

**Review of the  
New England Clean Energy Connect  
Visual Quality and Scenic Character**

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# 1. Introduction

Maine's Department of Environmental Protection (MDEP or DEP or Department) accepted as complete Central Maine Power Company's (CMP) permit application for construction of the New England Clean Energy Connect (NECEC) in September 2017. The NECEC is a proposed electric transmission line from the border with Quebec in Beattie Township to a new converter station in Lewiston. The project also includes several upgrades to CMP's existing electrical transmission network between Lewiston and Pownal, Windsor and Wiscasset and in Cumberland. Approximately 73 percent of the 147-mile transmission line will be built within CMP's existing transmission corridor. The remainder of the line will be built in an undeveloped corridor owned by CMP through working forestland in western Somerset and Franklin counties. The NECEC project will be capable of delivering up to 1,200 megawatts of renewable energy to the New England power grid. This report reviews the visual impact assessment (VIA) prepared by Terrence J. DeWan & Associates (TJD&A 2017).

## 1.1 Project Description

The project is divided into five segments, plus additional equipment at several substations. TJD&A (2017, p. 6.1-6.3) provides the following project description.

**Segment 1** includes 53.5 miles of new HVDC transmission line corridor within a 150' wide cleared corridor within a 300' right-of-way supported by single pole self-weathering steel structures with an average height of 100'. The new HVDC transmission line corridor will be located in Beattie Township (Twp.), Lowelltown Twp., Skinner Twp., Appleton Twp., T5 R7 BKP WKR, Bradstreet Twp., Parlin Pond Twp., Johnson Mountain Twp., West Forks Twp., Moxie Gore, and The Forks Plantation (Plt.).

**Segment 2** includes the northern portion (22+/- miles) of HVDC transmission line to be co-located within an existing 115kV transmission line corridor between the southern end of Segment 1 near the north end of Moxie Pond in The Forks Plt., through the towns of Caratunk and Bald Mountain Twp. T2 R3, to the Wyman Hydroelectric Facility located in Moscow. The co-located section will require the existing 150' wide corridor clearing to be widened by 75' on the western side with the exception of a small section near the former Moscow Radar Station which will be widened by 75' on the east side. The northern portion of the co-located HVDC transmission line along Moxie Pond and in the vicinity of the Appalachian Trail crossing, will be supported by single pole self-weathering steel structures ranging from 75' to 105 in height. The structures on the southern portion of Segment 2 will be single pole self-weathering steel structures with an average height of 100'.

**Segment 3** will include 70+/- miles of the co-located HVDC transmission line from the Wyman Hydroelectric Facility in Moscow, through the towns of Concord Plt., Embden, Anson, Starks, Industry, New Sharon, Farmington, Wilton, Chesterville, Jay, Livermore Falls, Leeds, Greene, to the new 345kV AC to +/-320kV HVDC 1200 MW Merrill Road Converter Station, just north of Larrabee Road Substation in Lewiston. The existing corridor clearing ranges between 150' and 225' in width for the majority of Segment 3, except for a 400' wide 1.1-mile-long section ending at the Livermore Falls Substation. The co-located section will require the existing cleared corridor to be widened by 75' on the western side.

The Converter Station and Larrabee Road Substation will be connected by a new 1.2-mile 345kV AC Transmission Line (Section 3007). In proximity to the Larrabee Road Substation there will be a partial rebuild of 0.8 miles of 34.5kV transmission line (Section 72) to accommodate the connecting segment of 345kV transmission line and the installation of a new 345kV transmission line terminal. The structures in Segment 3 will be single pole self-weathering steel structures with an average height of 100'.

**Segment 4** will include a new 345kV STATCOM Substation off Fickett Road in Pownal and a 0.3-mile 345kV AC Transmission Line (Section 3005) connection from this facility to the Surowiec Substation. In addition, two 115kV transmission lines will be rebuilt: the 9.3-mile Section 62 between Crowley's Substation in Lewiston and Surowiec Substation in Pownal, and the 16.1-mile Section 64 between Larrabee Road Substation and Surowiec Substation. The typical 45' wooden H-frame structures will be replaced with 75' wooden single pole structures. Both rebuilt sections are located in the towns of Lewiston, Auburn, Durham and Pownal.

**Segment 5** will include a new 26.5-mile 345kV AC Transmission Line (Section 3027) from the existing Coopers Mills Substation in Windsor to the existing Maine Yankee Substation in Wiscasset; partial rebuild of a 0.3 mile segment of the 345kV (Section 3025) transmission line between Larrabee Road Substation and Coopers Mills Substation; partial rebuild a 0.8 mile segment of 345kV (Section 392) transmission line between Maine Yankee Substation and Coopers Mills Substation; approximately 3 miles of re-conductor work on existing double circuit lattice steel towers outside of Maine Yankee; and a partial rebuild of a 0.8 mile segment 115kV transmission line (Section 60/88) outside of Coopers Mills Substation. Segment 5 is located in the towns of Windsor, Whitefield, Alna, Woolwich, and Wiscasset.

Several substations constructed or upgraded as part of the Maine Power Reliability Program (MPRP) will also require additional equipment installation as part of the NECEC Project including the Larrabee Road and Crowley's Substations in Lewiston, the Surowiec Substation in Pownal, the Coopers Mills Substation in Windsor, the Maine Yankee Substation in Wiscasset and the Raven Farm Substation in Cumberland. (TJD&A 2017, p. 6.1-6.3)

## **1.2 Scope to the Review**

The scope of the review is contractually specified to:

- Review of the scenic resource inventory and the recreational uses inventory and provide feedback on the completeness of these inventories.
- Determine whether the it [i.e., the VIA] is reasonable and technically correct according to standard visual impact assessment practices.

This review is structured to separately address these two tasks. The review responds to the requirements of the NRPA, Chapter 315, the Site Law and Chapter 375.14. However, it is guided primarily by the requirements of Chapter 315, because it contains more specific and detailed

directions. The next two sections review the requirements of Chapter 315 as they pertain to this review. This review will also be used by the Land Use Planning Commission (LUPC or Commission) in its allowed use determination pursuant to Chapter 10 of their rules. These are followed by two sections that consider the completeness of the scenic resource and recreational use inventories, and the whether the NECEC VIA meets standard professional standards.

## 2. Defining Scenic Resources

This task is to “review of the scenic resource inventory and the recreational uses inventory and provide feedback on the completeness of these inventories.” The review begins by defining the relevant terms associated with identifying and assessing scenic resources. It then considers each class of scenic resource identified in Chapter 315.10 Scenic Resources.

### 2.1 Scenic Resource Terms

Chapter 315.5.H defines scenic resource as:

**Scenic Resource.** Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities. The attributes, characteristics, and features of the landscape of a scenic resource provide varying responses from, and varying degrees of benefits to, humans.

Chapter 315.10 further defines and provides specific classes of scenic resources.

**Scenic resources.** The following public natural resources and public lands are usually visited by the general public, in part with the purpose of enjoying their visual quality. Under this rule, the Department considers a scenic resource as the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed. This list of scenic resources includes, but is not limited to, locations of national, State, or local scenic significance. A scenic resource visited by large numbers who come from across the country or state is generally considered to have national or statewide significance. A scenic resource visited primarily by people of local origin is generally of local significance. Unvisited places either have no designated significance or are “no trespass” places. Sources for information regarding specific scenic resources are found as part of the MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) provided in the application.

- A. National Natural Landmarks and other outstanding natural and cultural features (e.g., Orono Bog, Meddybemps Heath);
- B. State or National Wildlife Refuges, Sanctuaries, or Preserves and State Game Refuges (e.g., Rachael Carson Salt Pond Preserve in Bristol, Petit Manan National Wildlife Refuge, the Wells National Estuarine Research Reserve);
- C. A State or federally designated trail (e.g., the Appalachian Trail, East Coast Greenway);
- D. A property on or eligible for inclusion in the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966, as amended (e.g., the Rockland Breakwater Light, Fort Knox);
- E. National or State Parks (e.g., Acadia National Park, Sebago Lakes State Park);

- F. Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment and appreciation of natural or cultural visual qualities. (e.g., great ponds, the Atlantic Ocean).

All types of scenic resources share several characteristic.

- They are “**public natural resources or public lands.**” There is ambiguity about the intent of “public.” Clearly it includes lands held by government authorities. However, examples of scenic resources are provided that are not held by government authorities—the Meddybumps Heath is private land recognized through the Focus Areas of Statewide Ecological Significance as critical habitat, Rachael Carson Salt Pond Preserve is owned by The Nature Conservancy and is not part of the Rachel Carson National Wildlife Refuge, and the East Coast Greenway is a long distance cycling trail on public ways overseen by a non-profit organization without government designation.
- They are “**visited by the general public,** in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities.” There is no requirement that the public have a legal right of access, just that they are visited by the public. Enjoyment of visual qualities need not be the primary use of the scenic resource, as long as it is part of what they do there. A scenic resource is **not required to be designated as scenic.**
- They are “**the typical point** from which an activity [e.g., proposed project] in, on, over, or adjacent to a protected natural resource is viewed.” For the purposes of a VIA, a scenic resource is a viewpoint in, on or adjacent to a protected natural resource with a view of the proposed project.
- They “include, but are not limited to, locations of **national, State, or local scenic significance.**” This is followed by a definition of “significance” based on the distance visitors live from the scenic resource. It does not refer to the quality of the scenery, or a hierarchy of designation.

As referenced in the definitions, the MDEP Visual Evaluation Field Survey Checklist (DEPLW0540) references sources for information regarding specific scenic resources. However, it does not cover all of the scenic resource categories, and it does not necessarily include all the scenic resources within the categories for which it does provide a source.

## 2.2 National Natural Landmarks and other outstanding natural and cultural features

The MDEP Visual Evaluation Field Survey Checklist DEP (2003a) provides the following guidance:

A listing of National Natural Landmarks and other outstanding natural features in the State of Maine can be found at: [www.nature.nps.gov/nnl/Registry/USA\\_map/states/Maine/maine.htm](http://www.nature.nps.gov/nnl/Registry/USA_map/states/Maine/maine.htm). In addition, unique natural areas are listed in the Maine Atlas and Gazetteer published by DeLorme.

The URL is for the National Natural Landmarks Program, which is described as:

The National Natural Landmarks Program recognizes and encourages the conservation of sites that contain outstanding biological and geological resources. Sites are designated by the Secretary of the Interior for their condition, illustrative character, rarity, diversity, and value to science and education. The National Park Service administers the program and works cooperatively with landowners, managers and partners to promote conservation and appreciation of our nation's natural heritage.

There are Maine programs that identify areas for their “outstanding natural features,” such as the Ecological Reserve System (<http://www.maine.gov/dacf/mnap/reservesys/index.htm>).

Ecological Reserves are lands specifically set aside to protect and monitor the State of Maine's natural ecosystems. These lands are managed by the Bureau of Parks and Lands, and the Maine Natural Areas Program oversees the long-term ecological monitoring plan. As of 2013, Maine has designated more than 90,000 acres of Ecological Reserves on 17 public land units. The original designation was enabled by an act of the Maine Legislature in 2000. As specified in the legislation, the purposes of the Reserves are (Public Laws of Maine, Second Regular Session of the 119th, Chapter 592):

- "to maintain one or more natural community types or native ecosystem types in a natural condition and range of variation and contribute to the protection of Maine's biological diversity,”
- "as a benchmark against which biological and environmental change may be measured, as a site for ongoing scientific research, long-term environmental monitoring and education," and
- "to protect sufficient habitat for those species whose habitat needs are unlikely to be met on lands managed for other purposes".

### **2.3 State or National Wildlife Refuges, Sanctuaries, or Preserves and State Game Refuges**

The MDEP Visual Evaluation Field Survey Checklist DEP (2003a) provides the following guidance:

Most Maine State and National Wildlife Refuges, Sanctuaries, and Preserves and State Game Refuges are listed in the Maine Atlas and Gazetteer published by DeLorme.

Information for Maine Wildlife management Areas is found at <https://www.maine.gov/ifw/fish-wildlife/wildlife/lands/wildlife-management-areas/index.html>, for National wildlife Refuges it is at <https://www.fws.gov/refuges/>.

There are other programs that aim to protect wildlife habitat, such as the Beginning with Habitat Focus Areas (<http://www.maine.gov/dacf/mnap/focusarea/index.htm>).

Beginning with Habitat (BwH) Focus Areas are landscape scale areas that contain exceptionally rich concentrations of at-risk species and natural communities and high quality

common natural communities, significant wildlife habitats, and their intersection with large blocks of undeveloped habitat.

These non-regulatory areas are intended as a planning tool for landowners, conservation entities, and towns. BwH Focus Areas, unlike some other habitat values, are tied to specific environmental settings and are not geographically transferable. Thus, they warrant place-specific conservation attention through a variety of methods ranging from conservation acquisition to focused implementation of best management practices. It is hoped that identification of BwH Focus Areas will help to build regional awareness and concentrate conservation initiatives in those areas of the landscape with the greatest biodiversity significance.

#### **2.4 State or federally designated trail**

The MDEP Visual Evaluation Field Survey Checklist DEP (2003a) provides the following guidance:

Most State and federal trails are listed in the Maine Atlas and Gazetteer published by DeLorme. In addition, the Maine Department of Agriculture, Conservation and Forestry maintains a list of state parks with trails that can be searched by county at: [https://www.maine.gov/dacf/parks/trail\\_activities/index.shtml](https://www.maine.gov/dacf/parks/trail_activities/index.shtml) [corrected URL].

#### **2.5 Property on or eligible for inclusion in the National Register of Historic Places**

The MDEP Visual Evaluation Field Survey Checklist DEP (2003a) provides the following guidance:

Maine sites and structures listed on the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966, as amended, can be searched by town at: <https://npgallery.nps.gov/nrhp> [corrected URL].

In addition, State historic sites can be found at: [www.state.me.us/doc/parks/programs/db\\_search/index.html](http://www.state.me.us/doc/parks/programs/db_search/index.html). A partial listing of historic sites in Maine can be found in the Maine Atlas and Gazetteer published by DeLorme.

Both of these sources contain only designated properties; there is apparent no way to identify properties eligible for listing from these sites. At the time this guidance was written I believe fieldwork was the only available method to identify eligible sites.

#### **2.6 National or State Parks**

The MDEP Visual Evaluation Field Survey Checklist DEP (2003a) provides the following guidance:

A listing of Maine State Parks can be found at: [https://www1.maine.gov/cgi-bin/online/doc/parksearch/gmaps/doc\\_map.pl](https://www1.maine.gov/cgi-bin/online/doc/parksearch/gmaps/doc_map.pl) [corrected URL] or in the Maine Atlas and Gazetteer published by DeLorme. Acadia National Park on Mount Desert Island is Maine's only National Park.

Units of the National Park Service in Maine also includes the Appalachian National Scenic Trail, Katahdin Woods and Waters National Monument, Maine Acadian Culture, Roosevelt Campobello International Park, and Saint Croix Island International Historic Site. More information is available at <https://www.nps.gov/state/me/index.htm>

## **2.7 Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment and appreciation of natural or cultural visual qualities**

This scenic resource category is very general. First, it can be assumed that many people engaging in outdoor activities also “use, observation, enjoyment and appreciation of natural or cultural visual qualities.” For instance, many people driving on the public roads in the NECEC study area will enjoy the visual qualities of the surrounding landscape. Cultural visual qualities might refer to appreciation of architecture, but it could also refer to appreciation of cultural events, such as a festival or town fair.

The requirement that the scenic resources be “public” is more difficult to interpret—as discussed above, some of the examples of scenic resources included in Chapter 315.10 require an expansive interpretation of “public.” Some examples of areas where the public has a legal right of access and it can be expected that many people will appreciate the visual qualities of the landscape include:

- Great Ponds
- Rivers and Streams
- Public roads
- Public Reserve Lands
- Public parks, commons and sports fields
- Public cemeteries

In addition, Maine’s Open Space Tax Law<sup>1</sup> provides for property tax assessment based on current use as open space that provides a public benefit, including “conserving scenic resources, [or] enhancing public recreation opportunities.” Property is eligible for a 20 percent reduction in valuation for providing public access. Maine Revenue Services (2016) defines this as:

“Public access open space land” means an area of open space land allowing public access by reasonable means and the applicant agrees to refrain from taking action to discourage or prohibits daytime, nonmotorized and nondestructive public use.

Properties given a 20 percent reduction in valuation for providing public access would be considered scenic resources under Chapter 315.10.F.

Finally, there are properties where the public has traditional access (a broader view of “public lands”) that might include:

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<sup>1</sup> 36 M.R.S. §§ 1101-1121

- Maine Forest Legacy Program properties
- The Nature Conservancy and similar NGO properties
- Managed forest lands where the public has traditional access
- Golf courses and similar recreation areas
- Private campgrounds and RV parks

Information locating most of these resources can be found at the Maine Office of GIS:  
<http://www.maine.gov/megis/>.

### 3. Defining Standard VIA Practice

This task is to “determine whether it [i.e., the VIA] is reasonable and technically correct according to standard visual impact assessment practices.” Visual impact assessment is a process of (1) gathering the relevant data, (2) analyzing those data, and (3) evaluating the results of the analysis to determine whether a project’s impact is not adverse, adverse, or unreasonable adverse.

#### 3.1 Standard Visual Impact Assessment Practices

Chapter 315.7 direct the VIA to include specific analyses, which constitute standard visual impact assessment practices.

An applicant’s visual impact assessment should visualize the proposed activity and evaluate potential adverse impacts of that activity on existing scenic and aesthetic uses of a protected natural resource within the viewshed of a scenic resource, and to determine effective mitigation strategies, if appropriate. If required, a visual impact assessment must be prepared by a design professional trained in visual assessment procedures, or as otherwise directed by the Department.

In all visual impact assessments, scenic resources within the viewshed of the proposed activity must be identified and the existing surrounding landscape must be described. The assessment must be completed following standard professional practices to illustrate the proposed change to the visual environment and the effectiveness of any proposed mitigation measures. The radius of the impact area to be analyzed must be based on the relative size and scope of the proposed activity given the specific location. Areas of the scenic resource from which the activity will be visible, including representative and worst-case viewpoints, must be identified. Line-of-sight profiles constitute the simplest acceptable method of illustrating the potential visual impact of the proposed activity from viewpoints within the context of its viewshed. A line-of-sight profile represents the path, real or imagined, that the eye follows from a specific point to another point when viewing the landscape. See Appendix A for guidance on line-of-sight profiles. For activities with more sensitive conditions, photosimulations and computer-generated graphics may be required.

A visual impact assessment must also include narratives to describe the significance of any potential impacts, the level of use and viewer expectations, measures taken to avoid and minimize visual impacts, and steps that have been incorporated into the activity design that may mitigate any potential adverse visual impacts to scenic resources.

To summarize, the VIA must include the following components.

- Visibility analysis to a radius appropriate to the size and scope of the proposed project.
- Identification of scenic resource within the project viewshed.
- Photosimulations from representative and worst-case viewpoints.
- Evaluation of potential adverse impacts on existing scenic and aesthetic uses

- Mitigation strategies

The following sections review whether each of the NECEC's VIA components is reasonable and technically correct according to standard visual impact assessment practices.

### 3.2 Visibility Analysis

When conducted on a computer using geographic information system (GIS) software, the visibility analysis maps the project's viewshed. Chapter 315.5.L defines a viewshed as:

**Viewshed.** The geographic area as viewed from a scenic resource, which includes the proposed activity. The viewshed may include the total visible activity area from a single observer position or the total visible activity area from multiple observers' positions.

The visibility analysis requires the specification of a distance from the project that constitutes the study area. Chapter 315.7 states that:

The radius of the impact area to be analyzed must be based on the relative size and scope of the proposed activity given the specific location.

### 3.3 Identify Scenic Resources

The identification of scenic resource areas is discussed above in section 2. Completeness of Scenic Resource and Recreational Uses Inventories. In a confusing dual use of the term "scenic resource," Chapter 315.10 clearly states that:

Under this rule, the Department considers a scenic resource as the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed.

The selection of these viewpoints, called key observation points or KOPs, is one of the most important decisions effecting the VIA outcome. Chapter 315.7 states that:

Areas of the scenic resource from which the activity will be visible, including representative and worst-case viewpoints, must be identified

The extent of visibility from these viewpoints is to be determined, either by plotting line-of-sight profiles, or through mapped viewsheds. It is anticipated that photosimulations will be required "for activities with more sensitive conditions."

The Bureau of Land Management (BLM) uses a contrast rating system that is similar to the *Guidance for Assessing Impacts to Existing Scenic and Aesthetic Uses under the Natural Resources Protection Act* (DEPLW0541-A2003). Therefore, they have similar concerns about selecting KOPs. BLM's (1986, p. 3) guidance for selecting KOPs is:

**Select Key Observation Points (KOP's).** The contrast rating is done from the most critical viewpoints. This is usually along commonly traveled routes or at other likely observation points. Factors that should be considered in selecting KOP's are; angle of observation, number of viewers, length of time the project is in view, relative project size, season of use,

and light conditions (see Section IIID2b for a more detailed description of these factors). Linear projects such as power lines should be rated from several viewpoints representing:

- Most critical viewpoints, e.g., views from communities, road crossings
- Typical views encountered in representative landscapes, if not covered by critical viewpoints.
- Any special project or landscape features such as skyline crossings, river crossings, substations, etc.

In addition to the basic identification of these areas, Chapter 315 requires gathering of various types of information about the area or representative viewpoints.

- Significance of scenic resource (315.4)
- Existing character of the surrounding area (315.4, 315.6)
- Existing scenic, aesthetic and recreational uses (Standard 1 in Section 480-D of the NRPA)
- Degree viewer expectation would be altered (315.4, 315.7, 315.9)
- Level of use (315.7)
- Cumulative visual effects (315.9)

Standard professional practice would be to record this and other relevant information on a standard field sheet prepared for the project.

### **3.4 Photosimulations**

Chapter 315 provides little guidance about photosimulations. The most relevant sections from 315.7 are underlined for emphasis.

In all visual impact assessments, scenic resources within the viewshed of the proposed activity must be identified and the existing surrounding landscape must be described. The assessment must be completed following standard professional practices to illustrate the proposed change to the visual environment and the effectiveness of any proposed mitigation measures. The radius of the impact area to be analyzed must be based on the relative size and scope of the proposed activity given the specific location. Areas of the scenic resource from which the activity will be visible, including representative and worst-case viewpoints, must be identified. Line-of-sight profiles constitute the simplest acceptable method of illustrating the potential visual impact of the proposed activity from viewpoints within the context of its viewshed. A line-of-sight profile represents the path, real or imagined, that the eye follows from a specific point to another point when viewing the landscape. See Appendix A for guidance on line-of-sight profiles. For activities with more sensitive conditions, photosimulations and computer-generated graphics may be required.

It is clearly expected that for every scenic resource representative and worst-case viewpoints be identified, and one would assume photographically documented. However, photosimulations are only required for “activities with more sensitive conditions,” and it is reasonable to expect that a

process with some sort of explicit criteria are necessary to determine this. These key observation points (KOP) would be selected from among the KOPs discussed above in section 3.3 Identify Scenic Resources.

The standard professional practice for preparing digital photorealistic simulations (photosimulations) involves the following steps.

- Original photography using the equivalent of a 50mm lens on a 35mm film camera. It is expected that the photograph is in focus with a proper light exposure. The project should be visible, and there should not be foreground elements that obscure the view. The viewpoint location must be recorded with a GPS. The location of visible elements to register the digital model of the project should be located.
- A digital 3D computer model of the project and surrounding terrain is created and realistically rendered with accurate lighting conditions and material colors and textures. The same elements visible in the photography used to register the model must also be accurately located in the model.
- The photograph and 3D model are overlain registered to form a two-layer composite image.
- Digital image editing software is used to remove portions of the 3D model that will be obscured. If the project includes the removal or introduction of elements, such as vegetation, these must be “painted” into the composite image, often as a third layer. It may be necessary to create guides in the 3D model that indicate the extent of clearing and placement of new elements.
- The composite image is “cleaned up” and formatted for presentation with the original photograph and a cover sheet that includes descriptive information and a location map.

There is no single way to accomplish these steps. However, it is important that the procedures used provide an accurate result, and the steps are well documented so that the process can be audited.

### **3.5 Evaluation of Visual Impacts**

Assessment criteria: Chapter 315.4 defines the scope of the review, reformatted here to emphasize the specific considerations.

**Scope of Review.** The potential impacts of a proposed activity will be determined by the Department considering

- the presence of a scenic resource listed in Section 10,
- the significance of the scenic resource,
- the existing character of the surrounding area,
- the expectations of the typical viewer, the extent and intransience of the activity,

- the project purpose, and
- the context of the proposed activity.

Unreasonable adverse visual impacts are those that are expected to unreasonably interfere with the general public's visual enjoyment and appreciation of a scenic resource, or those that otherwise unreasonably impair the character or quality of such a place.

Chapter 315.9 further determines that:

The Department's determination of impact is based on the following visual elements of the landscape:

- A. **Landscape compatibility**, which is a function of the sub-elements of color, form, line, and texture. Compatibility is determined by whether the proposed activity differs significantly from its existing surroundings and the context from which they are viewed such that it becomes an unreasonable adverse impact on the visual quality of a protected natural resource as viewed from a scenic resource;
- B. **Scale contrast**, which is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource; and
- C. **Spatial dominance**, which is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

The evaluation of these visual elements is formalized through the *Guidance for Assessing Impacts to Existing Scenic and Aesthetic Uses under the Natural Resources Protection Act* (DEPLW0541-A2003). This form includes ratings and thresholds to determine the severity of the visual impact.

Chapter 315.9 continues with additional considerations. This paragraph has been reformatted to emphasize the specific consideration.

In making a determination within the context of this rule, the Department considers the

- type, area, and intransience of an activity related to a scenic resource that will be affected by the activity,
- the significance of the scenic resource, and
- the degree to which the use or viewer expectations of a scenic resource will be altered, including alteration beyond the physical boundaries of the activity.

In addition to the scenic resource, the Department also considers the

- functions and values of the protected natural resource,
- any proposed mitigation,
- practicable alternatives to the proposed activity that will have less visual impact, and
- cumulative effects of frequent minor alterations on the scenic resource.

An application may be denied if the activity will have an unreasonable impact on the visual quality of a protected natural resources as viewed from a scenic resource even if the activity has no practicable alternative and the applicant has minimized the proposed alteration and its impacts as much as possible through mitigation. An “unreasonable impact” means that the standards of the Natural Resources Protection Act, 38 M.R.S.A. § 480-D, will not be met.

Visual impact is not explicitly defined. However, it is reasonable to consider it to be the difference or change between the proposed and base-line visual conditions. It is common practice that the existing condition is taken as the baseline. For instance, where the NECEC is co-located in an existing transmission line corridor, the visual impact might be considered the incremental change in visual quality. On the other hand, Chapter 315 also directs the Department to consider the “cumulative effects of frequent minor alterations on the scenic resource.” In this case, the visual impact would be the total impact of the transmission infatuation within the context of the extensive forested landscape that many people consider natural-appearing or even “wild.”

Proposed projects need to be held remaining within a threshold of acceptable cumulative visual impacts, as well as being responsible for their incremental visual impact.

### **3.6 Mitigation Strategies**

Chapter 315.5(F) defines mitigation as:

**Mitigation.** Any action taken or not taken to avoid, minimize, rectify, reduce, or eliminate actual or potential adverse environmental impact, including adverse visual impact.

Chapter 315.8 further defines the developer’s responsibility to mitigate visual impacts.

**Mitigation.** In the case where the Department determines that the proposed activity will have an adverse visual impact on a scenic resource, applicants may be required to employ appropriate measures to mitigate the adverse impacts to the extent practicable. Mitigation should reduce or eliminate the visibility of the proposed activity or alter the effect of the activity on the scenic or aesthetic use in some way. The Department will determine when mitigation should be proposed and whether the applicant’s mitigation strategies are reasonable. The Department may require mitigation by requesting that the applicant submit a design that includes the required mitigation or by imposing permit conditions consistent with specified mitigation requirements.

In its determination whether adverse impacts to existing scenic and aesthetic uses are unreasonable, the Department will consider whether the applicant’s activity design is visually compatible with its surroundings, incorporating environmentally sensitive design principles and components according to the strategies described below.

- A. Planning and siting.** Properly siting an activity may be the most effective way to mitigate potential visual impacts. Applicants are encouraged, and may be required, to site a proposed activity in a location that limits its adverse visual impacts within the viewshed of a scenic resource.

- B. Design.** When circumstances do not allow siting to avoid visual impacts on a scenic resource, elements of particular concern should be designed in such a way that reduces or eliminates visual impacts to the area in which an activity is located, as viewed from a scenic resource. Applicants should consider a variety of design methods to mitigate potential impacts, including screening, buffers, earthen berms, camouflage, low profile, downsizing, non-standard materials, lighting, and other alternate technologies.
  
- C. Offsets.** Correction of an existing visual problem identified within the viewshed of the same scenic resource as the proposed activity may qualify as an offset for visual impacts when an improvement may be realized. Offsets may be used in sensitive locations where significant impacts from the proposal are unavoidable or other forms of mitigation might not be practicable. An example of an offset might be the removal of an existing abandoned structure that is in disrepair to offset impacts from a proposal within visual proximity of the same scenic resource. Offsets can also include visual improvements to the affected landscape, such as tree plantings or development of scenic overlooks.

Projects that have unreasonable adverse visual impacts are to be denied (Chapter 315.9). However, the developer is responsible for mitigating any adverse visual impacts to the full extent practicable through planning, siting and design. When significant adverse visual impacts cannot be avoided, then offsets may be required.

### **3.7 Professional Qualifications**

As for all technical studies, the DEP requires that VIAs be prepared by trained professionals. Chapter 315.7 states:

If required, a visual impact assessment must be prepared by a design professional trained in visual assessment procedures, or as otherwise directed by the Department.

## 4. Completeness of Scenic Resource and Recreational Uses Inventories

### 4.1 Introduction

This section provides a “review of the scenic resource inventory and the recreational uses inventory and provide feedback on the completeness of these inventories.” It is based on the interpretation of Chapter 315 presented above in the second section of this report. This review is limited to the primary study area within 3 miles of the project centerline.

**Scenic resources.** Chapter 315.10 defines six classes of scenic resources. It also states that “sources for information regarding specific scenic resources are found as part of the MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) provided in the application.” Therefore, at a minimum these sources must be checked. This review will investigate these resources, but also identify scenic resources from other sources appropriate to each class. No attempt is made to determine potential visibility—see section 5.2 of this report for a review of the VIA’s visibility analysis.

Many scenic resources cross political boundaries and may even include parcels that are not adjacent to each other. An attempt is made to reduce duplicate listing of a scenic resource within a particular class, however some scenic resources may be listed in multiple classes.

**Recreation use.** There are no data in the NECEC VIA describing recreation use or the role of scenic quality in recreation experience and how “the use or viewer expectations of the scenic resource will be altered” by the visual change” (Chapter 315.9). There are only very general statements about how the project will affect motorists, the recreation population and the working population. These statements are not supported by references to authoritative sources.

This is in contrast to the VIAs prepared by TJD&A for wind energy development projects that have the potential to affect viewers at scenic resources of state or national significance. These projects used intercept surveys to gather the necessary data to better understand how viewers will be affected (Palmer 2015). When respondents were asked how different types of development would impact the quality of their recreation experience, they responded that power lines were significantly more negative than wind power projects (Robertson & Mildner 2012, p. 13-21; Portland Research Group 2011, p. 68-73).

### 4.2 National Natural Landmarks and other outstanding natural and cultural features

The MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) states:

A listing of National Natural Landmarks and other outstanding natural features in the State of Maine can be found at:

[http://www.nature.nps.gov/nnl/Registry/USA\\_map/states/Maine/maine.htm](http://www.nature.nps.gov/nnl/Registry/USA_map/states/Maine/maine.htm) . In addition, unique natural areas are listed in the Maine Atlas and Gazetteer published by DeLorme.

The URL for the National Natural Landmarks (NNL) Program is active and small-scale map on their website is not very useful for determining visibility. The two NNL in the study area is listed in Table 1.

Maine's Ecological Reserves aim to protect outstanding natural features, similar to the NNL. There are no Ecological Reserves within the study area.

#### **4.3 State or National Wildlife Refuges, Sanctuaries, or Preserves and State Game Refuges**

The MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) states:

Most Maine State and National Wildlife Refuges, Sanctuaries, and Preserves and State Game Refuges are listed in the Maine Atlas and Gazetteer published by DeLorme.

It seems odd that the official source of information about State Wildlife Management Areas (WMA) should be the DeLorme Atlas and Gazetteer, which is a paper document. The Maine Department of Inland Fisheries and Wildlife (IFW) maintains spatial information about their WMAs, but the GIS file must be requested.<sup>2</sup> The WMAs within the study area are listed in Table 2. There are no U.S. Fish and Wildlife Service (FWS) properties in the study area.

Maine's Beginning with Habitat Focus Areas has similar goals to the IFW and FWS wildlife refuges. Table 2 identifies seven Focus Areas within the study area. Some of these are identified in the VIA under another class of scenic resource, however the Kennebec Estuary is not identified or discussed in the VIA.

There potentially are other properties managed primarily for wildlife; they may be listed in the Conservation database discussed section 4.7, below.

#### **4.4 State or federally designated trail**

The MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) states:

Most State and federal trails are listed in the Maine Atlas and Gazetteer published by DeLorme. In addition, the Maine Department of Agriculture, Conservation and Forestry maintains a list of state parks with trails that can be searched by county at: [http://www.state.me.us/doc/parks/programs/db\\_search/index.html](http://www.state.me.us/doc/parks/programs/db_search/index.html).

The Maine Bureau of Parks and Lands (BPL) maintains most of the state's designated trails. The referenced URL is active and does have a link to "Publications and Maps," though they are not in a form that can be used with a GIS.

Table 3 lists the state or federally designated trails in the study area. The Appalachian National Scenic Trail is crossed three times by the NECEC. There are also a number of trails on state lands managed by BPL.

#### **4.5 Property on or eligible for inclusion in the National Register of Historic Places**

The MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) states:

Maine sites and structures listed on the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966, as amended, can be searched by town at: <http://www.cr.nps.gov/nr/research/nris.htm>

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<sup>2</sup> <https://www.maine.gov/ifw/fish-wildlife/wildlife/environmental-review/accessing-data.html#google>

In addition, State historic sites can be found at:

[http://www.state.me.us/doc/parks/programs/db\\_search/index.html](http://www.state.me.us/doc/parks/programs/db_search/index.html) A partial listing of historic sites in Maine can be found in the Maine Atlas and Gazetteer published by DeLorme.

The National Register of Historic Places (NRHP) database is now found at:

<https://www.nps.gov/nr/research/index.htm> . The GIS database used was current through 2015; 80 historic places were identified within the study area. The boundary for the Arnold Trail to Quebec appears to come from the American Battlefield designation, which follows the original route, rather than the NRHP boundary, which is a large rectangle that contains the complete trail.

In the past, the only way to identify properties eligible for listing on the NRHP was through fieldwork. TJDA did provide a GIS database locating 138 listed and 1,184 eligible properties within the study area as part of the data request. However, the VIA only discussed listed properties, so it is assumed that eligible properties were not considered.

#### **4.6 National or State Parks**

The MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) states:

A listing of Maine State Parks can be found at:

[http://www.state.me.us/doc/parks/programs/db\\_search/index.html](http://www.state.me.us/doc/parks/programs/db_search/index.html) or in the Maine Atlas and Gazetteer published by DeLorme. Acadia National Park on Mount Desert Island is Maine's only National Park.

There are no units of the National Park Service within the study area.

Identifying State Parks may be more difficult. First, not all state parks are listed at the referenced URL or in the DeLorme Atlas. BPL maintains their own data locating all of state park properties, which can include boat launches, historic sites, trails, and easements in addition to areas that have "state park" after their name. However, BPL considers all of these areas to be "state parks" (Eickenberg 2015). Seven state parks are identified in Table 5.

The issue of what qualifies for the National or State Parks classification also effects National Parks. The National Park Service manages several different types of units, including National Battlefields, National Monuments, National Scenic Trails, National Wild and Scenic Rivers, and many other designations. We all accept that Acadia National Park is part of this class, but what about Saint Croix Island International Historic Site, Katahdin Woods and Waters National Monument, and the Appalachian National Scenic Trail? These are the other three units of the National Park Service in Maine. I would consider them all to be part of the "National or State Parks" class.

#### **4.7 Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment and appreciation of natural or cultural visual qualities**

The MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) does not provide guidance for identifying scenic resources in this class. The interpretation of this category has the potential to be very inclusive. It revolves particularly around what is intended as "public." This

could mean “publicly owned,” either fee simple, though lease, or easement. However, it might also mean private property to which the public is expected to have access, such as a conservation area held by The Nature Conservancy, a commercial campground, or an amusement park.

This class clearly includes all great ponds and canoeable streams, and all public roads—both are publicly owned and the visual qualities are enjoyed by people visiting them. Public Reserved Lands, which are not state parks, also fall into this class. There are many other public lands that fall into this class, such as other publicly parks, gardens, commons, and conservation areas.

Table 6 lists 255 great ponds and streams within the study area, plus one Public Reserved Land. No attempt was made to list the public roads—there would be thousands of road segments. However, the NECEC appears to cross a public road 161 times. The VIA only considers roads in the general effect described to motorists and residents in each section of the project. The general description that lumps the impact of all roads together contradicts the VIA’s recognition that visual impacts are the result of site specific conditions:

The level of sensitivity to the visual changes that may result from the NECEC Project is site specific and will depend on the type and use of the resource, duration of exposure, distance from the Project, and potential mitigation. (p. 6.9)

This class might also include other publicly accessible lands where one might enjoy natural or cultural visual qualities. The Maine Office of GIS makes available a conservation lands database that is a cooperative effort of various federal agencies, state agencies, and environmental organizations. Table 7 shows all of the publicly accessible sites after removing state and federally owned lands. There are 64 entries. Over 200 cemeteries are listed in Table 8. It would be possible to identify additional areas, such as town commons or athletic fields, or businesses such as commercial camp grounds or amusement parks.

#### **4.8 Summary**

I freely admit that this desk study has its weaknesses. It is based on data I have been able to acquire in a GIS-compatible format. The determination of potential visibility is from the analysis conducted for the VIA. There has been a substantial amount of manual cut-and-paste to create the tables, and errors were certainly made. Finally, many of these places will not have visibility of the NECEC. However, I believe the point is made that there are a great many places that fit the definition of Chapter 315.10 scenic resources that apparently were not inventoried for the VIA.

The VIA includes lists great ponds and listed historic resources within 3 miles of the NECEC, but it also includes errors. However, there are some ponds that should not be included because they are less than 10 acres (e.g., Sipun Pond) and some historic sites that are not included (e.g., Bradford Peck House in Lewiston). In addition, it does not include all the streams or the properties eligible to be NRHP listed. The VIA identifies approximately 86 conservation areas, but does not separate them into Chapter 315.10 scenic resource categories. However, they do include may private scenic resources, including some where public access is available but may have some restrictions.

TJDA appears to consult the sources suggested by the MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540). They also consult a number of additional sources, indicating that they recognized the need to go beyond the recommended sources. However, they do not appear to include public roads, streams, cemeteries, and many other public areas where people may enjoy the natural and cultural visual qualities. TJDA describes what areas they considered as follows:

In keeping with MEDEP policies, the VIAs have concentrated on views from publicly accessible viewpoints, primarily roads, trails, public lands, and water bodies (VIA 2017, p. 6.5).

However, some of these resources seem to be considered only if they have been recognized for their scenic quality, such as rivers identified in the Maine Rivers Study as having unique or significant scenic value, or designated scenic byways, rather than all roads where people may reasonably be expected to enjoy the scenery.

It is my understanding that Chapter 315 was originally drafted to assess the visual impact of docks in public waters. The definition of the scenic resource classes is somewhat open to interpretation, even very broad interpretation. Just as important, the quality of the scenery is not part of the definition. Chapter 315 has served well for projects that affect a relatively small area, such as a shopping mall. However, it has not work as well for very large projects, such as wind energy development. For this reason, the Governor's Task Force on Wind Power recommended that the definition of scenic resources be tightened to only include properties listed in existing inventories, and limited to places with significant or outstanding scenic value.

**Table 1. National Natural Landmarks and other Outstanding Natural and Cultural Features within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Moose River-Number 5 Bog	Bradstreet Twp., T5 R7 BKP WKR	Somerset	NNL	Y	Y
Number 5 Bog CE	T5 R7 BKP WKR	Somerset	NNL	Y	N

**Table 2. State or National Wildlife Refuges, Sanctuaries, or Preserves and State Game Refuges within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Chesterville WMA	Jay	Chesterville	WMA	Y	N
Chesterville WMA	Jay, Chesterville	Chesterville	WMA	Y	Y
Fahi Pond WMA	Embden	Somerset	WMA	Y	Y
Thurston WMA	New Gloucester	Cumberland	WMA	N	N
Tolla Wolla WMA	Livermore	Androscoggin	WMA	Y	Y
Androscoggin Lake	Leeds	Androscoggin	Focus Area	Y	Y
Attean Pond - Moose River	Appleton Twp., Bradstreet Twp., T5 R7 BKP WKR	Somerset	Focus Area	Y	Y
Bald Mountain	East Moxie Twp.	Somerset	Focus Area	Y	N
Bald Mountain	Bald Mountain Twp. T2 R3	Somerset	Focus Area	Y	Y
Cold Stream - West Forks	West Forks Plt., Moxie Gore	Somerset	Focus Area	Y	Y
Kennebec Estuary	Dresden, Pittston, Westport Island, Wiscasset, Woolwich	Lincoln, Kennebec, Sagadahoc	Focus Area	N	N
Kennebec Floodplain - Madison and Anson	Anson, Madison	Somerset	Focus Area	Y	Y

**Table 3. State or Federally Designated Trail within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Appalachian National Scenic Trail	The Forks Plt.	Somerset	NPS	Y	N
Appalachian National Scenic Trail	Bald Mountain Twp. T2 R3, Caratunk	Somerset	NPS	Y	Y
Androscoggin Riverlands State Park: Abaenaki Overlook, Bradford Hill Trail, Deer Path Trail, Fox Run Trail, Gilbert Homestead Path, Harrington Path, Ledges Trail, Maud Greenleaf Path, Multi Use Trail, Ridge Trail, Snowmobile Trail, The Bradford Loop Trail, and Townsend Jr Homestead Path	Turner	Androscoggin	BPL non-motorized trails	Y	N
Androscoggin Riverlands State Park: Homestead Trail, Mower Homestead Trail, Old River Road Trail, Pine Loop Trail, and Rose Homestead Path	Turner	Androscoggin	BPL non-motorized trails	Y	Y
Androscoggin Riverlands State Park: Turner	Turner	Androscoggin	BPL motorized trails	Y	Y
Bradbury Mountain State Park: Bat Trail, Bluff Trail, Boundary Trail, Fox Trail, Ginn Trail, Kristas Trail, Northern Loop Trail, Ragan Trail, Ski Trail, Snowmobile Trail, Summit Trail, Switchback Trail, Terrace Trail, and Tote Road Trail	Pownal	Cumberland	BPL non-motorized trails	Y	N
Bradbury Pineland Corridor	Pownal	Cumberland	BPL non-motorized trails	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Cold Stream Forest: JAC-FORK	West Forks Plt.	Somerset	BPL motorized trails	Y	N
Holeb Public Reserved Land: Spencer Rips Portage, and Spencer Rips Portage South	T5 R7 BKP WKR	Somerset	BPL non-motorized trails	Y	N
Moxie Falls Scenic Area: Moxie Falls Trail	Moxie Gore	Somerset	BPL non-motorized trails	Y	N
Pineland Public Reserved Land: Bradbury Pineland Connector	North Yarmouth	Cumberland	BPL non-motorized trails	Y	N
The Forks Plt. N public land: Moxie Falls	The Forks Plt., Moxie Falls	Somerset	BPL motorized trails	Y	N
Whistlestop Rail Trail Jay to Farmington	Farmington, Jay, Livermore Falls, Wilton	Franklin	BPL motorized trails	Y	Y

**Table 4. Properties Listed on the National Register of Historic Preservation within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Anson Grange #88	Anson	Somerset	NRHP	Y	N
Arnold Trail to Quebec	Anson, Bingham, Concord Twp., Embden, Madison, Moscow, Norridgewock, Pleasant Ridge Plt., Solon, and Starks	Somerset	MDOHP	Y	Y
Bailey Farm Windmill	Anson	Somerset	NRHP	Y	N
Bingham Free Meetinghouse	Bingham	Somerset	NRHP	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Bradford House	Lewiston	Androscoggin	NRHP	N	N
Briggs, William, Homestead	Auburn	Androscoggin	NRHP	Y	Y
Carrabasset Inn	Anson	Somerset	NRHP	Y	N
Christ Church	Greene	Androscoggin	NRHP	N	N
Clifford, John D., House	Lewiston	Androscoggin	NRHP	Y	Y
Clough Meeting House	Lewiston	Androscoggin	NRHP	Y	Y
Concord Haven	Bingham, Concord Twp., Embden	Somerset	NRHP	Y	Y
Cutler Memorial Library	Farmington	Franklin	NRHP	Y	Y
Embden Town House	Embden	Somerset	NRHP	Y	N
Farmington Historic District	Farmington	Franklin	NRHP	Y	Y
First Congregational Church, United Church of Christ	Farmington	Franklin	NRHP	Y	Y
Franklin County Courthouse	Farmington	Franklin	NRHP	Y	Y
Free Baptist Church	Auburn	Androscoggin	NRHP	Y	Y
Free Will Baptist Meetinghouse	Farmington	Franklin	NRHP	Y	Y
Frye, Sen. William P., House	Lewiston	Androscoggin	NRHP	N	N
Greenacre	Farmington	Franklin	NRHP	Y	Y
Greenwood, Chester, House	Farmington	Franklin	NRHP	Y	Y
Hathorn Hall, Bates College	Lewiston	Androscoggin	NRHP	Y	Y
Healey Asylum	Lewiston	Androscoggin	NRHP	N	N
Holland, Captain, House	Lewiston	Androscoggin	NRHP	Y	N
Holland-Drew House	Lewiston	Androscoggin	NRHP	Y	N
Holmes-Crafts Homestead	Jay	Franklin	NRHP	N	N
Intervale Farm	New Gloucester	Cumberland	NRHP	N	N
Isaacson, Philip M. and Deborah N., House	Lewiston	Androscoggin	NRHP	Y	Y
Jordan School	Lewiston	Androscoggin	NRHP	Y	Y
Kora Temple	Lewiston	Androscoggin	NRHP	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Lamb Block	Livermore Falls	Androscoggin	NRHP	Y	N
Little Red Schoolhouse	Farmington	Franklin	NRHP	Y	N
Lord, James C., House	Lewiston	Androscoggin	NRHP	Y	Y
Madison Public Library	Madison	Somerset	NRHP	Y	Y
Main Street-Frye Street Historic District	Lewiston	Androscoggin	NRHP	Y	Y
Mallett Hall	Pownal	Cumberland	NRHP	N	N
Marcotte Nursing Home	Lewiston	Androscoggin	NRHP	Y	Y
Martel, Dr. Louis J., House	Lewiston	Androscoggin	NRHP	N	N
Merrill Hall	Farmington	Franklin	NRHP	Y	Y
Nordica Homestead	Farmington	Franklin	NRHP	N	N
Oak Street School	Lewiston	Androscoggin	NRHP	Y	N
Old Point and Sebastian Rale Monument	Norridgewock	Somerset	NRHP	N	N
Old Union Meetinghouse	Farmington	Franklin	NRHP	N	N
Peck, Bradford, House	Lewiston	Androscoggin	NRHP	Y	Y
Pownal Cattle Pound	Pownal	Cumberland	NRHP	N	N
Ramsdell, Hiram, House	Farmington	Franklin	NRHP	Y	Y
Randall, Jacob, House	Pownal	Cumberland	NRHP	N	N
Saint Mary's General Hospital	Lewiston	Androscoggin	NRHP	Y	Y
St. Joseph's Catholic Church	Lewiston	Androscoggin	NRHP	Y	N
Steward--Emery House	Anson	Somerset	NRHP	Y	Y
Sts. Peter and Paul Church	Lewiston	Androscoggin	NRHP	Y	N
Temples Historic District	Anson	Somerset	NRHP	Y	Y
Thompson's Bridge	Starks	Somerset	NRHP	N	N
Trinity Episcopal Church	Lewiston	Androscoggin	NRHP	N	N
Tufts House	Farmington	Franklin	NRHP	Y	N
Union Church	Durham	Androscoggin	NRHP	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Universalist Meeting House	New Gloucester	Cumberland	NRHP	N	N
Webster Rubber Company Plant	Sabattus	Androscoggin	NRHP	N	N
Wedgewood, Dr. Milton, House	Lewiston	Androscoggin	NRHP	Y	N
West Durham Methodist Church	Durham	Androscoggin	NRHP	Y	N
Weston Homestead	Madison	Somerset	NRHP	Y	N

**Table 5. National and State Parks within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Androscoggin River Lands	Leeds, Turner	Androscoggin	BPL	Y	Y
Bradbury Mountain State Park	Pownal	Cumberland	BPL	Y	N
Emden Boating	Emden	Somerset	BPL	N	N
Moxie Falls	Moxie Gore	Somerset	BPL	Y	Y
Runaround Pond	Durham	Androscoggin	BPL	Y	Y
Whistle Stop (Jay Farmington) Rail Trail	Farmington, Jay, Wilton	Franklin	BPL	Y	Y

**Table 6. Public Natural Resources of Public Lands Visited in Part or Enjoyment of Visual Qualities within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Allen Pond	Greene	Androscoggin	Great Pond	Y	Y
Androscoggin Lake	Leeds	Androscoggin	Great Pond	Y	Y
Androscoggin Lake	Wayne	Kennebec	Great Pond	Y	N
Auburn Lake	Auburn	Androscoggin	Great Pond	Y	Y
Austin Pond	Bald Mountain Twp. T2 R3	Somerset	Great Pond	N	N
Baker Pond	Caratunk	Somerset	Great Pond	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Baker Pond	Moxie Gore	Somerset	Great Pond	Y	N
Bartlett Pond	Livermore	Androscoggin	Great Pond	N	N
Beattie Pond	Beattie Twp., Lowelltown Twp.	Franklin	Great Pond	Y	Y
Berry Pond	Greene	Androscoggin	Great Pond	Y	Y
Big Dimmock Pond	Caratunk	Somerset	Great Pond	N	N
Black Brook Pond	Moxie Gore	Somerset	Great Pond	Y	N
Boulder Pond	T5 R7 BKP WKR	Somerset	Great Pond	Y	N
Burgess Pond	Fayette	Kennebec	Great Pond	N	N
Burgess Pond	Livermore Falls	Androscoggin	Great Pond	N	N
Chase Pond	Moscow	Somerset	Great Pond	N	N
Chub Pond	Hobbs town Twp.	Somerset	Great Pond	Y	N
Clearwater Lake	Farmington, Industry	Franklin	Great Pond	Y	Y
Dead Stream Pond	West Forks Plt.	Somerset	Great Pond	N	N
Ellis Pond	Chase Stream Twp.	Somerset	Great Pond	Y	N
Embden Pond	Embden	Somerset	Great Pond	Y	Y
Fahi Pond	Embden	Somerset	Great Pond	Y	Y
Fish Pond	Moxie Gore	Somerset	Great Pond	Y	N
Grace Pond	Upper Enchanted Twp.	Somerset	Great Pond	Y	Y
Hall Pond	T5 R7 BKP WKR	Somerset	Great Pond	Y	Y
Heald Pond (Big)	Caratunk	Somerset	Great Pond	N	N
Heald Pond (Little)	Caratunk	Somerset	Great Pond	N	N
Horseshoe Pond	Chase Stream Twp.	Somerset	Great Pond	N	N
Iron Pond	Hobbs town Twp., T5 R6 BKP WKR	Somerset	Great Pond	Y	Y
Jackson Pond	Concord Twp.	Somerset	Great Pond	Y	N
Lily Pond	Concord Twp.	Somerset	Great Pond	Y	Y
Little Austin Pond	Bald Mountain Twp. T2 R3	Somerset	Great Pond	N	N
Little Dimmick Pond	Caratunk	Somerset	Great Pond	N	N
Little Mosquito Pond	The Forks Plt.	Somerset	Great Pond	N	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Little Sabattus Pond	Greene	Androscoggin	Great Pond	N	N
Little Wilson Hill Pd	Johnson Mountain Twp.	Somerset	Great Pond	Y	Y
Long Pond	Livermore	Androscoggin	Great Pond	N	N
Long Pond	Chase Stream Twp.	Somerset	Great Pond	Y	N
Moore Pond	Bradstreet Twp.	Somerset	Great Pond	Y	Y
Moose Hill Pond	Livermore Falls	Androscoggin	Great Pond	N	N
Moose Pond	Lowelltown Twp., Skinner Twp.	Franklin	Great Pond	Y	Y
Mosher Pond	Fayette	Kennebec	Great Pond	N	N
Mosquito Pond	The Forks Plt.	Somerset	Great Pond	Y	N
Mountain Dimmock Pond	Caratunk	Somerset	Great Pond	N	N
Moxie Pond	Bald Mountain Twp. T2 R3, East Moxie Twp., The Forks Plt.	Somerset	Great Pond	Y	Y
Mud Pond	Beattie Twp.	Franklin	Great Pond	Y	Y
Mud Pond	Moxie Gore	Somerset	Great Pond	Y	N
No Name Pond	Lewiston	Androscoggin	Great Pond	Y	Y
North Pond	Chesterville	Franklin	Great Pond	Y	Y
Parker Pond	Jay	Franklin	Great Pond	Y	Y
Parlin Pond	Johnson Mountain Twp., Parlin Pond Twp.	Somerset	Great Pond	Y	Y
Pease Pond	Wilton	Franklin	Great Pond	Y	Y
Pleasant Pond	Turner	Androscoggin	Great Pond	N	N
Prescott Pond	Moxie Gore	Somerset	Great Pond	Y	N
Rock Pond	Appleton Twp., T5 R6 BKP WKR	Somerset	Great Pond	Y	N
Round Pond	Livermore	Androscoggin	Great Pond	N	N
Round Pond	Chase Stream Twp.	Somerset	Great Pond	N	N
Runaround Pond	Durham	Androscoggin	Great Pond	Y	Y
Sabattus Pond	Greene, Sabattus, Wales	Androscoggin	Great Pond	Y	N
Sand Pond	Chesterville	Franklin	Great Pond	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Sandy Pond	Embden	Somerset	Great Pond	Y	N
Schoolhouse Pond	Fayette	Kennebec	Great Pond	Y	N
Schoolhouse Pond	Livermore Falls	Androscoggin	Great Pond	N	N
Spencer Lake	Hobbs town Twp.	Somerset	Great Pond	Y	Y
Temple Pond	Moscow	Somerset	Great Pond	Y	Y
Tibbetts Pond	Concord Twp.	Somerset	Great Pond	N	N
Tobey Pond	Johnson Mountain Twp.	Somerset	Great Pond	Y	Y
Tobey Pond #3	T5 R7 BKP WKR	Somerset	Great Pond	Y	N
Toby Pond	Hobbs town Twp.	Somerset	Great Pond	Y	Y
unnamed pond	Appleton Twp.	Somerset	Great Pond	Y	N
unnamed pond	Bradstreet Twp.	Somerset	Great Pond	Y	Y
unnamed pond	T5 R7 BKP WKR	Somerset	Great Pond	Y	Y
Upper Tobey Pond	T5 R7 BKP WKR	Somerset	Great Pond	Y	Y
Whipple Pond	T5 R7 BKP WKR	Somerset	Great Pond	Y	Y
Wilson Hill Pond	West Forks Plt.	Somerset	Great Pond	Y	N
Wyman Lake	Moscow, Pleasant Ridge Plt.	Somerset	Great Pond	Y	Y
Alder Brook	Durham	Androscoggin	Streams	Y	N
Alder Brook	Embden	Somerset	Streams	Y	Y
Alder Stream	East Moxie Twp.	Somerset	Streams	Y	N
Allen Stream	Greene	Androscoggin	Streams	Y	Y
Allen Stream	Leeds	Androscoggin	Streams	Y	Y
Androscoggin River	Auburn	Androscoggin	Streams	Y	Y
Androscoggin River	Durham	Androscoggin	Streams	Y	Y
Androscoggin River	Greene	Androscoggin	Streams	Y	Y
Androscoggin River	Jay	Franklin	Streams	Y	Y
Androscoggin River	Leeds	Androscoggin	Streams	Y	Y
Androscoggin River	Lewiston	Androscoggin	Streams	Y	Y
Androscoggin River	Lisbon	Androscoggin	Streams	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Androscoggin River	Livermore	Androscoggin	Streams	Y	Y
Androscoggin River	Livermore Falls	Androscoggin	Streams	Y	Y
Androscoggin River	Turner	Androscoggin	Streams	Y	Y
Austin Stream	Bald Mountain Twp. T2 R3	Somerset	Streams	Y	N
Austin Stream	Bingham, Mayfield Twp., Moscow	Somerset	Streams	Y	Y
Back River	Woolwich	Sagadahoc	Streams	N	N
Baker Stream	Caratunk	Somerset	Streams	Y	N
Baker Stream	Appleton Twp., Bald Mountain Twp. T2 R3, T5 R6 BKP WKR	Somerset	Streams	Y	Y
Bald Mountain Brook	Bald Mountain Twp. T2 R3	Somerset	Streams	Y	Y
Bald Mountain Stream	Bald Mountain Twp. T2 R3	Somerset	Streams	N	N
Barker Stream	Farmington	Franklin	Streams	Y	N
Barrett Brook	Appleton Twp.	Somerset	Streams	Y	Y
Bassett Brook	Moscow	Somerset	Streams	Y	N
Beales Brook	Farmington	Franklin	Streams	Y	Y
Bean Brook	Bradstreet Twp., Parlin Pond Twp.	Somerset	Streams	N	N
Bear Brook	Bald Mountain Twp. T2 R3	Somerset	Streams	Y	N
Bear Brook	East Moxie Twp.	Somerset	Streams	Y	Y
Bear Brook	New Gloucester	Cumberland	Streams	N	N
Beaver Brook	Farmington	Franklin	Streams	Y	Y
Big Sandy Stream	East Moxie Twp.	Somerset	Streams	Y	N
Billington Brook	Livermore Falls	Androscoggin	Streams	N	N
Bitter Brook	Bradstreet Twp., Upper Enchanted Twp.	Somerset	Streams	Y	Y
Bitter Brook	Hobbsdown Twp., T5 R7 BKP WKR	Somerset	Streams	Y	N
Black Brook	Moxie Gore	Somerset	Streams	Y	N
Black Brook	West Forks Pt.	Somerset	Streams	N	N
Black Hill Stream	Embden	Somerset	Streams	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Bog Brook	Appleton Twp.	Somerset	Streams	Y	Y
Boundary Brook	Beattie Twp.	Franklin	Streams	Y	N
Boundary Brook	Lowelltown Twp.	Franklin	Streams	N	N
Bradford Brook	Turner	Androscoggin	Streams	Y	Y
Bragdon Brook	New Sharon	Franklin	Streams	N	N
Caribou Flow	Skinner Twp.	Franklin	Streams	Y	Y
Carrabassett River	Anson	Somerset	Streams	Y	Y
Carry Brook	Moxie Gore	Somerset	Streams	Y	N
Carry Brook	West Forks Plt.	Somerset	Streams	N	N
Cascade Brook	Farmington	Franklin	Streams	Y	Y
Chandler Brook	Durham	Androscoggin	Streams	Y	N
Chandler Brook	North Yarmouth	Cumberland	Streams	N	N
Chandler Brook	Pownal	Cumberland	Streams	Y	N
Chase Stream	Chase Stream Twp.	Somerset	Streams	Y	N
Chase Stream	Moscow	Somerset	Streams	Y	Y
Clay Brook	Jay	Franklin	Streams	Y	N
Clay Brook	Livermore Falls	Androscoggin	Streams	Y	Y
Cold Brook	T5 R6 BKP WKR	Somerset	Streams	N	N
Cold Stream	Johnson Mountain Twp., West Forks Plt.	Somerset	Streams	Y	Y
Davis Brook	T5 R6 BKP WKR	Somerset	Streams	N	N
Dead River	Bowtown Twp., West Forks Plt.	Somerset	Streams	N	N
Dead River	Leeds	Androscoggin	Streams	Y	Y
Dead Stream	Chase Stream Twp.	Somerset	Streams	N	N
Dimmick Stream	Caratunk	Somerset	Streams	Y	N
Dud Brook	T5 R6 BKP WKR	Somerset	Streams	N	N
Durgin Brook	T5 R6 BKP WKR	Somerset	Streams	N	N
Durgin Brook	West Forks Plt.	Somerset	Streams	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Dyer Brook	Durham	Androscoggin	Streams	N	N
East Branch Barrett Brook	Appleton Twp.	Somerset	Streams	N	N
East Branch Chandler Brook	Pownal	Cumberland	Streams	N	N
East Branch Enchanted Stream	Upper Enchanted Twp.	Somerset	Streams	Y	N
East Branch Moose River	Skinner Twp.	Franklin	Streams	Y	N
East Branch Salmon Stream	West Forks Plt.	Somerset	Streams	Y	Y
Fahi Brook	Anson	Somerset	Streams	Y	N
Fahi Brook	Embden	Somerset	Streams	Y	Y
Fall Brook	Embden, Solon	Somerset	Streams	Y	Y
Falls Brook	Industry	Franklin	Streams	Y	N
Falls Brook	Starks	Somerset	Streams	N	N
Fish Brook	Industry	Franklin	Streams	Y	N
Fish Meadow Brook	Livermore, Livermore Falls	Androscoggin	Streams	Y	Y
Fourmile Brook	Bradstreet Twp.	Somerset	Streams	Y	Y
Fourmile Brook	Upper Enchanted Twp.	Somerset	Streams	Y	N
Fuller Brook	Jay	Franklin	Streams	Y	Y
Gerrish Brook	Durham	Androscoggin	Streams	Y	Y
Gerrish Brook	Lisbon	Androscoggin	Streams	Y	N
Getchell Brook	Anson	Somerset	Streams	Y	Y
Getchell Brook	Madison	Somerset	Streams	N	N
Gilbert Brook	Anson	Somerset	Streams	Y	Y
Gilbert Brook	Madison	Somerset	Streams	Y	N
Gilman Brook	Anson, Madison	Somerset	Streams	Y	Y
Gold Brook	Appleton Twp., T5 R6 BKP WKR	Somerset	Streams	Y	Y
Goodrich Brook	Industry	Franklin	Streams	Y	Y
Goodrich Brook	New Sharon	Franklin	Streams	Y	N
Gulf Stream	Moscow	Somerset	Streams	Y	N
Hale Brook	Industry, New Sharon	Franklin	Streams	N	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Hardy Brook	Farmington	Franklin	Streams	Y	Y
Hardy Brook	Wilton	Franklin	Streams	Y	N
Hart Brook	Lewiston	Androscoggin	Streams	Y	Y
Hay Bog Brook	Skinner Twp.	Franklin	Streams	Y	N
Heald Stream	Caratunk	Somerset	Streams	Y	N
Heald Stream	Moscow	Somerset	Streams	Y	Y
Hilton Brook	Starks	Somerset	Streams	Y	Y
Hogans Brook	Lowelltown Twp.	Franklin	Streams	Y	Y
Hooper Brook	Greene, Leeds	Androscoggin	Streams	Y	N
Horse Brook	Bradstreet Twp., Upper Enchanted Twp.	Somerset	Streams	Y	Y
House Brook	Auburn, Durham	Androscoggin	Streams	Y	Y
Houston Brook	Concord Twp., Pleasant Ridge Plt.	Somerset	Streams	N	N
Huckleberry Stream	Chester ville	Franklin	Streams	Y	N
Hunton Brook	Livermore, Livermore Falls	Androscoggin	Streams	Y	Y
Jackin Brook	Anson	Somerset	Streams	Y	N
Jackin Brook	Embden	Somerset	Streams	Y	Y
Jackson Brook	Bingham	Somerset	Streams	Y	Y
Jackson Brook	Moscow	Somerset	Streams	Y	N
James Brook	Jay	Franklin	Streams	Y	Y
Jepson Brook	Lewiston	Androscoggin	Streams	Y	Y
Jones Brook	Madison	Somerset	Streams	Y	Y
Josiah Brook	Industry	Franklin	Streams	Y	Y
Josiah Brook	Starks	Somerset	Streams	Y	N
Keith Brook	Livermore	Androscoggin	Streams	Y	Y
Kennebec River	Anson, Bingham, Concord Twp., Embden, Madison, Moscow, Moxie	Somerset	Streams	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
	Gore, Norridgewock, Pleasant Ridge Plt., Solon, West Forks Plt.				
Kennebec River	Starks	Somerset	Streams	Y	N
Kennebec River	The Forks Plt.	Somerset	Streams	N	N
Lemon Stream	Anson	Somerset	Streams	N	N
Lemon Stream	Industry	Franklin	Streams	N	N
Lemon Stream	Starks	Somerset	Streams	Y	Y
Libby Brook	Auburn	Androscoggin	Streams	Y	N
Libby Brook	Durham	Androscoggin	Streams	Y	Y
Little Heald Brook	Caratunk	Somerset	Streams	Y	N
Little Heald Brook	Moscow	Somerset	Streams	Y	Y
Little Houston Brook	Concord Twp.	Somerset	Streams	N	N
Little Norridgewock Stream	Chesterville	Franklin	Streams	Y	N
Little Norridgewock Stream	Farmington	Franklin	Streams	N	N
Little Norridgewock Stream	Jay	Franklin	Streams	Y	N
Little Sandy Stream	Bald Mountain Twp. T2 R3	Somerset	Streams	Y	Y
Little Sandy Stream	Caratunk, The Forks Plt.	Somerset	Streams	Y	N
Little Spencer Stream	Hobbstown Twp., T5 R7 BKP WKR	Somerset	Streams	Y	Y
Lively Brook	Turner	Androscoggin	Streams	N	N
Martin Stream	Concord Twp., Embden	Somerset	Streams	Y	N
Maxwell Brook	Sabattus, Livermore Falls	Androscoggin	Streams	Y	Y
Meadow Brook	Auburn	Androscoggin	Streams	N	N
Meadow Brook	Fayette	Kennebec	Streams	N	N
Meadow Brook	New Gloucester	Cumberland	Streams	N	N
Meadow Brook	Industry, Jay, Wilton	Franklin	Streams	Y	N
Meadow Brook	Starks	Somerset	Streams	Y	Y
Michael Stream	Solon	Somerset	Streams	Y	N
Mile Brook	Moxie Gore, The Forks Plt.	Somerset	Streams	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Mill Brook	Beattie Twp.	Franklin	Streams	Y	Y
Mill Stream	Anson, Concord Twp.	Somerset	Streams	Y	N
Mill Stream	Embden	Somerset	Streams	Y	Y
Mink Brook	Moscow	Somerset	Streams	Y	Y
Mitchell Brook	Industry	Franklin	Streams	Y	N
Montsweag Brook	Wiscasset, Woolwich	Lincoln	Streams	N	N
Moody Brook	Lewiston	Androscoggin	Streams	Y	N
Moose River	Beattie Twp.	Franklin	Streams	Y	Y
Moose River	Lowelltown Twp.	Franklin	Streams	Y	N
Moose River	Bradstreet Twp.	Somerset	Streams	Y	Y
Moose River	T5 R7 BKP WKR	Somerset	Streams	Y	N
Mosquito Brook	Jay	Franklin	Streams	Y	N
Mosquito Stream	The Forks Plt.	Somerset	Streams	Y	Y
Mountain Brook	Johnson Mountain Twp.	Somerset	Streams	Y	Y
Moxie Stream	East Moxie Twp., Moxie Gore, The Forks Plt.	Somerset	Streams	Y	Y
Muddy Brook	Industry	Franklin	Streams	Y	N
Muddy Brook	New Sharon	Franklin	Streams	Y	Y
Nash Brook	Jay	Franklin	Streams	Y	N
Nequasset Brook	Dresden	Lincoln	Streams	N	N
Nequasset Brook	Woolwich	Sagadahoc	Streams	N	N
Nezinscot River	Turner	Androscoggin	Streams	Y	Y
No Name Brook	Greene, Lisbon	Androscoggin	Streams	Y	N
No Name Brook	Lewiston	Androscoggin	Streams	Y	Y
Number One Brook	Beattie Twp.	Franklin	Streams	Y	Y
Number One Brook	Merrill Strip Twp.	Franklin	Streams	Y	N
Number Six Brook	Appleton Twp.	Somerset	Streams	Y	N
Number Six Brook	Skinner Twp.	Franklin	Streams	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Parlin Stream	Parlin Pond Twp.	Somerset	Streams	Y	Y
Pelton Brook	Anson	Somerset	Streams	Y	N
Pelton Brook	Starks	Somerset	Streams	Y	Y
Piel Brook	Bradstreet Twp., Johnson Mountain Twp., Parlin Pond Twp.	Somerset	Streams	Y	Y
Pooler Brook	Madison	Somerset	Streams	Y	Y
Red Brook	Turner	Androscoggin	Streams	N	N
Redwater Brook	Livermore Falls	Androscoggin	Streams	Y	Y
Rift Brook	Mayfield Twp.	Somerset	Streams	Y	N
Royal River	New Gloucester	Cumberland	Streams	N	N
Runaround Brook	Durham	Androscoggin	Streams	Y	Y
Runaround Brook	New Gloucester, Pownal	Cumberland	Streams	Y	Y
Sabattus River	Lisbon	Androscoggin	Streams	Y	N
Sabattus River	Sabattus	Androscoggin	Streams	Y	Y
Sabattus River	Wales	Androscoggin	Streams	N	N
Salmon Brook	Lewiston	Androscoggin	Streams	Y	Y
Salmon Brook	Lisbon	Androscoggin	Streams	Y	N
Salmon Stream	Lower Enchanted Twp., West Forks Plt.	Somerset	Streams	Y	Y
Sandy River	Chesterville	Franklin	Streams	Y	N
Sandy River	Farmington	Franklin	Streams	Y	Y
Sandy River	Norridgewock, Starks	Somerset	Streams	Y	Y
Scott Brook	Fayette	Kennebec	Streams	Y	N
Scott Brook	Livermore Falls	Androscoggin	Streams	Y	Y
Smart Brook	Lowelltown Twp.	Franklin	Streams	Y	N
Smart Brook	Skinner Twp.	Franklin	Streams	Y	Y
Soper Mill Brook	Auburn, Lewiston	Androscoggin	Streams	Y	Y
South Branch Austin Stream	Mayfield Twp.	Somerset	Streams	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
South Branch Moose River	Lowelltown Twp., Skinner Twp.	Franklin	Streams	Y	Y
Spaulding Brook	T5 R6 BKP WKR	Somerset	Streams	N	N
Spencer Stream	Skinner Twp., T5 R6 BKP WKR	Franklin	Streams	N	N
Stetson Brook	Greene, Lewiston	Androscoggin	Streams	Y	Y
Sugar Brook	Chesterville	Franklin	Streams	Y	N
Sugar Brook	Jay	Franklin	Streams	Y	Y
Temple Stream	Farmington	Franklin	Streams	Y	Y
Thoits Branch	Pownal	Cumberland	Streams	Y	N
Thompson Brook	Bradstreet Twp.	Somerset	Streams	N	N
Tomhegan Stream	Chase Stream Twp., Johnson Mountain Twp.	Somerset	Streams	Y	N
Tomhegan Stream	West Forks Plt.	Somerset	Streams	Y	Y
Twomile Brook	Johnson Mountain Twp.	Somerset	Streams	Y	N
West Branch Mill Brook	Beattie Twp.	Franklin	Streams	Y	N
West Branch Moose River	Merrill Strip Twp., Skinner Twp.	Franklin	Streams	Y	N
West Branch Spencer Stream	Skinner Twp.	Franklin	Streams	N	N
Wild Brook	Bald Mountain Twp. T2 R3	Somerset	Streams	Y	Y
Wilson Stream	Chesterville, Farmington	Franklin	Streams	Y	Y
Wilson Stream	Wilton	Franklin	Streams	Y	N
Upper Enchanted Twp.	Johnson Mountain Twp., Upper Enchanted Twp.	Somerset	Public Reserved Land	N	Y

**Table 7. Publicly Accessible Conservation Areas, Excluding State and Federal Lands within 3 Miles of NECEC**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Androscoggin River Preserve	Lewiston	Androscoggin	Conservation	Y	Y
Brackett-Longley Rare Plant Pres.	Leeds	Androscoggin	Conservation	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Bradbury-Pineland	Pownal	Cumberland	Conservation	N	N
Bradbury-Pineland	Pownal	Cumberland	Conservation	Y	N
Bradbury-Pineland Corridor	Pownal	Cumberland	Conservation	Y	N
Breton Preserve	Lisbon	Androscoggin	Conservation	Y	Y
Captain Harris	Greene	Androscoggin	Conservation	Y	N
Chadsey Road Fields Easement	Pownal	Cumberland	Conservation	Y	N
Clifford Woods	Farmington	Franklin	Conservation	Y	Y
Crain-Lawrence Easement	Pownal	Cumberland	Conservation	N	N
Dead River Trail and Conservation Corridor	West Forks Plt.	Somerset	Conservation	N	N
Deerfield Pines Easement	Pownal	Cumberland	Conservation	Y	N
Draper	Moxie Gore	Somerset	Conservation	Y	Y
Durham Riverpark	Durham	Androscoggin	Conservation	Y	Y
Expanding the Androscoggin Greenway	Jay	Franklin	Conservation	Y	N
Garcelon Bog	Lewiston	Androscoggin	Conservation	Y	Y
Grace Pond Upper Enchanted	Upper Enchanted Twp.	Somerset	Conservation	Y	Y
Graham	New Gloucester	Cumberland	Conservation	Y	N
Gruevermen-Wendt Trail	Pownal	Cumberland	Conservation	N	N
Gruevermen-Wendt Trail	Pownal	Cumberland	Conservation	Y	N
Hooper Pond	Greene	Androscoggin	Conservation	Y	N
Indian and Fowl Meadow Islands	Solon	Somerset	Conservation	N	N
Indian and Fowl Meadow Islands	Solon	Somerset	Conservation	Y	N
Knight Farm Easement	Pownal	Cumberland	Conservation	N	N
Lisbon Island	Lisbon	Androscoggin	Conservation	Y	N
Meadowbrook Farm Conservation Area	Fayette	Kennebec	Conservation	Y	Y
Moncrieff Easement	Pownal	Cumberland	Conservation	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Montsweag Brook pond buffer	Wiscasset, Woolwich	Lincoln	Conservation	N	N
Moose River-Number 5 Bog	T5 R7 BKP WKR, Bradstreet Twp., Appleton Twp.	Somerset	Conservation	Y	N
Moose River-Number 5 Bog	Bradstreet Twp., T5 R7 BKP WKR	Somerset	Conservation	Y	Y
Moosehead Region Conservation Easement	Johnson Mountain Twp., Moxie Gore, Squaretown Twp., West Forks Plt.	Somerset	Conservation	Y	N
Moosehead Region Conservation Easement	Chase Stream Twp.	Somerset	Conservation	Y	Y
Muddy Pond Lot	Wayne	Kennebec	Conservation	N	N
Pisgah Hill Project	New Gloucester	Cumberland	Conservation	Y	N
Pisgah Hill Project	New Gloucester	Cumberland	Conservation	Y	N
Pollution Control Facility	Farmington	Franklin	Conservation	Y	Y
Rand Trail	Pownal	Cumberland	Conservation	Y	N
River Rise Farm	Turner	Androscoggin	Conservation	Y	Y
Snowfields Easement	Pownal	Cumberland	Conservation	Y	Y
Spruce Mountian	Jay	Franklin	Conservation	Y	Y
Sturtevant Farm Conservation Area	Fayette	Kennebec	Conservation	N	N
Thompson/Dinsmore Islands	Madison	Somerset	Conservation	Y	Y
Thompson/Dinsmore Islands	Madison	Somerset	Conservation	Y	Y
Thorncrag Bird Sanctuary	Lewiston	Androscoggin	Conservation	Y	Y
Verrill Preserve	Pownal	Cumberland	Conservation	N	N
Whitney Easement	Pownal	Cumberland	Conservation	Y	N

**Table 8. Cemeteries**

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Additon Cemetery	Leeds	Androscoggin	Cemeteries	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Allens Mills Cemetery	Industry	Franklin	Cemeteries	Y	Y
Athearn Cemetery	Anson	Somerset	Cemeteries	Y	N
Auburn Plains Cemetery	Auburn	Androscoggin	Cemeteries	Y	N
Bailey Cemetery	Woolwich	Sagadahoc	Cemeteries	N	N
Baker Cemetery	Moscow	Somerset	Cemeteries	Y	Y
Beans Corner Cemetery	Jay	Franklin	Cemeteries	Y	N
Beech Hill Cemetery	Wayne	Kennebec	Cemeteries	Y	N
Belcher Cemetery	Farmington	Franklin	Cemeteries	N	N
Blake Cemetery	Farmington	Franklin	Cemeteries	Y	Y
Blake Cemetery	Lisbon	Androscoggin	Cemeteries	Y	N
Boardman True Cemetery	Industry	Franklin	Cemeteries	N	N
Boothby Cemetery	Livermore	Androscoggin	Cemeteries	Y	Y
Borough Cemetery	Chesterville	Franklin	Cemeteries	Y	N
Bradbury Cemetery	Durham	Androscoggin	Cemeteries	Y	N
Briggs Cemetery	Auburn	Androscoggin	Cemeteries	Y	Y
Broadview Cemetery	Lewiston	Androscoggin	Cemeteries	Y	N
Butterfield Cemetery	Farmington	Franklin	Cemeteries	Y	N
Carver Cemetery	Leeds	Androscoggin	Cemeteries	Y	Y
Case Cemetery	Farmington	Franklin	Cemeteries	Y	Y
Cedar Grove Cemetery	Durham	Androscoggin	Cemeteries	Y	N
Center Hill Cemetery	Industry	Franklin	Cemeteries	Y	N
Center Meeting House Cemetery	Farmington	Franklin	Cemeteries	Y	Y
Centerville Cemetery	Turner	Androscoggin	Cemeteries	Y	N
Cheney Private Yard	Livermore	Androscoggin	Cemeteries	N	N
Clough Cemetery	Lewiston	Androscoggin	Cemeteries	N	N
Conant Cemetery	Turner	Androscoggin	Cemeteries	Y	Y
Concord Corner Cemetery	Concord Twp.	Somerset	Cemeteries	Y	Y
Coombs Cemetery	Sabattus	Androscoggin	Cemeteries	N	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Cotton Cemetery	Lisbon	Androscoggin	Cemeteries	Y	N
Davis Cemetery	Farmington	Franklin	Cemeteries	Y	N
Davis Cemetery	Lewiston	Androscoggin	Cemeteries	Y	Y
Davis Cemetery	Lisbon	Androscoggin	Cemeteries	N	N
Davis-Bryent Cemetery	Sabattus	Androscoggin	Cemeteries	Y	N
Dill Cemetery	Auburn	Androscoggin	Cemeteries	Y	Y
Dill Cemetery	Lewiston	Androscoggin	Cemeteries	Y	Y
East Wilton Cemetery	Wilton	Franklin	Cemeteries	Y	N
Eaton Cemetery	Sabattus	Androscoggin	Cemeteries	Y	N
Elmwood Cemetery	Pownal	Cumberland	Cemeteries	N	N
Emery Cemetery	Anson	Somerset	Cemeteries	Y	N
Evergreens Cemetery	Solon	Somerset	Cemeteries	Y	N
Fairview Cemetery	Farmington	Franklin	Cemeteries	Y	Y
Fairview Cemetery	Leeds	Androscoggin	Cemeteries	Y	Y
Fish Cemetery	Leeds	Androscoggin	Cemeteries	N	N
Forest Hill Cemetery	Madison	Somerset	Cemeteries	Y	Y
Foss Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Francis Cemetery	Leeds	Androscoggin	Cemeteries	Y	Y
Frederic Cemetery	Starks	Somerset	Cemeteries	Y	N
Furbish Cemetery	Sabattus	Androscoggin	Cemeteries	Y	N
Garcelon Cemetery	Lewiston	Androscoggin	Cemeteries	Y	Y
Gatchell Cemetery	Auburn	Androscoggin	Cemeteries	Y	Y
Gibbs Cemetery	Livermore	Androscoggin	Cemeteries	Y	Y
Goddard Cemetery	Lewiston	Androscoggin	Cemeteries	N	N
Goding Cemetery	Livermore	Androscoggin	Cemeteries	Y	N
Golder Cemetery	Lewiston	Androscoggin	Cemeteries	Y	N
Gower Cemetery	Farmington	Franklin	Cemeteries	Y	N
Gracelawn Memorial Park	Auburn	Androscoggin	Cemeteries	Y	Y

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Grand Army of the Republic Cemetery	Lewiston	Androscoggin	Cemeteries	Y	Y
Greenwood Cemetery	Greene	Androscoggin	Cemeteries	Y	N
Grover Cemetery	Woolwich	Sagadahoc	Cemeteries	N	N
Harmony Grove Cemetery	Durham	Androscoggin	Cemeteries	N	N
Herrick Cemetery	Lewiston	Androscoggin	Cemeteries	Y	Y
Hillman Cemetery	Livermore	Androscoggin	Cemeteries	Y	Y
Holy Cross Cemetery	Livermore Falls	Androscoggin	Cemeteries	Y	Y
Howes Corner Cemetery	Turner	Androscoggin	Cemeteries	Y	N
Island Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Jay Hill Cemetery	Jay	Franklin	Cemeteries	Y	Y
Jones Cemetery	Madison	Somerset	Cemeteries	Y	N
Keen's Mills Cemetery	Turner	Androscoggin	Cemeteries	Y	N
Knapp Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Lake Cemetery	Pownal	Cumberland	Cemeteries	Y	N
Lakeshore Cemetery	Wayne	Kennebec	Cemeteries	Y	N
Lamb Cemetery	Livermore	Androscoggin	Cemeteries	Y	N
Land of Rest Cemetery	Norridgewock	Somerset	Cemeteries	Y	N
Leeds Center Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Libby Cemetery	Auburn	Androscoggin	Cemeteries	Y	N
Libby Number 2 Cemetery	Auburn	Androscoggin	Cemeteries	Y	N
Lisbon Cemetery	Lisbon	Androscoggin	Cemeteries	N	N
Locke Cemetery	Starks	Somerset	Cemeteries	N	N
Lowell Cemetery	Farmington	Franklin	Cemeteries	Y	N
Maple Grove Cemetery	Turner	Androscoggin	Cemeteries	Y	N
Maplewood Cemetery	Pownal	Cumberland	Cemeteries	N	N
McKenney - Murray Cemetery	Auburn	Androscoggin	Cemeteries	N	N
McKenney Cemetery	Auburn	Androscoggin	Cemeteries	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Moose Hill Cemetery	Livermore Falls	Androscoggin	Cemeteries	Y	N
Morris Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Morse Cemetery	Greene	Androscoggin	Cemeteries	N	N
Mosher Hill Cemetery	Farmington	Franklin	Cemeteries	Y	Y
Mount Hope Cemetery	Lewiston	Androscoggin	Cemeteries	Y	N
Mower Cemetery	Greene	Androscoggin	Cemeteries	N	N
Murphys Corner Cemetery	Woolwich	Sagadahoc	Cemeteries	N	N
Mutton Hill Cemetery	Anson	Somerset	Cemeteries	Y	N
North Franklin Cemetery	Farmington	Franklin	Cemeteries	Y	N
North Livermore Cemetery	Livermore	Androscoggin	Cemeteries	N	N
Old Indian Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Old Point Cemetery	Madison	Somerset	Cemeteries	Y	Y
Parker-Bowie Cemetery	Durham	Androscoggin	Cemeteries	Y	N
Peare Cemetery	Greene	Androscoggin	Cemeteries	N	N
Penley Corner Cemetery	Auburn	Androscoggin	Cemeteries	Y	Y
Perley Cemetery	Livermore	Androscoggin	Cemeteries	Y	Y
Pierce Cemetery	Solon	Somerset	Cemeteries	Y	N
Pierce Hill Cemetery	Moscow	Somerset	Cemeteries	N	N
Pike Cemetery	Industry	Franklin	Cemeteries	N	N
Pineland Memorial Cemetery	New Gloucester	Cumberland	Cemeteries	Y	N
Pitts Cemetery	Livermore	Androscoggin	Cemeteries	N	N
Pleasant Hill Cemetery	Livermore Falls	Androscoggin	Cemeteries	Y	N
Pleasant Hill Cemetery	Sabattus	Androscoggin	Cemeteries	Y	Y
Pleasant Valley Cemetery	Livermore Falls	Androscoggin	Cemeteries	N	N
Pleasant View Cemetery	Livermore Falls	Androscoggin	Cemeteries	Y	N
Plummer Cemetery	Auburn	Androscoggin	Cemeteries	Y	N
Potters Field Cemetery	Lewiston	Androscoggin	Cemeteries	Y	Y
Pownal Center Cemetery	Pownal	Cumberland	Cemeteries	N	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Quaker Cemetery	Lewiston	Androscoggin	Cemeteries	Y	N
Quaker Ridge Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Red Schoolhouse Cemetery	Farmington	Franklin	Cemeteries	N	N
River Grove Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
River Road Cemetery	Greene	Androscoggin	Cemeteries	N	N
Riverside Cemetery	Farmington	Franklin	Cemeteries	Y	Y
Riverside Cemetery	Lewiston	Androscoggin	Cemeteries	N	N
Rose Cemetery	Greene	Androscoggin	Cemeteries	N	N
Ruby Cemetery	Auburn	Androscoggin	Cemeteries	Y	N
Saint Anns Cemetery	Lisbon	Androscoggin	Cemeteries	Y	N
Saint Peters Cemetery	Lewiston	Androscoggin	Cemeteries	N	N
Sanborn Cemetery	Sabattus	Androscoggin	Cemeteries	N	N
Savage Hill Cemetery	Concord Twp.	Somerset	Cemeteries	Y	N
Sebastian Rasle Cemetery	Madison	Somerset	Cemeteries	Y	N
Seigars Cemetery	Dresden	Lincoln	Cemeteries	N	N
Sewall Cemetery	Farmington	Franklin	Cemeteries	Y	N
Shaw Cemetery	Industry	Franklin	Cemeteries	Y	N
Stones Corner Cemetery	Jay	Franklin	Cemeteries	Y	Y
Stricklands Cemetery	Livermore Falls	Androscoggin	Cemeteries	Y	Y
Stubbs Mill Cemetery	Jay	Franklin	Cemeteries	Y	Y
Sunset Cemetery	Anson	Somerset	Cemeteries	Y	Y
Sylvester Cemetery	Greene	Androscoggin	Cemeteries	N	N
Thompson Fruitland Cemetery	Jay	Franklin	Cemeteries	N	N
True Cemetery	Livermore	Androscoggin	Cemeteries	Y	Y
Union Cemetery	Auburn	Androscoggin	Cemeteries	Y	Y
Union Cemetery	Leeds	Androscoggin	Cemeteries	N	N
Union Cemetery	Moscow	Somerset	Cemeteries	Y	Y
Unknown	Anson	Somerset	Cemeteries	Y	N

Scenic Resource	Town	County	Type	Visibility	
				Topo	Forest
Unknown	Auburn	Androscoggin	Cemeteries	Y	N
Unknown	Bingham	Somerset	Cemeteries	Y	Y
Unknown	Chesterville	Franklin	Cemeteries	N	N
Unknown	Concord Twp.	Somerset	Cemeteries	Y	Y
Unknown	Embden	Somerset	Cemeteries	Y	N
Unknown	Leeds	Androscoggin	Cemeteries	Y	N
Unknown	Norridgewock	Somerset	Cemeteries	Y	Y
Unknown	Solon	Somerset	Cemeteries	Y	N
Unknown	Starks	Somerset	Cemeteries	Y	N
Upper Street Cemetery	Turner	Androscoggin	Cemeteries	Y	Y
Valley Cemetery	Greene	Androscoggin	Cemeteries	Y	N
Village Cemetery	Bingham	Somerset	Cemeteries	Y	Y
Wagg Cemetery	Auburn	Androscoggin	Cemeteries	Y	N
Warren Cemetery	Pownal	Cumberland	Cemeteries	Y	N
Waterhouse Cemetery	Durham	Androscoggin	Cemeteries	Y	N
Webster Cemetery	Farmington	Franklin	Cemeteries	Y	N
Weeks Mills Cemetery	New Sharon	Franklin	Cemeteries	N	N
West Leeds Cemetery	Leeds	Androscoggin	Cemeteries	Y	N
Wyman's (Noyes) Cemetery	Livermore	Androscoggin	Cemeteries	Y	Y
Zion Hill Cemetery	Chesterville	Franklin	Cemeteries	Y	N

## **5. Is the VIA Reasonable and Technically Correct**

Standard VIA practice, as defined by Chapter 315 must include the following components.

- Visibility analysis to a radius appropriate to the size and scope of the proposed project.
- Identification of scenic resource within the project viewshed.
- Photosimulations from representative and worst-case viewpoints.
- Evaluation of potential adverse impacts on existing scenic and aesthetic uses
- Mitigation strategies

How the NECEC VIA addresses each of these components is reviewed below.

### **5.1 Project Description**

A VIA typically includes text generally describing a project's location and its visible attributes, and this is the case with the NECEC VIA.

However, for projects that will affect a large area, such as wind energy development or transmission lines, the analysis requires the use of GIS data that accurately locates and describes the project elements. It has been difficult to obtain this information for this review.

### **5.2 Visibility Analysis**

The viewshed maps all include a cautionary note: "Potential transmission line visibility needs to be confirmed with field investigations and other visualization techniques." While providing such a statement on viewshed maps is both standard practice and good advice, there is still a responsibility to use the best available data to conduct the visibility analysis, and to report any unusual conditions that may significantly affect the accuracy of the analysis.

The visibility analysis was conducted only for the new self-weathering steel structures and did not include the existing structures or substations. The study area is defined as the area within 3 miles of the project centerline, and up to 5 miles for elevated viewpoints within the viewshed (VIA p. 6.3). These distances would seem to be in general agreement with Sullivan et al. (2014) for the visibility of monopole structures by a casual observer, though an observer with a critical eye may identify structures at greater distances.

The visibility analysis does not appear to consider the cleared corridor (i.e., visibility of the bare ground rather than the structures). A new 150-foot corridor is cleared for the northern 53.5 miles; while most of the existing corridor will be widened from 150 to 225 feet. This cleared corridor could be clearly visible for 10 miles or more (Driscoll et al. 1976), depending on the slope of the ground, its aspect relative to the observer, and the visual contrast with the surrounding landscape (Iverson 1985). The impact of the cleared corridor is often overlooked, but in a natural-appearing context a long straight line presents an easily observed contrast.

**Terrain and land cover data.** Visibility is the determination of whether there is a clear line of sight between an observer and a target. The line of sight can be interrupted by the bare terrain or land cover.

The VIA’s “topographic viewshed” considers the screening potential of only bare ground. The analysis uses nominal 10-meter resolution elevation data from The National Map.<sup>3</sup>

The VIA’s “landcover viewshed” seeks to account for the screening effect of different land covers. It assumes a fixed height for specific land cover types from the Maine Land Cover Data (MELCD), as shown in Table 9.<sup>4</sup> I have investigated the heights of land cover types based on IFSAR remotely sensed data and agree that 40 feet is a reasonable estimation of the height the opaque screen created by deciduous, evergreen and mixed forest land cover in northern new England, however a quarter of the forested cover was less than 30 feet high (Palmer 2016). Similarly, the mean height for woody wetlands was 24 feet, with 25 percent being 7 feet or lower. However, the real problem with the MELCD is that they are “primarily derived from Landsat Thematic Mapper 5 and 7 imagery, from the years 1999-2001. This imagery constitutes the basis for the National Land Cover Dataset (NLCD 2001).”<sup>5</sup> The only real advantage of the MELCD is that they indicate partially cut and regenerating forest areas—but they are so old that these classifications are no longer applicable. It would be far more appropriate to use the current 2011 NLCD, which will be updated in December to 2016.<sup>6</sup>

**Table 9. Land Cover Heights Used for Determining Screened Visibility**

Land Cover Type	Definition	Height
Deciduous Forest	9. Deciduous Forest-Areas dominated by trees generally greater than 5 meters tall and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.	40
Evergreen Forest	10. Evergreen Forest-Areas dominated by trees generally greater than 5 meters tall and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.	40
Mixed Forest	11. Mixed Forest-Areas dominated by trees generally greater than 5 meters tall, and greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.	40
Scrub Shrub	12. Scrub-Shrub-Areas dominated by shrubs less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes tree shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.	10

<sup>3</sup> The 1/3 arc-second DEM available from <https://viewer.nationalmap.gov/basic/?basemap=b1&category=ned,nedsr&title=3DEP%20View>

<sup>4</sup> <https://www.maine.gov/megis/catalog/metadata/melcd.html>

<sup>5</sup> See MELCD metadata information at <https://www.maine.gov/megis/catalog/metadata/melcd.html>.

<sup>6</sup> NLCD 2011 documentation and data are available at [https://www.mrlc.gov/nlcd11\\_data.php](https://www.mrlc.gov/nlcd11_data.php).

Land Cover Type	Definition	Height
Forested Wetland	13. Forested Wetland-Includes all tidal and nontidal wetlands dominated by woody vegetation greater than or equal to 5 meters in height, and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is below 0.5 percent. Total vegetation coverage is greater than 20 percent.	20
Light Partial Cut	24. Light Partial Cut-This type is composed of forestland where less than 50% of the overstory canopy has been removed through harvesting. Harvesting may have occurred previously. May include improvement thinning, light shelterwood and light selection harvests. Characterization conditional: Forest loss must have occurred after 1995.	40
Heavy Partial Cut	25. Heavy Partial Cut-This type includes forestland where greater than 50% of the overstory canopy has been removed through harvesting. Harvesting may have occurred previously. May include heavy shelter wood and heavy selection harvests. Characterization conditional: Forest loss must have occurred after 1995.	40
Forest Regeneration	26. Forest Regeneration-Forested areas previously harvested that have begun to regenerate to forest are included in this type. Seedling to sapling sized trees are expected, possibly with some residual trees present. Species present will vary based on the original site composition, harvesting techniques and site disturbance, and the presence of advance regeneration at the time of harvesting. These sites will return to mature forests. Characterization conditional: Forest loss and subsequent re-growth must have occurred after 1995.	20

**Project specification.** The visibility analysis requires information about the location and height of the transmission structures. The VIA states that the “elevation and structure height and configuration” of the transmission structures were provided by POWER Engineers (p. 6.6).

The request for the data used in the visibility analysis was sent on June 8, 2018. A hard drive with a partial response was received on July 2, that include the “dummy” project composed of 100-foot structures generally spaced at 500-foot intervals along the centerline.<sup>7</sup> Also included were the topography and land cover viewsheds for sections 1-4<sup>8</sup> and section 5<sup>9</sup>, which I assumed were created using the “dummy” structures. While proposed structure locations and heights were

<sup>7</sup> The file location is: F:\PEER REVIEW DATA REQUEST\A. Review of GIS data\12. Viewsheds\StructuresElevation\EstimatedStructuresElevation06192017.shp

<sup>8</sup> These files are location at: F:\PEER REVIEW DATA REQUEST\A. Review of GIS data\12. Viewsheds\NECEC\_VIEWSHED\_DATA\VIEWSHED\_DATA\_SEG\_1\_4.gdb

<sup>9</sup> These files are location at: F:\PEER REVIEW DATA REQUEST\A. Review of GIS data\12. Viewsheds\NECEC\_VIEWSHED\_DATA\VIEWSHED\_DATA\_SEG\_5.gdb

available in an Excel table as early as August 4, 2017, they did not appear to be in a GIS-compatible form.<sup>10</sup>

On July 23, 2018, Amy Segal brought to my attention that the VIA viewshed maps submitted with the VIA used project design data from September 2017 that included the heights for the new structures. I received these file on July 13, 2018 in the fifth instalment to the data request.<sup>11</sup> It is a geodatabase that included files for a September 2017 design of the project that included attributes for structure Name, Station, StrType, StrHeight, LineAngle, Northing, Easting, Elevation and TotHgt.<sup>12</sup> The geodatabase also includes the terrain and land cover elevations used for the visibility analysis, as well as the resulting viewsheds.<sup>13</sup> I assume these viewshed are based on the use of the September 2017 project design rather than the “dummy” design. However, there is no difference between the viewsheds received on July 2 that came with the “dummy” project, and the viewsheds received on July 13 that came with the September 2017 project design.

I confess to being confused about what project information was used for the visibility analysis. It appears that an initial analysis used to determine potential visibility for scenic resources and to guide the fieldwork were based on the “dummy” project. Then more accurate structure locations and heights were mad available for the visibility analysis included with the VIA. As a practical matter, difference between the two analyses is likely to be small, though it may be significant at specific locations.

**Availability of higher quality data.** It is a relatively recent expectation that a VIA for a transmission line would include a visibility analysis. The problem has been that the 30-meter resolution digital elevation data did not become commonly available until the mid-1990s. Even when 10-meter data became common in the mid-2000s, it was thought to be marginally useful for determining the visibility of transmission structures. However, more accurate ground elevation (DTM) and particularly canopy elevation (DSM) data from LiDAR or IfSAR sensors are now available and could have been used for the NECEC VIA. Mercer (2001) describes the similarities and differences between airborne LiDAR and IfSAR implementations.

They are both active systems, transmitting pulses and receiving the back-scattered returns. Both systems measure the 2-way time-delay from the transmitting element to the scattering elements and convert this to a range measurement. ... Both systems respond to the first surface of contact (assuming it is a solid surface) which may be the bare terrain itself or objects such as buildings resting upon the terrain. The resulting model is usually referred to as a DSM (Digital Surface Model). ... The height returned by the IFSAR is an integrated response over the vertical extent of the canopy. In dense forest conditions, an X-Band IFSAR generally measures an ‘effective’ height that corresponds to the top half of the canopy. ...

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<sup>10</sup> For example, see the Excel file FRE 098-344\_S3006\_South\_Preliminary Structure List\_ Rev A\_8-04-17.xlsx provided to the reviewer on July 9, 2018.

<sup>11</sup> The file, which Amy Segal references is: F:\NECEC files 2018-07-13\ViewshedAnalysisSeptember2017.gdb

<sup>12</sup> These three files in the geodatabase are named: DraftStructures09132017North, DraftStructures09132017South, and DraftStructuresSouthEast08102017.

<sup>13</sup> The viewshed files in the geodatabase are named: ViewshedDTM and ViewshedDSMMask.

LIDAR scatters from foliage, but if there are any holes to the forest floor, a portion of the pulse may penetrate all the way through the canopy, and scatter from the true ground surface.

The deciduous forest canopy height will be more accurate if the trees are in full-leaf because it offers a more solid surface for the first reflected return.

Intermap Technologies sells 5-meter resolution terrain (DTM) and land cover surface or canopy (DSM) data based on data from an airborne IFSAR sensor.<sup>14</sup> These data were used by TJD&A in their preparation of the Northern Pass VIA. In addition, Intermap Technologies also sells 10-meter DTM and DSM data. The adequacy of the 10-meter data for assessing transmission line visibility would need to be evaluated, but if acceptable they would be more cost effective.

Raw LiDAR data are publicly available for most if not all of the study area.<sup>15</sup> Additional processing is required to create a DSM from a LiDAR cloud, but the raw data are free. For both data sources, it is probable that the DSM is more accurate if obtained from data collected when vegetation was fully leafed.

In summary, the 3-mile study area is marginally adequate for evaluating the visual impact from the monopole structures of a 345 kV transmission project, but inadequate for the evaluation of the cleared corridor. During the fieldwork phase, the visibility analysis was based on a “dummy” project; the only available information was a tentative centerline. There is no consideration of the existing structures to the cumulative visual impact. The screening heights appear to be guesstimates of the average height for various land cover types and the land cover data are very old. In addition, by using average height, approximately half of the area in a particular land cover will be lower, which may result in indicating there will be screening where it does not exist. While it is professional practice to set the height of forest cover at 40 feet, it may be more appropriate to use a lower height.

### **5.3 Identify Scenic Resources**

Section 4 of this review considers the identification of scenic resources.

### **5.4 Photosimulations**

Among all sources of information about a project, the public is most likely to understand and relate to visual simulations. Therefore, it is important that they be accurate and prepared using best professional practices. The simulation process requires five steps:

- Photography
- Selection of viewpoints
- Project 3D model
- Registering the project model to the photograph
- Final simulation editing

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<sup>14</sup> <https://www.intermap.com/>

<sup>15</sup> <https://www.maine.gov/geolib/programs/lidar/index.html>

- Panorama

This section concludes with some summary comments.

**Photograph.** A total of 70 simulations from 44 viewpoints were evaluated. Nearly all of the original photography was taken with a Nikon D5500 or Nikon D7100 camera with a 35mm lens which is the “normal” focal length for these DX-format cameras. The only focal length exception noted was for the three photographs at viewpoint 32 Kennebec Gorge Picnic Area, which have a 34mm focal length. These photographs were taken with an 18-55mm zoom lens, which is poor practice because of the potential for different focal lengths being used.

Nearly all of these photographs have a resolution of 6,000-by-4,000 pixels. The only exceptions to the high resolution are viewpoints 10 and 11 which are 1,150 feet north and 1,400 feet south of the proposed crossing of the Kennebec River where a Canon EOS 5D Mark III camera was used with a 50mm lens, which is the “normal” focal length for this full-frame format camera. The resolution of these photographs is 3,840-by-2,560 pixels, which is lower than the 5,760-by-3,840 pixels of which the camera is capable.

There is no indication in the VIA that a tripod with a panoramic head was used for the photography, which would improve the creation of panoramas.

**Selection of viewpoints.** It is necessary that a number of viewpoints be selected to represent the type of conditions where viewers will see the project. Since the project is only represented from these specific views, their selection can have a significant effect on the assessment of visual impacts, as well as the public’s understanding of how the project will appear. The VIA states that:

A total of 32 key observation points (KOPs) from scenic resources and locally sensitive resources were selected for the development of photosimulations to illustrate the ‘worst case’ visibility and potential visual impact of the proposed Project

While a perusal of the simulations suggests that they represent a range of viewing distances and contexts, but the procedure for selecting the KOPs was not identified. In addition, at any particular viewpoint there is some discretion about what view(s) to simulation. For instance, for photosimulation 35 Sandy River it is unclear how the TJDA’s commitment to selecting “worst-case” views led to looking toward the structure that was 810 feet from the center of the river rather than the one 225 feet away on the other bank.

**Project 3D model.** The photosimulations used information about structure type, location and height that was available in September 2017, which was much more detailed than the information used for the visibility analysis. This information also included the boundaries of the cleared corridor.

A 3D terrain model of the viewed area is created in 3D Studio using the same elevation data used in the visibility analysis. This model of the view is created with the same “camera” attributes as the original photograph—viewpoint, angle of view, lighting, etc. A CAD model of the

conductors and each structure's type and height is inserted into the 3D Studio Max model, which is also used to render the structures. Features that will be used for registration, and guidelines locating the extent of clearing are also included in the 3D model, usually as simple geometric markers.

**Registering the project model to the photograph.** The project 3D model is registered to the photograph using the registration features in 3D Studio Max. The photograph is imported as a background layer where it and the model can be scaled, rotated, and otherwise adjusted so they match each other. The same clearly defined registration markers in both the photo and 3D model are necessary for this to work accurately with a high degree of confidence. Examples of clearly defined markers would be a chimney, the corner of a building, or an existing transmission structure. If a clear marker is not available in a photograph, then one can insert a stake and determine its location with an accurate GPS unit. The stake can be removed from the photograph in the next step. Terrain ridge and peaks can also be used for registration, but allowance must be made for land cover.

The registered 3D model is saved as PNG file to be combined with the photograph in the next step.

**Final simulation editing.** The photograph and 3D model are imported as layers into Photoshop. This composite needs to be "edited" to portray the visual effects of clearing vegetation in the ROW and removal of project elements that are obscured by topography and vegetation, and in other ways "cleaned up.". Typically edits are done in separate layers, so that it is easier to accommodate design changes. This procedure requires significant understanding in how the view is composed, which is often as much an artistic as technical skill.

**Panorama.** TJDA uses a standard cover sheet for each viewpoint. It includes a panoramic image created from the individual simulations, and possibly additional photos. This cover sheet also includes a location map shows the area viewed in the panorama, a context map that locates the viewpoint in the context of one or more townships, a typical cross section of the Project near the viewpoint, and information about the photography. No instructions for the proper viewing distance of the panorama is given. It is unclear how or if the panorama is used in the evaluation of visual impacts.

The individual simulations have a horizontal angle of view of approximately 37°, which has slight distortion at the edges. This is not very noticeable for individual simulations but becomes apparent when creating the panoramas. It becomes particularly apparent if the conductors span the panorama, since they do not match up. One way to improve the panoramic "stitching" of the original simulations is to project them while they are being stitched. TJDA appears to use Photoshop to create their panoramas, and if they used the Photomerge Wizard, they should use Cylindrical projection or let the software choose the best projection. The effectiveness of the stitching requires that the adjacent photo overlap by 50 percent, and is greatly improved if tripod with a panoramic head is used (this is particularly important if there are objects visible in the immediate foreground where two photos overlap).

**Summary comments about the simulations.** Simulations are the most accessible analysis for the public to understand potential impacts of a proposed project. Chapter 315.7 requires that:

Areas of the scenic resource from which the activity will be visible, including representative and worst-case viewpoints, must be identified.

This applies to all scenic resources. One assumes that the identification will initially be guided by a visibility analysis using the most accurate data available (it is not helpful if it is just a course analysis that is likely to be unreliable). Then these representative and worst-case viewpoints at all the scenic resources are photographically documented. From this photographic inventory, viewpoints representing “activities with more sensitive conditions” are identified for the preparation of photosimulations. It is reasonable to expect that a process with some sort of explicit criteria are necessary to determine the selection of these viewpoints.

While many photographs were taken, it does not appear that an attempt was made to identify and photographically document representative and worst-case viewpoints for all of the scenic resources. In addition, there is no clear process that guided the selection of KOPs from among the photographic inventory. This is essentially the process that would be followed in preparing a VIA for a shopping center. It is unreasonable to expect less of NECEC simply because it is a bigger project—does it make sense to lower the standards for projects because they are bigger? If that is really a problem then divide the big project into ten separate projects and do them properly. If the full process indicated by Chapter 315.7 is followed, then it is possible that more than 44 viewpoints should be used for the photosimulations.

The process used for creating simulations is generally considered the current best professional practice. In particular, the photography has few problems, and no serious ones. The only recommendation would be to use a tripod with a panoramic head and take care that it is leveled.

It is difficult to check the simulations without an independent 3D model. TJDA has checked their own work in the past using Google Earth and a 3D KMZ model of a project. However, TJDA does not appear to have a 3D KMZ of this Project. In the past I have created an ArcScene model of a project to provide an independent review. However, a shape file with the location and height of new structures was not obtained until very late in the review and location and height of the existing structures, which would provide a way to check the scaling of the image were never provided.

It is assumed that TJDA worked under these same burdens. As a result, they were not able to prepare the Google Earth model that their Quality Assurance/Quality Control for Production of Photosimulations requires (step 4).

Through my limited spot checking, I have found several possible serious concerns about the simulations.

- There is an over-reliance on using only ridgelines to register the 3D Studio Max model to the photograph. It is very desirable to use some additional markers, such as building corners or existing transmission structures.

- There does not appear to be any registration information for photosimulation 35 Sandy River looking south.
- There are photosimulations that have high visual impact that are not presented—for instance the view looking north from Sandy River. The new 75-foot structure does not appear properly sized, but I cannot check it without having information about the existing structure. There is no registration information for this simulation.
- The simulations only represent full-leaf vegetation (conditions with leaf-off are not evaluated).

Less serious concerns include:

- The proper viewing distance is not provided with the simulation. It will be different for the single frame simulations, and for each panorama.
- The viewpoints do not follow a consistent referencing scheme. In the original simulation, the viewpoint is numbered, and then a letter is assigned to the base photograph and whether the image represents the existing or simulated condition is identified. Beginning with photosimulation 30, a number that is equivalent to the viewpoint is given, and a letter is assigned sequentially to each single frame images (e.g., the existing and simulated condition do not share a letter).
- The location maps for photosimulations 32 and 33 do not agree about whether the corridor is cleared to the water.
- Table 6-1 of the VIA identifies viewpoint 27 as Route 194, Whitefield, but on the actual photosimulation it is Route 1, Wiscasset, and viewpoint 29 is Route 1, Wiscasset in the table but on the actual simulation it is Route 194, Whitefield. I think the numbers on the simulation may be in error.

As a last comment, I would like to commend TJDA's practice of using multiple adjacent single-frame simulations to portray the full scope of a Project's visibility from a particular viewpoint. Others often only include one single-frame simulation to represent a view where a Project extends across 100° or more.

### **5.5 Evaluation of Visual Impacts**

The VIA includes a substantial amount of analysis—the identification of hundreds of scenic resources, calculating the areas of project visibility, and the creation of photosimulations—but there is little evidence provided to document a process of evaluation. The VIA (p. 6.10 and 6.11) states:

MDEP's Basic Visual Impact Assessment Form (VIA Form) is used as a starting point to determine the potential visual effect of the Project on resources, based upon an evaluation of the Project's visual elements (i.e., landscape compatibility, scale contrast, and spatial

dominance as described in 6.1.8.1). The narrative also includes a description of the scenic significance of scenic resources based on state or local designations in published documents and visual quality observed during field visits (landform, vegetation, water bodies, color, views, human development and character.)

Observations and researched data are provided, when available, to determine the Project's effects on user expectation of scenic quality; extent, nature, duration of public use, and continued use and enjoyment. The following two questions were asked for each identified resource: Will the Project affect the way the scenic resource is currently being used and will it have an effect on the public's enjoyment of the resource?

Chapter 315.9 lists several criteria to be considered in determining scenic impact (reformatted as bulleted points here):

- the type, area, and intransience of an activity related to a scenic resource that will be affected by the activity,
- the significance of the scenic resource,
- the degree to which the use or viewer expectations of a scenic resource will be altered, including alteration beyond the physical boundaries of the activity.
- proposed mitigation, practicable alternatives to the proposed activity that will have less visual impact,
- cumulative effects of frequent minor alterations on the scenic resource

There is no explanation in the VIA of how this evaluation is conducted. The discussion of specific scenic resources in the VIA normally includes a judgement about the visual impact-- either there will be no visual impact, or the impact will be minimal, moderate or strong. The only example I found in the VIA of a specific scenic resource with more than moderate visual impact was Rock Pond, which will be moderate to strong (p. 6.27). The greater potential visual impact at viewpoints where the Project will cross trails, rivers and roads is moderated by considering it within the context of the scenic resource as a whole, or stating that the exposure is for a very short time. Notably, no evaluation of the Upper Kennebec River is given (p. 6.28). For each of the Project's sections there is a discussion of user expectation, continued use and enjoyment of the affect populations, including motorist, resident, recreating, and working populations. No documentation or other supporting evidence is given for the judgements presented.

Chapter 315.9 outlines a visual contrast approach to determining the extent of visual impact which has been implemented as the Basic Visual Impact Assessment Form (DEP 2003b) and was referred to in the above quote from the VIA. Copies of the original evaluation forms were requested on June 8, 2018. These copies were never provided, but a table listing the ratings for two reviewers was made available on August 13, 2018. These rating indicate a "strong" visual impact at Moxie Stream (viewpoint 12), and the Appalachian Trail—Troutdale Road (viewpoint B). A memo accompanied this table and provided additional interpretation of the visual impacts at the Upper Kennebec River Crossing, Moxie Stream, the Appalachian Trail Crossing, and the

Fickett Road Substation. I believe that mitigation plantings have been proposed for these four sites.

The visual impact judgments need to be summarized in a way that the overall effect can be assessed. For very large projects, the MDEP Visual Evaluation Field Survey Checklist does a poor job of facilitating an understanding of the overall visual impact. For example, it has become common practice for Maine's wind energy project VIAs to include a chart that lists each scenic resource and how it is evaluated for each of the criteria in Chapter 315.9.

Chapter 315 recognizes that the overall visual impact to an area may become unreasonable as the result of many small, individually reasonable incremental impacts. The VIA fails to consider the cumulative impact of the existing transmission line(s) and the NECEC to the affected scenic resources. As far as I can tell, no information is made available about the existing transmission lines.

### **5.6 Mitigation Strategies**

The NECEC VIA identifies two primary mitigation measures used throughout the project. First, the use of self-weathering steel poles that develop a dark rust-brown color that generally minimizes color contrast with the surroundings, particularly in a forested landscape (though the contrast will increase against a snowy backdrop). However, these new structures will contrast with the color, size and form of existing wooden H-frame structures. Second, locating the line adjacent to or within an existing corridor for approximately two-thirds its length minimizes the need for additional land acquisition and clearing. In many circumstances, both of these measures are generally considered to be good practices.

In discussing viewer groups, the VIA makes it clear that visual impacts are the result of site specific conditions:

The level of sensitivity to the visual changes that may result from the NECEC Project is site specific and will depend on the type and use of the resource, duration of exposure, distance from the Project, and potential mitigation. (p. 6.9)

This implies that it is necessary to evaluate the appropriateness of mitigation for each site where it is known the project will be visually prominent. This does not appear to have been done in any systematic formal way. For instance, vegetation screening is frequently an effective visual mitigation for transmission lines. The VIA (2017, p. 6.15) states that:

Wherever practicable, existing vegetation will be preserved within the transmission line corridor by careful layout of access roads and monitoring of construction practices during the installation process. No additional roadside buffers are proposed at this time.

The VIA also states that detailed planting plans will be developed for the substations. However, there is no discussion of the process and procedures that will be used to determine when vegetation screening needs to be employed. TJDA conducted this sort of assessment for all road crossings as part of their VIA for the Maine Power Reliability Program (TJDA 2010a, 2010b). However, site specific formal evaluations appear not to have been conducted for the NECEC.

There are several additional mitigation measures that appear not to have been considered, or that may be used more extensively.

- Non-specular conductors are only specified for Rock Pond and the Kennebec Gorge crossings. There is no indication that was considered for other locations (VIA p. 6.37).
- Structure heights were reduced on the western side of Moxie Pond (VIA p. 6.52). There is no indication that was considered for other locations.
- Co-locating the existing and new transmission lines on the same structures. This reduces the number of structures and the need for additional clearing.
- There is no indication that visual impacts were considered in the selection of the route for Section 1. There might be an alternative route with lower visual impacts.
- Burial of the transmission line eliminates visual impacts from structures and conductors.

**Mitigation at the Kennebec River Crossing.** One location that has received particular attention is the Kennebec River crossing. The crossing proposed in the VIA involves five transmission structures. The VIA states that “at the Upper Kennebec River crossing, approximately “200’ of existing mature tree growth will remain on both sides of the riverbanks (p. 6.37). This condition appears to be shown in photosimulations 10 and 11.

A new three-structure configuration removed the two poles closest to the river. Photosimulations 30 and 31 represent this new configuration as seen from the river look at the crossing. They include a graphic analysis to show that within the corridor a 300-foot forested buffer will be retained on one side of the Kennebec River crossing and a 550-foot buffer on the other side. A letter from Gerry Mirabile to James Beyer dated July 26, 2018 states that a “mature forested buffer will be maintained, with trees within this buffer at an average height of 75 feet.” The photosimulations represent this forested buffer as screening all visibility of the transmission structures, though the conductors and marker balls will be very visible. The proposed use of non-specular conductors reduces the potential for glints or glare that would attract the attention of recreation users on the river.

Mirabile (2018) states that the crossing will not have unreasonable adverse impacts because:

The overhead crossing would not be out of character with this section of the river. The entire Kennebec River whitewater rafting experience is inherently commercial. From late spring through early fall, the view at the location of the proposed crossing is of dozens of bright colored rafts, kayaks, and small inflatables, all with occupants who often are boisterous. ...

This commercial and recreational use of this section of the river arguably has more impact on any bucolic nature of the river than does the proposed overhead crossing.

Additionally, rafters using the Kennebec Gorge already are exposed to and aware of existing transmission lines adjacent to the parking and staging areas prior to rafting. The sole vehicular access route to Harris Dam follows an existing transmission line, as Indian Pond Road is adjacent and parallel to the existing 150' wide cleared transmission corridor (the total corridor is 225') for 5.5 miles. The road is on the east side of the corridor in most locations, and the entire width of the road right-of-way is cleared to the transmission line corridor such that the transmission line corridor appears wider than 150'. These existing transmission lines are visible to rafters and other boaters while checking in, preparing to raft, and walking down the stairs next to the Harris Dam to put in to the water.

This existing human-caused visual impact at the Harris Dam put-in is significantly greater than the Preferred Alternative would be (see the discussion below), and affects rafters' and other boaters' aesthetic expectations on the river downstream.

While I can accept the description of the physical conditions, I am skeptical of the implied effect on the rafting experience. It is asserted that "the overhead crossing in the proposed location will not diminish the recreational use or scenic character of the outstanding river segment located between the Forks and Indian Pond Dam." However, no evidence is presented about why people are taking the whitewater rafting trip, how the character of the Harris Dam affects them, what the experience of Class III and IV rapids is like and whether scenery plays a role, what the experience of more sluggish water in the area of the NECEC crossing is like and whether scenery plays a role, and how all of these separate experiences effect their remembrances of the day.

I could imagine that a large part of the motivation to go whitewater rafting is to "get away" and for the "adventure." The industrial quality of the Harris Dam may not be a detriment to this motivation, rather it may be like experiencing the machinery that drives a roller coaster. Or maybe it is a reminder of what they want to escape—and then they start down the rapids and are carried away into the Gorge, which they see as "natural" and "wild," perceptions that are enhanced by the contrast with their entrance at the Harris Dam. During the exhilaration of the Class III and IV rapids, there is little time to contemplate the scenery, all eyes are on the rocks and waves! They come to the relative calm below the rapids, and contemplate the experience and the beauty of this river. They ground the rafts at the best spot identified by the guides and have a look around while the guides prepare their picnic. In the future they will see the NECEC conductor wires and colored marker balls, which are early reminders of the industrial civilization they hoped to leave behind. One might say that this is the worst place for a crossing, because it pulls them out of their reverie before the trip is done.

**Underground the NECEC at the Kennebec River Crossing.** Power Engineers (Sawin 2017) prepared a feasibility report to locate the Kennebec River crossing underground. I am unclear about the installation—there is reference to 1,500 of open trenching, but also 2,900 feet long horizontal directional drilling. And I do not know if it is required that the area immediately above the cable be kept clear of trees. If the forested buffer used in the overhead crossing can be retained, this alternative would not be visible from the river at all. However, Mirabile (2018) determines that it is unreasonable because of additional cost, additional environmental impacts, and it may not be possible to engineer. Perhaps, but it obviously has no visual effects, as long as no clearing needs to be maintained above the cables.

**Brookfield Alternative.** This alternative would leave the proposed route just south of the West Forks NE Reservation and to head east where it crosses the Kennebec River just south of the Harris Dam. It then heads south to rejoin the proposed route just north of Moxie Pond. This alternative route requires the acquisition of a new right-of-way, which Mirabile (2018) identifies as a major impediment because it would break the deadlines set by Massachusetts. Other reasons that this alternative is unreasonable include additional cost, and the environmental impacts associated with additional corridor clearing. In addition, it is asserted that:

The Brookfield Alternative would be visually prominent and would therefore have a significant visual impact on recreational users of the upper Kennebec Gorge and Indian Pond area. As demonstrated by the photosimulations provided to the DEP on June 29, 2018, structures on both sides of the river would be visible to all boaters, and there is no way to screen these structures. The Brookfield Alternative would be visible to all rafters and private boaters putting in to the Kennebec River and most likely would be directly over the stairway and marshaling area where rafters receive instruction before launching. The average time spent at the put-in underneath the Brookfield Alternative crossing site is 20 to 30 minutes. Were boaters to look upstream, the Brookfield crossing site would be visible for 0.25 to 0.5 mile after entering the river. Accordingly, the Brookfield Alternative creates no less impact on existing scenic and aesthetic uses than the Preferred Alternative.

The viewshed analysis does seem to indicate that the Brookfield Alternative could be more visible than the preferred alternative. However, Mirabile seems to consider the visual context of the two crossings to be equivalent, a claim about which I am skeptical. The preferred crossing is in a more scenic location and occurs at a stage in the trip where people may be inclined to take a break and contemplate their surroundings. In contrast, the Brookfield crossing is seen in the context of Harris Dam and other power lines, and as show in four photosimulations it will possibly be an unnoticed addition to the existing infrastructure. At the beginning of the trip, in the visual context of Harris Dam, it may have no effect on the overall experience. The feeling of “getting away” and “adventure” begins as one leaves the dam behind. However, these are both imaginary interpretations and there is no evidence to support either of them.

### **5.7 Professional Qualifications**

TJD&A is a landscape architecture and planning firm with decades of experience preparing VIAs for projects in Maine and other northeastern states. They clearly meet the Chapter 315(7) requirement that the VIA “assessment must be prepared by a design professional trained in visual assessment procedures.”

I am concerned with what appears to have been a rushed preparation of this VIA. Based on the photographic inventory, the fieldwork began on May 24, 2017 and the final draft of the VIA was dated September 26, 2017. Four months is inadequate to do a VIA for a project of this size. One implication is that there was no opportunity to properly consider conditions when the trees have dropped their leaves and there was snow on the ground. By way of contrast, TJDA’s fieldwork for the Northern Pass Transmission Project (NPTP) began in April 2014 and the VIA is dated October 14, 2015, or 18 months.

Another indication of the rushed nature of the VIAs preparation is the lack of a credible design. It is inexcusable that a VIA for a project of this size would rely on a “dummy” project to conduct its visibility analysis. While a new viewshed may have been prepared in September 2017 with the first available project design, this was too late to be considered in during the VIA process. While TJDA may represent that this has little to no effect on the analysis, it is still inappropriate.

I have no real knowledge of why this is happening. However, it is very unlike my past knowledge of how TJDA conducts a VIA.

## **6. Conclusions**

It has been difficult to obtain the data necessary to conduct a technical review of this VIA. TJDA has responded to similar requests for data as part of the review of wind projects, and there have never been the types of problems presented by this project. In some cases, there are different versions of the data and it is difficult to keep them straight; in others the data simply do not exist. It is assumed that this results from the compressed schedule under which the VIA was produced. Under such conditions there is a greater concern that errors have been made that cannot be identified by a technical review but require an independent analysis. The following discussion summarizes the major topics covered in this review.

### **6.1 Availability of Project Data**

In most cases, the design of a project evolves as the VIA is being conducted. As this happens, the analysis and evaluation are adjusted to reflect the new circumstances. The information provided in response to the data request indicates that the original visibility analysis was conducted based on a proposed centerline, with hypothetical structure locations and heights. The first data with project design information appears to be dated September 13, 2017, and the Site Law Application is dated September 27, 2017. Two weeks seems like too short a time to revise an analysis and report, have others review the revisions, and integrate it into the application package. Even now I am told that the design is only at 30% completion, which seems the point where a VIA might begin an analysis rather than months after its completion.

### **6.2 Visibility**

Among VIA professionals, there is some disagreement over the role and importance of a visibility analysis. There are some who consider it a rough guide that is only useful for identifying areas for investigation during fieldwork. Supporters of this view often rely primarily on a bare terrain viewshed—the US Forest Service and the UK’s Landscape Institute recommend this since it is not possible to predict the screening effect of land cover in 50 years or more. When land cover is assigned screening heights, it should be done cautiously so as not to overstate the effect. This has been the accepted practice in the northeastern US, where we have normally assumed that forest cover has a 40-foot height.

As my reviews of wind projects have shown, I believe that visibility and other GIS modeling can play a much larger role in the analysis of visual impacts. For instance, one can determine how much of a structure may be visible, the number of visible structures by distance zone, and estimate an overall impact by weighting the closer structures more heavily and those beyond a certain distance not at all. Within a particular scenic resource some areas will be more impacted than other areas, so this analysis can help locate the “worst-case” viewpoints. Chapter 315.10 states that “the Department considers a scenic resource as the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed.” The visibility and additional criteria implemented in a GIS analysis can help locate this typical viewpoint; presently there are no criteria or formal process to make this determination.

If the visibility analysis is going to play a more important role in a VIA, then it needs to use the most accurate and current data. High quality terrain elevation (DTM) and land cover height (DSM) data are available from LiDAR or IfSAR systems. An analysis using these data would seem to be more responsive to the needs of Chapter 315.7, which requires that the project

visibility be determined for all scenic resources, including representative and worst-case viewpoints.

### **6.3 Scenic Resources**

Chapter 315.10 describes six types or classes of scenic resources and specifies that “this list of scenic resources includes, but is not limited to, locations of national, State, or local scenic significance.” It also indicates that the MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540) provides sources for information regarding specific scenic resources. These sources are federal or state website and the DeLorme’s Maine Atlas and Gazetteer. TJDA recognizes that these sources are only a starting point, and that other sources should be consulted, including web sites for local governments, businesses, conservation organization, and recreation resource finders. Overall, TJDA’s effort to locate additional scenic resources appears quite extensive.

However, how to implement Chapter 315.10’s definition of scenic resources still must be addressed. For instance, this review suggests that:

- A. “Other outstanding natural and cultural features” should include Maine’s Ecological Reserve System.
- B. “State or National Wildlife Refuges” include Maine’s Beginning with Habitat Focus Areas.
- C. The not designated East Coast Greenway is given in Chapter 315.10.C an example of a State or federally designated trail. It seems reasonable that other trails organized by local governments or NGOs should be recognized, such as the Northern Forest Canoe Trail (which TJDA does identify).
- D. No effort is made to review all properties eligible for inclusion in the National Register of Historic Places within the study area, even though TJDA appears to have data about these scenic resources.
- E. “National or State Parks” should include all units of the National Park Service and the Bureau of Parks and Lands, not just those with “park” in their name.
- F. “Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment and appreciation of natural or cultural visual qualities” has the potential to significantly increase the identification of scenic resources. Chapter 315.1 recognizes that Maine’s public waters are a scenic resource, not just those with significant or unique value in the state inventories. Scenic viewing while driving is a very common activity, and all public roads in areas with scenery of at least typical value should be recognized as a scenic resource.

It is unclear how many other additional areas should be considered scenic resources. Maine’s Open Space Tax Law offers property tax reductions in return for public access to

private conservation lands. These lands would seem to be recognized by the state as scenic resources. What about a public golf course or a commercial camp ground?

This more expansive consideration of scenic resources does not come into play for a typical NRPA permit application. When preparing a VIA for a dock permit or shopping center parking lot, there will only be a couple of potential scenic resources. However, with very large projects that have extensive visibility, there will be a great number of scenic resources. The ambiguities of the Chapter 315 scenic resource definitions appear to be one of the issues that the Wind Energy Act sought to correct by limiting the classes of scenic resources, limiting consideration to only those with higher than average scenic quality, and not considering scenic resources not of state or national significance. If the full range of scenic resources are considered, it becomes clear that they represent whole landscapes and not just a few selected points. As a result, very large projects, such as the NECEC, have the potential to degrade the whole landscape. While the visual impact at any particular scenic resource may be moderate, it is the extensiveness of the impact that can create concern.

#### **6.4 Identification of Key Observation Points**

Identification of key observation points (KOP) and photosimulations from them represent the primary opportunity for a formal evaluation of visual impacts. This is particularly true if the potential of the visibility and other GIS analyses are not exploited for this purpose. Chapter 315.7 requires that for all scenic resources within the Project's viewshed, representative and worst-case viewpoints be identified, and that the potential visual impacts be illustrated. If it is impractical to prepare visual simulations for all of these viewpoints, then there needs to be a rational procedure and criteria to select the KOPs that will have simulations and determining when sufficient viewpoints have been chosen. The VIA does not present such a process or set of criteria.

#### **6.5 No Explicit Evaluation Procedure**

The purpose of the evaluation is to determine whether the "proposed design does not unreasonably interfere with existing scenic and aesthetic uses, and thereby diminish the public enjoyment and appreciation of the qualities of a scenic resource" (Chapter 315.9). Several sections list criteria that should be applied to the VIA.

Chapter 315.4 lists:

1. Presence of a scenic resource
2. Significance of the scenic resource
3. Existing character of the surrounding area
4. Expectations of the typical viewer
5. Extent and intransience of the activity
6. Project purpose
7. Context of the proposed activity

Chapter 315.7 lists:

8. Significance of any potential impacts,
9. Level of use and viewer expectations,
10. Measures taken to avoid and minimize visual impacts,

Chapter 315.9 lists:

11. Visual contrast ratings (i.e., results from the Basic Visual Impact Assessment Form).
12. Type, area, and intransience of an activity related to a scenic resource
13. Significance of the scenic resource,
14. Degree to which the use or viewer expectations of a scenic resource will be altered, including alteration beyond the physical boundaries of the activity.
15. The proposed mitigation,
16. Practicable alternatives to the proposed activity that will have less visual impact,
17. Cumulative effects of frequent minor alterations on the scenic resource

There is clearly some replication among these lists that needs to be resolved, and these criteria need some additional definition and clarification, but these are the factors that Chapter 315 directs the VIA to evaluate and DEP to consider in making their determination.

There is no evidence that these criteria are explicitly considered for each effected scenic resource. This is in contrast to wind energy projects reviewed under the similar criteria listed in the Wind Energy Act. In these VIAs each criterion is explicitly addressed for each scenic resource and the results are summarized in tabular form at the end of the report.

## **6.6 Mitigation**

The primary forms of mitigation identified for the NECEC are to locate the Project within or immediately adjacent to an existing transmission line ROW, and to use a self-weathering steel monopole structure. Both are generally considered best practices. However, there is little evidence that additional mitigation was considered. In particular, a systematic evaluation of the benefit that would be provided by vegetative screening should be evaluated, similar to that employed by TJDA (2010b) for the Maine Power Reliability Program. As described in Chapter 315.8, additional mitigation may be required by the Department. However, making this determination is hindered without a clear evaluation process.

## **6.7 Recommendations for Additional Review**

This review has necessarily been limited to more technical topic and does not include original analysis or evaluation. Recommendations for further review include the following.

1. Conduct a field review at sensitive viewpoints and evaluate the potential visual impacts using the Basic Visual Impact Assessment Form (MDEP 2003b). The review should be conducted by at least five DEP and LUPC staff trained to use this form. Past research on

the contrast rating approach to evaluating visual impacts has shown that at least this number of raters is required to obtain reliable results.

2. Conduct a visibility analysis with high quality terrain elevation (DTM) and land cover height (DEM) data obtained with either LiDAR or IFSAR sources. The available Project data needs to have reached a reasonable level of completeness and include the information describing the existing transmission lines in the corridor.
3. Conduct a GIS-based assessment of the visual impact to scenic resources and the wider landscape. A model used for the DOE Northern Pass Transmission Project could be adapted for this purpose (TJ Boyle Associates 2017).
4. Prepare additional photosimulations. In particular, it may be conditions where the Department deems it desirable for a video simulation or an immersive poster-size panoramic photosimulation.

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