

**Review of the
Hancock Wind Project
Visual Impact Assessment of Additional
Design Option Comparative Analysis**

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1. Introduction

Maine’s Department of Environmental Protection (DEP) accepted as complete Hancock Wind, LLC’s permit application for the Hancock Wind Project in January 2013. This project had a nameplate capacity of 54 megawatts (MW) generated by 18 Siemens 3.0-113 (or the slightly smaller Vestas V112-3.0) wind turbines. The height to the Siemens turbine hub is 99.5 meters (approximately 326 feet), and to the tip of an upright blade is 156 meters (512 feet). The turbines are located in T22 MD and T16 MD, Hancock County, Maine and is within the area designated for expedited grid-scale wind development. The visual impact assessment (VIA) was prepared by Terrence J. DeWan & Associates (TJD&A 2013). The DEP approved the application to construct this project subject to a list of conditions on July 22, 2013.

On or about July 3, 2014, Hancock Wind, LLC filed an application to amend the approved project to increase the nameplate capacity to 56 MW. This amendment involves two changes. First, it is proposed to use Vestas V117 3.3 MW, which are 116.5 meters (382 feet) to the hub and 175 meters (574 feet) to the tip of an upright blade. Second, only 17 of the turbine sites will be used—the turbine site nearest Spectacle Pond has been removed. TJD&A also prepared the VIA for these proposed amendments (TJD&A 2014).

The current document reviews whether or not the VIA for the proposed amendment “is accurate and technically correct according to standard design practices.” The focus is on the visibility analysis and photosimulations. DEP requested that the analysis of the Maine Wind Energy Act’s (WEA) Evaluation Criteria not be revisited.

1.1 Scenic Resources of State or National Significance

The scenic resources of state or national significance (SRSNS) within 8 miles of the Hancock Wind Project have been established previously for the approved project (TJD&A 2013, pages 19-20, 33-34). These SRSNS are listed in Table 1, along with their distance from the nearest turbine and the number of turbines visible in the approved project and proposed amendment.

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

Scenic Resources of State or National Significance in the Surrounding Area	Nearest Turbine (miles)
Historic Sites	
Eastbrook Baptist Church & Town House	7.0
Great Ponds	
Fox Pond, T10 SD	7.5
Little Long Pond, T10 SD	7.2
Lower Lead Mtn. Pond, T28	5.0
Middle Lead Mtn. Pond, T28	5.2
Myrick Lake, T10 SD	6.0
Narraguagus Lake, T16 MD	4.7
Spring River Lake, T10 SD	7.8
Tilden Pond, T10 SD	7.5
Upper Lead Mtn. Pond, T28	4.2

Scenic Resources of State or National Significance in the Surrounding Area	Nearest Turbine (miles)
Public Reserved Lands	
Donnell Pond Unit	6.9
Coastal Scenic Resources	
Tunk Mountain	6.9

Notes: † Source: TJD&A (2013, pages 19-20, 33-34)

2. Methods

There are two primary technical methods used when conducting the VIA: visibility or viewshed analysis and visual simulation. The approach used to validate the accuracy of these methods is described below.

2.1 Visibility Analysis

TJD&A conduct their visibility analysis using WindPRO software to calculate the area that turbine hubs and blade tips will be visible over bare terrain and over the vegetative screen of forest cover (i.e., this is four viewshed maps for both the approved project and proposed amendment). In addition, TJD&A provides detailed maps for both the approved project and proposed amendment of the SRSNS with potential visibility of the turbines hubs over forest land cover. A final set of maps investigates the cumulative visibility of the existing Bull Hill Wind Project and the approved or amended Hancock Wind Project.

The land elevation comes from 10 meter resolution DEM data acquired from the GeoCommunity's GIS Data Depot. Maine Land Cover Data (MELCD) is used to identify forested area. A 40-foot screen is added to areas with the following land cover classes: (9) deciduous forest, (10) evergreen forest, (11) mixed forest. These cover types are dominated by trees that are at least 5 meters (16 feet) high. Assigning a height of 40 feet to the forest canopy in all likelihood will lead to overestimating visibility, since fieldwork for nearby wind development found that trees around the SRSNS often measured 65 feet high. This conservative approach has become accepted practice because it is less likely to indicate that there will be no visibility, but when a project is built it is discovered visibility exists (TJD&A 2013).

It is assumed that the same approach is used for the visibility analysis of the proposed amendments. However the analysis removes the turbine site nearest Spectacle Pond and adjusts the turbine height to reflect the Vestas V117's parameters.

This review uses the same turbine, location, elevation and land cover data as TJD&A used. However it employs ArcMap 10.2.2 software (ESRI 2014). The visibility analysis conducted for this review considers the same four parameters used by TJD&A—(1) the view of blade tips over bare terrain, (2) the view of turbine hubs over bare terrain, (3) the view of blade tips over forested land cover, and (4) the view of turbine hubs over forested land cover. These four basic maps were prepared for: (a) the 18 approved Siemens 3.0-113 turbines, (b) the 17 proposed Vestas V117-3.3 turbines, and (c) the difference between them, or the net change in visibility.

In addition, the same three viewshed analyses were conducted for the FAA warning lights mounted on the top of the nacelle. The application for the approved project indicated which turbine sites would have FAA warning lights. Fortunately both turbine location H05 and H06 were to have warning lights, so removing location H05 still left a warning light at the end of the string.

A final set of maps was prepared to investigate the areas of potential visibility for the turbine location that the amendment proposes to remove. While the larger Vestas turbines may increase visibility, the removal of a turbine from this site helps moderate this problem and these maps help understand the extent of this change.

All 22 visibility maps are included in Appendix A.

2.1.1 Computational note. The visibility analysis for both the VIAs (TJD&A 2013, 2014) and this review appear to include all the turbines that are visible from viewpoints within the study area (i.e., within 8 miles of any turbine). While this is useful information, it is not what the Wind Energy Act appears to require. The Wind Energy Act's threshold is that the scenic impact of turbines greater than 8 miles from the viewer is insignificant.¹ The difference between these two approaches is subtle, but the results can be quite different. This issue is discussed further in the conclusions section at the end of the review.

2.2 Visual Simulation

Visual simulations are a primary tool to investigate the impact to significant scenic resources. TJD&A used either a Nikon D300 or D70 camera with a 35mm lens for their field work. Photosimulations from viewpoints on the four SRSNS with potential visibility of the Siemens turbines were prepared as part of the VIA for the approved project (TJD&A 2013). The same photography has been used to prepare simulations of the Vestas turbines for the proposed amendment (TJD&A 2014). WindPRO software is used to create a 3D model of the turbines and spatially register their location to the perspective of the original photographs.

The scope and scale of these photosimulations are verified in this review using ArcScene software to create perspective visualizations of the same conditions represented in the photosimulations. The data and parameters are the same as used for the visibility analysis described above. However the visualizations represent two canopy layers, one at 40 as used in the visibility analysis, and another at 60 feet, which better represents the effective screening height of the forest canopy where growing conditions are good or the forest has not recently been harvested. It is understood that individual trees, and potentially the whole forest canopy may be higher than this. These values are chosen because they are reasonable and not expected to exaggerate the visual screening effect of the forest.

The study area for Maine's wind project VIAs is the area within 8 miles of the turbines. Simulation viewpoints are selected from SRSNS within the study area that have potential visibility. When the simulations are created, it has been common practice that all of the project turbines are represented, even if they are more than 8 miles from the viewpoint. However, the

¹ 35-A MRSA, § 3452, §§ 3

Wind Energy Act clearly states that turbines beyond 8 miles from the viewpoint are insignificant, and therefore it may be more appropriate not to include them in the simulation.

Visualizations were created from four viewpoints: (1) Lower Lead Mountain Pond, (2) Upper Lead Mountain Pond, (3) Narraguagus Lake, and (4) Tunk Mountain. For each viewpoint there are five scenarios: (1) existing conditions, including the 19 Bull Hill Wind Project turbines, (2) the approved 18 turbine Hancock Wind Project, (3) the cumulative visual effect of the approved project and Bull Hill Wind Project, (4) the proposed 17 turbine amended Hancock Wind Project, and (5) the cumulative visual effect of the amended project and Bull Hill Wind Project. Two approaches were used to identify which turbines to represent: (1) all the potentially visible turbines, and (2) only those turbines within 8 miles of the viewpoint. As a result, each viewpoint has 10 visualizations labeled a through j, as indicated in Table 2.

Table 2. A Key to Identifying Each Visualization Scenario

Scenario	Turbine Included	
	All Turbines [†]	Within 8 miles [‡]
Existing conditions (Bull Hill)	a	b
Approved Project (Hancock)	c	d
Approved Cumulative (Hancock + Bull Hill)	e	f
Proposed Amendment (Hancock)	g	h
Amendment Cumulative (Hancock + Bull Hill)	i	j

Notes: † All turbines are included. ‡ Only turbines within 8 miles of the viewpoint are included.

The visualizations (or the photosimulations) can be compared to answer different questions about how the visual condition might change. For instance, the primary question is the visual effect within 8 miles of the viewpoint of the proposed amendment compared to the approved project—compare visualizations d and h. However, if the reviewer is also interested in turbines beyond 8 miles, then compare visualizations a and g. If the reviewer is interested in the cumulative effects (i.e., in the context of the existing Bull Hill Project) of the approved project compared to the amended proposal, then the appropriate comparison would be visualizations f and j.

All 40 visualizations are included in Appendix B.

2.2.1 Computational note. The creation of visualizations uses data reasonably accurate data about the terrain elevation and turbine heights. However, it requires assumptions about what potentially screening land cover types to represent and what heights to assign them. The visualizations show tree heights at 40 and 60 feet, which may be higher, but is expected to be the same or lower than the actual canopy. The result is that the visualization are expected to have the same or slightly greater turbine visibility than will actually occur.

The situation is different for the creation of photosimulations using WindPRO to register a 3D model to the turbines to the photograph. WindPRO can draw the horizon line of the bare terrain, but the problem is that normally the bare terrain is not visible and its location must be approximated below the forest canopy. The imprecision of this process can lead to error of vertical or horizontal alignment, which has happened for the original submitted Narraguagus Lake photosimulation in the Bull Hill Wind VIA and the Shagg Pond photosimulation in the

Spruce Mountain Wind VIA. Since there errors, TJD&A has instituted additional quality control procedures.

These and related issues were discussed greater detail in the review of the approved Hancock Wind VIA (Palmer 2013a, 2013b).

3. Findings of the Review

3.1 Visibility Analysis

Appendix A includes maps of the visibility analyses for upright blade tips, the turbine hubs and the FAA warning lights as seen over bare terrain and over forest land cover for the approved project, proposed amendment and net difference between the two.

The VIAs prepared by TJD&A indicate only four SRSNS have potential visibility of the Hancock Wind Project: Lower and Middle Lead Mountain Pond, Upper Lead Mountain Pond, Narraguagus Lake and Tunk Mountain. There is little difference in the number of turbines visible from these SRSNS—though the area with visibility increases slightly, and more hubs will be visible. Table 3 summarizes my understanding of TJD&A’s analysis of the maximum number of turbines potentially visible above the forest screen, as described in the 2013 and 2014 VIAs.

It needs to be restated that the visibility maps in this review and in the VIAs prepared by TJD&A appear to include all turbines in the study area, which is defined as within 8 miles of any wind turbine. The results will show higher visibility from some viewpoints than if the Wind Energy Act’s threshold of only including turbines within 8 miles of the viewer was used.

Table 3. Summary of Turbine Visibility within 8 Miles of Scenic Resources of State and National Significance as Described by the Applicant[†]

Scenic Resources of State or National Significance in the Surrounding Area	Number of Turbines Visible over Forest Cover within 8 miles	
	Approved Project [†]	Proposed Amendment*
Great Ponds		
Lower Lead Mtn. Pond, T28	10 blades	4 hubs + 5 blades
Narraguagus Lake, T16 MD	6 hubs	6 hubs
Upper Lead Mtn. Pond, T28	3 blades	4 hubs
Public Reserved Lands		
Donnell Pond Unit	(same as Tunk Mtn.)	(same as Tunk Mtn.)
Coastal Scenic Resources		
Tunk Mountain	4 turbines	4 turbines

Notes: †Only SRSNS with potential visibility of Hancock Wind turbines are included in this table.

† Source: TJD&A (2013, pages 19-20, 33-34) * TJD&A (2014, page 3)

The visibility analysis conducted for this review can be used to provide a richer idea of how many turbines are potentially visible. The following tables show the cumulative percent of the SRSNS that have a view of *at least* the specified number of turbines seen over a 40-foot forest screen. It should be restated that a canopy height of 40 feet is employed because it is realistic, but

unlikely to exaggerate the screening effect of the forest. While the visibility of both turbine hubs and blade tips is shown, the discussion will focus on the visibility of turbine hubs, since this better represents the experience of scenic impacts.

3.1.1 Lower Lead Mountain Pond. Lower and Middle Lead Mountain Ponds are a single pond with a large island that gives it the appearance of two ponds (Giffen et al. 1987). Their total area is 597 acres. Table 4 reports the extent of visibility—there will likely not be any visibility of turbine hubs from 77 percent of the lake under the approved project, this will fall to 75 percent under the proposed amendment. At least one turbine hub is potentially visible on 23 percent of the lake under the approved project and 25 percent under the proposed amendment.

Table 4. Cumulative Percent of Turbine Hub and Blade Tip Visibility over a 40-foot Forest Screen for the Approved Project and Proposed Amendment from Lower Lead Mountain Pond.

Visible Turbines	Turbine Hubs		Blade Tips	
	Approved	Amendment	Approved	Amendment
None	77	75	70 69	
1	23	25	30 31	
2	21	22	28 29	
3	18	20	26 27	
4	15	17	24 24	
5	12	15	21 23	
6	10	14	20 22	
7	7	12	19 20	
8	4	8	18	18
9	1	4	15	16
10			13	14
11			10	12
12			7	9
13			5	6
14			3	5
15			2	3
16			1	2
17			0	
18		*	0	*

Notes: * The proposed amendment has only 17 turbines.

3.1.2 Upper Lead Mountain Pond. The total area of Upper Lead Mountain Ponds is 979 acres. Table 5 reports the extent of visibility—there will likely not be any visibility of turbine hubs from 94 percent of the lake under the approved project, this will fall to 85 percent under the proposed amendment. At least one turbine hub is potentially visible on 6 percent of the lake under the approved project and 15 percent under the proposed amendment.

Table 5. Cumulative Percent of Turbine Hub and Blade Tip Visibility over a 40-foot Forest Screen for the Approved Project and Proposed Amendment from Upper Lead Mountain Pond

Visible Turbines	Turbine Hubs		Blade Tips	
	Approved	Amendment	Approved	Amendment

None	94	85	65 56	
1	6	15	35 44	
2	1	9	29	37
3		4	23	31
4			12	20
5			5	10
6			2	7
7				4
8				1
9				
10				
11				
12				
13				
14				
15				
16				
17				
18		*		*

Notes: * The proposed amendment has only 17 turbines.

3.1.3 Narraguagus Lake. The total area of Narraguagus Lake is 480 acres. Table 6 reports the extent of visibility—there will likely not be any visibility of turbine hubs from 83 percent of the lake under the approved project, this will fall to 78 percent under the proposed amendment. At least one turbine hub is potentially visible on 17 percent of the lake under the approved project and 22 percent under the proposed amendment.

Table 6. Cumulative Percent of Turbine Hub and Blade Tip Visibility over a 40-foot Forest Screen for the Approved Project and Proposed Amendment from Narraguagus Lake

Visible Turbines	Turbine Hubs		Blade Tips	
	Approved	Amendment	Approved	Amendment
None	83	78	69 63	
1	17	22	31 37	
2	15	20	29 33	
3	13	18	27 31	
4	11	16	23 27	
5	8	14	22 25	
6	6	13	20 21	
7		10	19 18	
8		1	14 1	
9				
10				
11				
12				

Visible Turbines	Turbine Hubs		Blade Tips	
	Approved	Amendment	Approved	Amendment
13				
14				
15				
16				
17				
18		*		*

Notes: * The proposed amendment has only 17 turbines.

3.1.4 Donnell Pond Unit. The Tunk Mountain simulation viewpoint is partially within the Donnell Pond Unit, which is also a SRSNS. The total area of the Donnell Pond Unit that is within 8 miles of a Hancock Wind turbine is 2,588 acres. Table 7 reports the extent of visibility—there will likely not be any visibility of turbine hubs from 98 percent of that portion of the Donnell Pond Unit within 8 miles of either the approved project or proposed amendment. However, the remaining 2 percent of this area has a panoramic vista with visibility of all the existing Bull Hill and either the approved or amended Hancock wind turbines. This is the result that is shown in Table 7, however there are only 4 turbines that are within 8 miles of the points with visibility (e.g., Tunk Mountain).

Table 7. Cumulative Percent of Turbine Hub and Blade Tip Visibility over a 40-foot Forest Screen for the Approved Project and Proposed Amendment from Donnell Preserve.

Visible Turbines	Turbine Hubs		Blade Tips	
	Approved	Amendment	Approved	Amendment
None	98	98	98 98	
1	2	2	2 2	
2	2	2	2 2	
3	2	2	2 2	
4	2	2	2 2	
5	2	2	2 2	
6	2	2	2 2	
7	2	2	2 2	
8	2	2	2 2	
9	2	2	2 2	
10	2	2	2 2	
11	2	2	2 2	
12	2	2	2 2	
13	2	2	2 2	
14	2	2	2 2	
15	2	2	2 2	
16	2	2	2 2	
17	2	2	2 2	
18	2	*	2	*

Notes: * The proposed amendment has only 17 turbines.

3.1.5 Conclusions. Overall, the results reported in these tables and shown on the maps in Appendix A indicates that there will be a slight increase in the extent of the area with potential visibility, and in the number of turbines visible from any particular viewpoint. This is true, even though the proposed amendment removes the turbine closest to Spectacle Pond. The area with visibility of this turbine in the approved project is shown in maps 7a through 7d in Appendix A. While this was one of the more visible turbines, the benefit from its removal is more than counterbalanced by the increased height of the turbines in the proposed amendment.

3.2 Visual Simulation

TJD&A presents two photosimulation formats, one is a single frame image that has a 37.3 degree horizontal angle of view, and the other is a panorama composed of multiple frames stitched together that has an unknown angle of view. The angle of view is important, since it is used to determine the viewing distance for the photosimulation that shows the appropriate visual magnitude for the turbines. For the single frame photosimulations, the appropriate viewing distance of the 14.34 inch wide photosimulation is 21.2 inches (TJD&A 2014).

Single frame visualizations with a 40-degree horizontal angle of view were prepared to evaluate the scope and scale of the VIA photosimulations and to show the effect of including all the Hancock Wind turbines or only those within 8 miles of the viewpoint, to give an impression of the potential visual impact of the FAA warning lights, and provide some information about the cumulative visual impact of the Bull Hill and Hancock Wind Projects.

3.2.1 Lower Lead Mountain Pond

It appears that only three Bull Hill blade tips are visible in the VIA photograph of the existing conditions shows. The existing condition in visualization 1a shows perhaps five Bull Hill turbine hubs and perhaps eight blade tips just visible above the tree line. This illustrates the sensitivity of the analysis; particularly when objects that are so far way and the height of the near-by screening tree line is only approximately known. The Bull Hill turbines are beyond 8 miles from this viewpoint and are not represented in visualization 1b.

The VIA reports that there is the potential to see 10 blade tips from the approved project on this SRSNS, though I can only identify four in the photosimulation—no hubs are shown. Visualizations 1c and 1d show two hubs just above the tree line and eight addition blade tips. Again, this may be due to under representing the tree line height.

The VIA reports that the photosimulation of the proposed amendment has the potential to show four hubs and five blade tips, though the simulation clearly shows only five blade tips, and no hubs. Visualization 1g and 1h show two hubs clearly above and three or four right at the tree line, plus three or four blade tips. And again, this may be due to under representing the tree line height.

The difference between the photosimulations and visualizations appears to ride on the correct height of the tree line on the far side of the lake. The visualization appears to systematically overestimate the visibility of the existing Bull Hill as well as the Hancock turbines, most likely because it underestimates the height of this tree line. Taking this situation into account, it appears that the visualizations generally support the accuracy of the photosimulations' scope and scale.

3.2.2 Upper Lead Mountain Pond

The existing condition photograph in the VIA and visualizations 2a and 2b indicate that the Bull Hill turbines will not be visible from this viewpoint.

The VIA reports that up to 3 blade tips from the approved project are potentially visible on this SRSNS. The photosimulation of the approved project clearly shows two blade tips, and possibly a third largely obscured by a tree top. Visualizations 2c and 2d show three blade tips.

The VIA reports that up to 4 hubs are potentially visible from the proposed amendment; the photosimulation more clearly shows the same three turbine blades visible from this viewpoint for the proposed amendment. Visualizations 2g and 2h show one hub just above the tree line and three blades.

The visualizations support the general accuracy of the photosimulations' scope and scale from this viewpoint.

3.2.3 Narraguagus Lake

The existing photograph in the VIA shows six or seven Bull Hill turbines sufficiently above the tree line that most of a downward blade will be visible; portions of three or four additional turbines are also visible. The existing conditions in visualization 2a and 2b is very consistent with the photograph. The major difference is that there are emergent trees along the near-by shoreline that partially obscure the turbines, but are not accounted for in the generalized tree line shown in the visualizations. The Bull Hill turbines have a significant visual presence from this viewpoint that is greater than any view from a SRSNS of the Hancock Wind turbines.

The VIA reports that after evaluating the visibility analysis and creation of the photosimulations, it appears that up to six turbines from the approved project within 8 miles of this viewpoint may be visible. The photosimulation shows six turbine hubs plus two blade tips—8 turbines in total, two of which apparently are beyond 8 miles from the viewpoint. Visualizations 3c and 3d show only five blade tips.

The VIA reports that up to six turbine hubs from the proposed amendment may be visible; the same turbines as reported for the approved project. The photosimulations clearly shows seven turbine hubs well above the tree line, plus one blade tip. Visualization 3g shows two hubs right on the tree line, plus five more blade tips. Visualization 3h shows only two hubs and two blade tips are visible for turbines within 8 miles of the viewpoint. Again, it appears that the photosimulation is representing turbines beyond 8 miles from the viewpoint.

The photosimulations are representing turbines further than 8 miles from the viewpoint. Nonetheless, the general scope and scale of the photosimulation is supported by the visualizations.

3.2.4 Donnell Pond Unit

The existing photograph shows all 19 of the Bull Hill turbines down to near ground level. The two turbines on the left are difficult to see because they are in a cloud's shadow, illustrating one

of the difficulties in taking simulation photography. Visualizations 4a and 4b also show that all of the Bull Hill turbines are visible from this viewpoint.

Unless one carefully scrutinizes the simulations, there is no discernable difference between the appearance of the approved project and the proposed amendment as seen from Tunk Mountain. All the Hancock Wind turbines will be visible and are shown in the photosimulations, though only four are within 8 miles of Tunk Mountain or any location in the Donnell Pond Unit. One might easily miss that the eastern most turbine of the approved project is not present in the proposed amendment. Visualizations 4c, 4d, 4g and 4h are similar to the photosimulations.

The visualizations support the accuracy of the scope and scale of the photosimulations.

3.2.5 Conclusions

Overall the visualizations support the accuracy of the scope and scale of the photosimulations. The visual differences between the approved project and the proposed amendment are slight, but present. The most significant change is that turbine hubs will rise above the tree line in several instances. However, this is partially balanced by the removal of one of the approved project's more visible turbines sites from the proposed amendment.

4. Conclusions

The overall visual change from the approved project to the proposed amendment is visible, but slight. However, the close comparison of the photosimulations or visualizations for the approved project and proposed amendment may lead a reviewer to exaggerate their importance, while the experience of a user of the SRSNSs would likely not be affected in any significant way.

This review did uncover a lack of clarity in how to address two issues that may become important in future projects: (1) when to include particular turbines in the analysis, and (2) how to address cumulative visual impacts.

4.1 When to Include Particular Turbines

The Wind Energy Act states that “the primary siting authority shall consider insignificant 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.”² It has sometimes occurred that all of the turbines are included in either the visibility analysis or the photosimulations for locations within the project study area (i.e., within 8 miles of any turbine). This appears to be the case in the VIA prepared by TJD&A (2013, 2014) and the reviews prepared by Palmer (2013, Appendix A of this review). For instance, look at Map 2 Viewshed Topography. At the 8 mile edge there are several places where 16 to 18 turbines potentially visible (i.e., the red areas) when clearly there are not 16 turbines within 8 miles of anywhere along the edge. Similarly, the photosimulations appear to include turbines that are greater than 8 miles from the viewpoint (e.g., Narraguagus and Tunk Mountain), even though the text points out that this is so.

² 35-A MRSA, § 3452, §§ 3

In preparing the visualizations for this review, I have presented both interpretations—all of the visible turbines and only those within 8 miles of the viewpoint. The difference should be apparent, and it would seem appropriate for DEP to provide guidance to others how to proceed when preparing or reviewing VIAs.

4.2 How to Address Cumulative Visual Impacts

Cumulative visual impacts clearly are a public concern, though they are not explicitly address by the Wind Energy Act. The various issues and possible approached to addressing them were reviewed by the Cumulative Visual Impact Study Group (2012). As the density of wind energy development in Maine increases, it is to be expected that concern over cumulative impacts will arise more frequently. It also seems appropriate for DEP to provide guidance to others on how to report possible cumulative impacts, and perhaps how their significance is to be evaluated.

4.3 Monitoring is Required to Validate the Photosimulation Process

While the creation of photosimulations is conceptually a straightforward process, it requires significant technical knowledge and craftsmanship to perform. However, it does require some assumptions that can affect the appearance of the simulations, as well as the potential to make various types of errors. There are now a sufficient number of wind projects that have been constructed in Maine that it would be constructive to monitor the validity of the VIA photosimulations by systematically comparing them to the corresponding view of the built projects.

A monitoring study might be one component of a larger DEP effort to prepare guidance in the preparation, review and interpretation of the visual simulations used to evaluate wind energy projects.

5. References

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Appendix 1

Visibility Maps

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 Hancock 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 1a: Terrain Viewshed for Blade Tips: Siemens 3.0-113

Map 1b: Terrain Viewshed for Blade Tips: Vestas V117 3.3

Map 1c: Terrain Viewshed for Blade Tips: Change in Visibility

Map 2a: Terrain Viewshed for Turbine Hubs: Siemens 3.0-113

Map 2b: Terrain Viewshed for Turbine Hubs: Vestas V117 3.3

Map 2c: Terrain Viewshed for Turbine Hubs: Change in Visibility

Map 3a: Terrain Viewshed for FAA Warning Lights: Siemens 3.0-113

Map 3b: Terrain Viewshed for FAA Warning Lights: Vestas V117 3.3

Map 3c: Terrain Viewshed for FAA Warning Lights: Change in Visibility

Map 4a: Forested Viewshed for Blade Tips: Siemens 3.0-113

Map 4b: Forested Viewshed for Blade Tips: Vestas V117 3.3

Map 4c: Forested Viewshed for Blade Tips: Change in Visibility

Map 5a: Forested Viewshed for Turbine Hubs: Siemens 3.0-113

Map 5b: Forested Viewshed for Turbine Hubs: Vestas V117 3.3

Map 5c: Forested Viewshed for Turbine Hubs: Change in Visibility

Map 6a: Forested Viewshed for FAA Warning Lights: Siemens 3.0-113

Map 6b: Forested Viewshed for FAA Warning Lights: Vestas V117 3.3

Map 6c: Forested Viewshed for FAA Warning Lights: Change in Visibility

Map 7a: Terrain Viewshed for Blade Tips: Location H05

Map 7b: Terrain Viewshed for Turbine Hubs: Location H05

Map 7c: Forested Viewshed for Blade Tips: Location H05

Map 7d: Forested Viewshed for Turbine Hubs: Location H05

Simulation Viewpoints Map

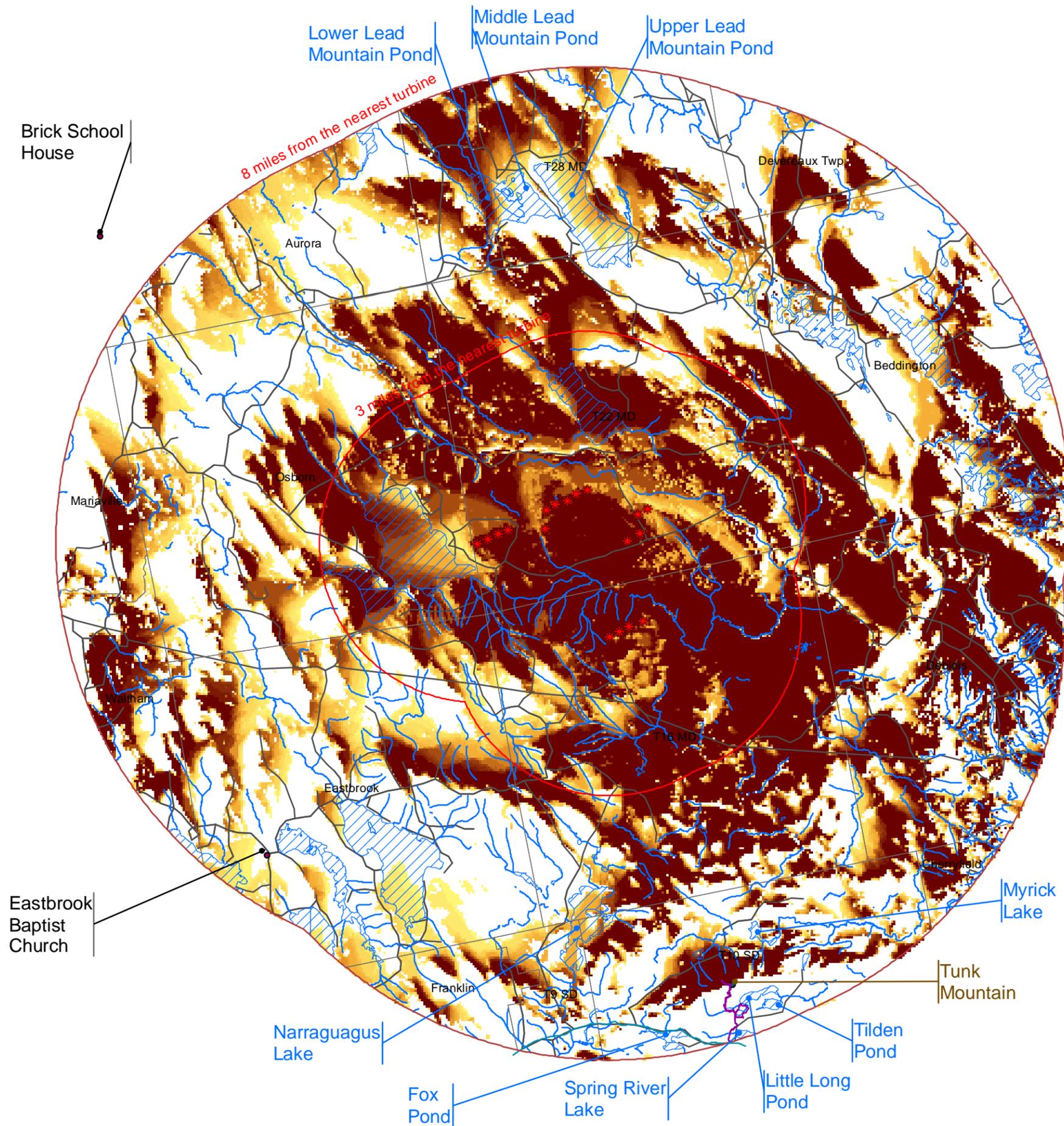
This map shows the Hancock Wind and Bull Hill Wind turbines within 8 miles of the four viewpoints used for the photosimulations in the VIA (TJD&A 2013, 2014) and for this review's visualizations.

Map 8: Hancock Wind Simulation Viewpoints

Map 1a Terrain Viewshed for Blade Tips

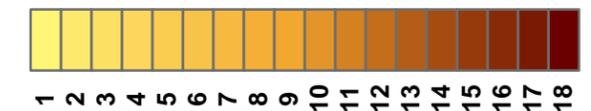
Hancock Wind Project: Siemens 3.0-113

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.



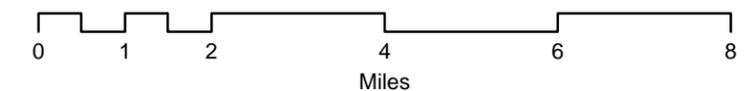
Legend

Turbines



Scenic Resources of State or National Significance

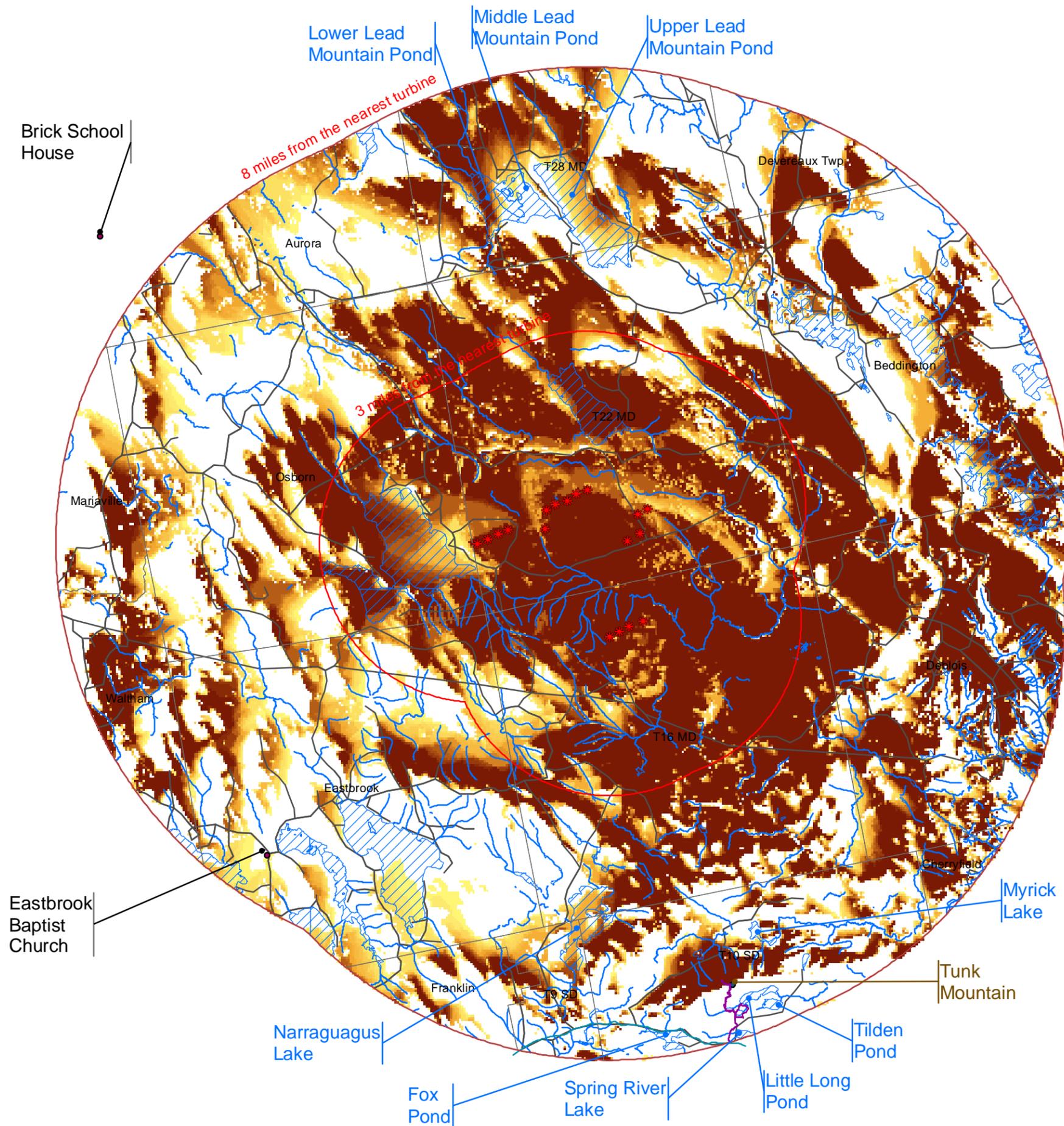
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 1b Terrain Viewshed for Blade Tips

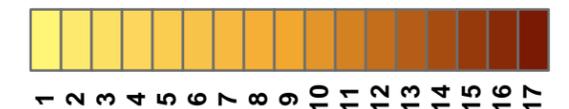
Hancock Wind Project: Vestas V117 -- 3.3 MW

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.



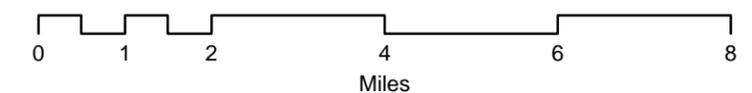
Legend

Turbines



Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 1c Terrain Viewsheds for Blade Tips

Hancock Wind Project: Change in Visibility

This map show the change in the number of turbines that will be visible if the amendment approved.

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.

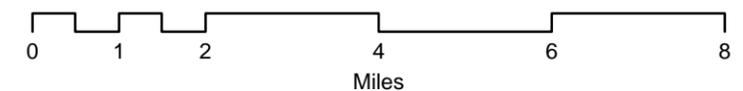
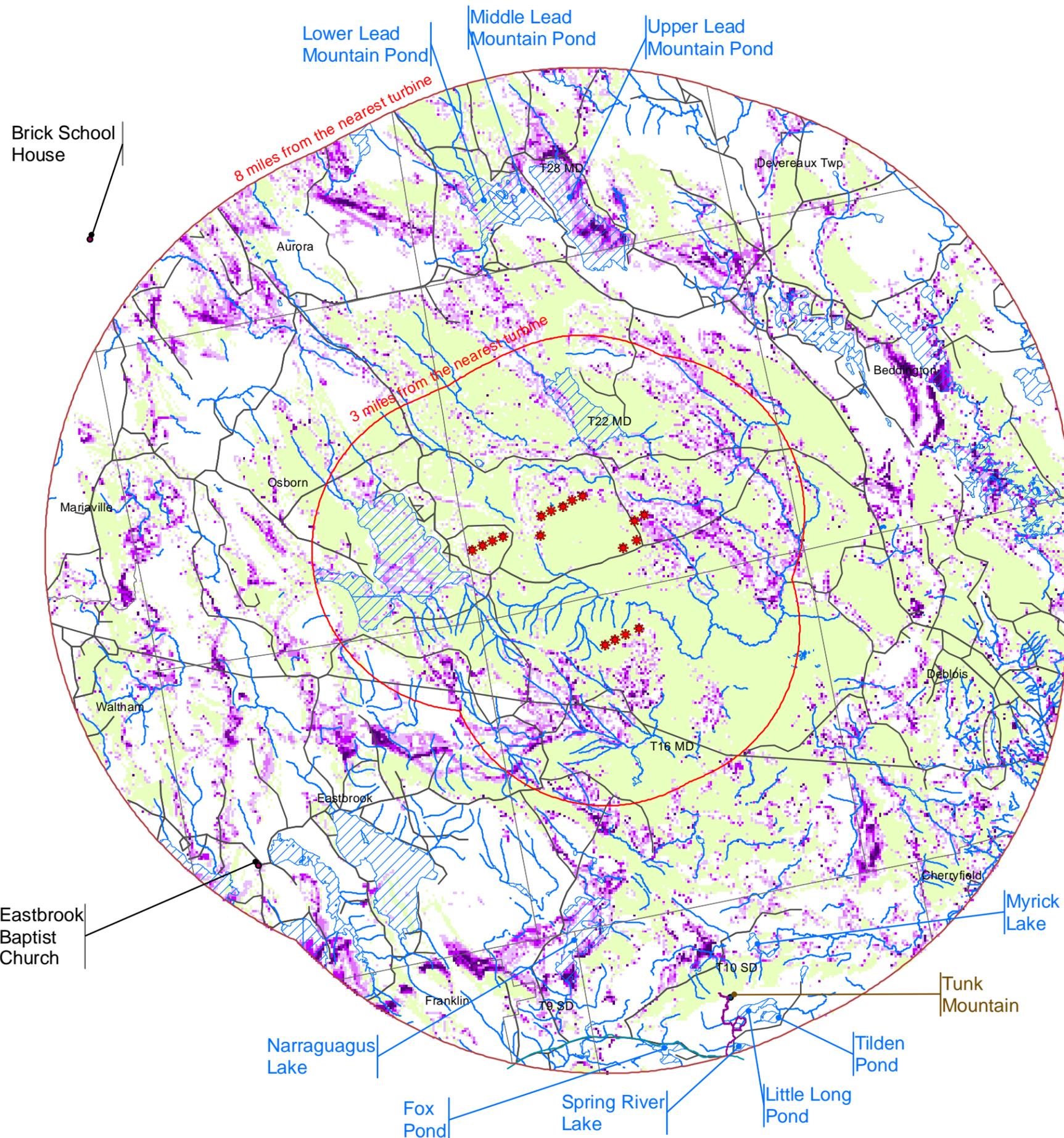
Legend

Turbines

	At least 1 fewer		2 more
	Same number		3 more
	1 more		4 more
			At least 5 more

Scenic Resources of State or National Significance

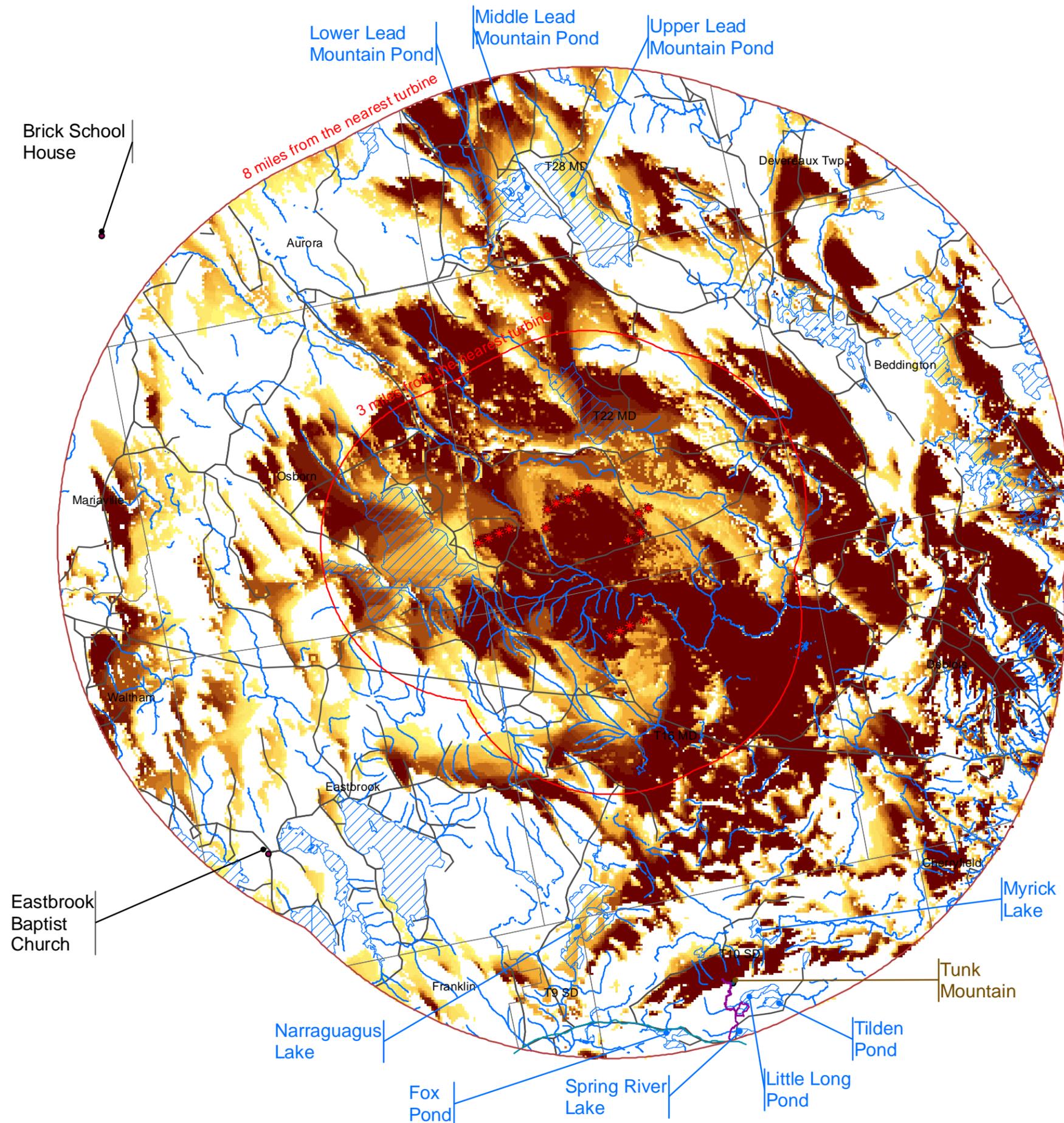
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 2a Terrain Viewshed for Turbine Hubs

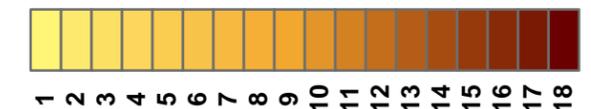
Hancock Wind Project: Siemens 3.0-113

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.



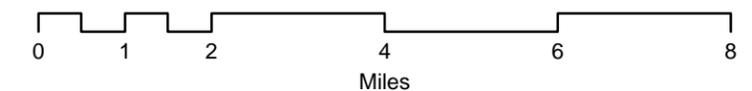
Legend

Turbines



Scenic Resources of State or National Significance

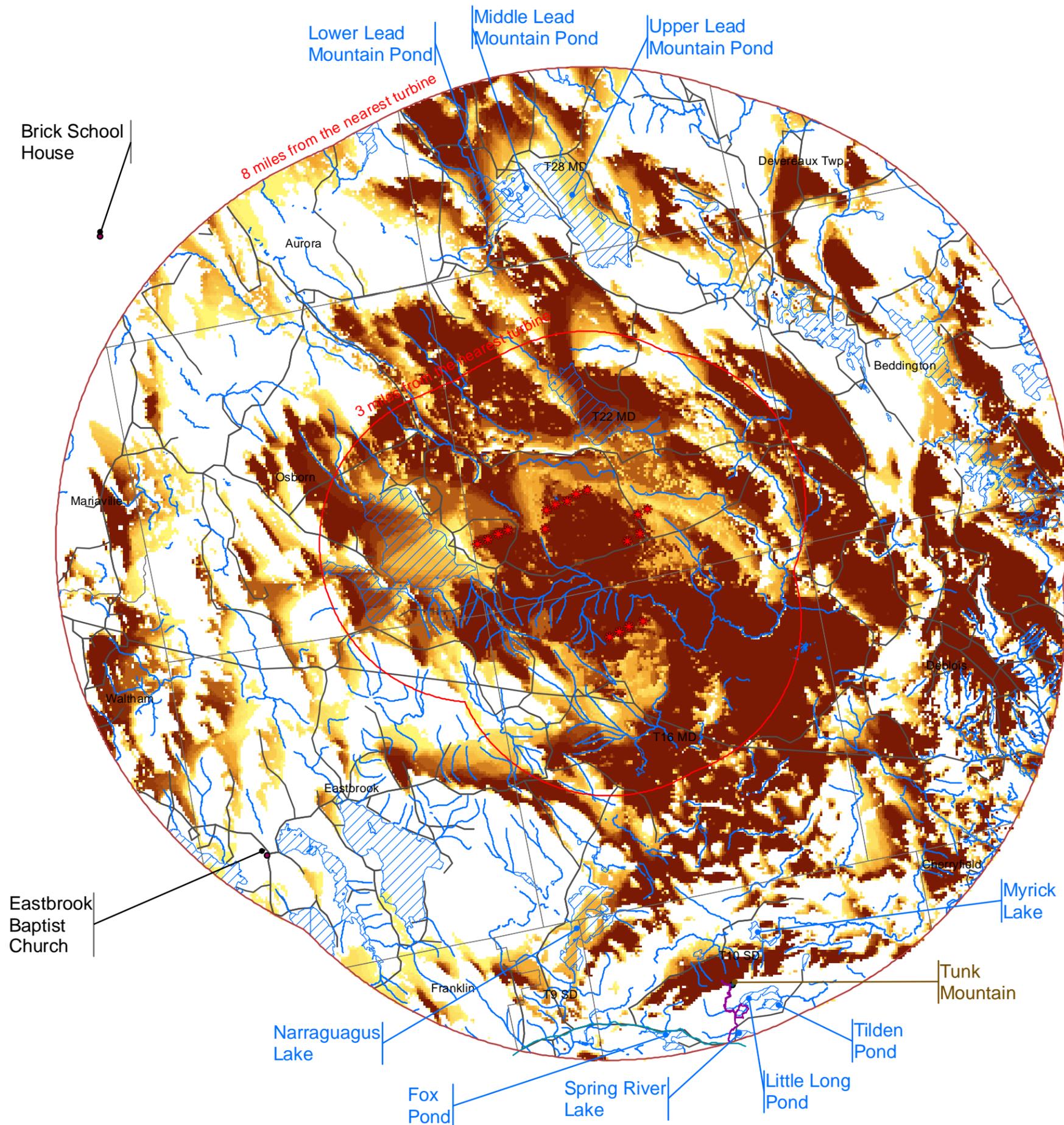
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 2b Terrain Viewshed for Turbine Hubs

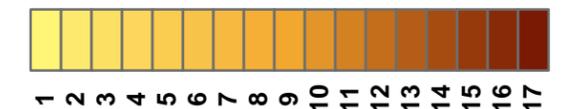
Hancock Wind Project: Vestas V117 -- 3.3 MW

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.



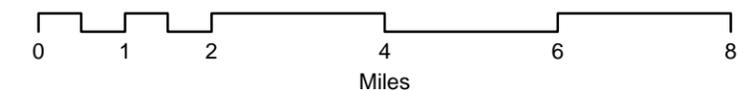
Legend

Turbines



Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 2c Terrain Viewsheds for Turbine Hubs

Hancock Wind Project: Change in Visibility

This map show the change in the number of turbines that will be visible if the amendment approved.

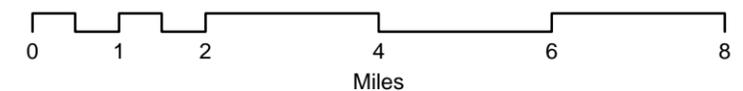
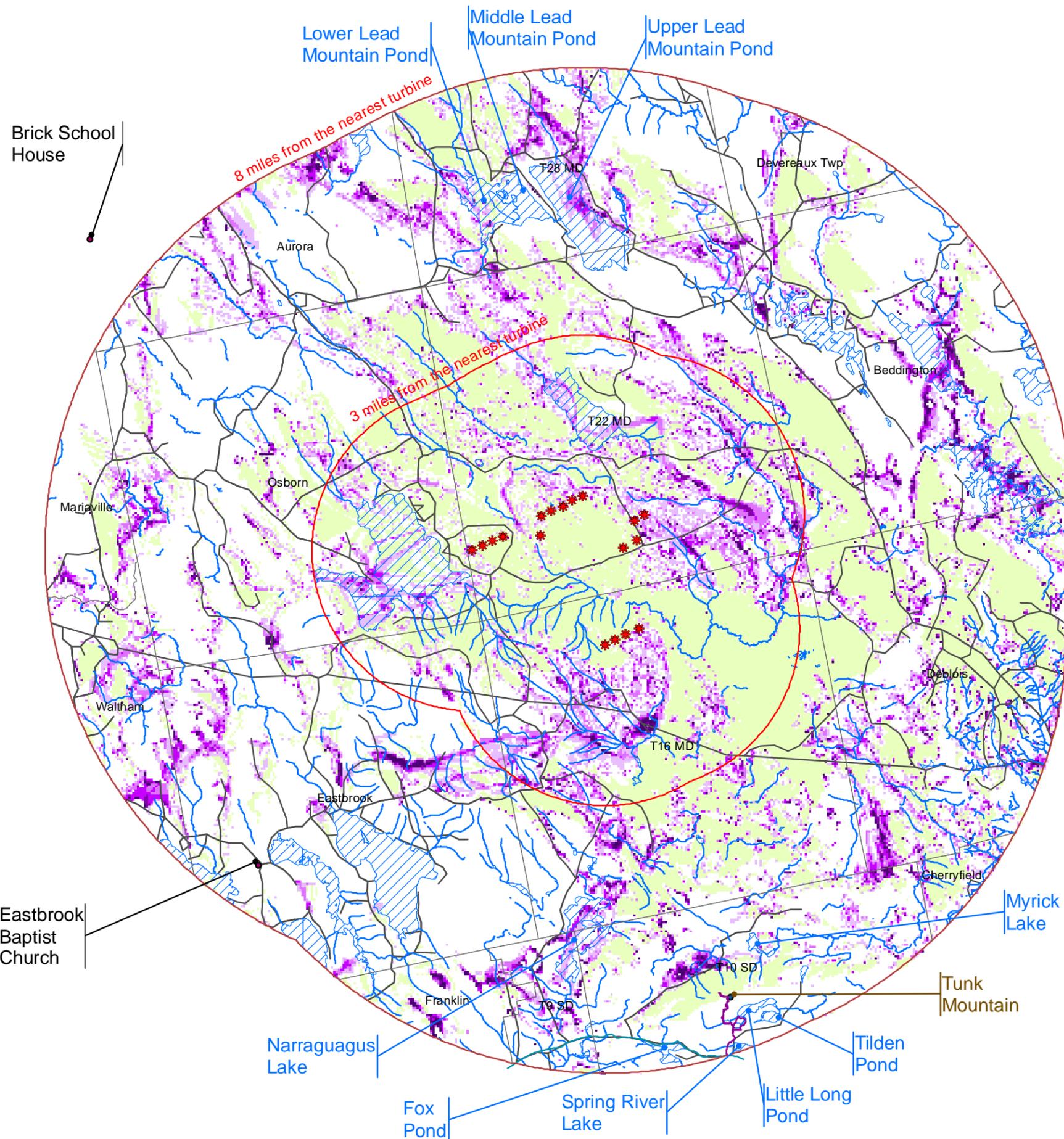
GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation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

Legend

Turbines	 2 more
 At least 1 fewer	 3 more
 Same number	 4 more
 1 more	 At least 5 more

Scenic Resources of State or National Significance

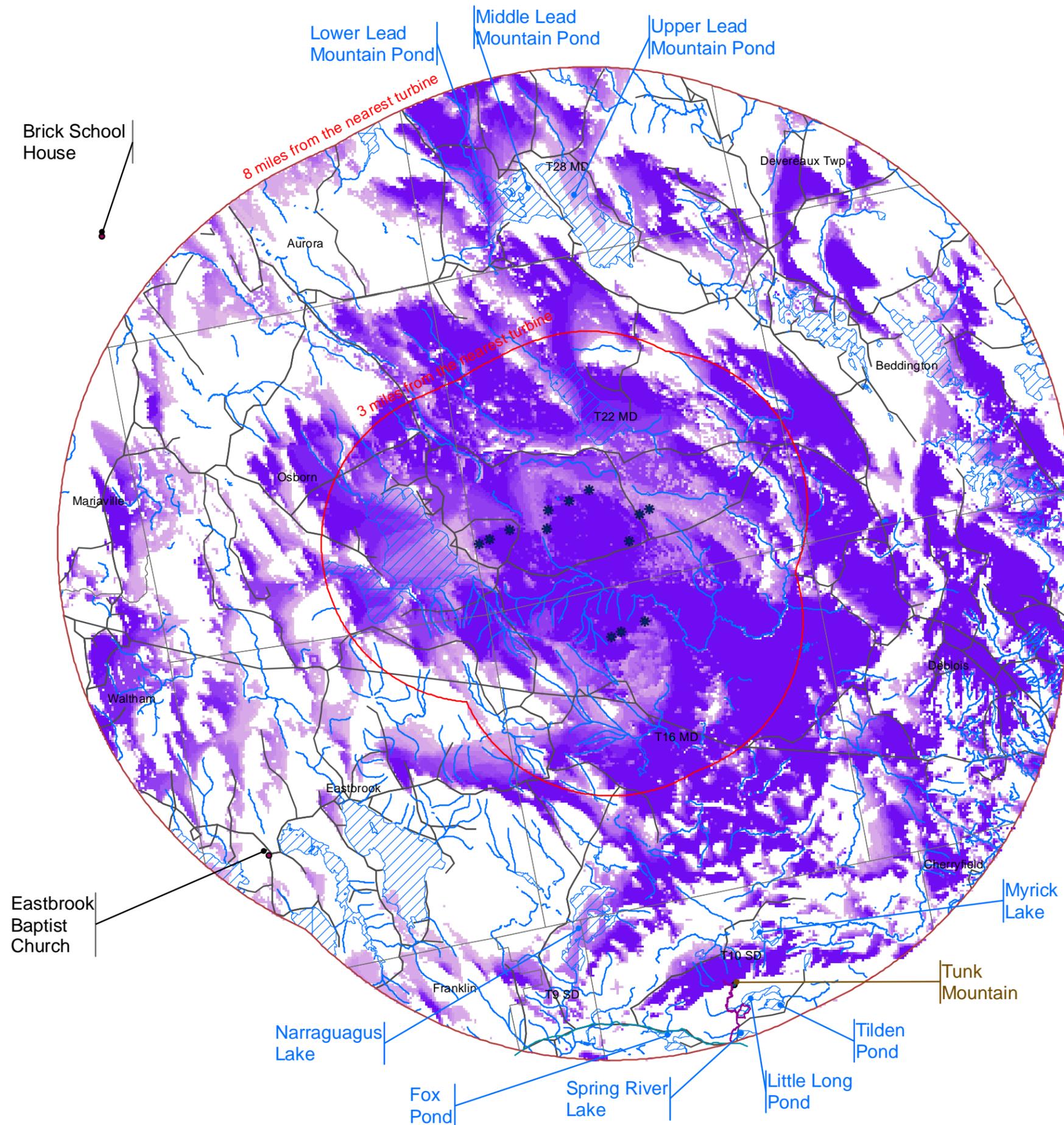
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 3a Terrain Viewshed for FAA Warning Lights

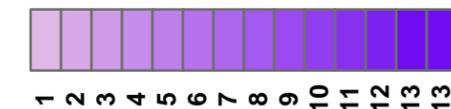
Hancock Wind Project: Siemens 3.0-113

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.



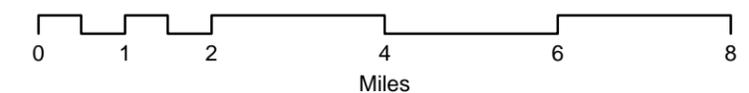
Legend

Turbines



Scenic Resources of State or National Significance

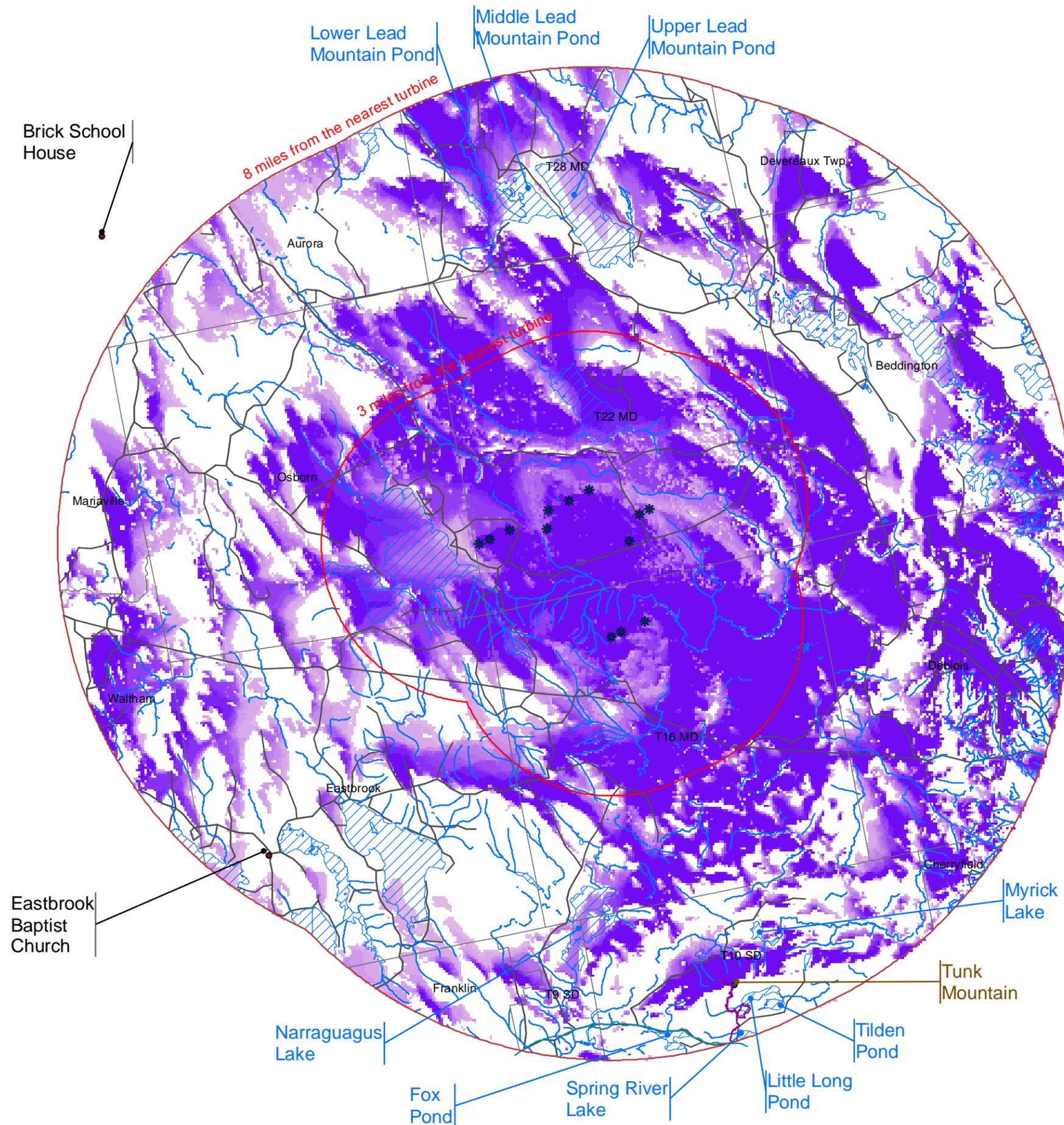
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 3b Terrain Viewshed for FAA Warning Lights

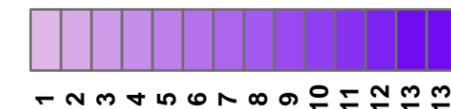
Hancock Wind Project: Vestas V117 -- 3.3 MW

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.



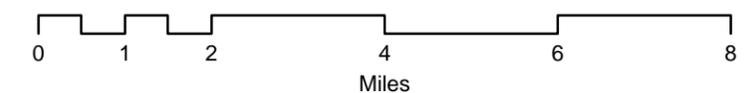
Legend

Turbines



Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint

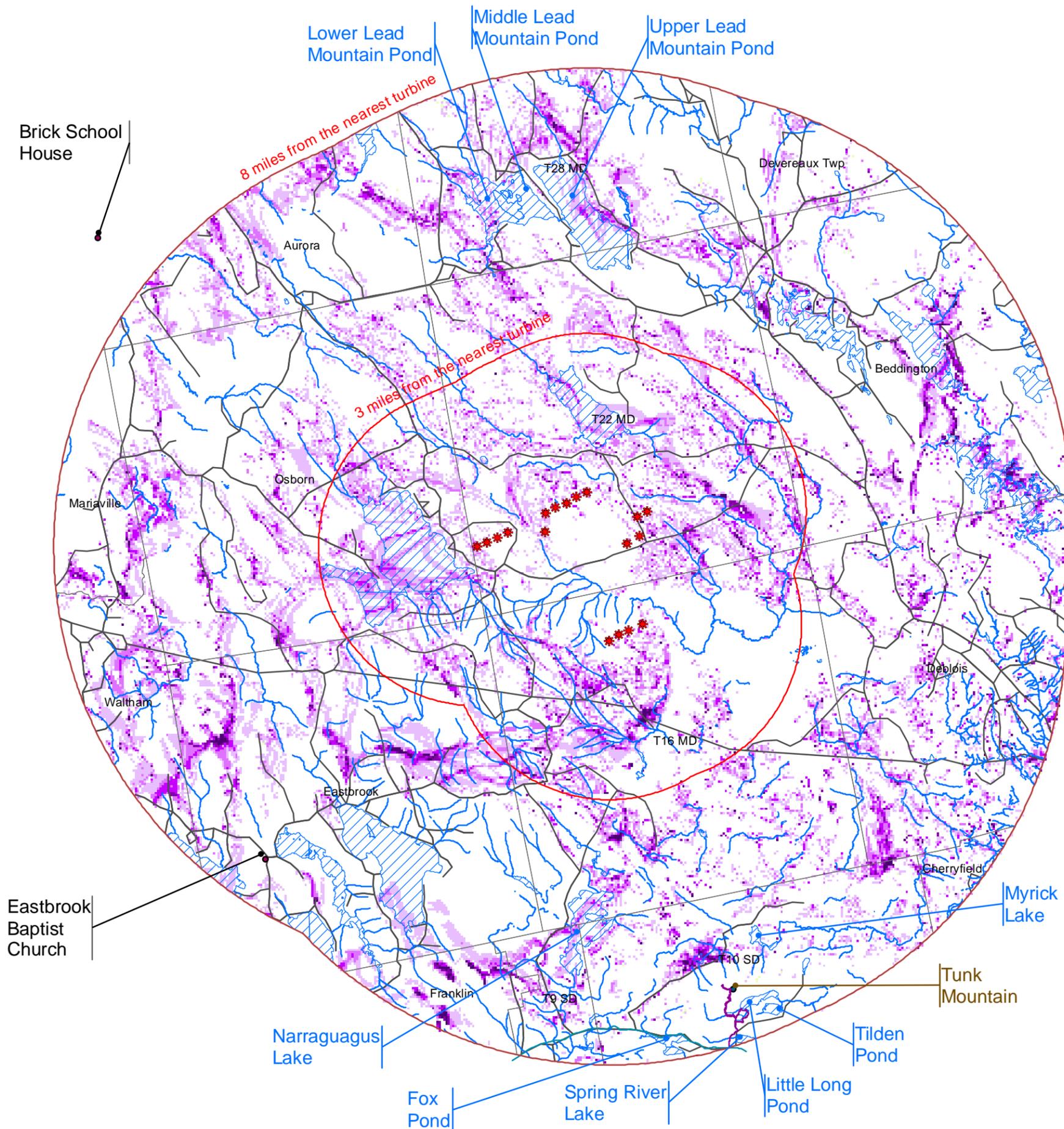


Map 3c Terrain Viewsheds for FAA Warning Lights

Hancock Wind Project: Change in Visibility

This map show the change in the number of turbines that will be visible if the amendment approved.

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.

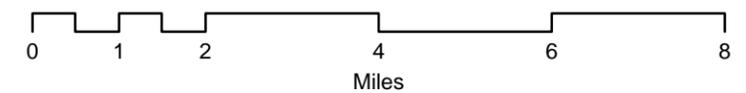


Legend

Turbines	 2 more
 At least 1 fewer	 3 more
 Same number	 4 more
 1 more	 At least 5 more

Scenic Resources of State or National Significance

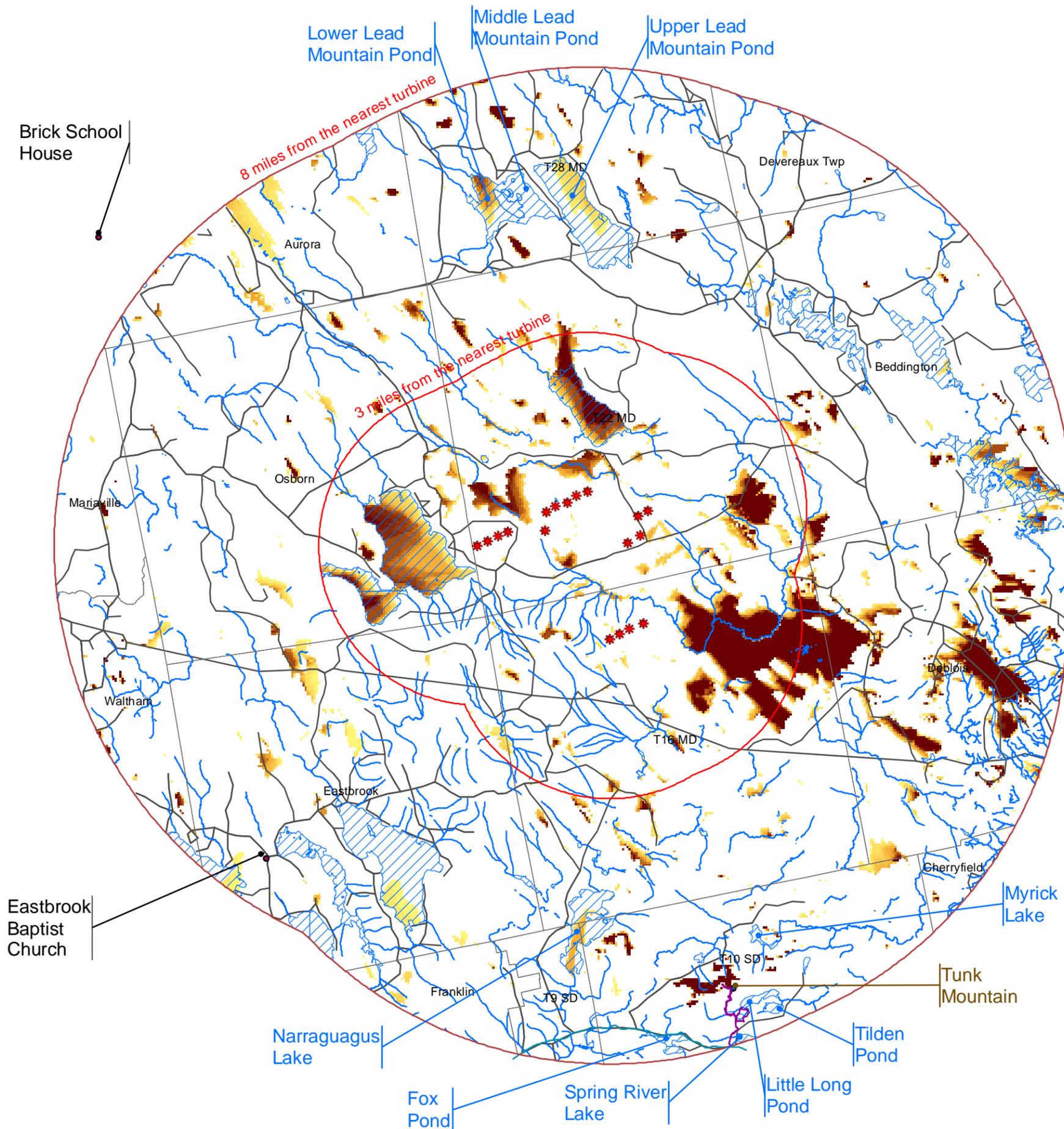
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 4a Forested Viewshed for Blade Tips

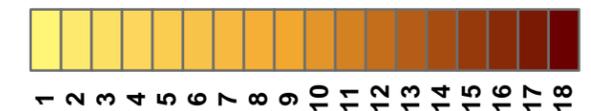
Hancock Wind Project: Siemens 3.0-113

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.



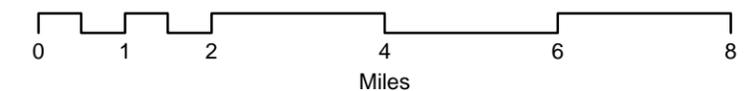
Legend

Turbines



Scenic Resources of State or National Significance

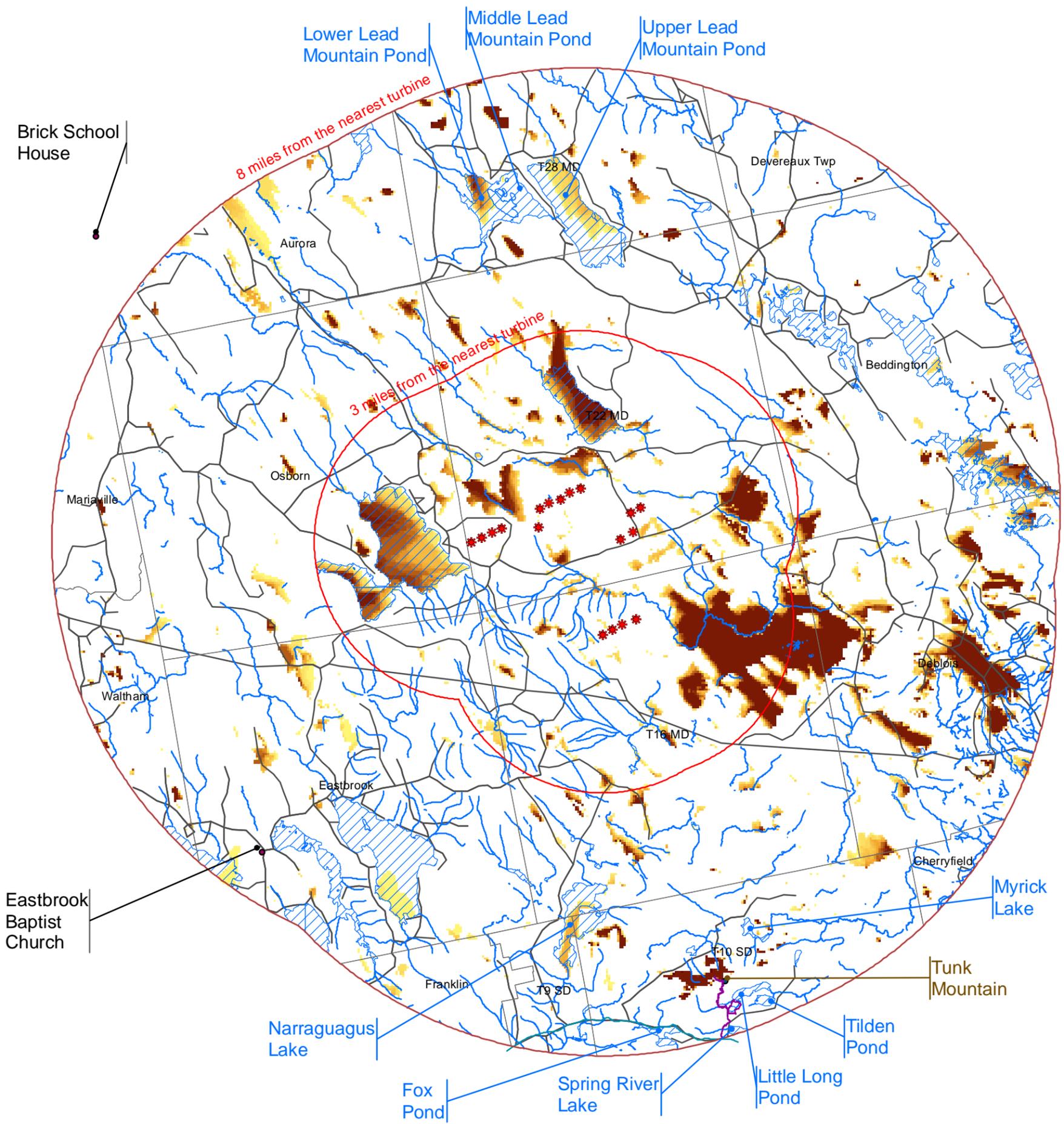
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 4b Forested Viewshed for Blade Tips

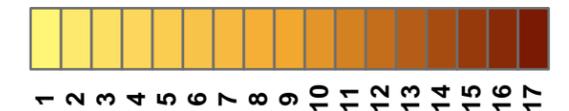
Hancock Wind Project: Vestas V117 -- 3.3 MW

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.



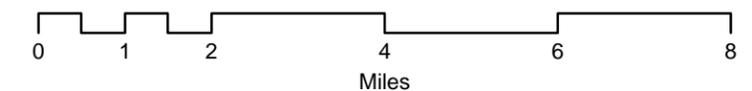
Legend

Turbines



Scenic Resources of State or National Significance

- Great Ponds
- National Register of Historic Places
- Coastal Scenic Viewpoint



Map 4c Forested Viewsheds for Blade Tips

Hancock Wind Project: Change in Visibility

This map show the change in the number of turbines that will be visible if the amendment approved.

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.

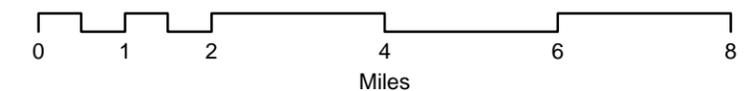
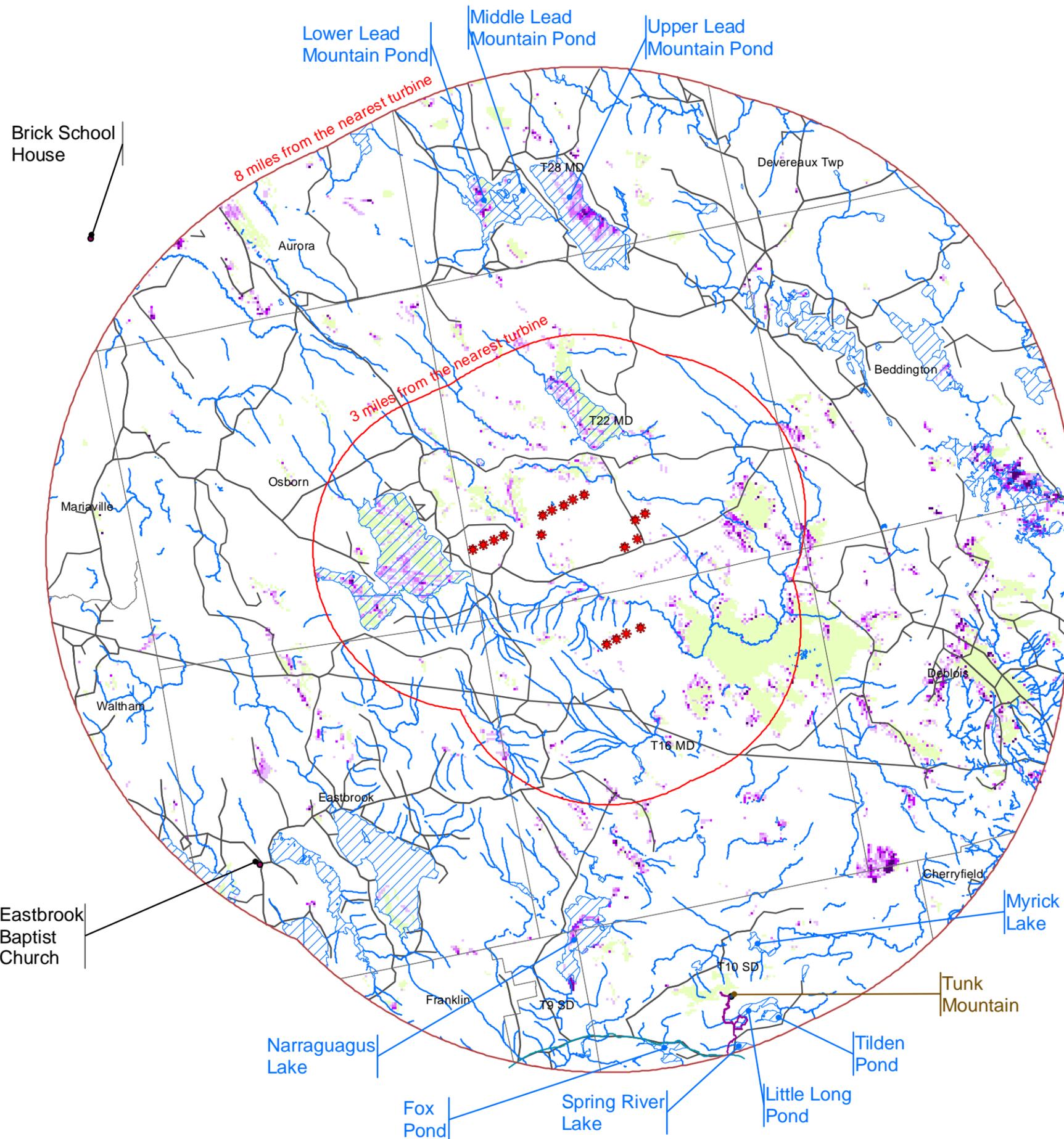
Legend

Turbines

	At least 1 fewer		2 more
	Same number		3 more
	1 more		4 more
			At least 5 more

Scenic Resources of State or National Significance

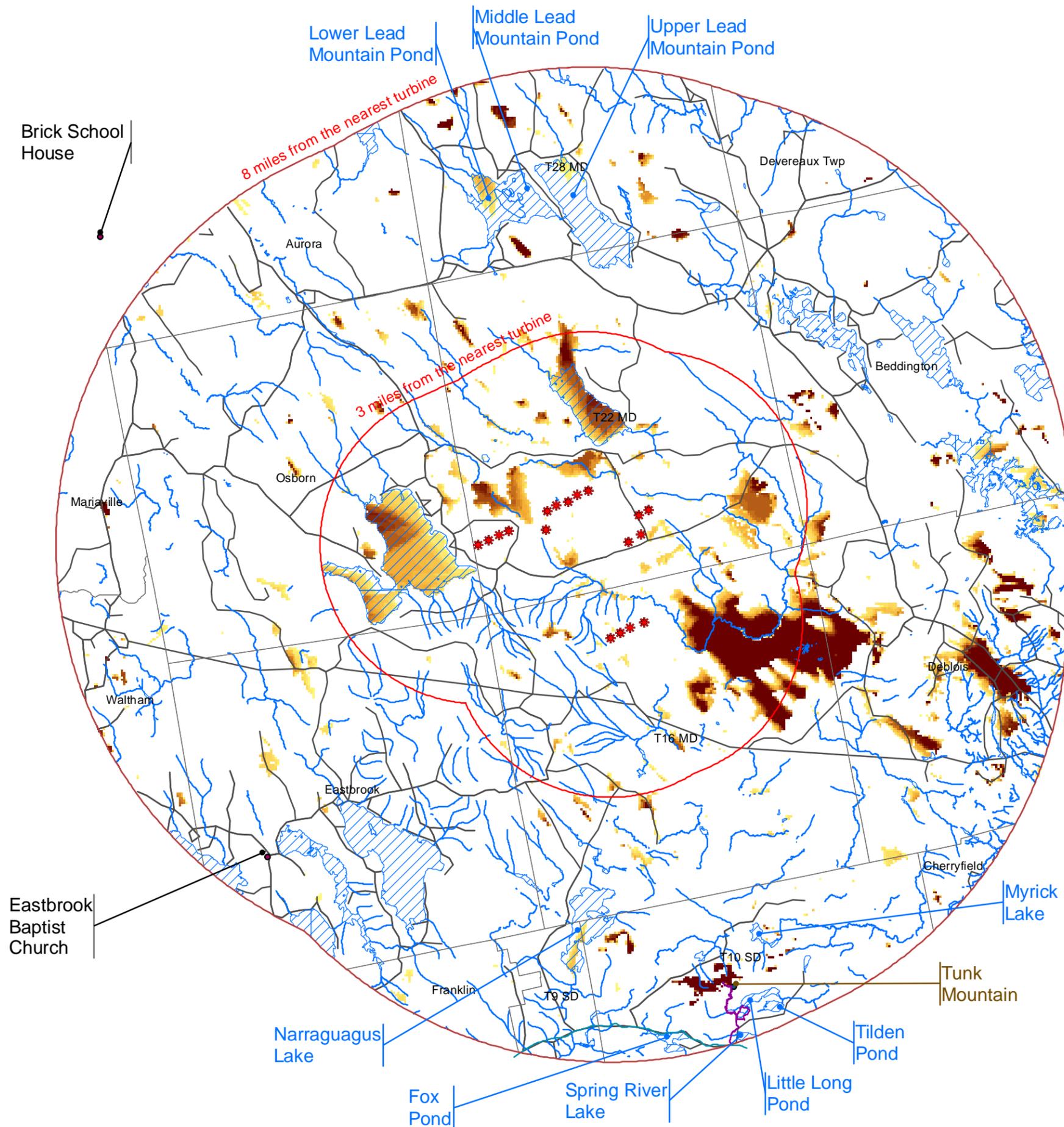
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 5a Forested Viewshed for Turbine Hubs

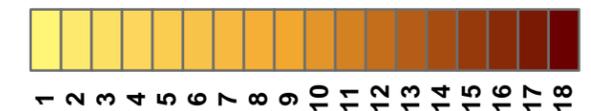
Hancock Wind Project: Siemens 3.0-113

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.



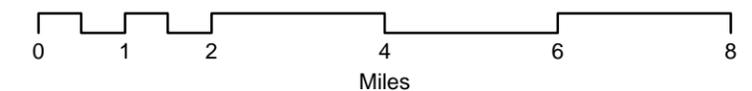
Legend

Turbines



Scenic Resources of State or National Significance

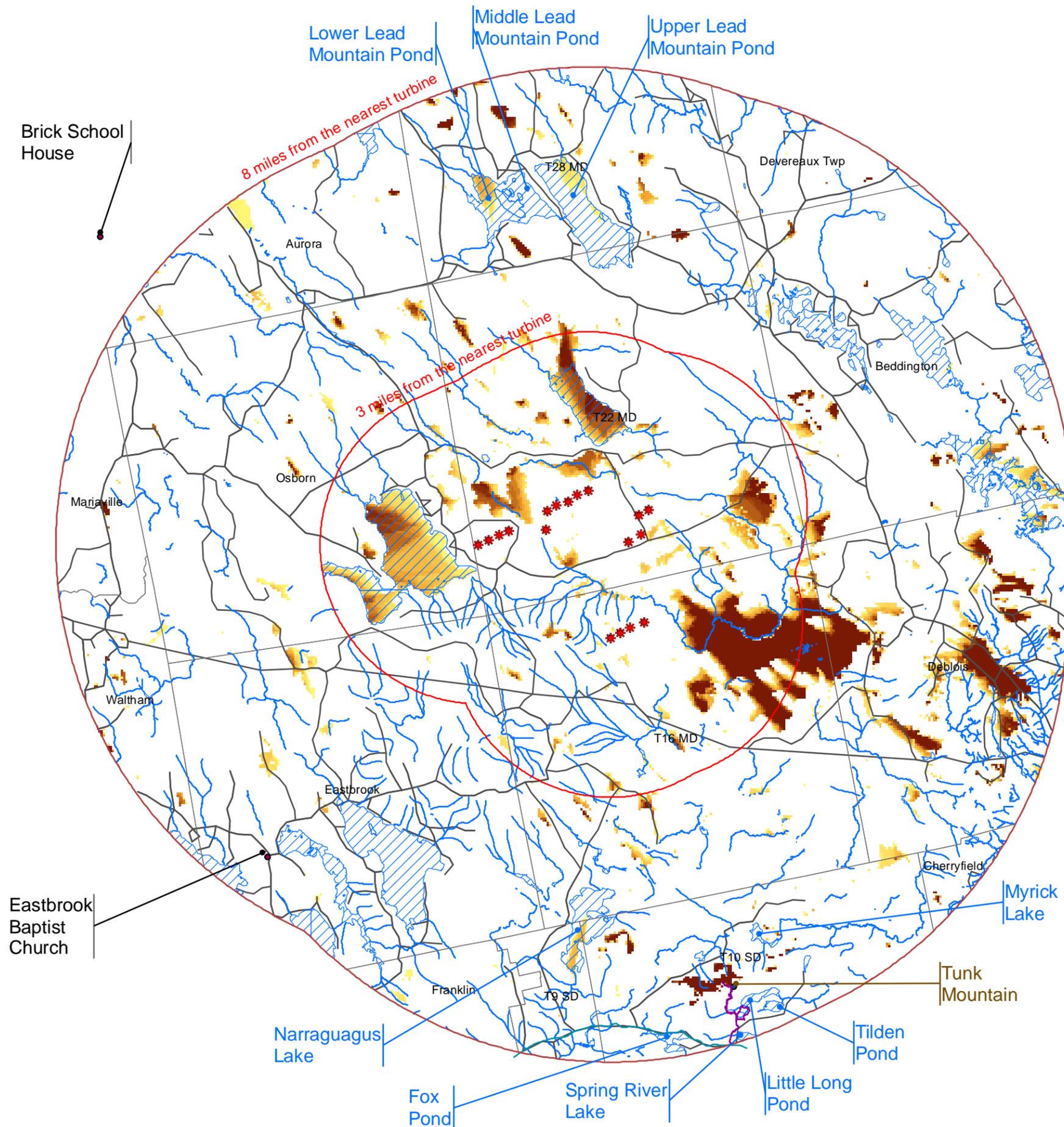
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 5b Forested Viewshed for Turbine Hubs

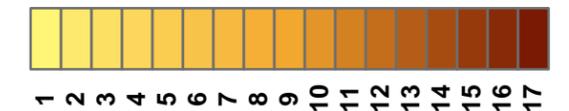
Hancock Wind Project: Vestas V117 -- 3.3 MW

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.



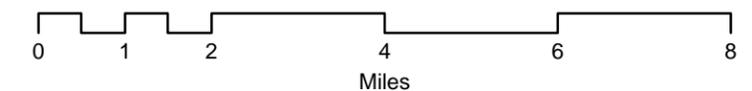
Legend

Turbines



Scenic Resources of State or National Significance

- Great Ponds
- National Register of Historic Places
- Coastal Scenic Viewpoint



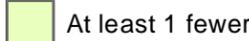
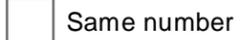
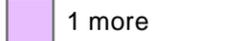
Map 5c Forested Viewsheds for Turbine Hubs

Hancock Wind Project: Change in Visibility

This map show the change in the number of turbines that will be visible if the amendment approved.

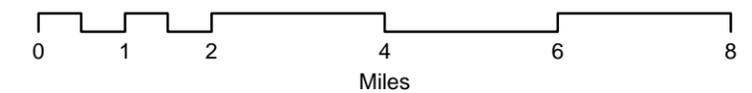
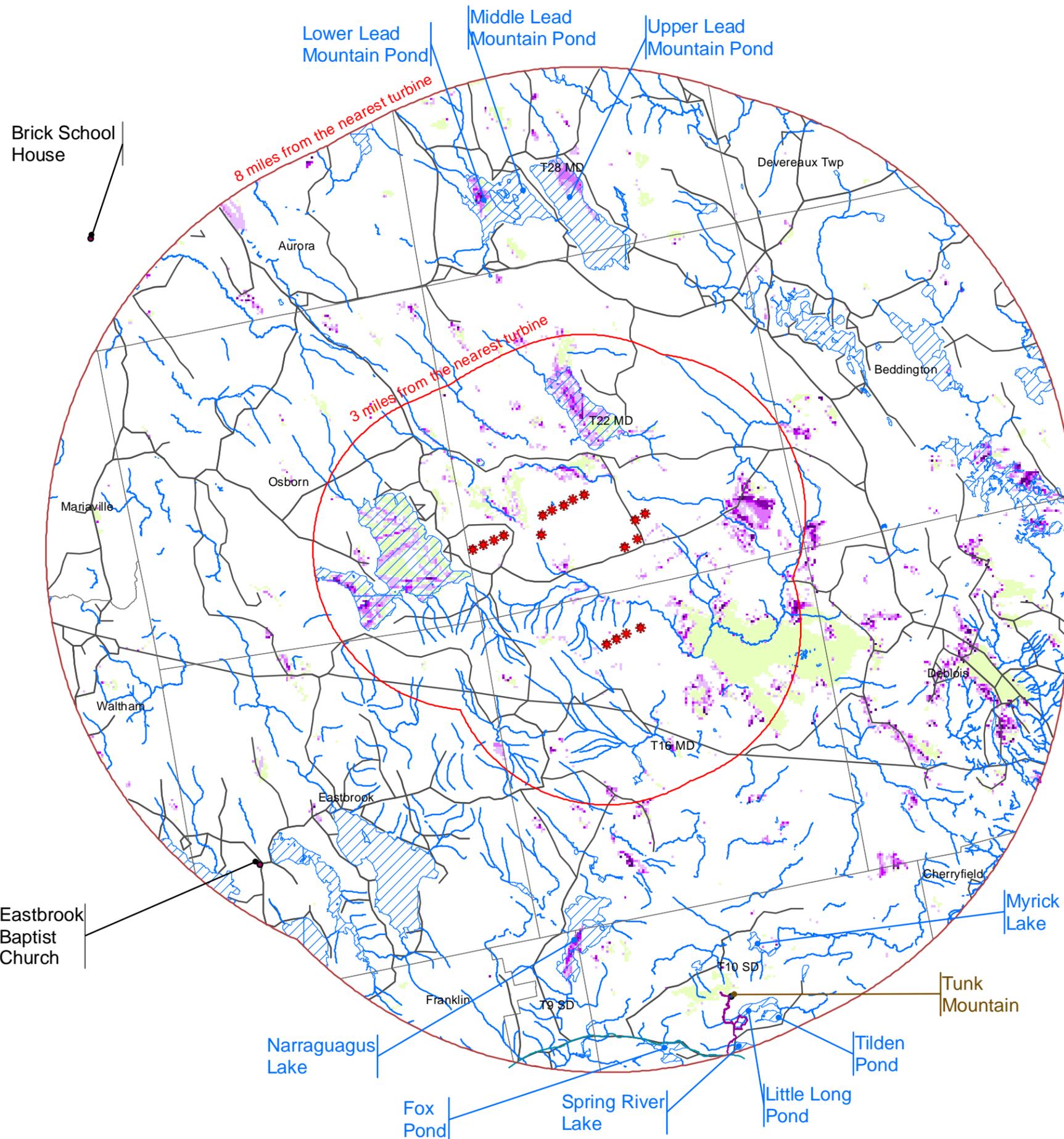
GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation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

Legend

Turbines	 2 more
 At least 1 fewer	 3 more
 Same number	 4 more
 1 more	 At least 5 more

Scenic Resources of State or National Significance

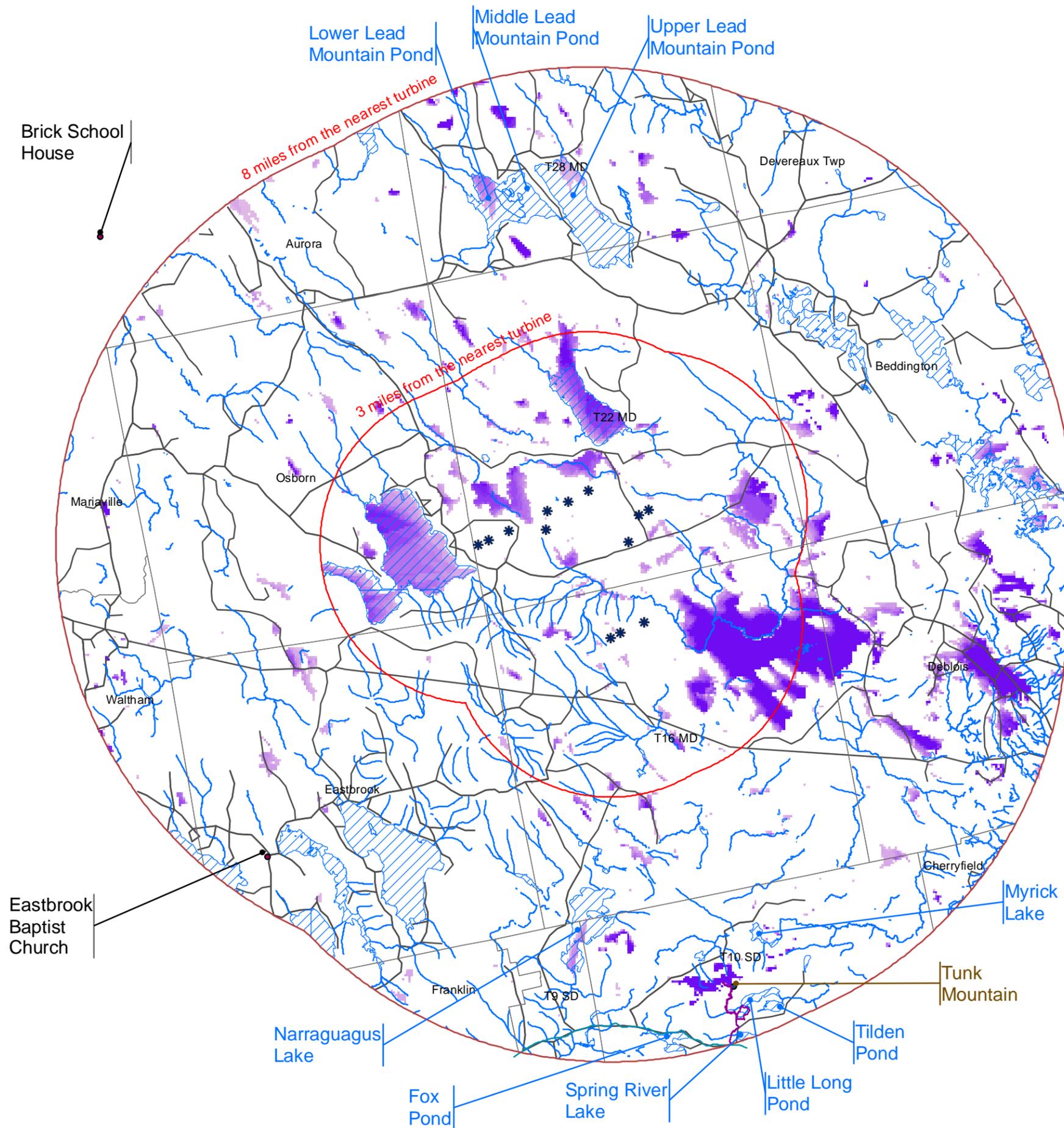
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 6a Forested Viewshed for FAA Warning Lights

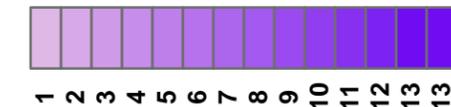
Hancock Wind Project: Siemens 3.0-113

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.



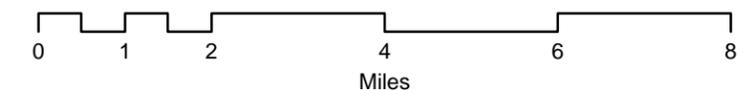
Legend

Turbines



Scenic Resources of State or National Significance

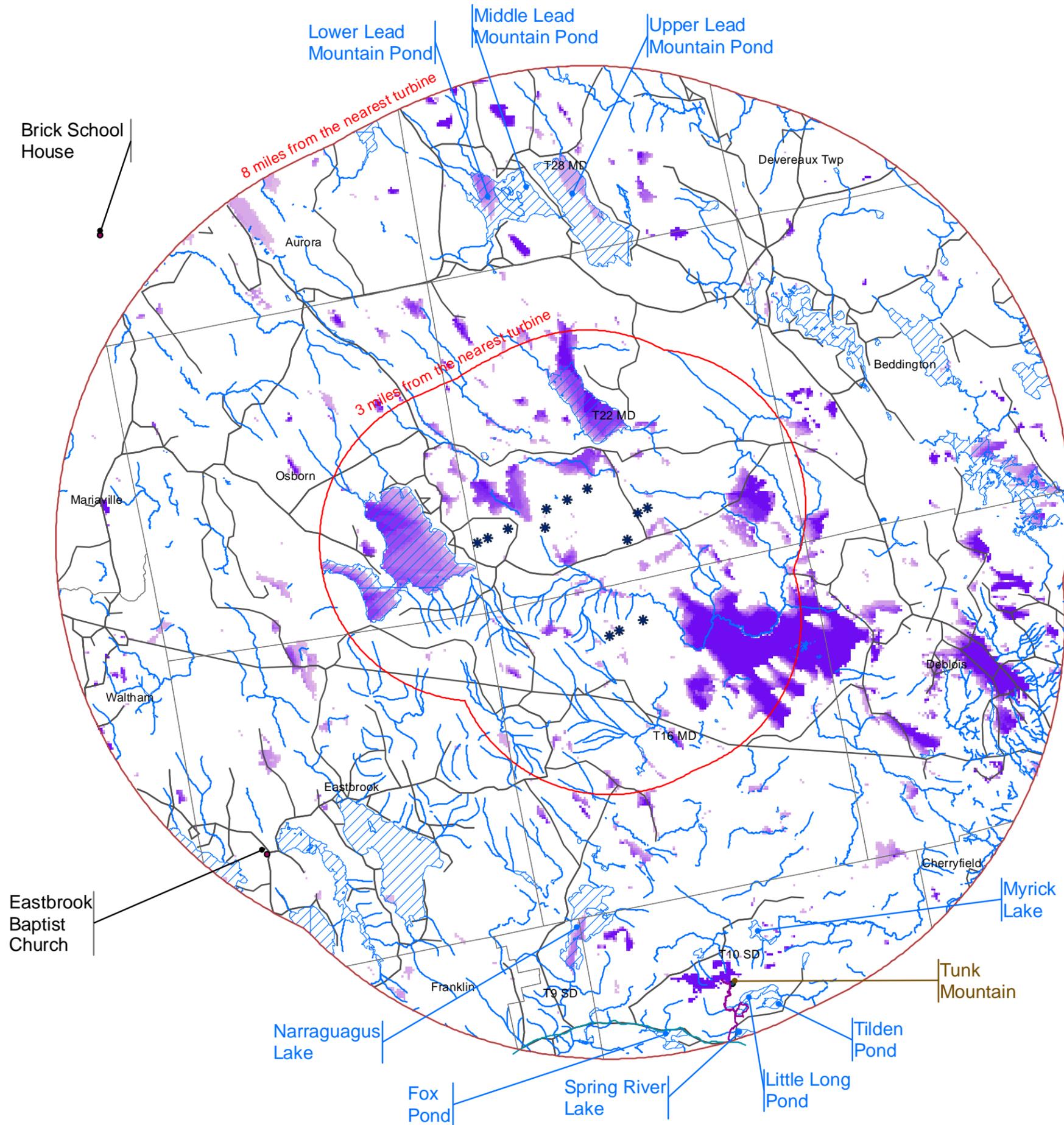
-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 6b Forested Viewshed for FAA Warning Lights

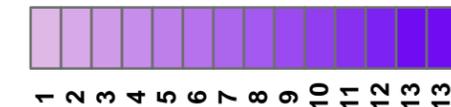
Hancock Wind Project: Vestas V117 -- 3.3 MW

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.



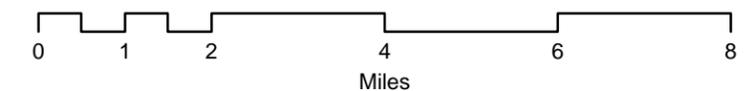
Legend

Turbines



Scenic Resources of State or National Significance

- Great Ponds
- National Register of Historic Places
- Coastal Scenic Viewpoint



Map 6c Forested Viewsheds for FAA Warning Lights

Hancock Wind Project: Change in Visibility

This map show the change in the number of turbines that will be visible if the amendment approved.

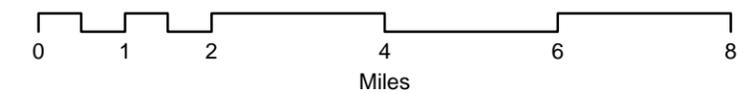
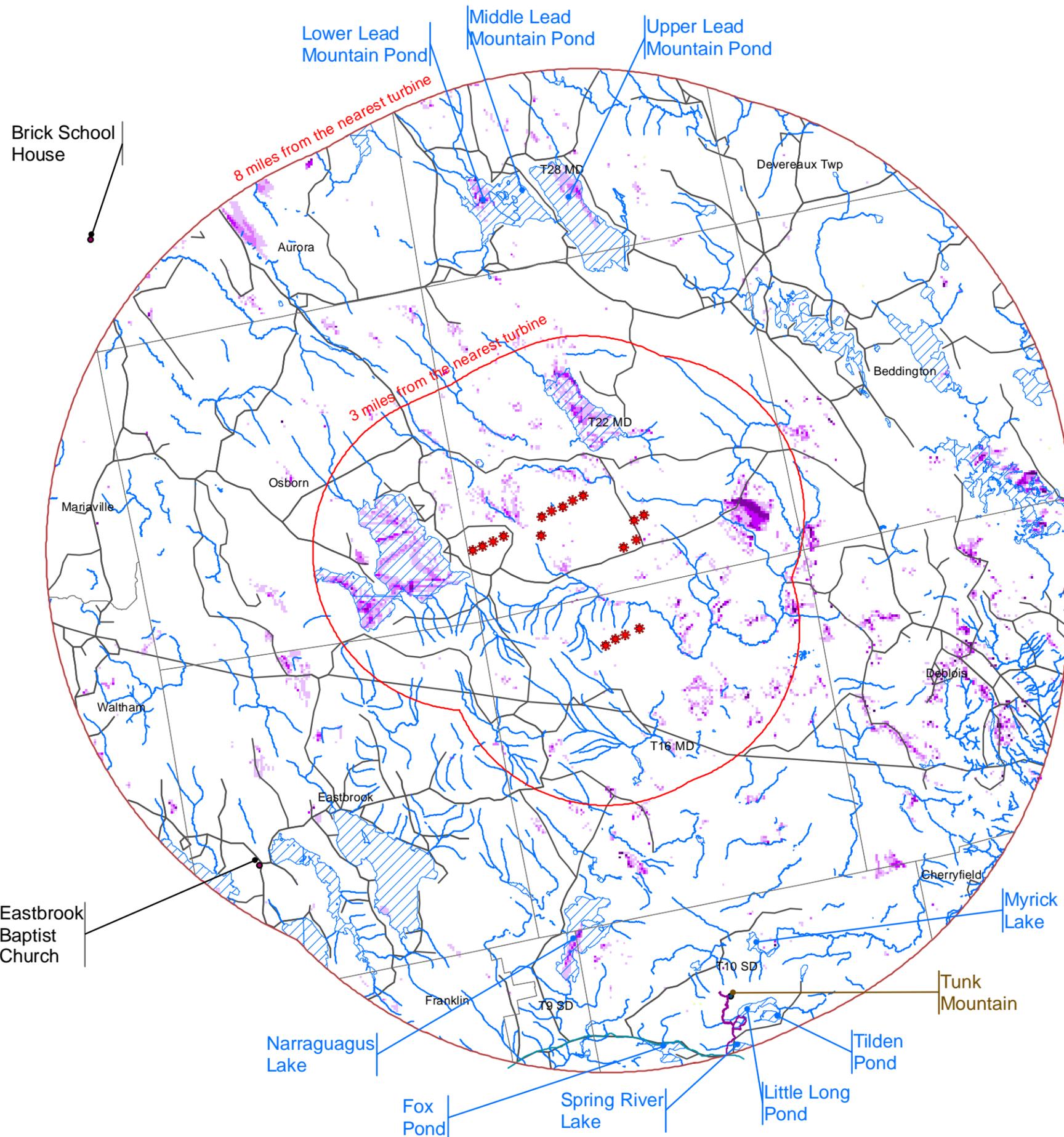
GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation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

Legend

Turbines	 2 more
 At least 1 fewer	 3 more
 Same number	 4 more
 1 more	 At least 5 more

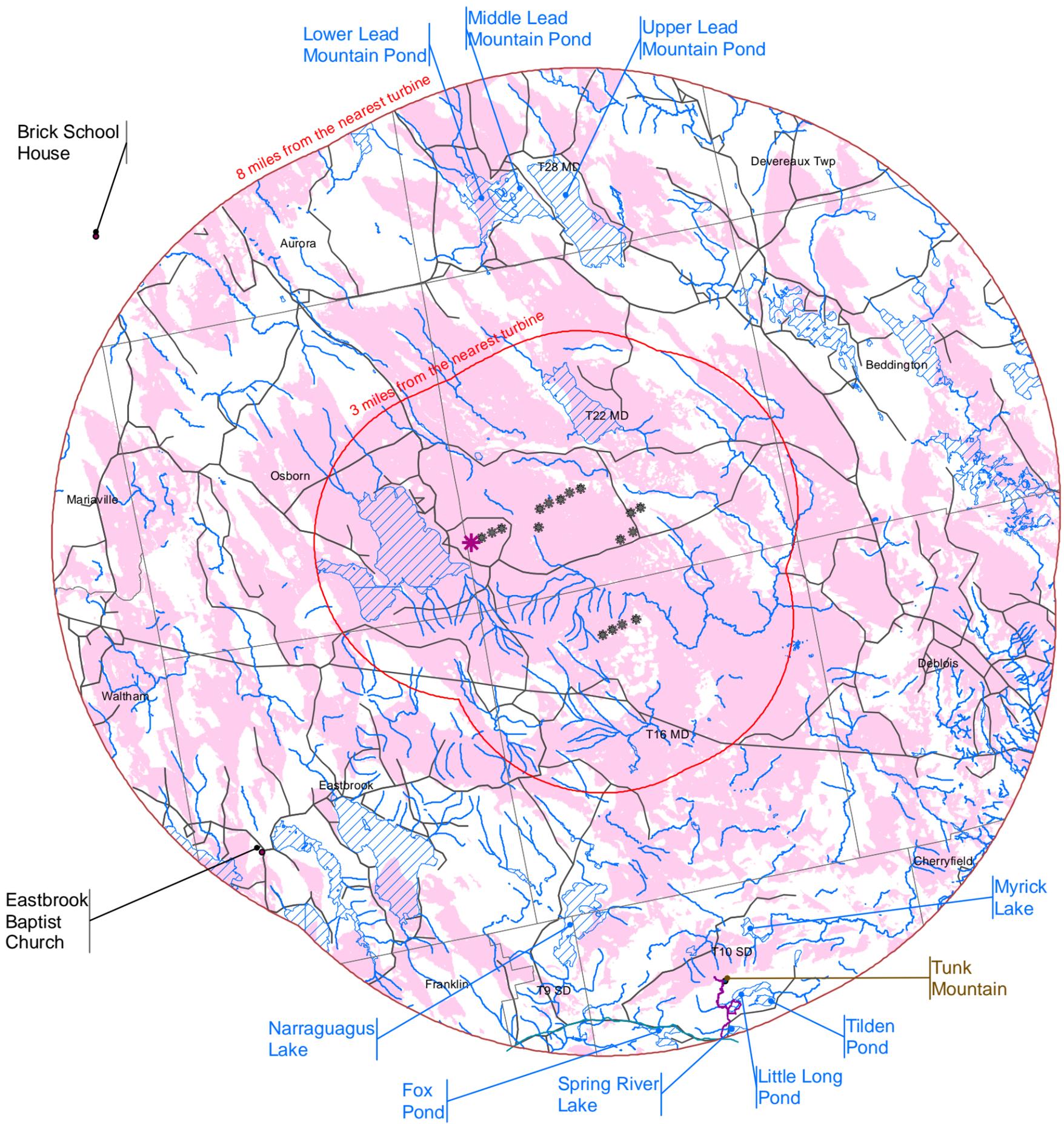
Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 7a Terrain Viewshed for Blade Tips

Hancock Wind Location H05: Siemens 3.0-113



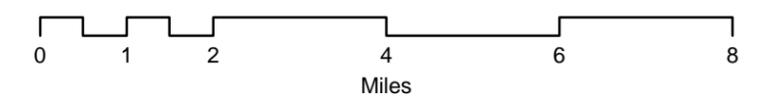
GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation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

Legend

-  Turbine location H05
-  Visible from location H05

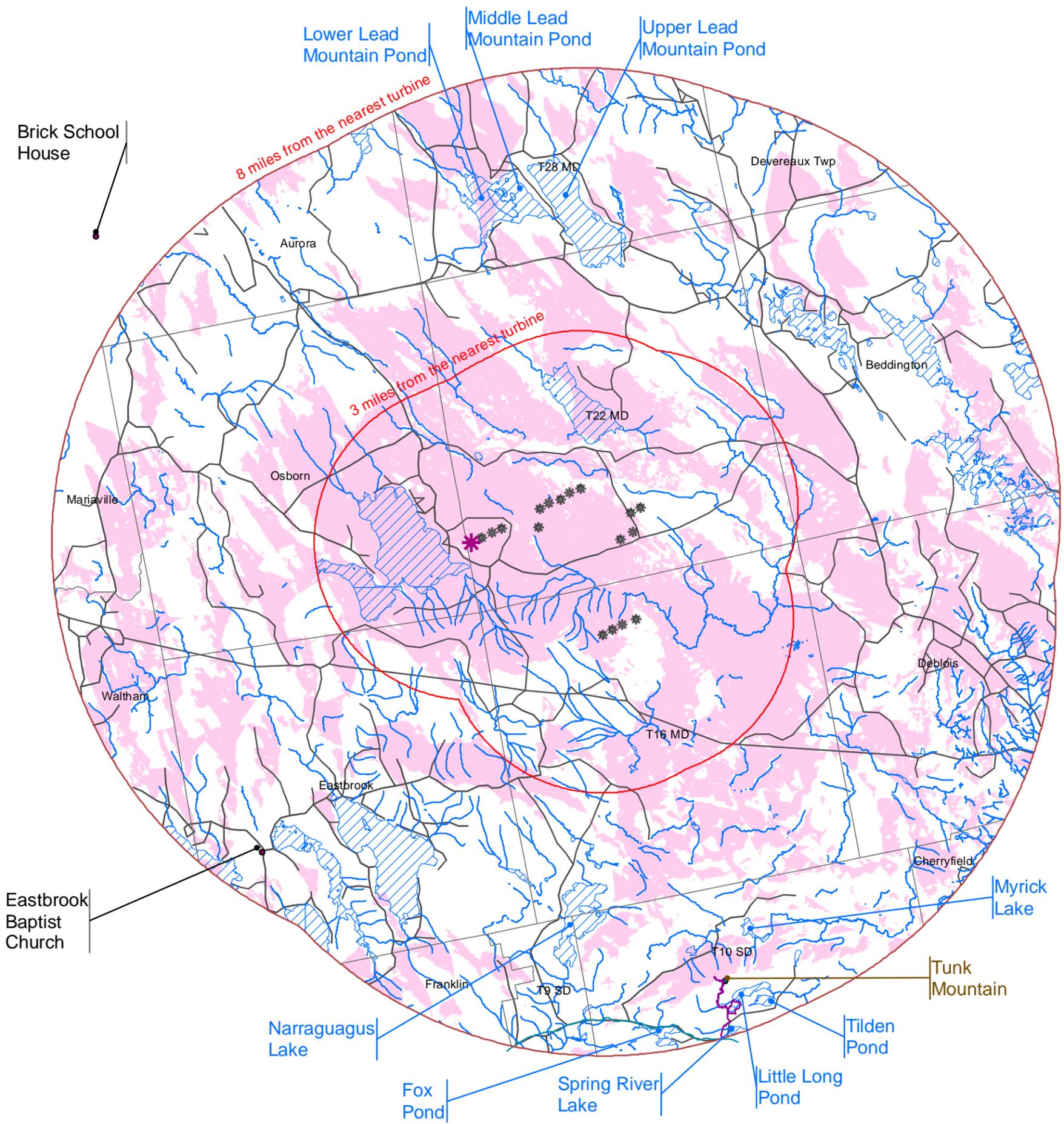
Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 7b Terrain Viewshed for Turbine Hubs

Hancock Wind Location H05: Siemens 3.0-113



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 location H05

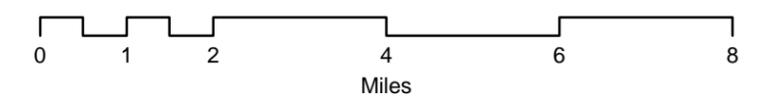
Visible from location H05

Scenic Resources of State or National Significance

Great Ponds

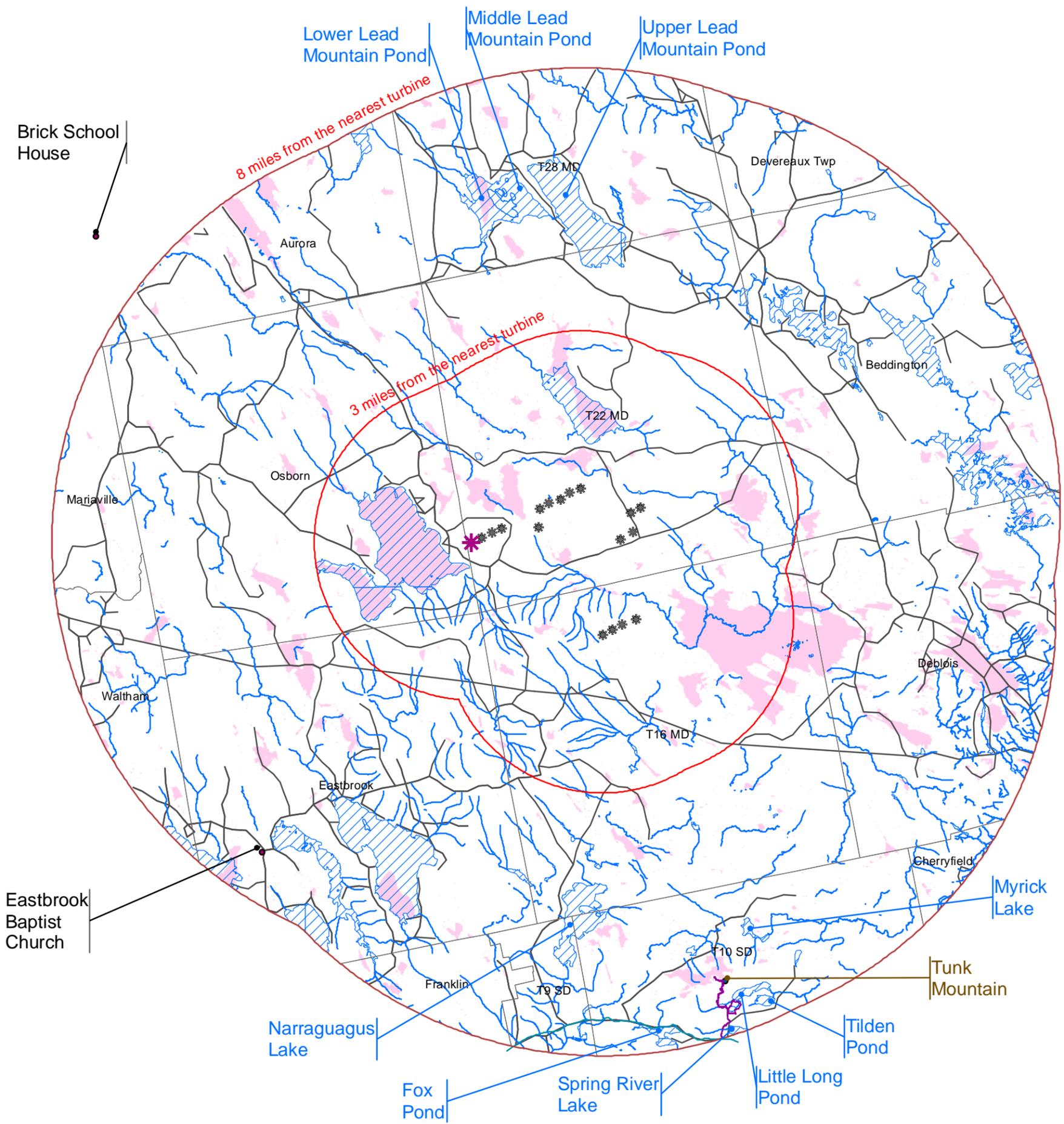
National Register of Historic Places

Coastal Scenic Viewpoint



Map 7c Forested Viewshed for Blade Tips

Hancock Wind Location H05: Siemens 3.0-113



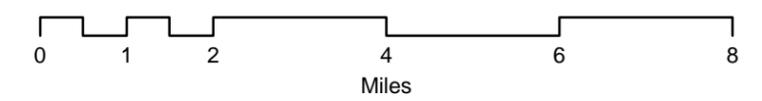
GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation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

Legend

-  Turbine location H05
-  Visible from location H05

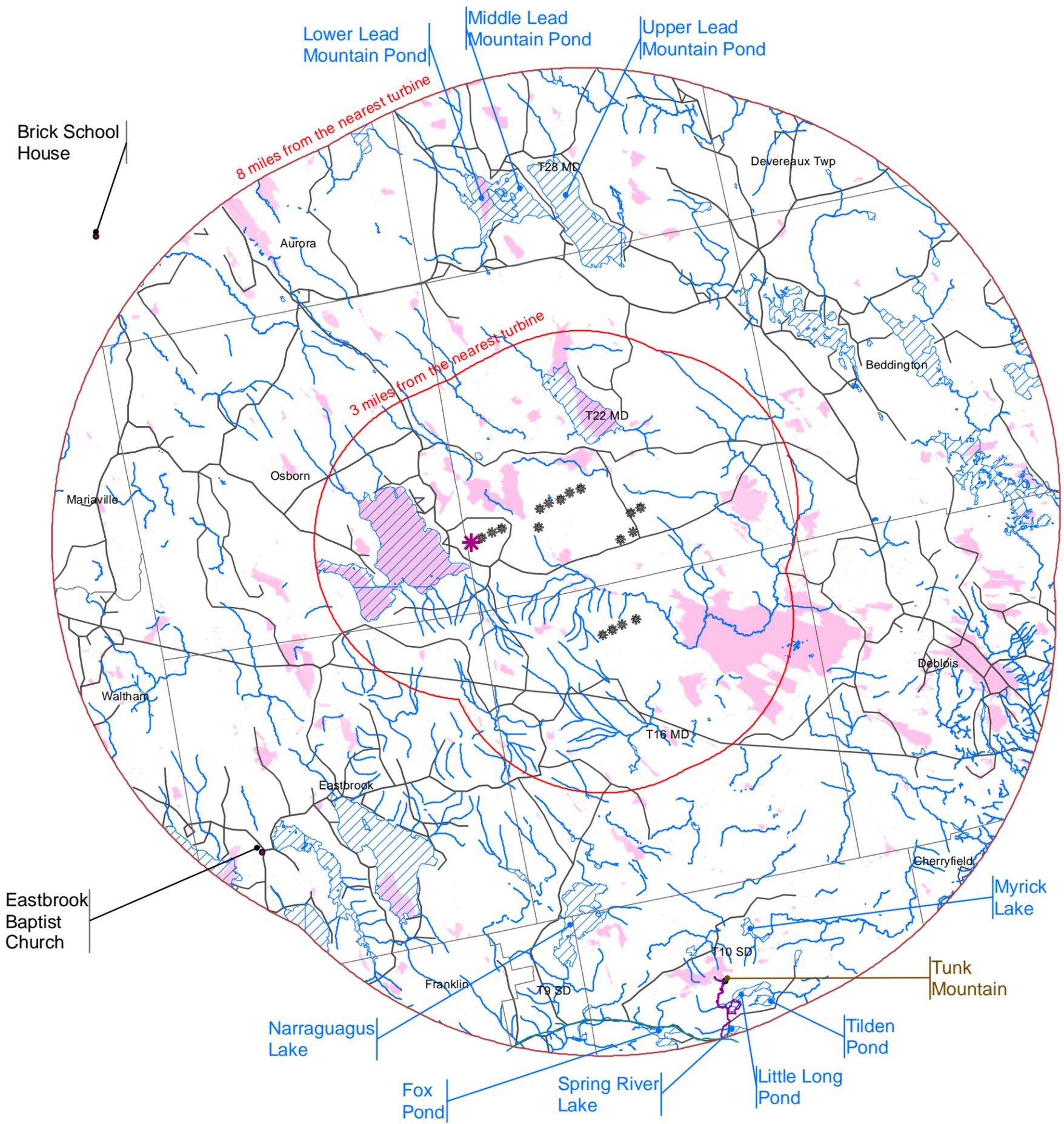
Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 7d Forested Viewshed for Turbine Hubs

Hancock Wind Location H05: Siemens 3.0-113



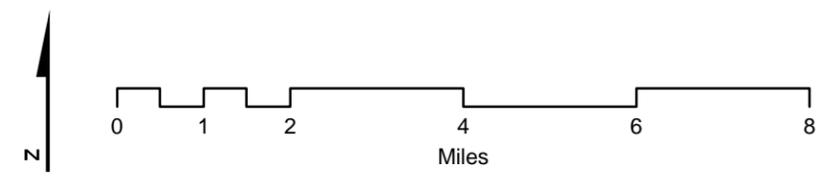
GIS viewshed mapping is a preliminary means of visual analysis. While beneficial for preliminary orientation and investigation, because of data assumptions and omissions, viewshed maps are not a definitive indication of visibility. Potential visibility needs to be confirmed through field investigation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

Legend

-  Turbine location H05
-  Visible from location H05

Scenic Resources of State or National Significance

-  Great Ponds
-  National Register of Historic Places
-  Coastal Scenic Viewpoint



Map 8. Hancock Wind Simulation Viewpoints

This site map shows the location of the 18 turbines in the approved Hancock Wind Project. The proposed amendment does not include turbine H05, which is the location closest to Spectacle Pond.

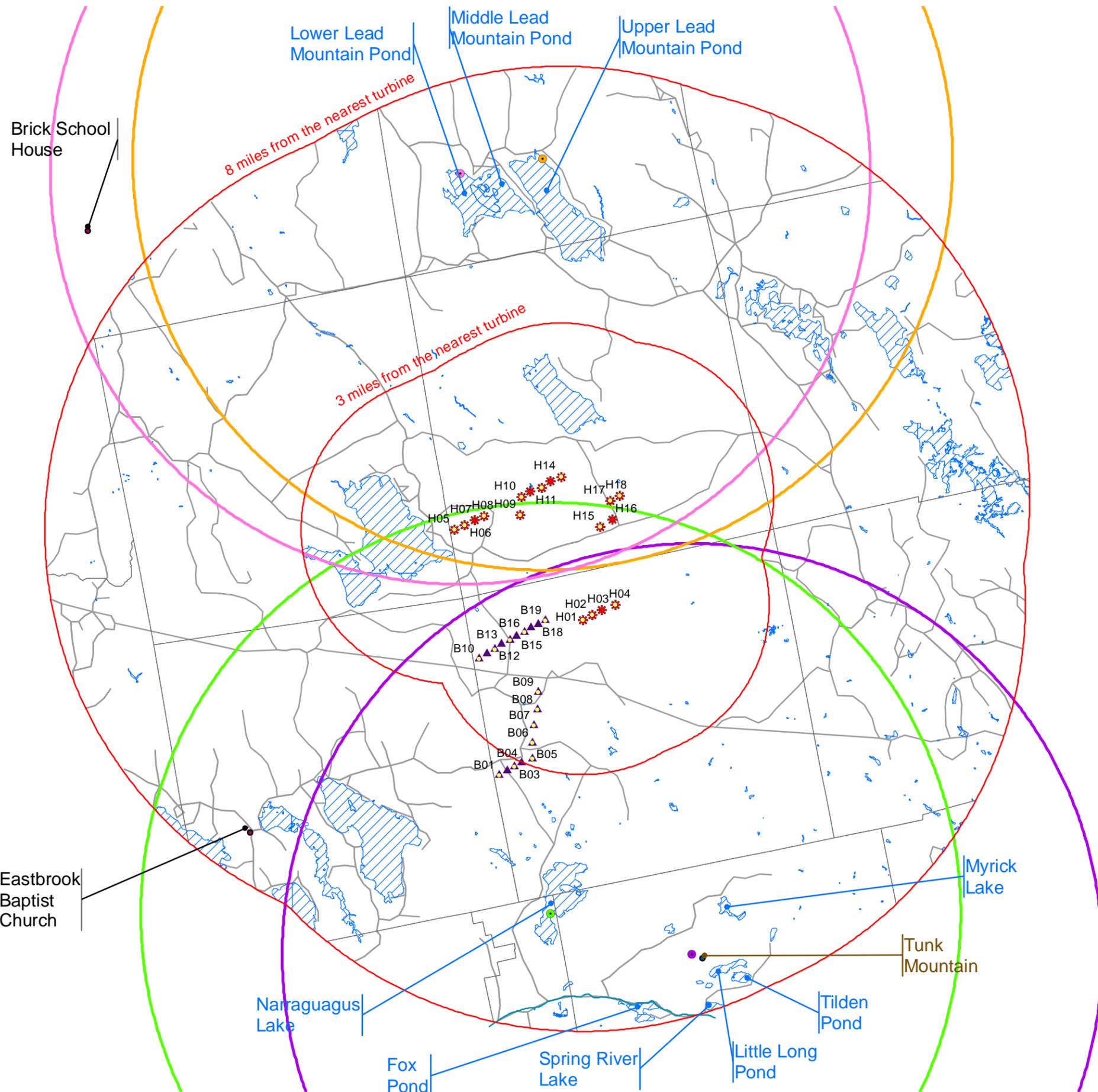
The existing 19 turbines in the constructed Bull Hill Wind Project are also shown to help understand the potential for cumulative impacts.

Each of the simulation viewpoints is represented by a dot and an 8-mile circle of the same color. This makes it apparent which turbines are within 8 miles of an observer at these viewpoints.

From the **Lower Lead Mountain Pond** and **Upper Lead Mountain Pond** viewpoints, Hancock turbines H1 through H04 and all of the Bull Hill turbines are beyond 8 miles.

From the **Narraguagus Lake** viewpoint, Hancock turbines H10 through H14, H17 and H18 are beyond 8 miles.

From the **Tunk Mountain** viewpoint, Hancock turbines H05 through H18 are beyond 8 miles.



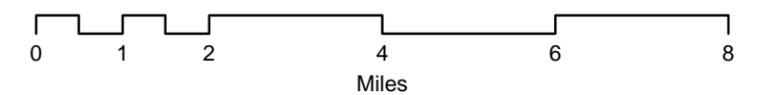
Legend

Simulation Viewpoints

- Lower Lead Mountain Pond
- Upper Lead Mountain Pond
- Narraguagus Lake
- Tunk Mountain

Scenic Resources of State or National Significance

- Great Ponds
- National Register of Historic Places
- Coastal Scenic Viewpoint



Appendix 2

ArcScene Visualizations

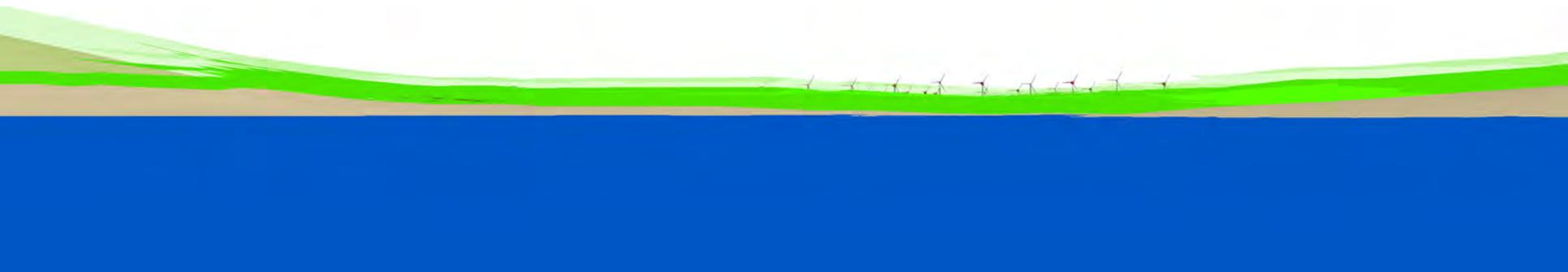
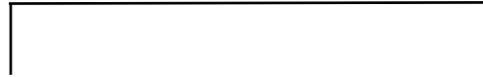
The purpose of these visualizations is to validate the relative accuracy of the photographic simulations created by TJD&A (2013, 2014). They are created using the location and camera information from the photograph metadata and GIS database that were used to prepare the photosimulations. Forest cover does not include forested wetlands or areas harvested since 1995. Two canopies are represented: one with opaque greens at 12 meters (40 feet) and another with lighter translucent greens at 18 meters (60 feet). The representation of foreground vegetation may not be accurate. A red dot is placed above the nacelle of those turbines that have been identified as having FAA aviation warning lighting. The horizontal angle of view is 40 degrees, which is similar to the VIA photosimulations, and the visualization will be in proper perspective when viewed from a distance approximately 1.4 times its width.

There are four viewpoints: (1) Lower Lead Mountain Pond, (2) Upper Lead Mountain Pond, (3) Narraguagus Lake, and (4) Tunk Mountain. At each viewpoint, there are 10 represented visual conditions: (a) existing conditions, (b) existing conditions within 8 miles, (c) approved project, (d) approved Project within 8 miles, (e) approved project cumulative, (f) approved project within 8 miles, (g) proposed amendment, (h) proposed amendment within 8 miles, (i) proposed amendment cumulative, and (j) proposed amendment cumulative within 8 miles.

ArcScene Visualization 1a: Lower Lead Mountain Pond: Existing Conditions

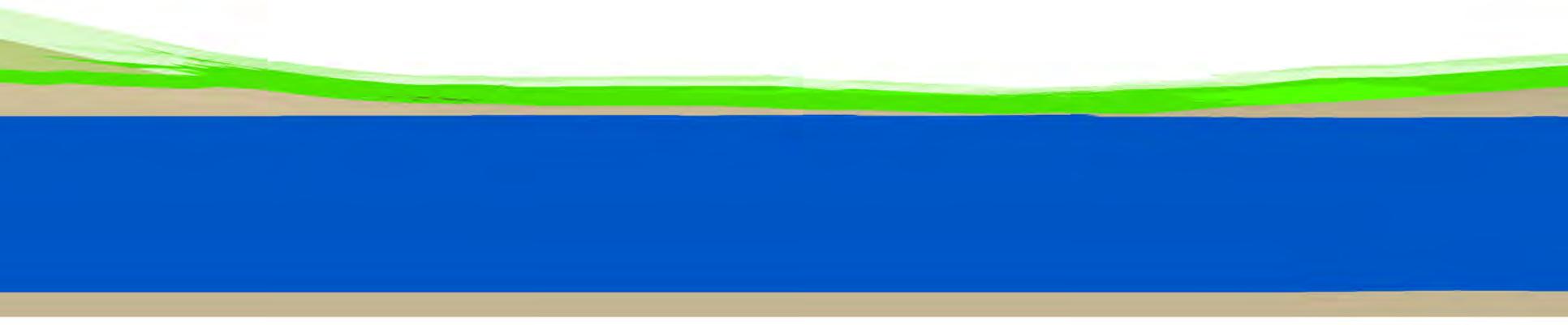
The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Lower Lead Mountain Pond viewpoint (TJD&A 2013, 2014). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Bull Hill Wind Project



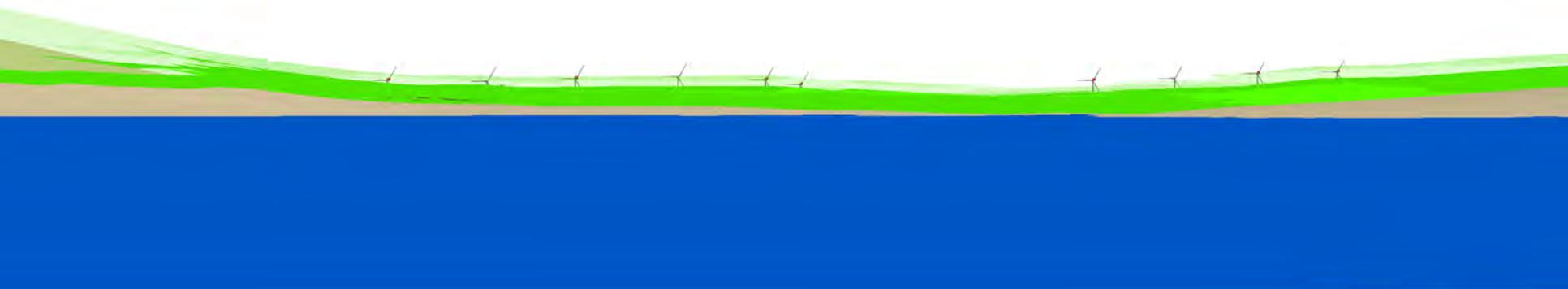
ArcScene Visualization 1b: Lower Lead Mountain Pond: Existing Conditions within 8 miles

The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Lower Lead Mountain Pond viewpoint (TJD&A 2013, 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. There are no Bull Hill Wind turbines within 8 miles of this viewpoint. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



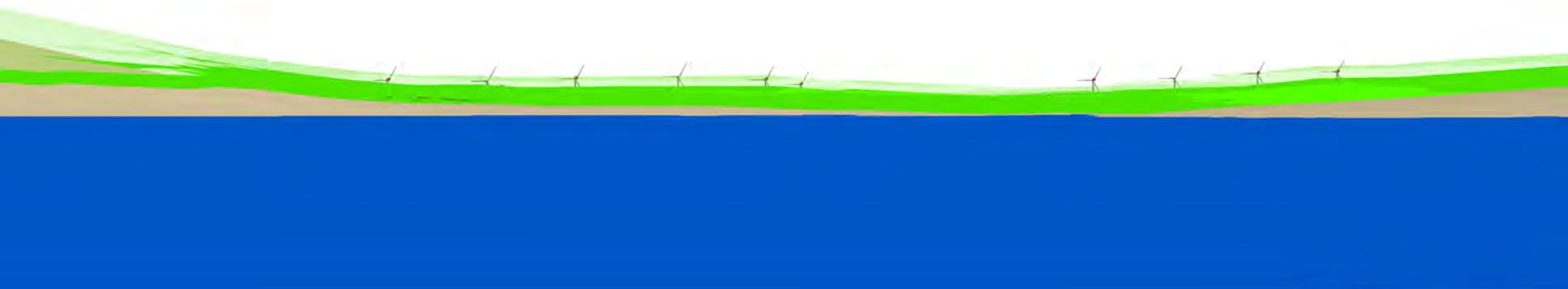
ArcScene Visualization 1c: Lower Lead Mountain Pond: Approved Project

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



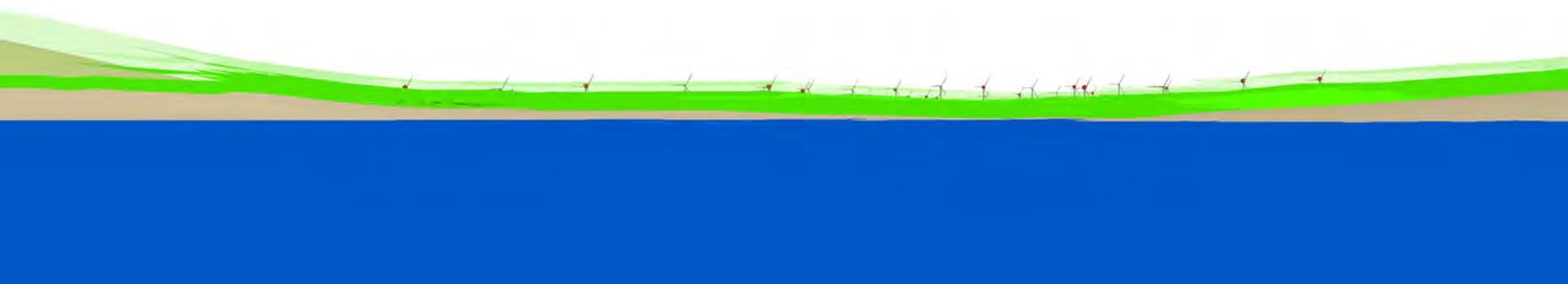
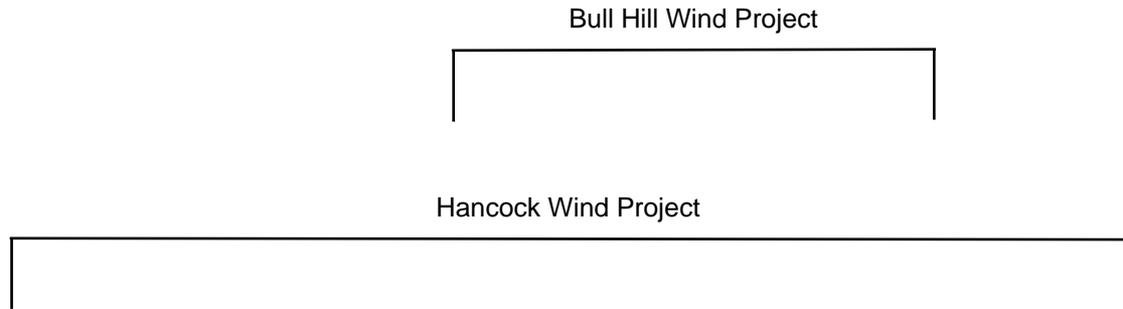
ArcScene Visualization 1d: Lower Lead Mountain Pond: Approved Project within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 1e: Lower Lead Mountain Pond: Approved Project Cumulative

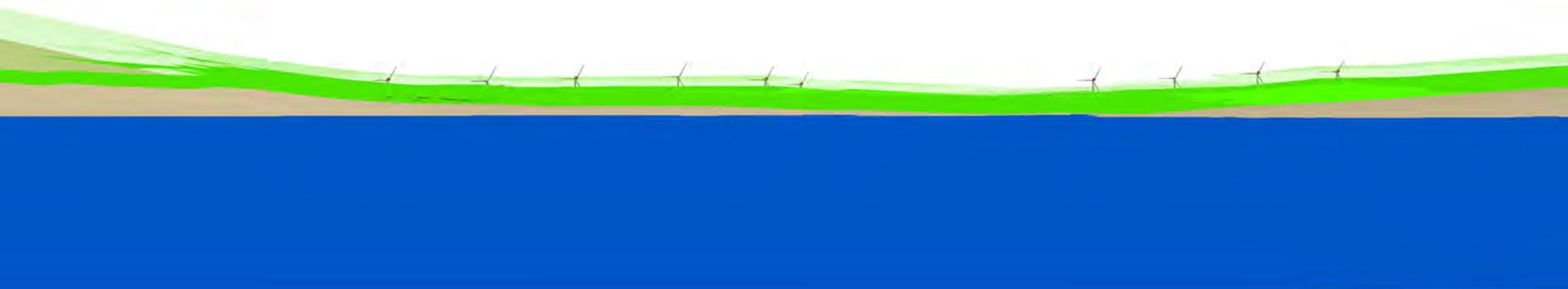
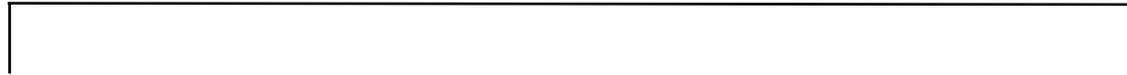
The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2013). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 1f: Lower Lead Mountain Pond: Approved Project Cumulative within 8 miles

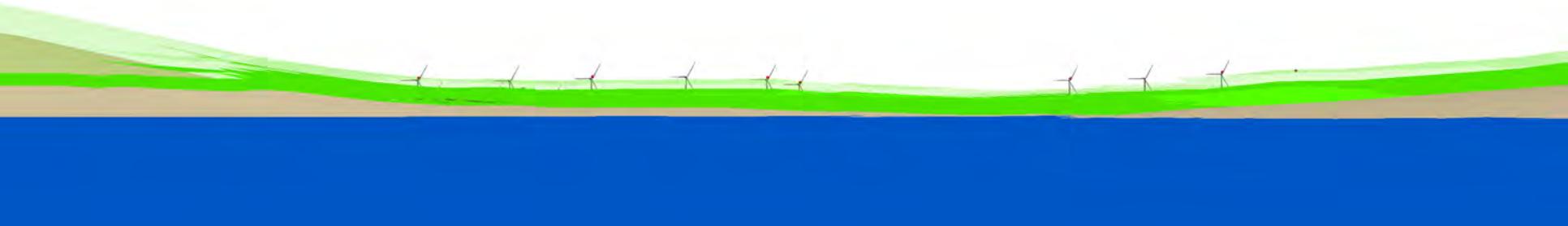
The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2013). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. The Bull Hill Wind turbines are beyond 8 miles. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Hancock Wind Project



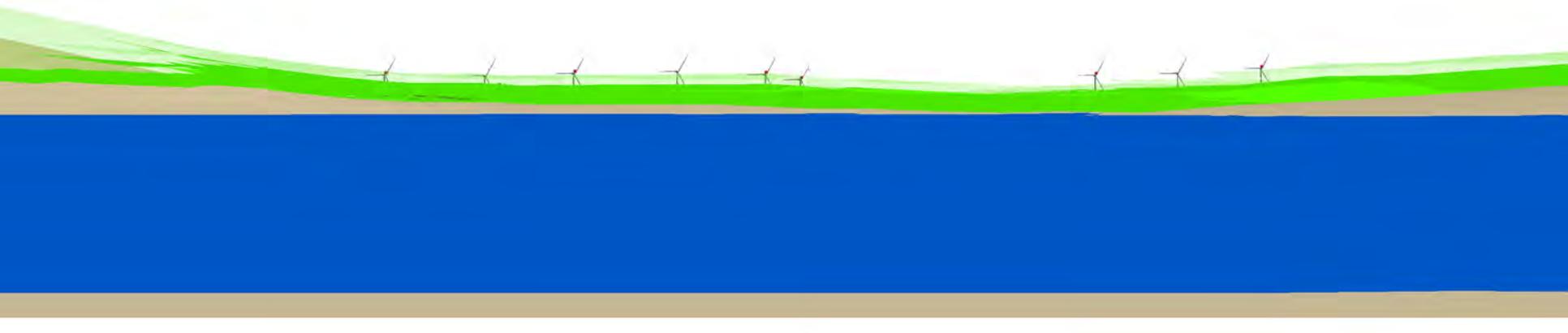
ArcScene Visualization 1g: Lower Lead Mountain Pond: Proposed Amendment

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



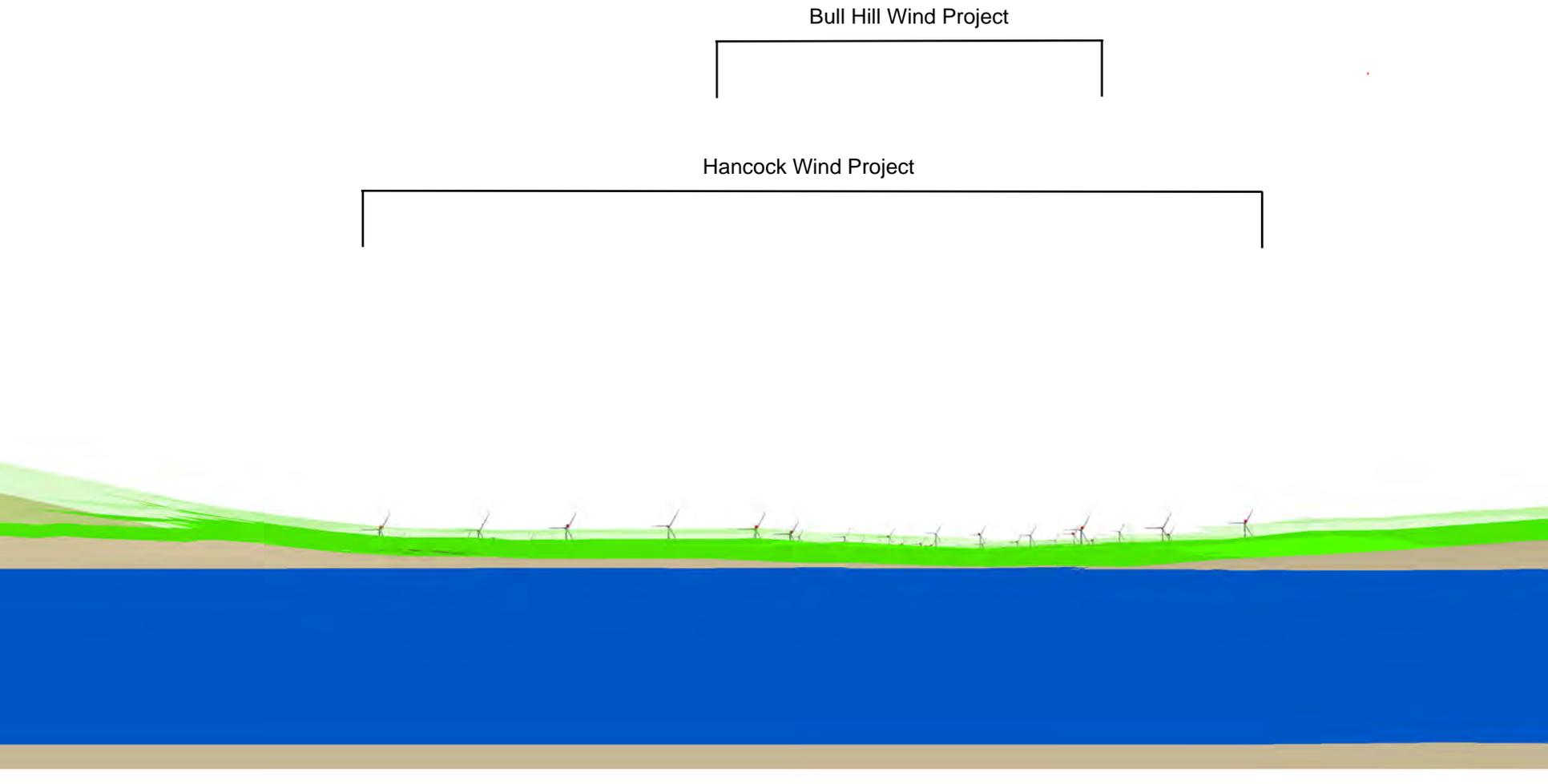
ArcScene Visualization 1h: Lower Lead Mountain Pond: Proposed Amendment within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 times its width.



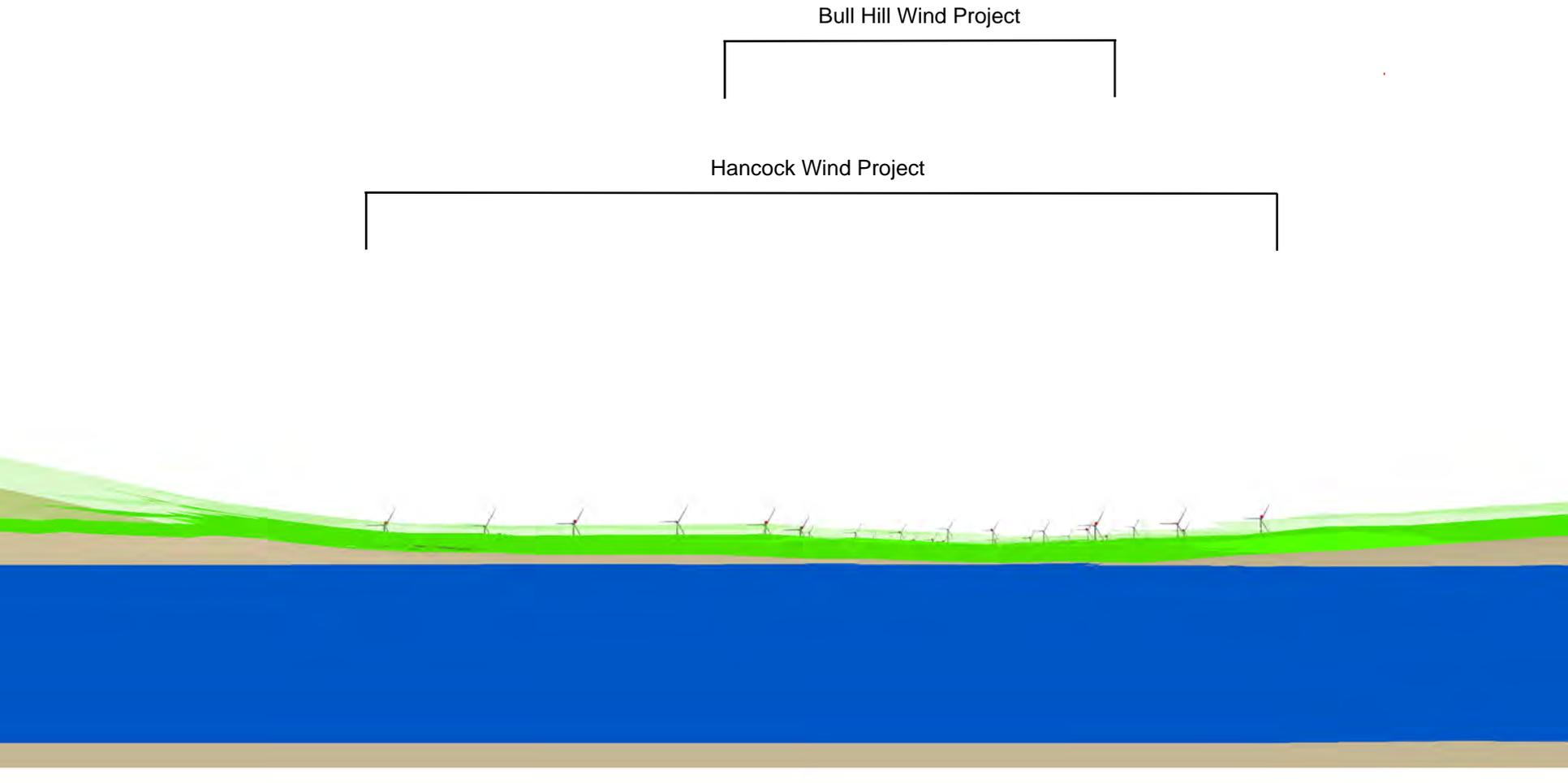
ArcScene Visualization 1i: Lower Lead Mountain Pond: Proposed Amendment Cumulative

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



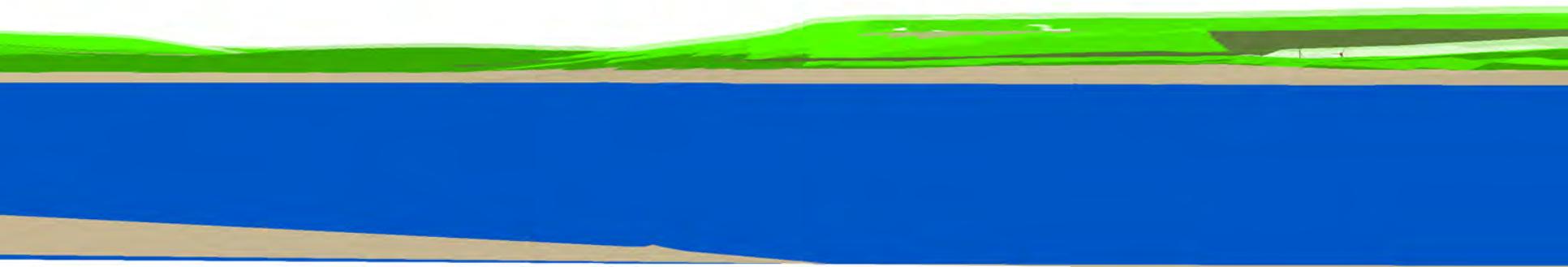
ArcScene Visualization 1j: Lower Lead Mountain Pond: Proposed Amendment Cumulative within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Lower Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



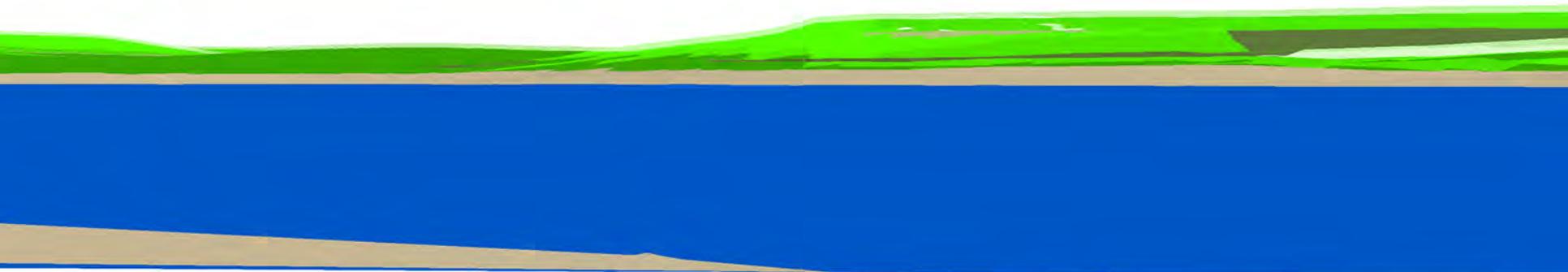
ArcScene Visualization 2a: Upper Lead Mountain Pond: Existing Conditions

The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Upper Lead Mountain Pond viewpoint (TJD&A 2013, 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are not visible. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



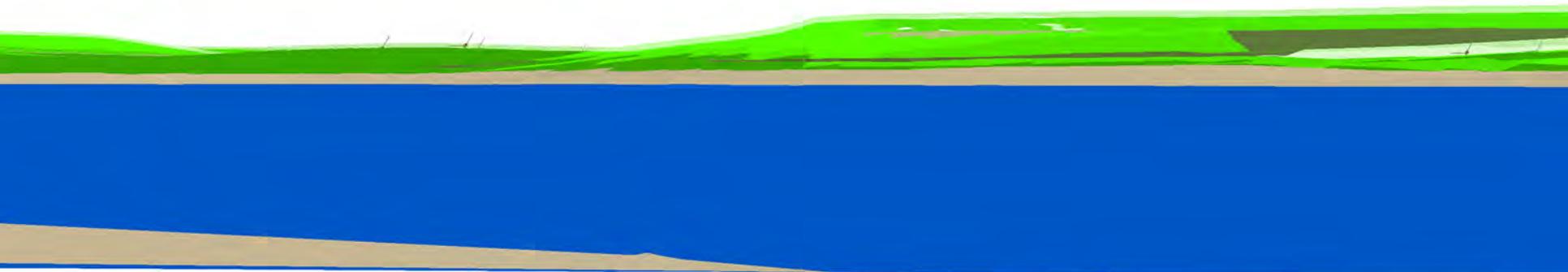
ArcScene Visualization 2b: Upper Lead Mountain Pond: Existing Conditions within 8 miles

The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Upper Lead Mountain Pond viewpoint (TJD&A 2013, 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. There are not Bull Hill Wind turbines within 8 miles of this viewpoint. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 2c: Upper Lead Mountain Pond: Approved Project

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 2d: Upper Lead Mountain Pond: Approved Project within 8 miles

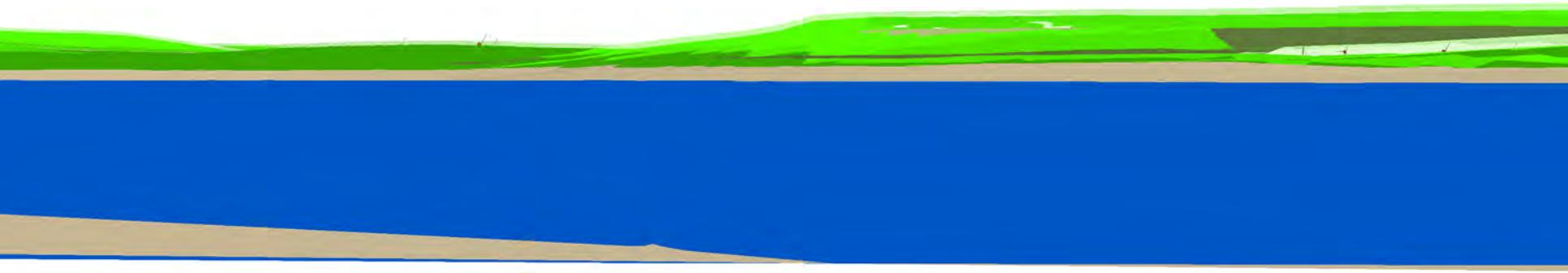
The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2013). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 2e: Upper Lead Mountain Pond: Approved Project Cumulative

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. The Bull Hill Wind turbines are not visible. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

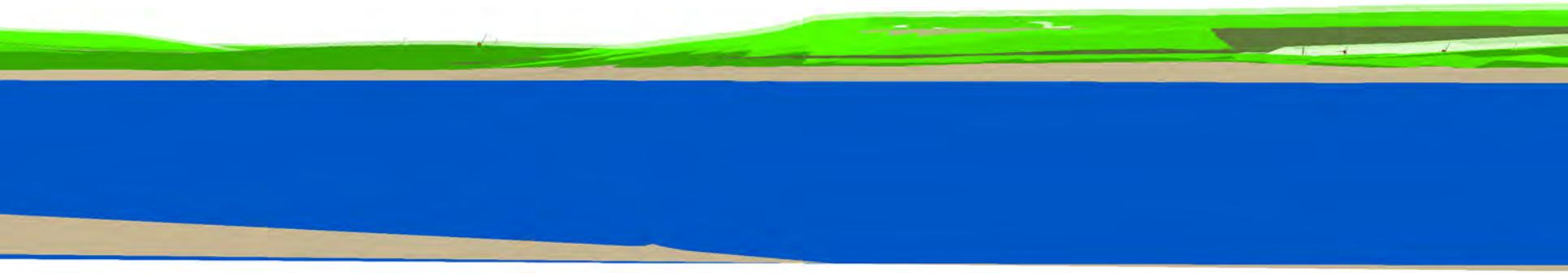
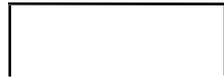
Hancock Wind Project



ArcScene Visualization 2f: Upper Lead Mountain Pond: Approved Project Cumulative within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. The Bull Hill Wind turbines are beyond 8 miles and not visible. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Hancock Wind Project



ArcScene Visualization 2g: Upper Lead Mountain Pond: Proposed Amendment

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



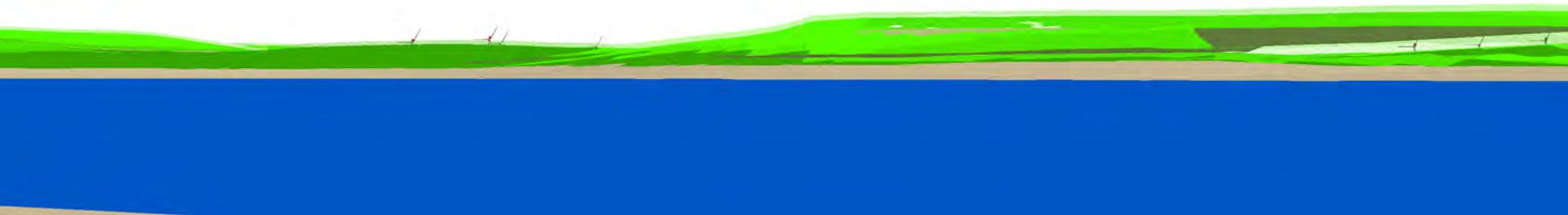
ArcScene Visualization 2h: Upper Lead Mountain Pond: Proposed Amendment within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 2i: Upper Lead Mountain Pond: Proposed Amendment Cumulative

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. The Bull Hill Wind turbines are not visible. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 2j: Upper Lead Mountain Pond: Proposed Amendment Cumulative within 8 miles

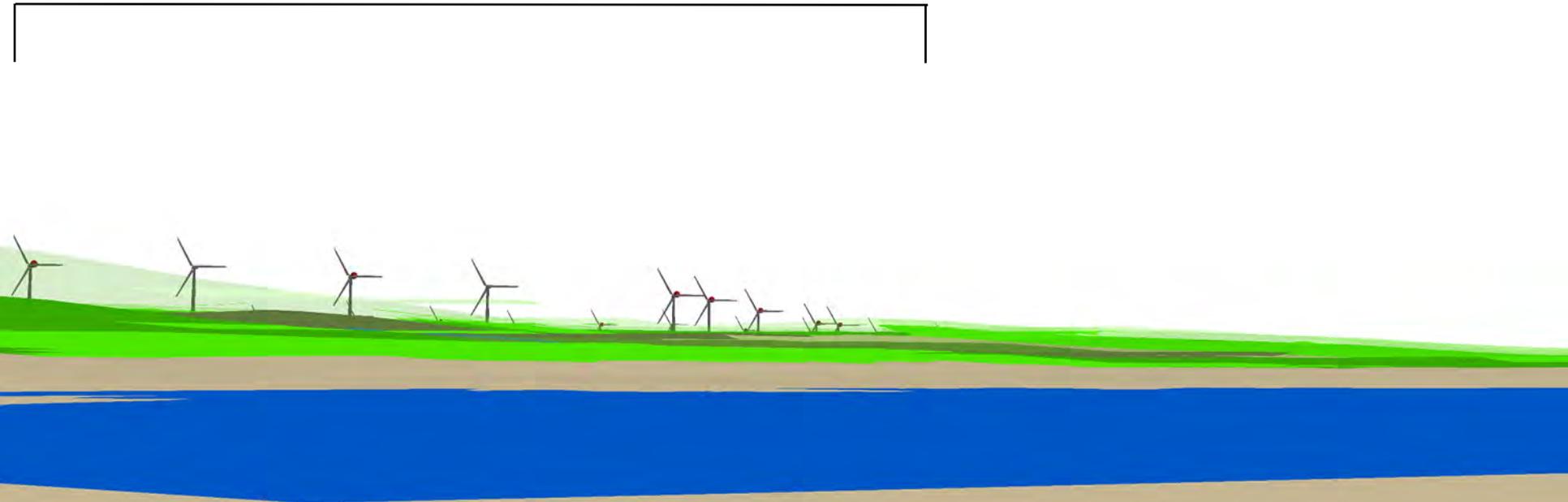
The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Upper Lead Mountain Pond viewpoint (TJD&A 2014). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. The Bull Hill Wind turbines are not visible. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 3a: Narraguagus Lake: Existing Conditions

The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Narraguagus Lake viewpoint (TJD&A 2013, 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters to the upraised blade tip; they are all within 8 miles of the viewpoint. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

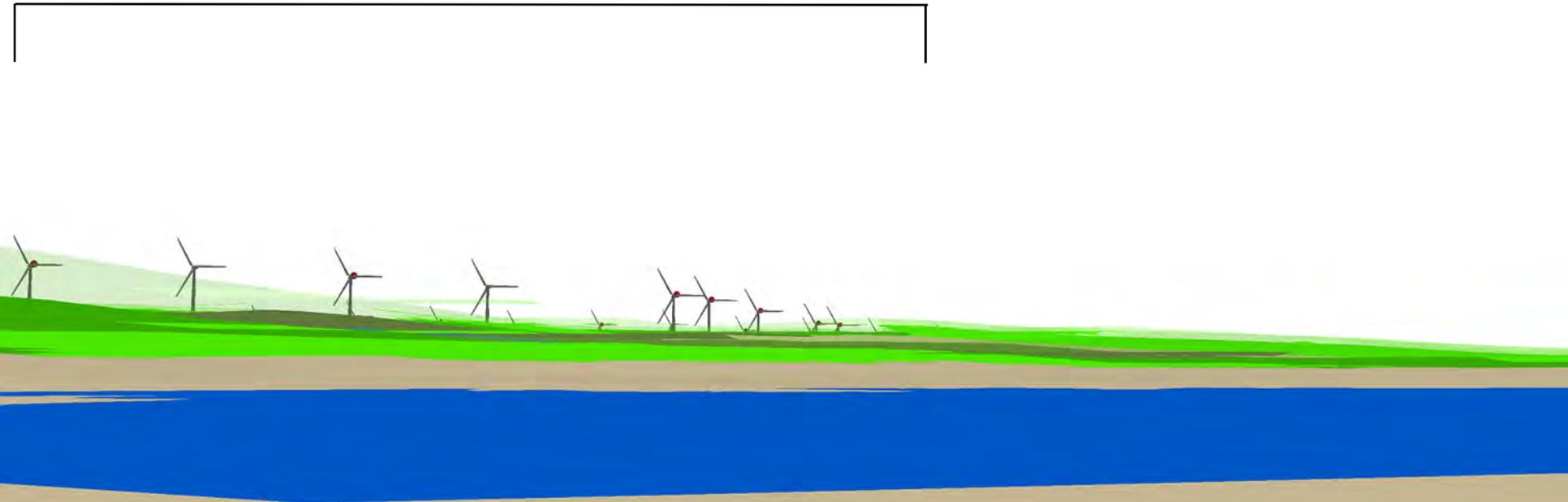
Bull Hill Wind Project



ArcScene Visualization 3b: Narraguagus Lake: Existing Conditions within 8 miles

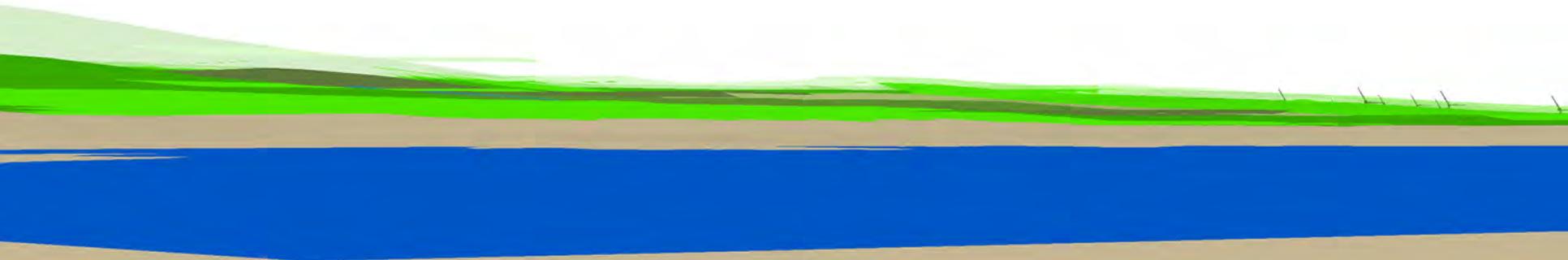
The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Narraguagus Lake viewpoint (TJD&A 2013, 2014). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters to the upraised blade tip; they are all within 8 miles of the viewpoint. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Bull Hill Wind Project



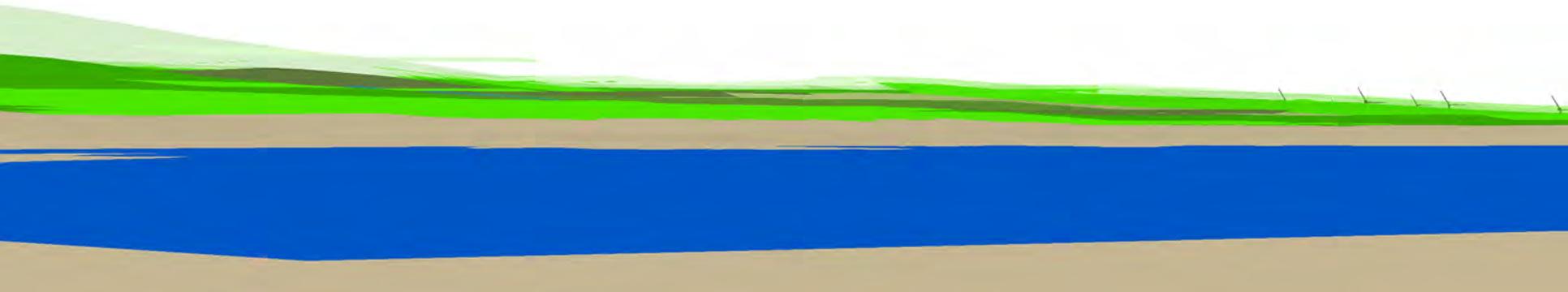
ArcScene Visualization 3c: Narraguagus Lake: Approved Project

The purpose of this visualization is to validate its accuracy relative to the photograph of the Photosimulation from the Narraguagus Lake the (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



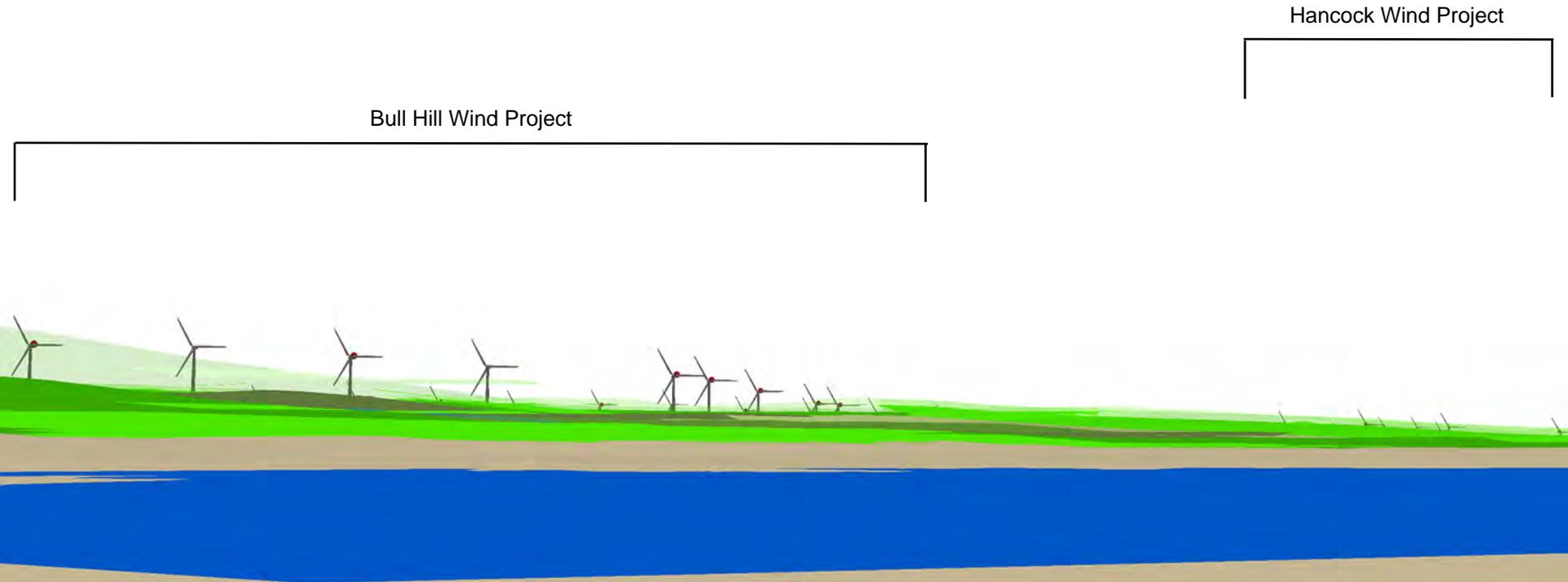
ArcScene Visualization 3d: Narraguagus Lake: Approved Project within 8 miles

The purpose of this visualization is to validate its accuracy relative to the photograph of the Photosimulation from the Narraguagus Lake viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



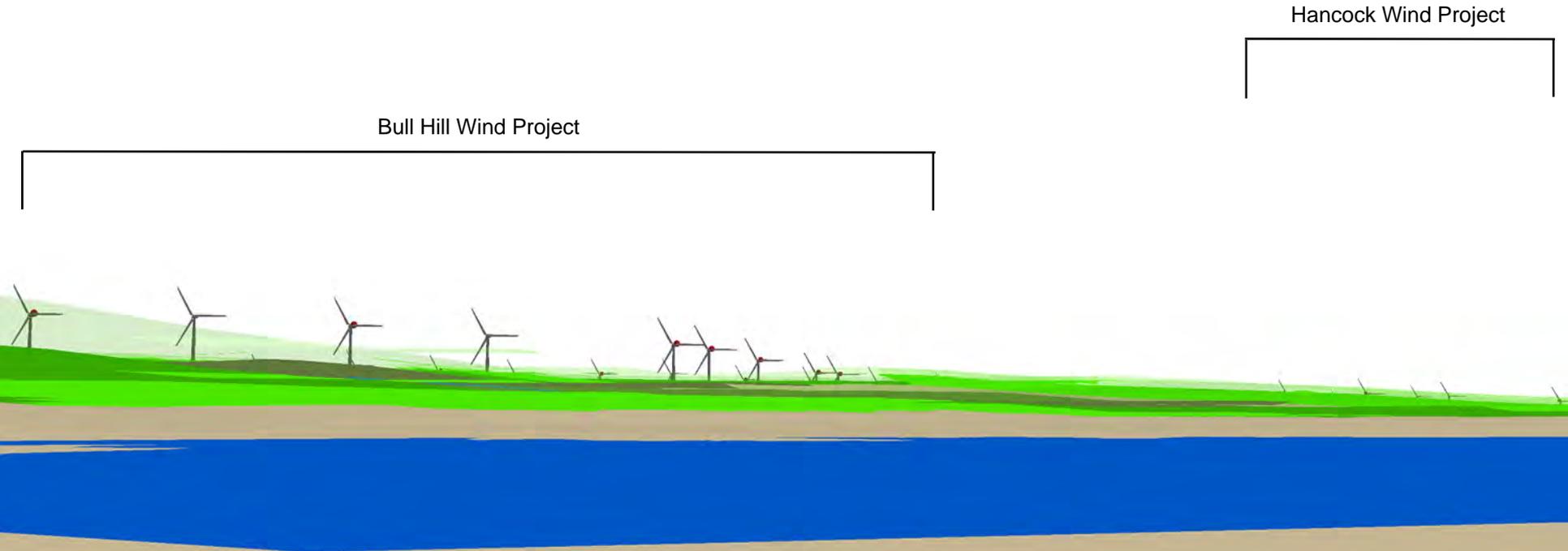
ArcScene Visualization 3e: Narraguagus Lake: Approved Project Cumulative

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Narraguagus Lake viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 3f: Narraguagus Lake: Approved Project Cumulative within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Narraguagus Lake viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



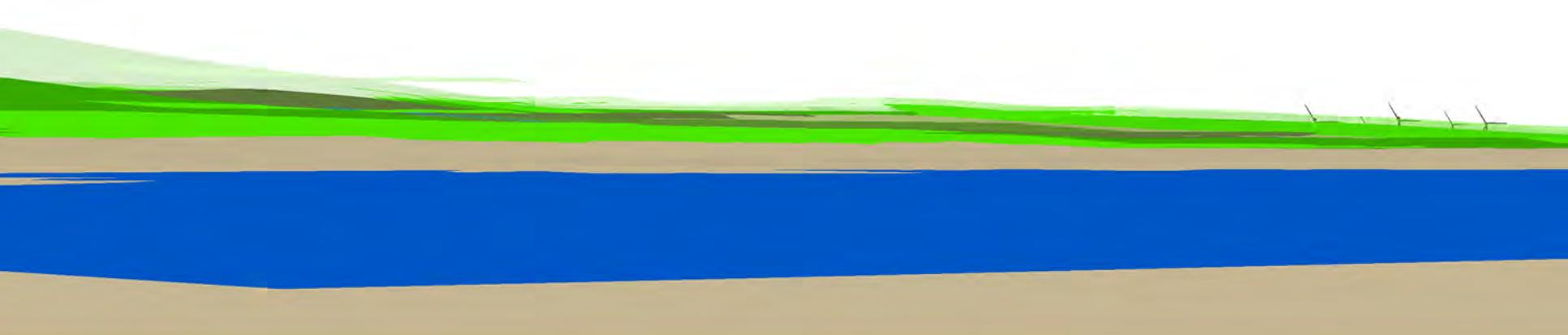
ArcScene Visualization 3g: Narraguagus Lake: Proposed Amendment

The purpose of this visualization is to validate its accuracy relative to the photograph of the Photosimulation from the Narraguagus Lake the (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 3g: Narraguagus Lake: Proposed Amendment within 8 miles

The purpose of this visualization is to validate its accuracy relative to the photograph of the Photosimulation from the Narraguagus Lake the (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

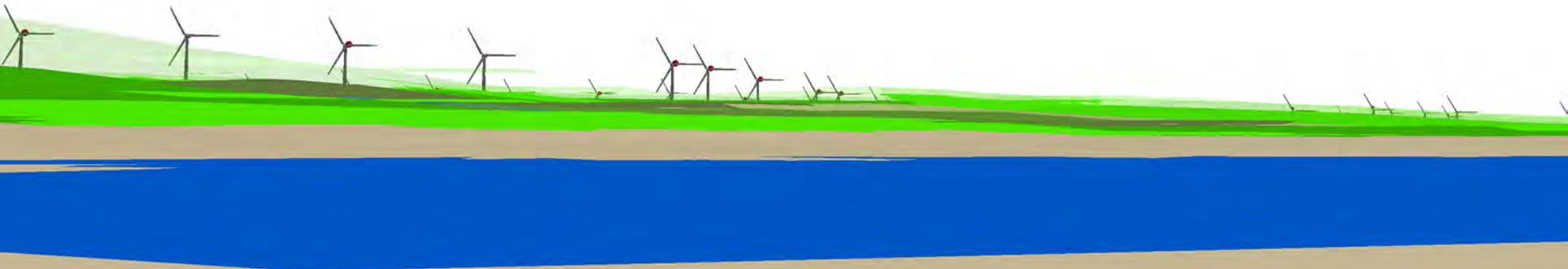


ArcScene Visualization 3i: Narraguagus Lake: Proposed Amendment Cumulative

The purpose of this visualization is to validate its accuracy relative to the photograph of the Photosimulation from the Narraguagus Lake the (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Hancock Wind Project

Bull Hill Wind Project

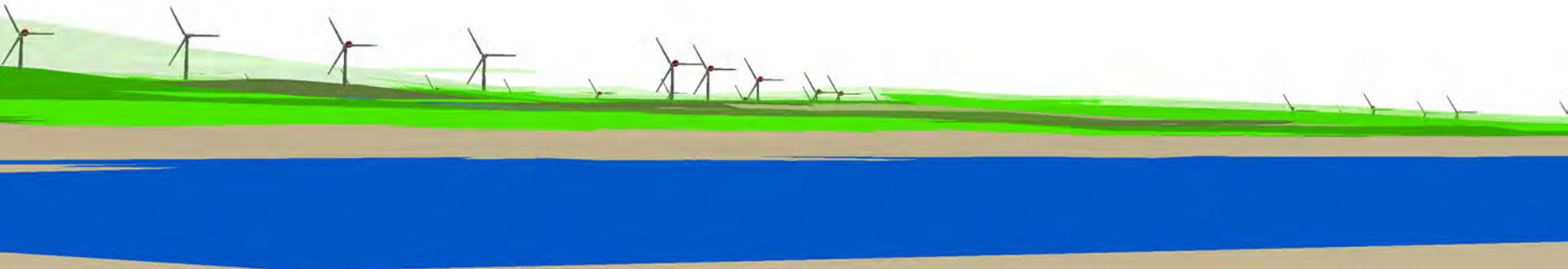


ArcScene Visualization 3j: Narraguagus Lake: Proposed Amendment Cumulative within 8 miles

The purpose of this visualization is to validate its accuracy relative to the photograph of the Photosimulation from the Narraguagus Lake the (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Hancock Wind Project

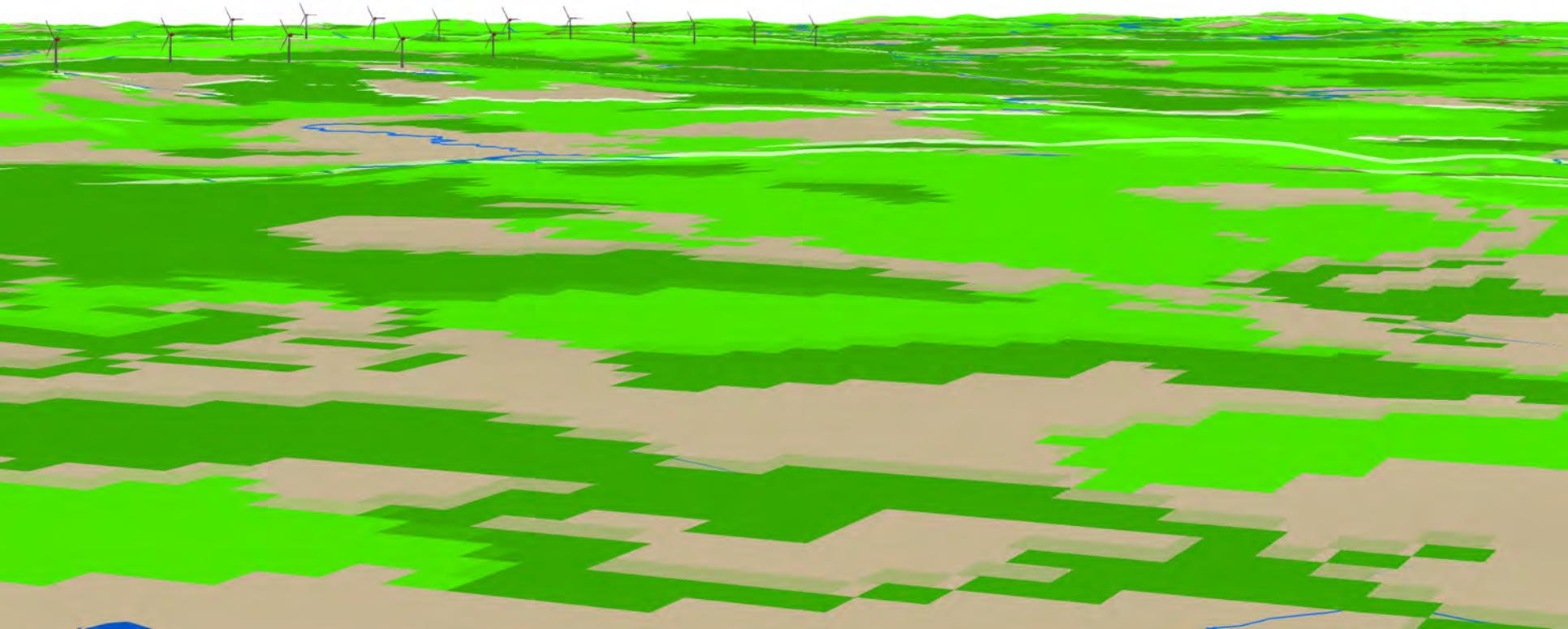
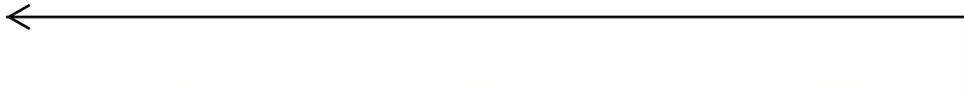
Bull Hill Wind Project



ArcScene Visualization 4a: Tunk Mountain: Existing Conditions

The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Tunk Mountain viewpoint (TJD&A 2013, 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters to the upraised blade tip; they are all within 8 miles of the viewpoint. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

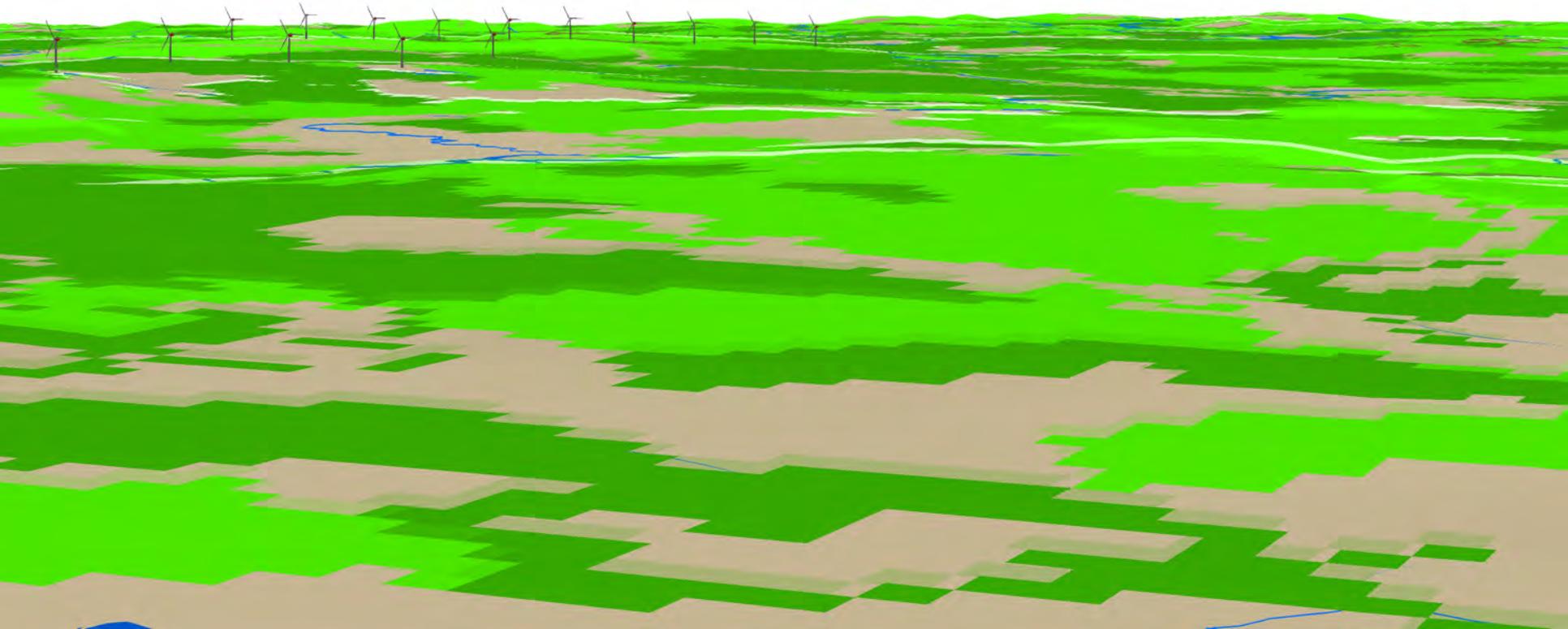
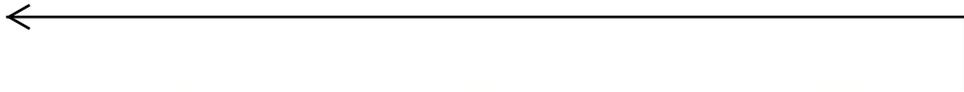
Bull Hill Wind Project



ArcScene Visualization 4b: Tunk Mountain: Existing Conditions within 8 miles

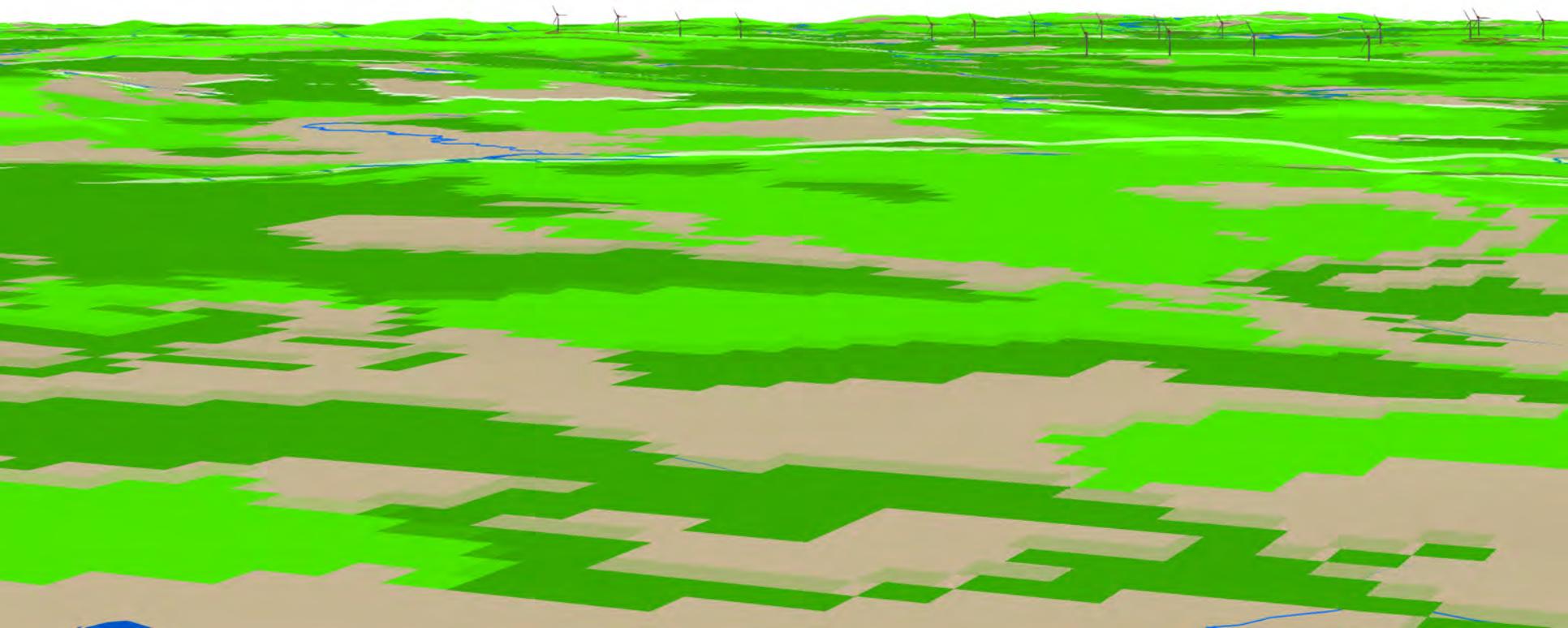
The purpose of this visualization is to validate its accuracy relative to the photograph of the Existing Conditions from the Tunk Mountain viewpoint (TJD&A 2013, 2014). It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Visual Impact Assessment Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters to the upraised blade tip; they are all within 8 miles of the viewpoint. FAA aviation warning lighting is represented as a red dot above the nacelle. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

Bull Hill Wind Project



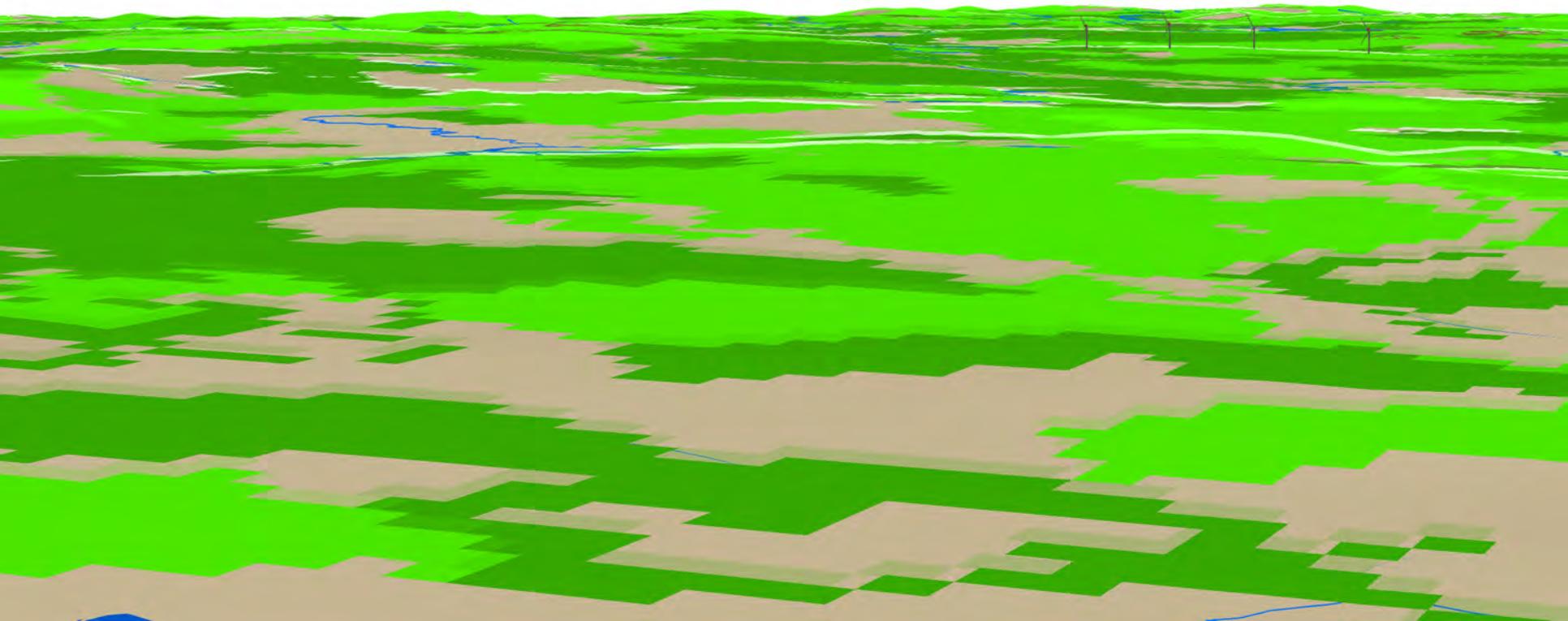
ArcScene Visualization 4c: Tunk Mountain: Approved Project

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



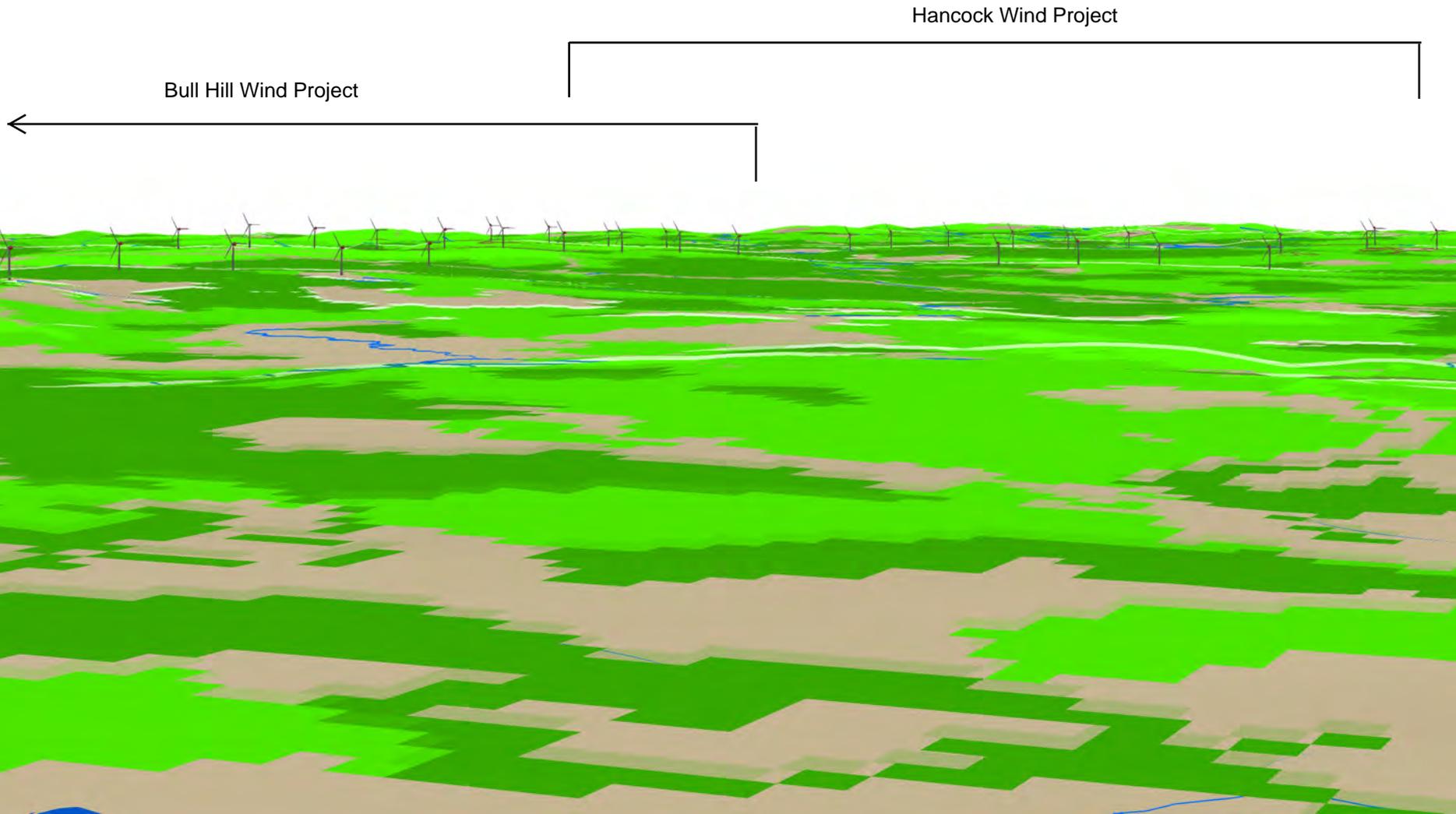
ArcScene Visualization 4d: Tunk Mountain: Approved Project within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



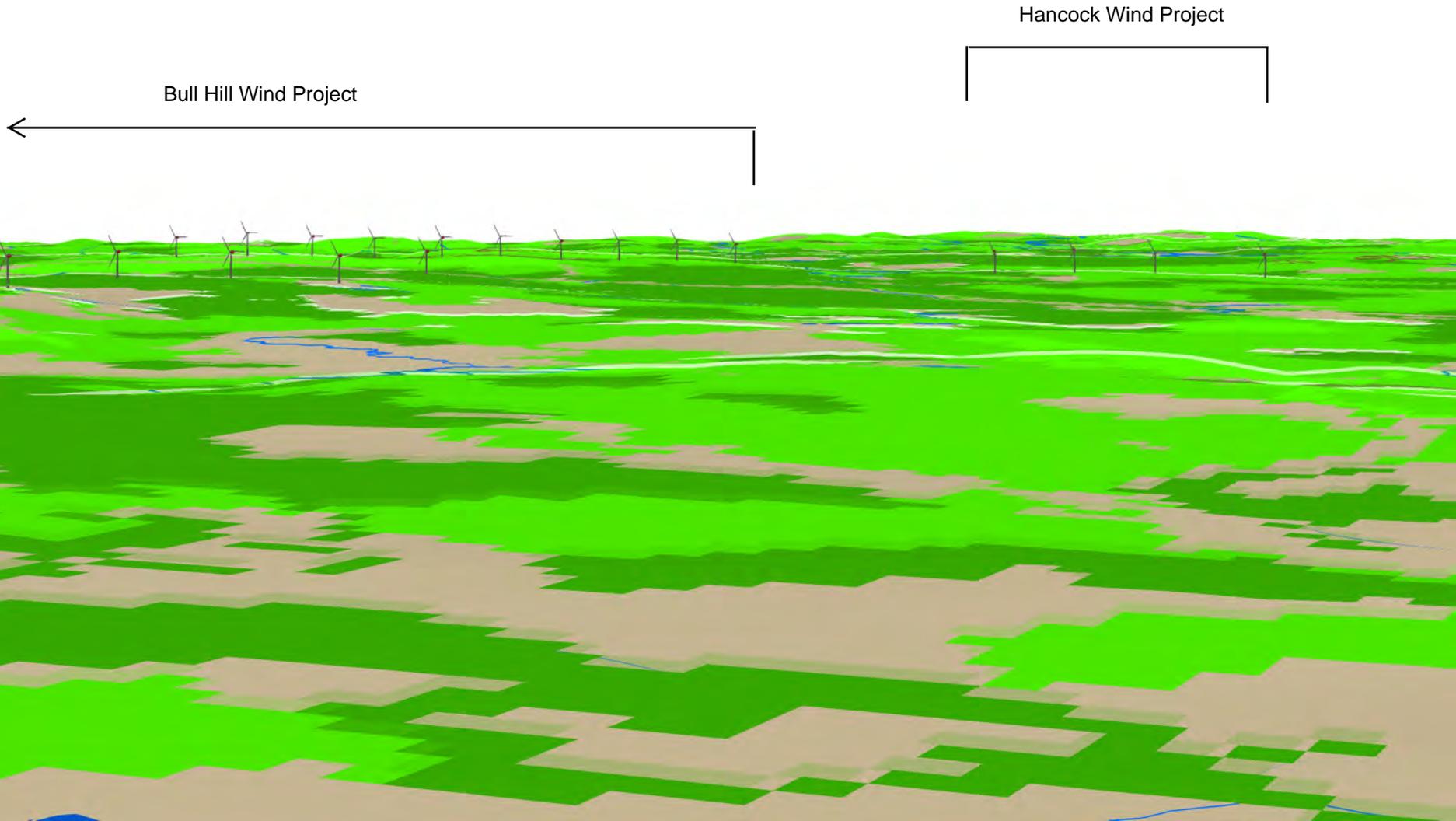
ArcScene Visualization 4e: Tunk Mountain: Approved Project Cumulative

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



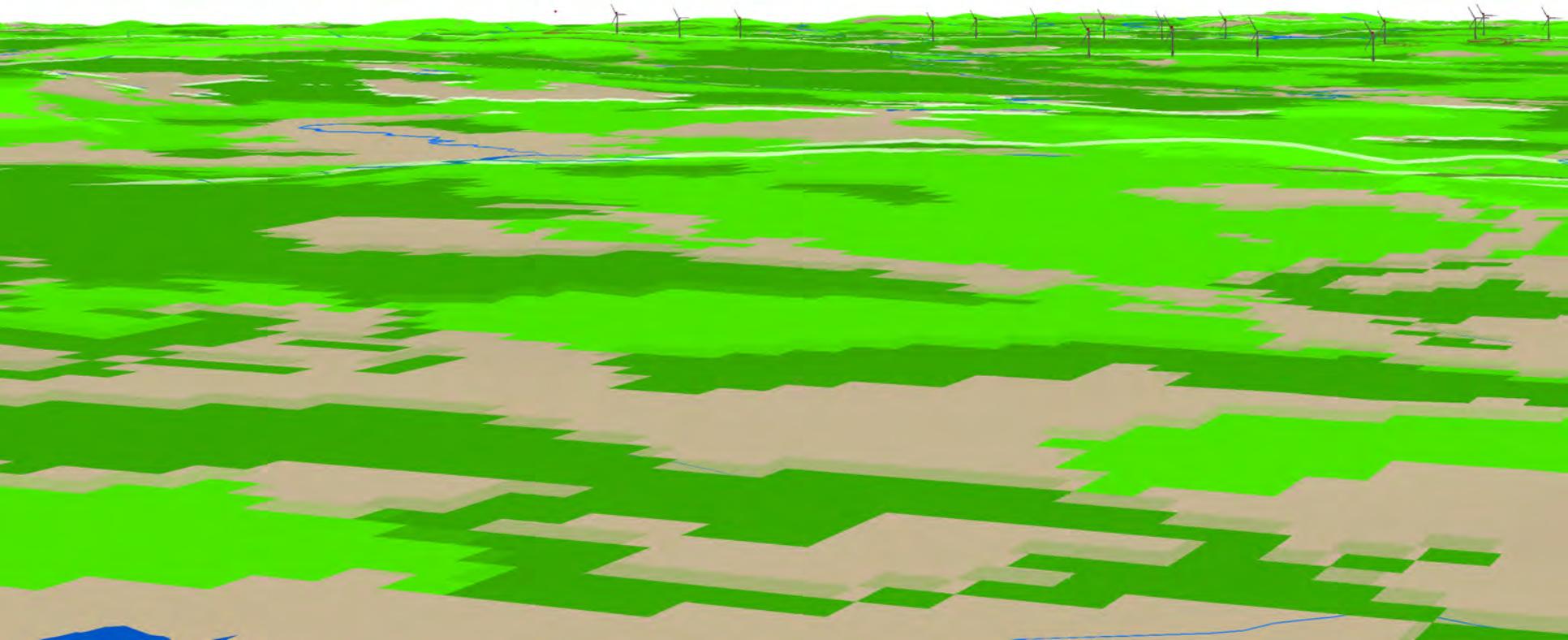
ArcScene Visualization 4e: Tunk Mountain: Approved Project Cumulative within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2013). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Siemens 3.0-113 turbines approved for Hancock Wind are 156 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



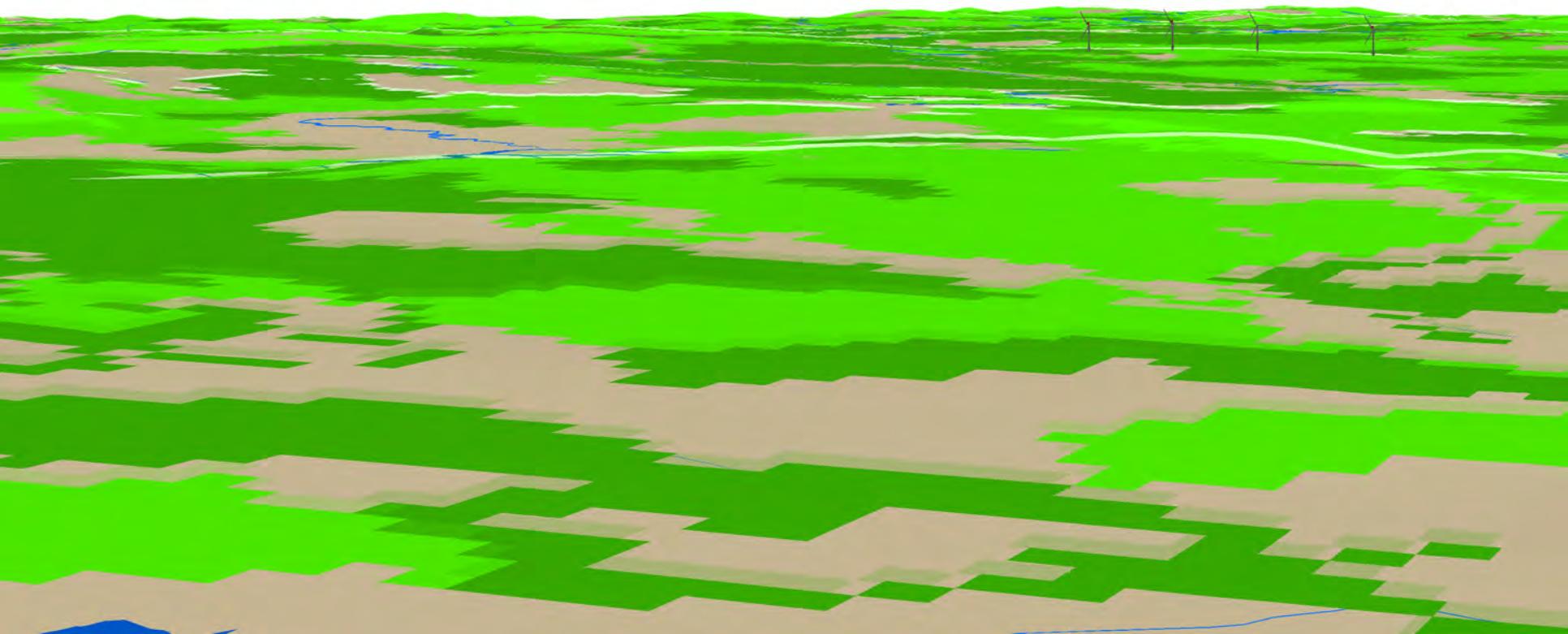
ArcScene Visualization 4g: Tunk Mountain: Proposed Amendment

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



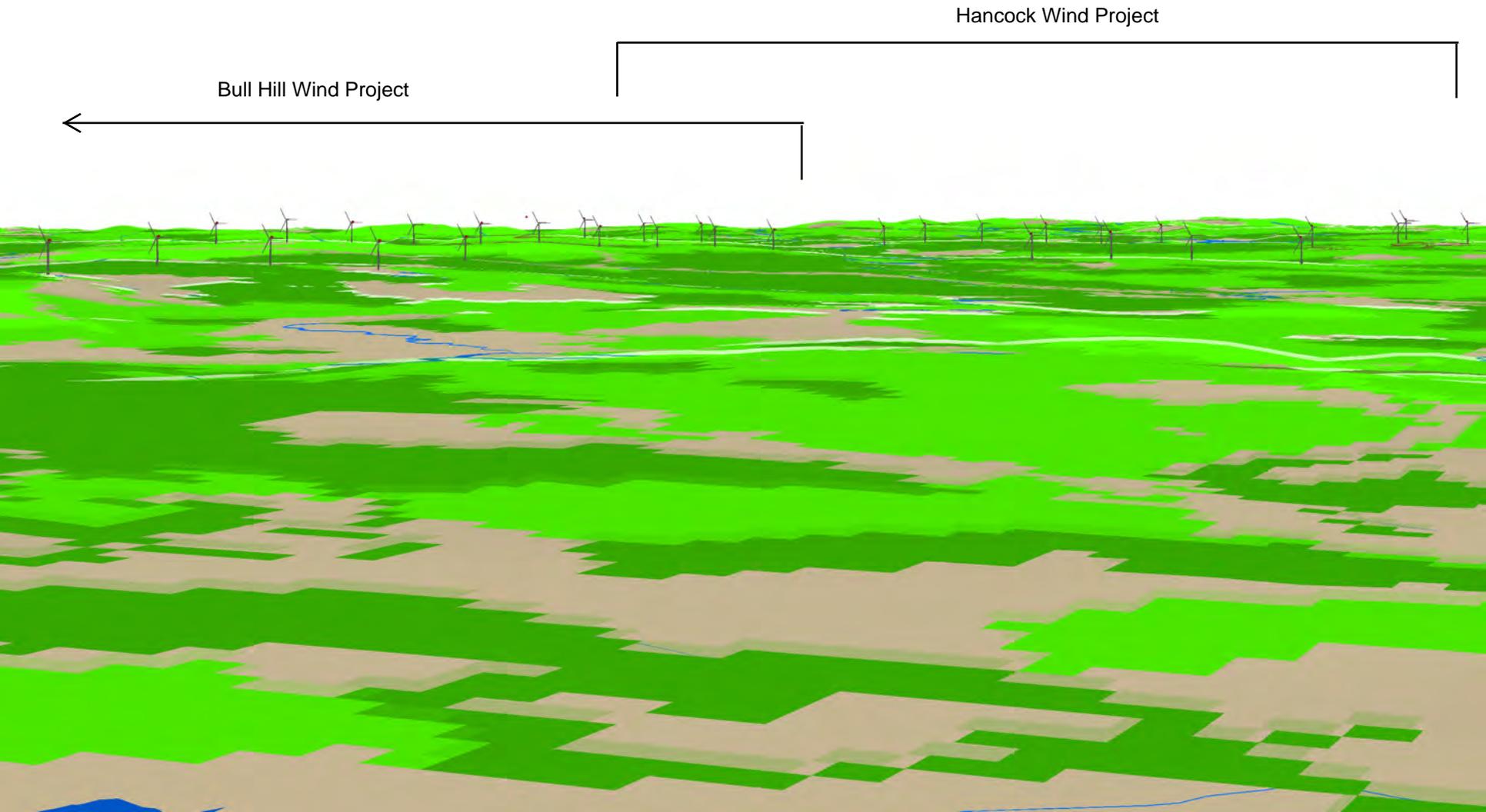
ArcScene Visualization 4h: Tunk Mountain: Proposed Amendment within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 4i: Tunk Mountain: Proposed Amendment Cumulative

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.



ArcScene Visualization 4j: Tunk Mountain: Proposed Amendment Cumulative within 8 miles

The purpose of this visualization is to validate the relative accuracy of the Photosimulation from the Tunk Mountain viewpoint (TJD&A 2014). 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 Hancock Wind Project*. Two forest canopy layers are shown, an opaque one at 40 feet and a semi-transparent one at 60 feet high. Forest cover does not include forested wet lands or areas harvested since 1995. The representation of foreground vegetation may not be accurate. The Bull Hill Wind turbines are 145 meters and the Vestas V113 3.3 MW turbines proposed for the Hancock Wind amendment are 175 meters to the upraised blade tip. FAA aviation warning lighting is represented as a red dot above the nacelle. The access roads and crane paths are represented using a reddish-brown, visible near some of Hancock wind turbines. The horizontal angle of view is 40 degrees, and the visualization will be in proper perspective when viewed from a distance 1.4 time its width.

