use on Junior Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Medium.

4.7 Keg Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 35. Its rating is Low to Medium.

Criterion B: Character of surrounding area. This is a small lake[38] surrounded by low-lying hills covered with a mixed forest. Views from on the lake are in all directions; the lake's small size and surrounding topography and shoreline trees provide a sense of enclosure. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are approximately 15 camps, primarily clustered along the most western shore.[39] Because of the low density and clustering of camps and the lack of a public boat launch, the probable Water-ROS class for the lake is Rural Natural Setting.[40] The rating is Low-Medium.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[41] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

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[38] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[39] Reported in the VIA on page 228 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[40] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[41] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is somewhat developed, one suspects that people come to their camps to get away and be closer to nature. Nothing in this suggests that the scenic expectations would be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. There no boat launch on Junior Lake; there public access by water from Bottle Lake. However, there are 15 camps and homes on the shoreline of this small lake. Fishing, boating, hiking, camping, swimming and paddling are common activities. In addition to any general use by the public, if the 15 camps are all active then the lake should receive moderate use for its size. The rating is Low-Medium.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[42] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the northeast. The nearest visible turbine from the Keg Lake photosimulation viewpoint is 4.3 miles and elsewhere on the lake there may be turbines visible as close as 3.6 miles. The forested viewshed analysis indicates that as many as 26 turbine blade tips and 21 turbine hubs will potentially be visible from the lake's northwest corner of the lake. Turbines will be visible western half of the lake; there is no visibility from the eastern and southern portions of the lake. The photosimulation viewpoint is half a mile to the south of where the visibility map suggests the "worst case" view would be.

[42] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

The photosimulation and visualization show 13 turbines on the horizon that occupy a horizontal arc of about 18°; the presence of several blade tips to the right extends the horizontal visual arc to 21°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). This is a bit greater than the area that would be blocked if the fingers and thumbs of both hands were held side-by-side at arm's length with the palms facing outward. The turbines will have a significant visual presence, and several turbines or hubs will be visible from most areas of the lake. The rating is Medium to High.

Overall scenic impact. The turbines will have a significant visual presence above the horizon line from approximately half of Keg Lake, including as close as 3.6 miles. It is anticipated that there is a moderate level of recreation use on Keg Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Medium.

4.8 Lombard Lake

Criterion F: Scope and scale of project views. Topography will screen views of the project. Without visibility there can be no visual impact. Therefore it will not be considered further.

Overall scenic impact. None, since there is no possible project visibility.

4.9 Norway Lake

Norway Lake was not evaluated by LandWorks, because they indicated that there were no turbines visible from it. The visibility map for this review indicates that there may be visibility from nearly 8 miles. However I was unable to create a visualization in ArcScene that showed this visibility. Given this situation and that at this distance it is unlikely that a blade tip will be recognizable, I have decided to agree with LandWorks' determination that there will be no visibility.

Criterion F: Scope and scale of project views. Topography will screen views of the project. Without visibility there can be no visual impact. Therefore it will not be considered further.

Overall scenic impact. None, since there is no possible project visibility.

4.10 Pleasant Lake

Criterion A: Significance of resource. This lake was rated as an outstanding scenic resource in the *Maine Wildlands Lake Study*. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 50, the lowest possible for the outstanding rating. Its rating is Medium.

Criterion B: Character of surrounding area. This is a medium sized lake[43] surrounded by low-lying hills covered with a mixed forest. A large long island on the eastern side divides the lake

[43] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

into two separate spaces, one a small lake and the other a medium sized lake. Views from on the lake are in all directions; the lake's medium size and surrounding topography and shoreline trees provide a moderate sense of enclosure. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are only a few private camps along the lakeshore, but Pleasant Lake hosts a resort, Maine Wilderness Camps.[44] There are campsites scattered around the lake; a public boat launch that can accommodate trailers, and a private boat launch at Maine Wilderness Camps, which also rents boats. The probable Water-ROS class for the lake is Rural Developed Setting.[45] The rating is Medium.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[46] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is not heavily developed, neither is it remote. This would suggest that the scenic expectations of users would not be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. However, there is a public boat launch that can be used by trailers. Maine Wilderness Camps is a commercial resort that has a private launch and rents canoes and kayaks. In addition, there is a hand full of camps and homes on the eastern shore. Fishing, boating, hiking, swimming, and paddling are common activities. In addition to any general use by the public, with people staying at Maine Wilderness Camps the lake should receive moderate use for its size. The rating is Low-Medium.

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[44] Reported in the VIA on page 29 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[45] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[46] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[47] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the northwest. Photosimulations for Pleasant Lake were created from two viewpoints: boat launch and near the north shore. The nearest visible turbine from the Pleasant Lake Boat Launch photosimulation viewpoint is 4.6 miles and from the Near the Northern Shore viewpoint it is 2.8 miles. Elsewhere on the lake there may be turbines visible as close as 2.1 miles. The forested viewshed analysis indicates that as many as 25 to 27 turbine hubs will potentially be visible from over half of the lake. Because the lake's major axis it oriented toward the project, there are very few areas that fall within the visual shadow of the shoreline vegetation. The boat launch viewpoint is clearly a "worst case" view, since people boating from the launch must face toward the project. However, the viewpoint near the northern shore is not a "worst case" situation.

The boat launch photosimulation and visualization show 16 turbines, half a dozen hubs and a couple blade tips on the horizon that occupy a horizontal arc of about 44°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). This is a bit greater than the area that would be blocked if the fingers and thumbs of both hands were held side-by-side at arm's length with the palms facing outward along with both hands of a friend. The turbines will be a visual focal point as people leave the boat launch for other parts of the lake.

The second viewpoint, near the northern shore, has less potential for visibility and is in a location that is partially within the visual shadow of shoreline vegetation. Nine turbines that will be visible on the horizon will occupy a horizontal visual arc or about 30°. The visualization outlines the shoreline vegetation that will be screening additional turbines. If one were to move south from this viewpoint as little as a quarter of a mile, it appears that 24 or more turbine hubs would become visible and they could occupy a horizontal visual angle of 55° to 60°. The rating is High.

Overall scenic impact. The turbines will have a significant visual presence above the horizon line from nearly all of Pleasant Lake, including as close as 2.1 miles. Pleasant Lake is recognized as an Outstanding scenic resource in the *Maine Wildlands Lake Study.* It is anticipated that there is a moderate level of recreation use on Pleasant Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Medium to High.

[47] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

4.11 Scraggley Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 45. Its rating is Medium.

Criterion B: Character of surrounding area. This is a medium sized lake[48] surrounded by low-lying hills covered with a mixed forest. It is a long lake and its north and south shores pinch together in two places to create visually separate rooms that are each medium sized lakes. There is a substantial amount of wetlands in the eastern room. Views from on the lake are in all directions; the lake's medium size and surrounding topography and shoreline trees provide a moderate sense of enclosure. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are only a few private camps scattered along the lakeshore.[49] There are campsites scattered around the lake and a public hand carry boat launch accessed by a rough road. The probable Water-ROS class for the lake is Rural Natural Setting.[50] The rating is Medium.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[51] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is not heavily developed, neither is it remote. This would suggest that the scenic expectations of users would not be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant

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[48] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[49] Reported in the VIA on page 22 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[50] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[51] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. However, there is a hand carry boat launch and scattered primitive campsites. Boat access is from the trailer boat launch on Bottle Lake via Junior Lake. There is a hand full of camps and homes scattered around the lake. Fishing, hiking, swimming, and paddling are common activities. The rating is Low.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[52] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the north and northwest. The nearest visible turbine from the Scraggley Lake photosimulation viewpoint is 4.7 miles and elsewhere on the lake there may be turbines visible as close as 3.5 miles. The forested viewshed analysis indicates that as many as 27 turbine blade tips and 26 turbine hubs will potentially be visible from the photosimulation viewpoint and elsewhere along the southern shore of the lake. Turbines will be visible from most of the lake, except close to the northern shore. The photosimulation viewpoint is well chosen as a "worst case" view.

The photosimulation and visualization show 19 turbines, 4 hubs and a blade tip on the horizon that occupy a horizontal arc of about 49°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). This is a bit greater than the area that would be blocked if the fingers and thumbs of both hands were held side-by-side at arm's length with the palms facing outward, as well as the both hands of a friend. The turbines will have a significant visual presence, and several turbines or hubs will be visible from most areas of the lake. The turbines will have a major visual presence, and many turbines or hubs will be visible from most areas of the lake. The rating is High.

Overall scenic impact. The turbines will have a significant visual presence above the horizon line from nearly all of Scraggly Lake, including as close as 3.7 miles. It is anticipated that there is a very modest level of recreation use on Scraggly Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Medium to High.

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[52] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

4.12 Shaw Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 40. Its rating is Low to Medium.

Criterion B: Character of surrounding area. This is a small lake[53] surrounded by low-lying hills covered with a mixed forest. Views from on the lake are in all directions; the lake's small size and surrounding topography and shoreline trees provide a sense of enclosure. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are no camps apparent along the lakeshore.[54] Because of the undeveloped shoreline and lack of a boat launch, the probable Water-ROS class for the lake is Rural Natural Setting.[55] The rating is Medium.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[56] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is not heavily developed, neither is it remote. This would suggest that the scenic expectations of users would not be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative impact of wind development sprawl that would significantly affect the state's overall scenic quality).

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[53] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[54] Reported in the VIA on page 32 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[55] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[56] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

Criterion E.1: Extent, nature & duration of uses. This is unknown. There is no boat launch it appears that access is by an eight-mile portage from Scraggley Lake. There may be one camp on the lake. Fishing and paddling are assumed to be the common activities. The rating is Low.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[57] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the north and northwest. The nearest visible turbine from the Shaw Lake photosimulation viewpoint is 3.7 miles and elsewhere on the lake there may be turbines visible closer than 3.0 miles. The forested viewshed analysis indicates that as many as 27 turbine blade tips and 24 turbine hubs will potentially be visible from the photosimulation viewpoint and elsewhere along the southern half of the lake. There will be a relatively small area along the northern shore that falls within the shoreline vegetation's visual shadow that will not have views of any turbines. The photosimulation viewpoint is well chosen as a "worst case" view.

The photosimulation and visualization show 7 turbines, 5 hubs and 7 blade tips above the horizon-line of an intervening ridge; Bowers Mountain and Dill hill are not visible. The view of visible turbines extends beyond the photosimulation to the right. Two Shaw Lake visualizations were required show the full extent of these turbines in the visual field where they occupy a horizontal arc of about 60°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). This is a bit greater than the area that would be blocked if the fingers and thumbs of both hands were held side-by-side at arm's length with the palms facing outward, as well as the both hands of <u>two</u> friends. The turbines will have a major visual presence, and a large number of hubs and blade tips will be visible from most areas of the lake. The turbines will have a major visual presence, and many turbines or hubs will be visible from most areas of the lake. The rating is High.

Overall scenic impact. The turbines will have a major visual presence above the horizon line from nearly all of Shaw Lake, including as close as 2.7 miles. It is anticipated that there is a very modest level of recreation use on Shaw Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Medium to High.

[57] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

4.13 Sysladobsis Lake

Criterion A: Significance of resource. This is a scenic resource of statewide significance. In the *Scenic Lakes Character Evaluation in Maine's Unorganized Towns*, it received a score of 45. Its rating is Medium.

Criterion B: Character of surrounding area. This is a large lake[58] surrounded by low-lying hills covered with a mixed forest. The portion of the lake within 8 miles of the project is visually isolated from the rest of the lake by a large island and narrows, creating the spatial equivalent of a small lake. Views from on the lake are in all directions. There does not appear to be any clearly dominant feature visible from the lake, such as a near-by mountain with a distinctive form. There is active forest management within this general area. There are approximately 52 camps or full size homes, primarily along both shores.[59] Because of the density of second homes, a private campground and public hand carry boat launch, the probable Water-ROS class for the lake is Rural Developed Setting.[60] The rating is Low to Medium.

Criterion C: Typical viewer expectation. There are no existing data to directly address this criterion.[61] An alternative approach is to apply deductive reasoning to respond to this criterion using common knowledge and assumptions. Because it is not empirically grounded, it may not be valid or reliable.

This lake and the surrounding area are not a scenic or recreation destination in Maine. While it is somewhat developed, one suspects that people come to their camps to get away and be closer to nature. Nothing in this suggests that the scenic expectations would be high. The most common activity appears to be fishing perhaps accompanied by boating, followed by hiking, camping and canoeing. There is some evidence that scenic quality may be less important to people engaged in fishing or motor boating as compared to those engaged in hiking or canoeing (Palmer 1999). Its rating is Medium.

Criterion D: Development's purpose and context. At 69.1 MW, the Bowers Wind Project will make a substantial contribution to Maine's wind energy goal. Bowers is within 8 miles of the southern end of the Stetson Wind I, which includes 38 turbines for a name plate capacity of 167 MW. This project was then extended to the north--Stetson II is 11 turbines with a name plate capacity of 25.5 MW. Since I have interpreted this criterion to place a premium on extending existing wind project, I consider this criterion to be High (meaning that it provides a significant counter balance to scenic impacts and that as an expansion project, it reduces the cumulative

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[58] The *Scenic Lakes Evaluation for the Unorganized Towns in Maine*. (Jones 1986, pages 2 and 14) defines a small lake as being less than 500 acres, a medium sized lake as between 500 and 1,999 acres, and a large lake as larger than 2,000 acres.

[59] Reported in the VIA on page 33 and Exhibit 5: Photo Inventory. "Structures were identified by Stantec based on the 2009 NAIP imagery for Penobscot and Washington counties as well as the 24K USGS quads, and LURC parcel maps."

[60] Recreation Opportunity Spectrum (ROS) was used to help describe how Plum Creek's proposed concept plan might change the character of the Moosehead Lake region. Hass, et al. (2004) developed a guidebook to apply the ROS to water-based recreation resources.

[61] The Telephone Survey cannot be used for this criterion because the sampling procedures were not random, therefore the data cannot be generalized beyond the specific 191 respondents (Portland Research Group 2011a).

impact of wind development sprawl that would significantly affect the state's overall scenic quality).

Criterion E.1: Extent, nature & duration of uses. This is unknown. However, there a boat launch that can be used by trailers. In addition, there are a number of camps and homes, many with docks on the shoreline within 8-miles of the Bowers wind turbines. Fishing, boating, hiking, camping, and paddling are common activities, but it is also likely that there is swimming, water play equipment, and perhaps water skiing and jet skiing. In addition to any general use by the public, if the camps are all active then the lake should receive substantial use at this end. The rating is Medium.

*Criterion E.2: Effect on continued use and enjoyment***.** This is unknown for the Bowers Wind Project. To date surveys of hikers have found that proposed grid-scale wind projects in Maine will have a slight negative effect on their recreation enjoyment, though it will not significantly effect the likelihood they will return. One survey investigated the effect on water-based activities. It found that the Bull Hill wind turbines would have no effect on respondents' likelihood of returning to Donnell Pond[62] for water activities such as boating, canoeing, kayaking, swimming or fishing, and it is likely to be similar here (Robertson and MacBride 2010). They were not asked about its effect on enjoyment. In addition, fishing is anticipated to be the primary use and Palmer (1999) found that fishing was an activity where people did not appear to place as high a value on scenic quality as people who hiked or paddled. It is assumed that the effect on continued use and enjoyment is Low.

Criterion F: Scope and scale of project views. Views toward the Bowers Wind Project are to the north-northeast. There is no photosimulation for Sysladobsis Lake, but a visualization was made for a viewpoint less than a quarter of a mile north of the lake's large island. The nearest visible turbine from the Sysladobsis Lake visualization viewpoint is 7.0 miles and elsewhere on the lake there may be turbines visible as close as 6.4 miles. The forested viewshed analysis indicates that as many as 13 turbine hubs will potentially be visible from the center of the lake; there will be no turbines visible from a little over half of the lake that is within 8 miles of a project turbine. The visualization viewpoint is a bit to the north of where the visibility map suggests the "worst case" view would be.

The visualization shows all 11 turbines within 8 miles of the viewpoint, plus 2 turbines and 11 tips that are beyond 8 miles. Just the turbines within 8 miles of the viewpoint occupy a horizontal arc of about13°; with the addition turbines and tips that are beyond 8 miles distant it will be 23°. To put this in perspective, the viewing angle of [the] thumb's width is about 2 degrees" when held at arm's length (O'Shea 1991). For the turbines within 8 miles, this is a bit less than the area that would be blocked if the fingers of both hands were held side-by-side at arm's length with the palms facing outward. Less than 15% of Sysladobsis Lake is within 8 miles of the project, but the turbines will have a significant visual presence from this portion of the lake. However, this factor is moderated by the distance of the views. On the other hand, one of the two hand boat launches that DeLorme Maine Atlas and Gazetteer show are present is at the northern end of the

[62] Donnel Pond is identified a significant scenic resource in the *Maine Wildlands Lake Study*. It is adjacent to the Donnel Pond Unit Maine Reserved Land which is designated as a significant scenic resource (Maine DOC 2009a)

lake. Therefore all returning boats will be focusing on the view toward the turbines. The rating is Medium.

Overall scenic impact. There will be no visibility of turbines from approximately half of Sysladobsis Lake that is within 8 miles of the turbines. While there are locations were a number of turbine hubs will be visible, they are at a distance of at least 6.4 miles and they will not be visually dominant. It is anticipated that there could be a substantial level of recreation use on Sysladobsis Lake. However scenic quality is not generally thought to be central to the types of activities that are expected to be most common—fishing, swimming, boating. Therefore the Overall Scenic Impact is set at Low-Medium.

4.14 Upper Sysladobsis Lake

Criterion F: Scope and scale of project views. Topography will screen views of the project. Without visibility there can be no visual impact. Therefore it will not be considered further.

Overall scenic impact. None, since there is no possible project visibility.

4.15 West Musquash Lake

West Musquash Lake was not evaluated by LandWorks, because they indicated that there were no turbines visible from it. The visibility map for this review indicates that there may be one blade tip visible from nearly 8 miles. At this distance, it is unlikely that a lone blade tip will be recognizable.

Criterion F: Scope and scale of project views. Topography will screen views of the project. Without visibility there can be no visual impact. Therefore it will not be considered further.

Overall scenic impact. None, since there is no possible project visibility.

4.16 Summary of Impacts

Table 5 summarizes the above findings from applying the scenic impact evaluation criteria to the 14 resources identified within 8 miles of a turbine and possibly having state or national significance as a scenic resource.

Table 5. Summary of Evaluation Criteria Ratings for the Bowers Wind Project

Scenic Resources of State or National Significance	Scenic Impact Evaluation Criteria							Overall Scenic Impact
	A	B	C	D	E.1	E.2	F	
Historic Sites								
Springfield Congregational Church	*	*	*	*	*	*	0	None
Great Ponds								
Bottle Lake	Low	Low	Medium	High	Medium	Low	Low	Low-Med
Duck Lake	Low	Low	Medium	High	Medium	Low	Medium	Low-Med
Horseshoe Lake	*	*	*	*	*	*	0	None
Junior Lake	Medium	Low-Med	Medium	High	Medium	Low	Med-High	Medium
Keg Lake	Low-Med	Low-Med	Medium	High	Low-Med	Low	Med-High	Medium
Lombard Lake	*	*	*	*	*	*	0	None
Norway Lake	*	*	*	*	*	*	0	None
Pleasant Lake	Medium	Medium	Medium	High	Low-Med	Low	High	Med-High
Scraggley Lake	Medium	Medium	Medium	High	Low	Low	High	Med-High
Shaw Lake	Low-Med	Medium	Medium	High	Low	Low	High	Med-High
Sysladobsis Lake	Medium	Low-Med	Medium	High	Medium	Low	Medium	Low-Med
Upper Sysladobsis Lake	*	*	*	*	*	*	0	None
West Musquash Lake	*	*	*	*	*	*	0	None

Notes: The Evaluation Criteria are: (A) Significance of resource, (B) Character of surrounding area, (C) Typical viewer expectation, (D) Development's purpose and context, (E.1) Extent, nature & duration of uses, (E.2) Effect on continued use and enjoyment, and (F) Scope and scale of project views.

† Since there is no project visibility, there is no scenic impact.

5. Summary and Conclusions

This review evaluates the adequacy of the *Visual Impact Assessment for the Proposed Bowers Wind Project* (LandWorks 2011a), also considering some of the material presented in the supplement for associated facilities (LandWorks 2011b). Overall this VIA is accurate and clearly presented. Additional analyses were conducted for this review; it was not possible to conduct fieldwork due to field conditions.

LandWorks proposed an evaluation framework using most of the Wind Energy Act's Evaluation Criteria, but also introducing some new criteria; this review applies a framework taken directly from the Wind Energy Act's Evaluation Criteria. Both frameworks are systematically applied to all of the state and nationally significant scenic resources. A comparison of the Summary of Evaluation Criteria presented in Table 5 above and Evaluation Matrix presented in the VIA (LandWorks 2011, page 40) reveal substantial differences. This review anticipate more severe scenic impacts than does the VIA.

The apparent scenic impact to the state and nationally significant scenic resources is Adverse at some locations and Very Adverse others. It is my judgment that it will be very difficult to decide whether the scenic impact to some of the state or nationally significant scenic resources is Unreasonably Adverse without better information about the "extent, nature and duration" of their use, the "expectations of the typical viewer" and "potential effect…on the public's continued use and enjoyment" of these resources.

The preparation of this review has resulted in several observations and recommendations are worth repeating.

1. The Wind Energy Act's evaluation criteria are so succinct as to be somewhat ambiguous. It is my belief that LandWorks has made a significant contribution in the ongoing discussion of how to further define the evaluation criteria. I have summarized those points that I have found most helpful in their approach and added to them in section 2.8 Observations about the Application of the Evaluation Criteria in the VIA. **The primary permitting authorities should further refine the evaluation so they are unambiguously understood, accurately applied and usefully interpreted. This should include identifying indicator thresholds that distinguish between Unreasonably Adverse, Adverse, and Not Adverse scenic impacts. Particular attention needs to be given to forming guidance about synthesizing the Evaluation Criteria into an Overall Scenic Impact evaluation to each state or nationally significant scenic resource, and then to combine them into a Total Scenic Impact.**

2. Assumptions made about vegetation height significantly affect a visibility analysis. The VIA chose to assign heights to certain wetlands and harvested areas that could have few canopy trees to screen views. As a result, the visibility analysis may indicate that areas are screened, when they are not. **Visibility analysis should be used primarily to guide the fieldwork. As such primary emphasis should be placed on the topographic visibility man and assumptions about screening should be used cautiously so as not exclude sites with potential visibility from field investigation.**

3. Photosimulations were not prepared for every significant scenic resource from which potential views of the project were identified, in particular the Sysladobsis Lake. **Photosimulations must be prepared from a "worst case" viewpoint for all state and nationally significant scenic resources which have a potential view of wind energy development components.**

4. There is real difficulty in obtaining information about the "extent, nature and duration of potentially affected public uses of scenic resources." A telephone survey was conducted to supplement the VIA, however the sample was created in a way that makes it impossible to make reasonable estimates of the extent, nature and duration of use. **Future VIAs need to obtain or develop reasonable estimates of the extent, nature and duration of use for location in significant scenic resources with potential views of wind energy development components**.

5. If a developer were to propose a 10 mile transmission line they would need to complete a thorough VIA. Yet adequately documented assessment and evaluation of Associated Facilities is not being presented. While a supplement was prepared for associated facilities, it was only from locally rather than state or nationally significant scenic resources. **Associated Facilities need to be thoroughly evaluated, and adequate documentation supporting the evaluation must be presented.**

6. The developer is to be commended for conducting a survey to help understand how users other than hikers may experience grid-scale wind power projects. However the results could not be used because of problems with the sample. In addition, the survey did not use photosimulations or on site evaluations to better ground the respondents in how the wind turbines will appear in the landscape. **Future VIAs need to increase knowledge about how grid-scale wind energy projects effect the expectations, scenic perceptions, enjoyment and likelihood to return for a greater variety of scenic resource users, at different distances, in different seasons, and for a variety of significant scenic resources**.

7. There is a concern that repeated exposure to scenic impacts from grid-scale wind energy development may have a cumulative impact. It is unknown how to combine these repeated exposures and assign them proper weight in relation to the overall experience which includes relatively little visual exposure to the Project. **Future VIAs need to consider the cumulative exposure for users that travel through the landscape.**

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Appendix 1

Maine's Wind Energy Act and the Evaluation of Scenic Impacts

Maine's Wind Energy Act and the Evaluation of Scenic Impacts

James F. Palmer

On April 18, 2008, Governor John Baldacci signed *An Act to Implement Recommendations of the Governor's Task Force on Wind Power Development* (the Wind Energy Act). It establishes a favorable State policy encouraging grid-scale wind energy development in appropriate locations. In particular, it designates a large portion of the state for expedited grid-scale wind energy development. While most environmental impacts are evaluated in the same manner as previously, special provisions are made for scenic impacts.

While the provisions of the Wind Energy Act can be viewed as an effort to simplify and clarify visual impact assessments, questions of interpretation still remain. There are several major determinations that effect how a visual impact assessment is to be conducted. This Q&A presents the Wind Energy Acts' approach to scenic impact evaluation.

What is the standard of scenic impact evaluation? The standard is "Unreasonably Adverse," and it only applies to views from significant scenic areas. "The primary siting authority shall determine…whether the development significantly compromises views from a scenic resource of state or national significance such that the development has an unreasonable adverse effect on the scenic character or existing uses related to scenic character of the scenic resource of state or national significance;"[63] whether the development "fits harmoniously into the existing natural environment" is explicitly not required.[64]

Is this standard applied to all proposed facilities? It is clear that this standard applies to "generating facilities"—turbines and transportation lines. However, there is the possibility of an exception for certain "associated faculties," making it somewhat less clear how to approach them.[65] Associated facilities include "elements of a wind energy development other than its generating facilities that are necessary to the proper operation and maintenance of the wind energy development, including but not limited to buildings, access roads, generator lead lines and substations."[66]

> "If the primary siting authority determines that application of the standard [unreasonably adverse, not harmonious fit] to the development may result in unreasonable adverse effects due to the scope, scale, location or other characteristics of the associated facilities"[67] then "the primary siting authority shall evaluate the effect of associated facilities of a wind energy development in terms of potential effects on scenic character and existing uses related to scenic character in accordance with Title 12, section 685-B, subsection 4, paragraph C or Title 38, section 484,

[63] 35-A MRSA, § 3452, sub-§1
[64] 35-A MRSA, § 3452, sub-§1
[65] 35-A MRSA, § 3452, sub-§2
[66] 35-A MRSA, § 3451, sub-§1
[67] 35-A MRSA, § 3452, sub-§2

> subsection 3, in the manner provided for development other than wind energy development."[68]

In other words, if the primary siting authority determines that there may be unreasonably adverse impacts under the Wind Energy Act's standard due to the associated facilities, then they shall evaluate the associated facilities using the standards for non-wind projects. Further, "The primary siting authority shall make a determination pursuant to this subsection within 30 days of its acceptance of the application as complete for processing."[69]

What evaluation criteria are to be used? The Wind Energy Act lists six evaluation criteria: [70]

A. **"Significance of…affected scenic resource;"** The Wind Energy Act does not explicitly describe how significance should be considered. One possible interpretation is that all scenic resources are equally significant. Another interpretation might be to distinguish between state and nationally designated scenic resources. However, this difference does not seem to have much to do with scenic quality, *per se*. Perhaps the most appropriate interpretation of this criterion is the significance of scenic quality to the identification and designation of a particular scenic resource. Sometimes the level of significance is indicated in the report responsible for the designation (e.g., designation as significant or outstanding scenic quality in the *Maine's Finest Lakes* or *Maine Wildlands Lake Assessment* studies, or local, state or national significance on a Nation Register of Historic Places nomination form).

B. **"Existing character of surrounding area;"** The Wind Energy Act explicitly states that whether "a wind energy development fits harmoniously into the existing natural environment in terms of potential effects on scenic character and existing uses related to scenic character is not required."[71] Since harmonious fit cannot be the criterion, perhaps it is whether perception of the landscape's character type is significantly changed. For instance, does the visible presence of many wind turbines change the perceived landscape character from "wooded hillside with scattered residences," to "industrial facility"?

C. **"Expectations of the typical viewer;"** Viewers may have certain expectations for the visible character of certain scenic resources. For instance, they may expect that views from a particular state park or hiking trail be predominately natural appearing. However, it is reasonable to question the appropriateness of viewer expectations, such as when people describe lands intensively managed for timber as "wilderness." In addition, viewer expectations change in reaction to changed circumstances. A few turbines may be approved because the project is small—once built people's expectations change, making it possible to build additional turbines. Consideration of this incremental cumulative change may be the point of the next criterion.

D. **"Expedited wind energy development's purpose and…context;"** The Wind Energy Act makes it clear that the Legislature believes tapping the state's wind resource is desirable, and has set substantial wind energy generation goals.[72] In addition, the

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[68] 35-A MRSA, § 3452, sub-§2
[69] 35-A MRSA, § 3452, sub-§2
[70] 35-A MRSA, § 3452, sub-§3
[71] 35-A MRSA, § 3452, sub-§1
[72] 35-A MRSA, § 3402, sub-§2

Legislature recognizes that "wind turbines are potentially highly visible landscape features that will have an impact on views."[73] It seems reasonable that the Legislature intended that areas determined to be suitable for grid-scale energy development be utilized to their full capacity. This criterion may require consideration of the wind energy potential of the surrounding context, and evaluating the scenic impacts of fully building-out the area's capacity to produce wind energy. The greatest impact comes from the initial wind turbines built in an area; additional turbines will add a smaller incremental scenic impact, making it very difficult to determine where to stop further development. It may be most responsible to consider potential cumulative wind development impacts to an area as part of an initial proposal.

E. **"Extent, nature and duration of the… public use of the scenic resource… and the… effect… on the public's continued use and enjoyment of the scenic resource;"** This evaluation criterion says that we need to know what activities are occurring at significant scenic resource sites, how many people engage in these activates, for how long, and what the impact of seeing the project will have on the enjoyment of these activities. Said another way, "Is an Adverse scenic impact Unreasonable if turbines are only visible from a rarely visited viewpoint, or is visible only to people engaged in an activity for which scenic quality is not central to its enjoyment?"

F. **"Scope and scale of the… effect of views of the generating facilities… including… number and extent of [visible] turbines, … distance [to visible facilities]… and effect of prominent features of the development on the landscape"** The issue is whether the generating facilities become dominating elements in the landscape, primarily because of their proximity to the viewer and the area they occupy in the visual field.

What constitutes a significant scenic resource? The Wind Energy Act specifies that only designated state or nationally significant scenic resources be evaluated and provides a list of qualifying designations. In this review further reference to scenic resources will assume that they are state or nationally significant.

- A national natural landmark, federally designated wilderness area or other comparable outstanding natural or cultural feature.
- A property listed on the National Register of Historic Places.
- A national or state park.
- A great pond identified as having outstanding or significant scenic quality in the *Maine's Finest Lakes* study or *Maine's Wildlands Lake Assessment*.
- A segment of a river or stream identified as having unique or outstanding scenic attributes in the *Maine Rivers Study*.
- Viewpoints from state public reserve land or on a trail that is used exclusively for pedestrian use, as designated by the Department of Conservation.
- Scenic turnouts on scenic highways constructed by the Department of Transportation.
- Scenic viewpoints located in coastal areas that are ranked as having state or national significance in terms of scenic quality in inventories published by the Executive Department, State Planning Office.

[73] 35-A MRSA, § 3402, sub-§2(C)

While a major step toward specificity, it is anticipated that interpretation of this list will be contested. For instance, this list includes resources typically designated for non-scenic reasons (e.g., national landmark or listed historic place), and only minor portions of resources that are designated for scenic reasons (e.g., only the turnouts of a scenic byway). In addition, "the public [must have] a legal right of access" if the significant scenic resources is not on public land (e.g., listed historic place or coastal viewpoint).[74]

What is the area of potential effects (APE)? The regulations presume that potential scenic impacts to scenic resources must be evaluated within 3 miles of generating facilities (i.e., turbines and transmission lines). The primary siting authority may also require the evaluation of potential scenic impacts to state and nationally significant scenic resources located between 3 and 8 miles from generating facilities if there is substantial evidence that it is needed.[75] Interested parties have 30 days after the acceptance of the application to submit such information.[76] The Wind Energy Act states that scenic impacts from generating facilities (i.e., turbines or transmission lines) located 8 or more miles from a scenic resource are "insignificant."[77]

What is the Process of Conducting a Visual Impact Assessment?
While the Wind Energy Act has identified specific resources from which views are to be considered and established criteria and a standard for their evaluation, there is no apparent reason that the process by which a visual impact assessment (VIA) is conducted would be changed. While there are slight variations, a professionally conducted VIA includes the following:

1. **Project Description**. The foundation of any VIA is an accurate and complete description of the visible attributes of all project elements—their location, dimensions, form, color, reflectance, surface texture, etc. It is also important to describe the surrounding site and how it will change. For instance, accurate information must be provided about the location and heights of trees that may screen the project, and the extent of site clearing and regrading. The purpose and context of the project must be described, as it is one of the evaluation criteria.[78]
2. **Landscape Character**. The description of the landscape character establishes the context for evaluating any visual change from introducing the proposed development.[79] What is the visual character of the landform and vegetation? What is the visual character of the settlement pattern and road network? How does the project site relate to the larger regional landscape context—is it unusual or mundane? The US Forest Service describes landscape character this way:

   > Landscape Character descriptions are a combination of the objective information contained within ecological unit descriptions and the cultural values that people assign to landscape. Together they help define the meaning of "place", and its scenic expression (USDA FS 1995, page 1-1).

[74] 35-A MRSA, § 3451, sub-§9
[75] 35-A MRSA, § 3452, sub-§4
[76] 35-A MRSA, § 3452, sub-§4
[77] 35-A MRSA, § 3452, sub-§3
[78] 35-A MRSA, § 3452, sub-§3,criterion D
[79] 35-A MRSA, § 3452, sub-§3, criterion B

The regional landscape character is described first. Often there are several distinct landscape units to describe. The character (e.g., ecological zone) and scenic attractiveness (e.g., vividness, intactness, unity) of each landscape unit is summarized (USDA FS 1995, page 1-15). A somewhat more detailed description is given for the project site and its APE.

3. **Visibility Analysis**. A visibility or viewshed analysis identifies those areas with potential views of the proposed development. The minimum professional standard is to map the topographic viewshed for the highest point of each major project element. This shows those areas that have a potential view of the tip of an upright turbine blade if all land cover were removed. Since it is possible that views to a project could be opened by the removal of land cover, a topographic viewshed is considered a useful conservative assessment of the maximum area of potential project visibility.

   Typically, a second visibility analysis includes the screening effect of forest cover. However such analyses should be used with caution and carefully field checked, since vegetation data can change quickly. The three forest classes (deciduous, evergreen and mixed) of the National Land Cover Database are most commonly used. Forest height is typically set to a regionally appropriate 40 feet for the analysis, though the minimum tree height for an area to be classified as forest is 16 feet. This use of generalized rather than location specific tree heights is another reason to use the vegetated visibility analysis with caution.

   Additional visibility analyses might show how many turbines are visible, or the viewshed for larger portions of each project element (i.e., the nacelle rather than the upright blade tip). Current practice has been to only evaluate visibility of the turbines, but the transmission line must also be considered. It may also be appropriate to include associated facilities, such as access roads, substation, maintenance building and other structures.

   Normally only views from scenic resources within the topographic viewshed are evaluated in detail (though the accuracy of the analysis must field checked). A visibility analysis may also be helpful in describing the potential number, extent, and distance of visible turbines.[80]

4. **Significant Scenic Resources**. Identify the state or nationally significant scenic resources within the study area, based on the list in the statute.[81] A description of each identified scenic resource needs to be presented in sufficient detail that the criteria for evaluating scenic impacts can be applied.[82] Each scenic resource will be documented as part of the fieldwork, include the general scenic character of the resource, the "worst case" potential views of the proposed development, and perhaps other views.

5. **Public Use and Expectations**. The extent, number and duration of public uses of the identified scenic resources, and the expectations of the "typical viewer" must be described.[83]

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[80] 35-A MRSA, § 3452, sub-§3, criterion F
[81] 35-A MRSA, § 3451, sub-§9
[82] 35-A MRSA, § 3452, sub-§3, criterion A
[83] 35-A MRSA, § 3452, sub-§3, criteria E and C

6. **Evaluation of Potential Impacts**. The findings from applying each of the criteria for evaluating scenic impacts should be reported.[84]

   Accurate visual simulations are particularly useful when conducting this evaluation. The selection of viewpoints for the visual simulations is frequently a source of controversy. Opponents are likely to want simulations that represent "worst case" views, while the developer and other proponents will argue that "typical views" provide a fairer representation. Worst case views are closer, show larger portions of the project, represent situations where the project appears less compatible with its surroundings. Typical views normally do not show the project at its worst, but are at viewpoints that might have may viewers, or that are selected to represent a diversity of viewing conditions (e.g., distances from the project, types of screening, and levels of incompatibility). It is very unusual for a scientific method (i.e., random sampling) to be used to select the typical viewpoints—normally they are simply declared "typical" by the analyst. Both types of simulations are useful to decision makers. However, it is difficult to imagine why they would not want to be aware of the very worst case situations.

7. **Mitigation**. It is normal in a professional VIA that the approaches taken to mitigate adverse effects are described. Typically, if Unreasonably Adverse scenic impacts were found, approaches to further mitigation would be discussed. This might include revisions to project siting or design, or screening at impacted viewpoints. However, mitigation is not one of the evaluation criteria for scenic impacts.[85] The Attorney General's Office has advised both DEP and LURC that it does not believe mitigation can be required for scenic impacts—if scenic impacts are Unreasonably Adverse, the project should be denied, otherwise it should be approved.

[84] 35-A MRSA, § 3452, sub-§3
[85] 35-A MRSA, § 3452, sub-§3

Appendix 2

Review Maps

Map 1: Topographic Viewshed for Blade Tip

Map 2: Forested Viewshed for Blade Tip

Map 3: Forested Viewshed for Blade Tip Using LandWorks Forest Heights

Map 4: Topographic Viewshed for Turbine Hub

Map 5: Forested Viewshed for Turbine Hub

Map 6: Forested Viewshed for Turbine Hub Using LandWorks Forest Heights

Visibility analysis determines whether a line-of-sight exists between two specified points. A geographic information system (GIS) is used to map the viewsheds from which the Bowers' Wind Project's turbines are potentially visible. In principle this is an objective exercise in geometry highly suited to a computer application. In practice however, since the data are only approximations of the actual condition and may include errors and assumptions, the resulting viewshed maps are best considered a preliminary analysis of potential visibility under specified conditions. The maps are useful for providing a preliminary investigation of the overall potential visual impact. If potential visual impacts appear to exist for significant scenic resources, they need to be confirmed through field investigation and other visualization techniques.

Map 1
Topographic Viewshed for Blade Tip

Bowers Wind Project

Springfield Congregational Church

Webster Plt

Prentiss Twp T7 R3 NBPP

T8 R3 NBPP

Brookton Twp

Topsfield

Kossuth Twp

Carroll Plt

Springfield

Talmadge

T6 R1 NBPP

Lakeville

Pukakon Twp

Lombard Lake

Duck Lake

Upper Sysladobsis Lake

Sysladobsis Lake

Bottle Lake

Keg Lake

Horseshoe Lake

Junior Lake

Norway Lake

Scraggley Lake

Shaw Lake

Pleasant Lake

West Musquash Lake

GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation and other visualization techniques.

Legend

Turbine Locations

Number Visible

1 - 3 | 4 - 6 | 7 - 9 | 10 - 12 | 13 - 15 | 16 - 18 | 19 - 21 | 22 - 24 | 25 - 27

Scenic Resources of State or National Significance

Great Ponds

National Register of Historic Places

0 1 2 4 6

Miles

Map 2
Forested Viewshed for Blade Tip

Bowers Wind Project

GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation and other visualization techniques.

Legend

Turbine Locations

Number Visible

1 - 3
4 - 6
7 - 9
10 - 12
13 - 15
16 - 18
19 - 21
22 - 24
25 - 27

Scenic Resources of State or National Significance

Great Ponds

National Register of Historic Places

0 1 2 4 6

Miles

Springfield Congregational Church
Webster Plt
Prentiss Twp T7 R3 NBPP
T8 R3 NBPP
Brookton Twp
Topsfield
Kossuth Twp
Carroll Plt
Springfield
Talmadge
T6 R1 NBRP
West Musquash Lake
Lombard Lake
Lakeville
Pukakon Twp
Pleasant Lake
Shaw Lake
Duck Lake
Scraggley Lake
Upper Sysladobsis Lake
Norway Lake
Sysladobsis Lake
Junior Lake
Bottle Lake
Keg Lake
Horseshoe Lake

Map 3
Forested Viewshed for Blade Tip Using LandWorks Forest Heights
Bowers Wind Project

Springfield Congregational Church

Webster Plt

Prentiss Twp T7 R3 NBPP

T8 R3 NBPP

Brookton Twp

Topsfield

Kossuth Twp

Carroll Plt

Springfield

Talmadge

T6 R1 NBPP

Lakeville

Pukakon Twp

Lombard Lake

Duck Lake

Upper Sysladobsis Lake

Sysladobsis Lake

Bottle Lake

Keg Lake

Horseshoe Lake

Junior Lake

Norway Lake

Scraggley Lake

Shaw Lake

Pleasant Lake

West Musquash Lake

GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation and other visualization techniques.

Legend

Turbine Locations

Number Visible

1 - 3
4 - 6
7 - 9
10 - 12
13 - 15
16 - 18
19 - 21
22 - 24
25 - 27

Scenic Resources of State or National Significance

Great Ponds

National Register of Historic Places

0 1 2 4 6

Miles

Map 4
Topographic Viewshed for Turbine Hub

Bowers Wind Project

GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation and other visualization techniques.

Legend

Turbine Locations

Number Visible

1 - 3
4 - 6
7 - 9
10 - 12
13 - 15
16 - 18
19 - 21
22 - 24
25 - 27

Scenic Resources of State or National Significance

Great Ponds

National Register of Historic Places

0 1 2 4 6

Miles

Springfield Congregational Church

Webster Plt

Prentiss Twp T7 R3 NBPP

T8 R3 NBPP

Brookton Twp

Topsfield

Kossuth Twp

Carroll Plt

Springfield

Talmadge

T6 R1 NBPP

Lakeville

Pukakon Twp

Lombard Lake

Duck Lake

Upper Sysladobsis Lake

Sysladobsis Lake

Bottle Lake

Keg Lake

Horseshoe Lake

Junior Lake

Norway Lake

Scraggley Lake

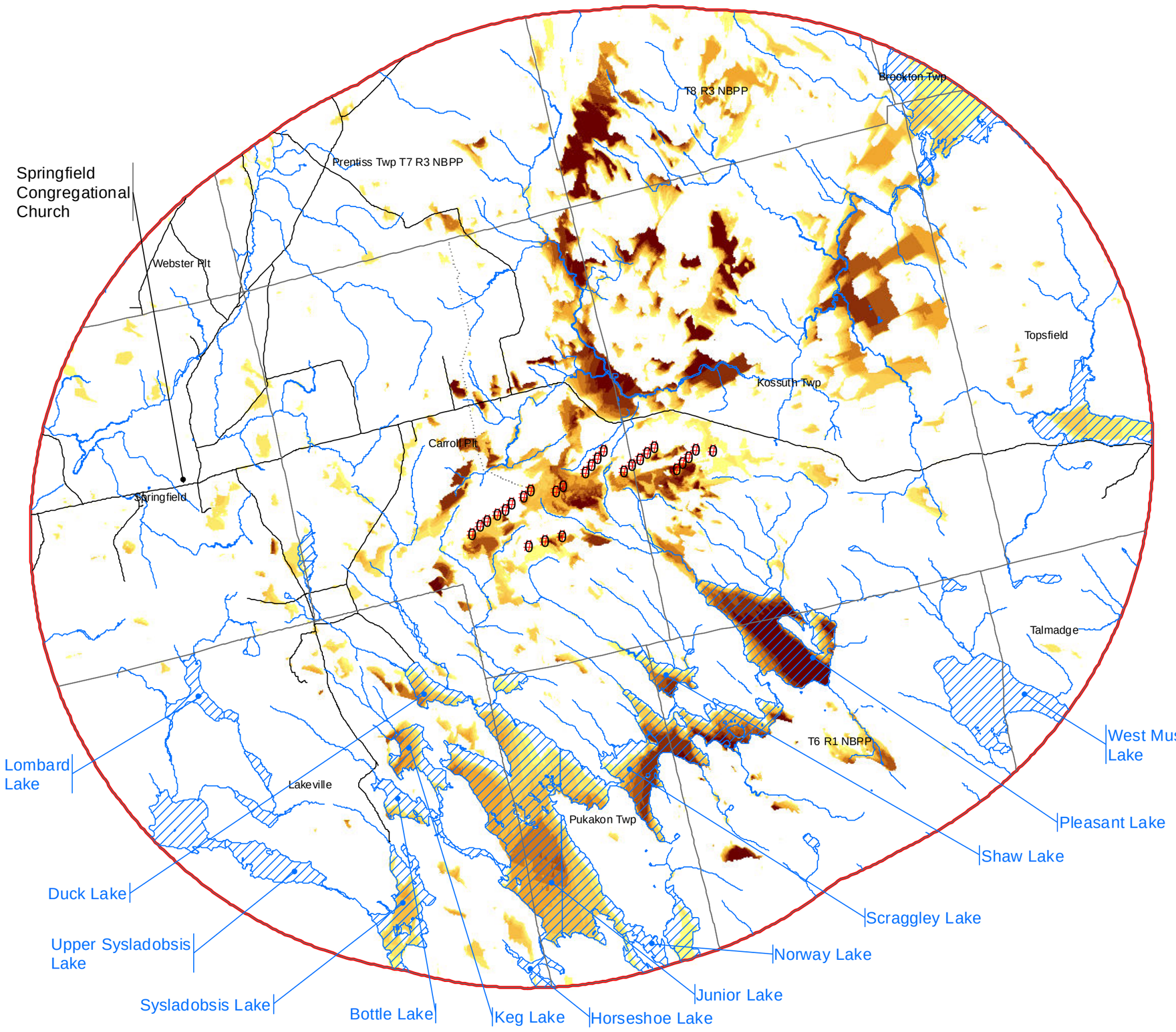
Shaw Lake

Pleasant Lake

West Musquash Lake

Map 5
Forested Viewshed for Turbine Hub

Bowers Wind Project



GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation and other visualization techniques.

Legend

Turbine Locations

Number Visible

1 - 3
4 - 6
7 - 9
10 - 12
13 - 15
16 - 18
19 - 21
22 - 24
25 - 27

Scenic Resources of State or National Significance

Great Ponds

National Register of Historic Places

0 1 2 4 6

Miles

Map 6
Forested Viewshed for Blade Tip Using LandWorks Forest Heights
Bowers Wind Project

GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation and other visualization techniques.

Legend

Turbine Locations

Number Visible

1 - 3
4 - 6
7 - 9
10 - 12
13 - 15
16 - 18
19 - 21
22 - 24
25 - 27

Scenic Resources of State or National Significance

Great Ponds

National Register of Historic Places

0 1 2 4 6

Miles

Springfield Congregational Church

Webster Plt

Springfield

Prentiss Twp T7 R3 NBPP

T8 R3 NBPP

Brookton Twp

Topsfield

Kossuth Twp

Carroll Plt

Talmadge

T6 R1 NBPP

West Musquash Lake

Pleasant Lake

Shaw Lake

Scraggley Lake

Norway Lake

Junior Lake

Horseshoe Lake

Keg Lake

Bottle Lake

Sysladobsis Lake

Upper Sysladobsis Lake

Duck Lake

Lombard Lake

Lakeville

Pukakon Twp

Appendix 3

ArcScene Visualizations

Visualization 1: Bottle Lake

Visualization 2: Duck Lake

Visualization 3: Junior Lake

Visualization 4: Keg Lake

Visualization 5: Pleasant Lake Boat Launch

Visualization 6: Pleasant Lake, Near Northern Shore

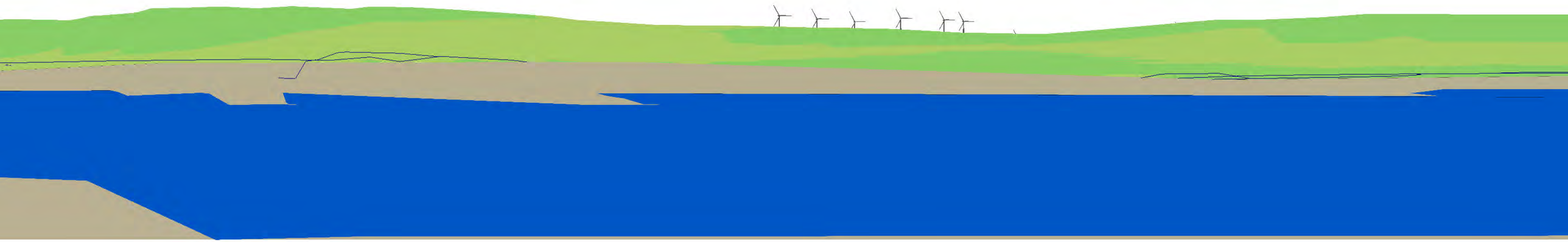
Visualization 7: Scraggly Lake

Visualization 8a: Shaw Lake

Visualization 8b: Shaw Lake

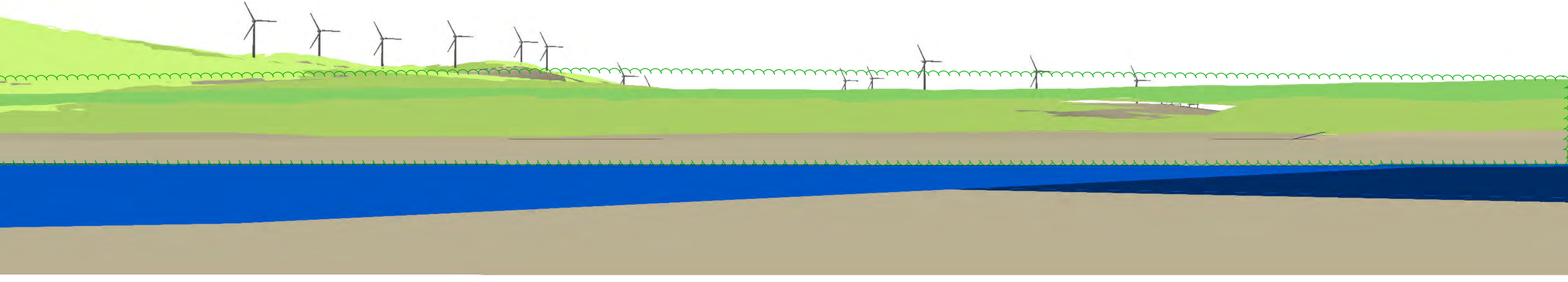
Visualization 9: Sysladobsis Lake

The purpose of these visualizations is to validate the relative accuracy of the *Visual Impact Assessment for the Bowers Wind Project* photographic simulations (LandWorks 2011, exhibits 6–13). They are created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project*. Forest cover is set to 40 feet and does not include forested wetlands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, which is similar to the VIA photosimulations, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.



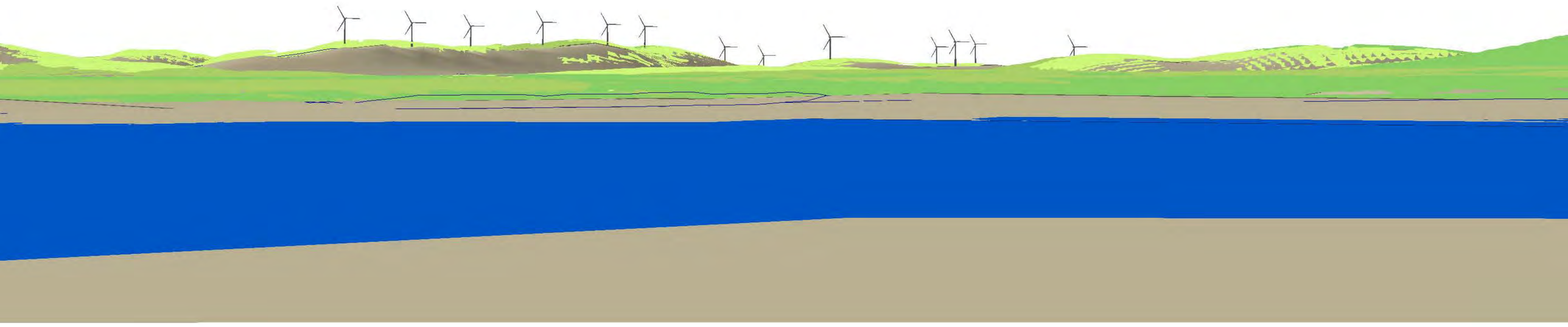
ArcScene Visualization 1: Bottle Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 8: Visual Simulation from Bottle Lake, Lakeville (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.



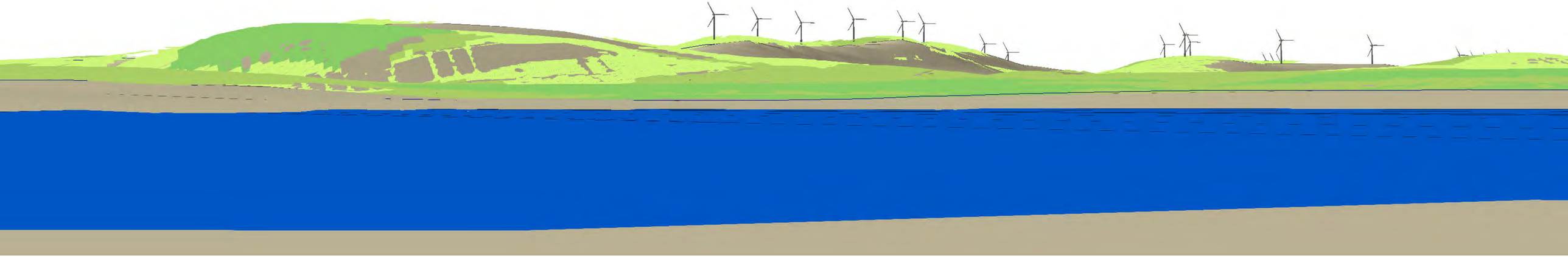
ArcScene Visualization 2: Duck Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 7: Visual Simulation from Duck Lake, Lakeville (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width. Shoreline trees will screen turbines on the right side of the visualization.



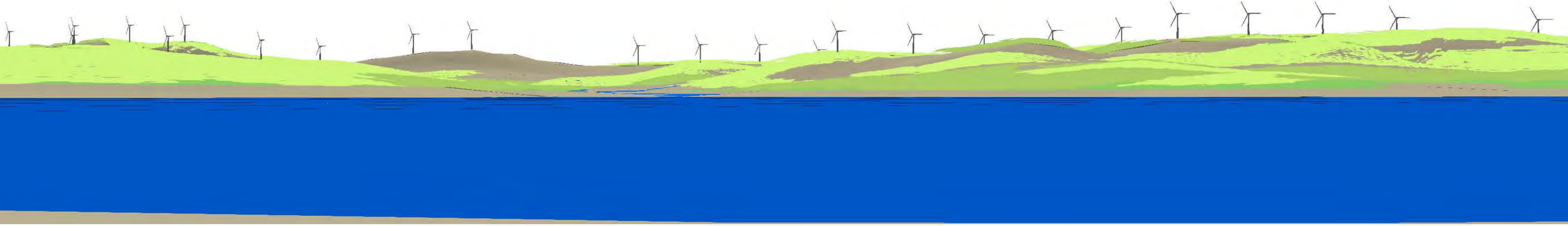
ArcScene Visualization 3: Junior Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 8: Visual Simulation from Junior Lake, Lakeville (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.



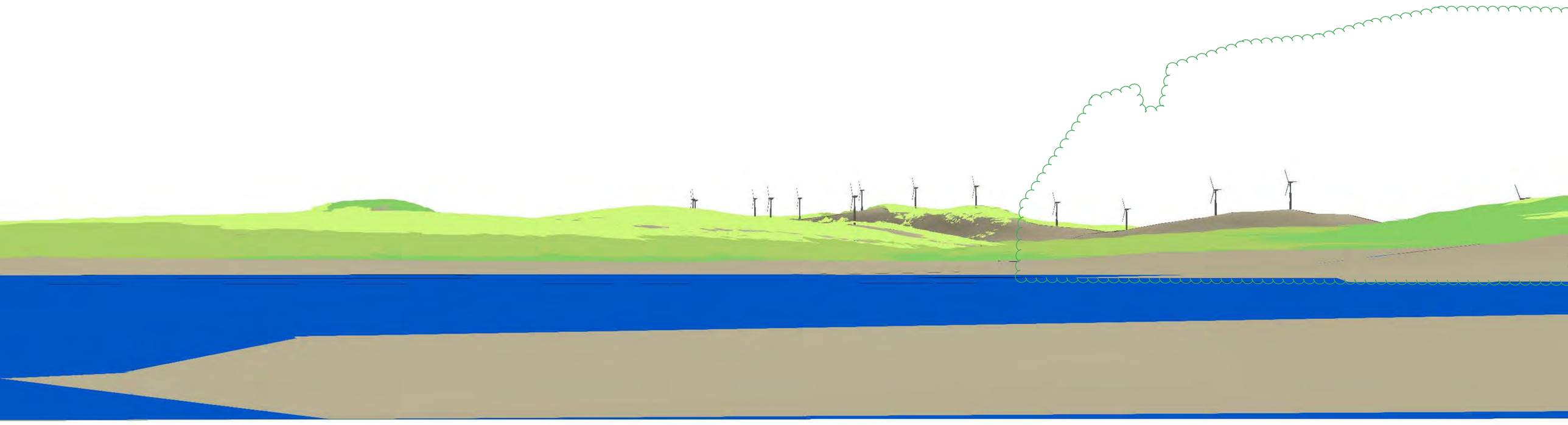
ArcScene Visualization 4: Keg Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 9: Visual Simulation from Keg Lake, Lakeville (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.



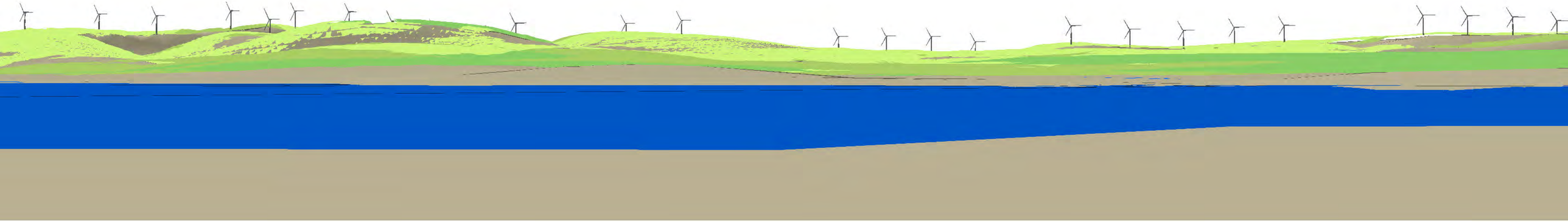
ArcScene Visualization 5: Pleasant Lake Boat Launch

The purpose of this visualization is to validate the relative accuracy of Exhibit 10: Visual Simulation from Pleasant Lake Boat Launch, T6 R1 NBPP (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.



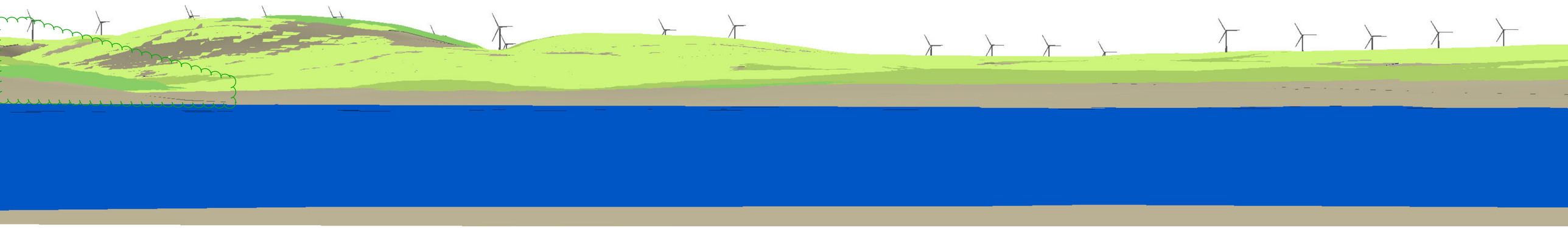
ArcScene Visualization 6: Pleasant Lake, Near Northern Shore

The purpose of this visualization is to validate the relative accuracy of Exhibit 10: Visual Simulation from Pleasant Lake, Near Northern Shore, T6 R1 NBPP (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width. Shoreline trees will screen turbines on the right side of the visualization.



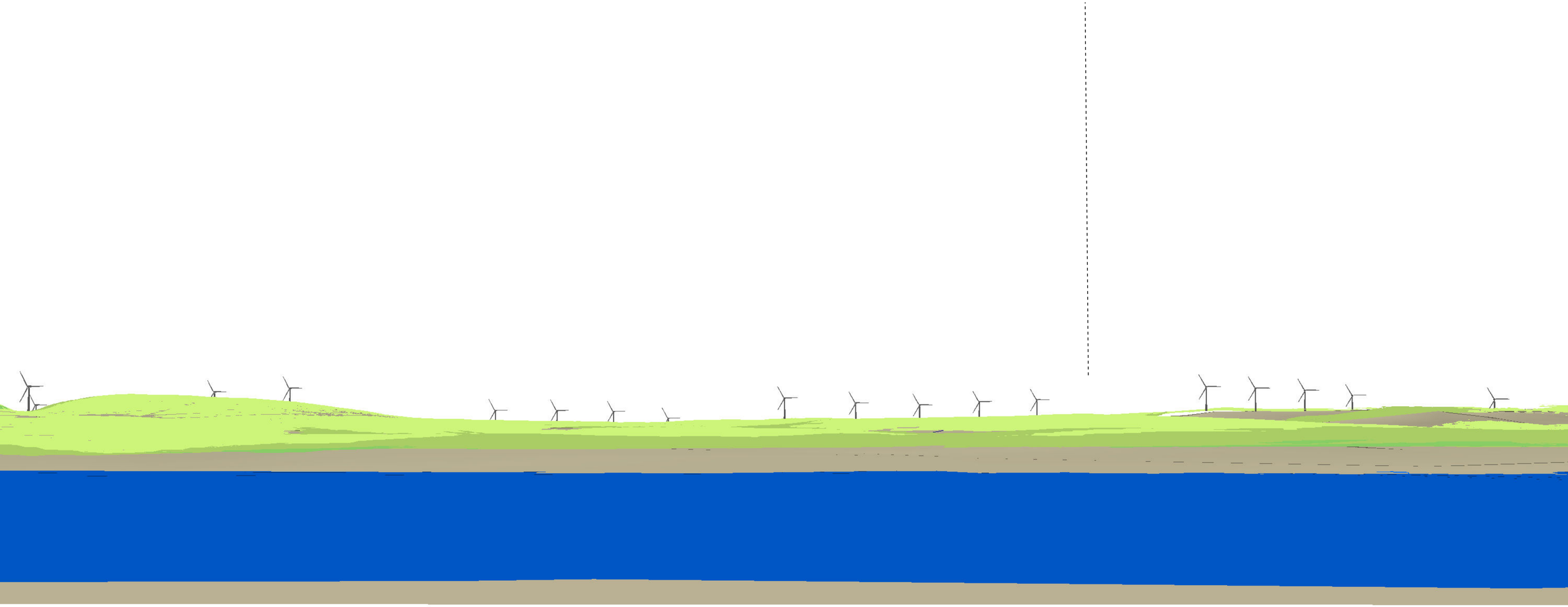
ArcScene Visualization 7: Scraggly Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 10: Visual Simulation from Scraggly Lake, Pukakon Township (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 55 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.



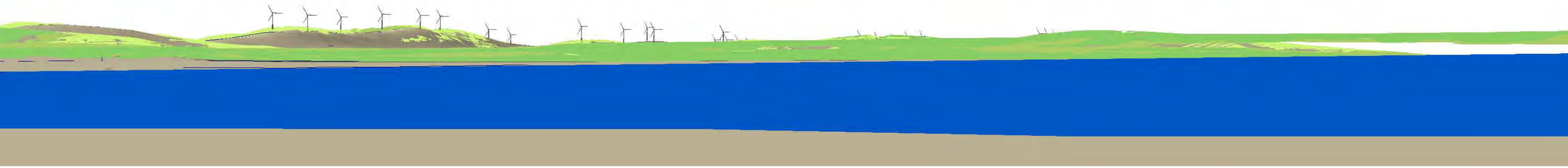
ArcScene Visualization 8a: Shaw Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 10: Visual Simulation from Shaw Lake, T6 R1 NBPP (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 55 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width. Shoreline trees will screen turbines on the left side of the visualization.



ArcScene Visualization 8b: Shaw Lake

The purpose of this visualization is to validate the relative accuracy of Exhibit 10: Visual Simulation from Shaw Lake, T6 R1 NBPP (LandWorks 2011a). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment for the Bowers Wind Project.* Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 55 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width. Visualization 8a represents the conditions to the left of the dashed line.



ArcScene Visualization 9: Sysladobsis Lake

The purpose of this visualization is to illustrate the potential scenic impact from the north shore of the large island in Sysladobsis Lake. No visual simulation was prepared for this lake in the *Visual Impact Assessment for the Bowers Wind Project.* Of the 14 turbines to the right, 10 are within 8 miles of the viewer. Forest cover is set to 40 feet, and does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The horizontal angle of view is 50 degrees, and the visualization will be in proper perspective when viewed from a distance slightly greater than its width.