

SEPTEMBER 3, 2015

VISUAL ASSESSMENT

for the Antrim Wind Project



Prepared by:

LandWorks

228 Maple Street, Suite 32
Middlebury, VT 05753
Phone: 802.388.3011
Fax: 802.388.1950
Web: www.landworksvt.com
Email: info@landworksvt.com

Prepared for:

Antrim Wind Energy LLC

155 Fleet Street
Portsmouth, NH 03801
Phone: 603.570.4842
Fax: 603.386.6743
Web: www.antrim-wind.com

Table of Contents

1. EXECUTIVE SUMMARY	1
A. OVERVIEW	1
B. CONCLUSION	2
2. METHODOLOGY	3
A. OVERVIEW	3
B. PROJECT DESCRIPTION, GEOGRAPHIC SCOPE AND EXISTING LANDSCAPE CHARACTER	5
1. Project Description	5
2. Geographic Scope	5
3. Existing Landscape Character	6
C. INVENTORY	6
1. Identification of Scenic Resources	6
2. Field Visits and Site Photography	8
D. DETERMINATION OF VISIBILITY	8
1. Viewshed Mapping	8
2. 3D Modeling	11
3. Visual Simulations	11
E. IDENTIFICATION OF SENSITIVE SCENIC RESOURCES	12
1. Cultural Designation	13
2. Scenic Quality	14
3. Overall Sensitivity Rating	16
F. DETERMINATION OF VISUAL EFFECT FROM SENSITIVE SCENIC RESOURCES	16
1. Determining Visual Effect	16
2. Visual Effect Criteria	17
3. Overall Visual Effect	29
G. DETERMINING EFFECT ON THE VIEWER FROM SENSITIVE SCENIC RESOURCES	29
1. Determining Viewer Effect	29
2. Overall Viewer Effect	33
H. OVERALL CONCLUSION AND DETERMINATION OF REASONABLE/UNREASONABLE	33
3. BACKGROUND	35
A. ABOUT THE PROJECT	35
1. Project Facilities	35
2. Project Lighting	37
B. PROJECT AREA/LANDSCAPE CHARACTER	38
1. Introduction	38
2. The Natural Environment	40
3. The Human-Altered Environment	42
4. THE VISUAL ASSESSMENT	48
A. INVENTORY OF SCENIC RESOURCES	48

TABLE OF CONTENTS

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

B. IDENTIFICATION OF SENSITIVE SCENIC RESOURCES	59
1. Cultural Designation	61
2. Scenic Quality	69
3. Overall Sensitivity Rating	71
C. DETERMINATION OF VISUAL EFFECT FROM SENSITIVE SCENIC RESOURCES WITH POTENTIAL VISIBILITY	72
Photographs from Sensitive SCENIC Resources with Potential Visibility	72
1. Number of turbines potentially visible	82
2. Percent of visibility	82
3. Proximity or distance	83
4. Angle of view	84
5. Visual dominance	84
6. Visual clutter/landscape coherence	86
7. Overall Visual Effect	87
D. DETERMINING EFFECT ON THE VIEWER FROM SENSITIVE SCENIC RESOURCES	88
1. Activity	88
2. Extent of Use	88
3. Duration of View	89
4. Remoteness	89
5. Overall Viewer Effect	90
5. OVERALL CONCLUSION	91
A. THE VISUAL ANALYSIS METHODOLOGY	91
B. THE PROPOSED PROJECT SITE AND CHARACTERISTICS	92
C. NIGHT LIGHTING OF THE PROJECT TURBINES	94
D. THE REGIONAL LANDSCAPE AND VIEWSHED	95
E. LOCAL CIRCUMSTANCES AND THE POTENTIAL VISUAL EFFECT	114
F. PROPOSED MITIGATION MEASURES	131
G. OVERALL CONCLUSION	131
6. BIBLIOGRAPHY	133

APPENDICES Attached

EXHIBIT 1: VIEWSHED MAP [TOPOGRAPHY ONLY/FROM THE TIP OF THE BLADE]
EXHIBIT 2: VIEWSHED MAP [TOPOGRAPHY ONLY/FROM THE TURBINE HUB]
EXHIBIT 3: VIEWSHED MAP [TOPOGRAPHY AND VEGETATION/FROM THE TIP OF THE BLADE]
EXHIBIT 4: VIEWSHED MAP [TOPOGRAPHY AND VEGETATION/FROM THE TURBINE HUB]
EXHIBIT 5: VISUAL SIMULATION LOCATION MAP
EXHIBIT 6: BALD MOUNTAIN VISUAL SIMULATION
EXHIBIT 7: FRANKLIN PIERCE LAKE VISUAL SIMULATION
EXHIBIT 8: GREGG LAKE BEACH AREA VISUAL SIMULATION
EXHIBIT 9: ISLAND POND VISUAL SIMULATION
EXHIBIT 10: PITCHER MOUNTAIN VISUAL SIMULATION
EXHIBIT 11: SUMMIT TRAIL, CROTCHED MOUNTAIN VISUAL SIMULATION
EXHIBIT 12: WILLARD POND BOAT LAUNCH VISUAL SIMULATION

TABLE OF CONTENTS

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

EXHIBIT 13: WILLARD POND NORTHEAST CORNER VISUAL SIMULATION
EXHIBIT 14: ANGLE OF VIEW THRESHOLDS: 180° TOTAL POSSIBLE VIEW
EXHIBIT 15: ANGLE OF VIEW THRESHOLDS: 360° TOTAL POSSIBLE VIEW
EXHIBIT 16: 360° VIEWS FROM PITCHER MOUNTAIN
EXHIBIT 17: PANORAMA VIEW FROM WILLARD POND
EXHIBIT 18: VISUAL SIMULATION COMPARISON FROM WILLARD POND
EXHIBIT 19: SUB STATION MITIGATION PLANTING PLAN
EXHIBIT 20: TREND IN TURBINE SIZE IN THE 21ST CENTURY
EXHIBIT 21: VISUAL RATIO COMPARISON
EXHIBIT 22: RESOURCES LANDWORKS VISITED
EXHIBIT 23: CHANGE IN VIEW FROM MEADOW MARSH

1. Executive Summary

A. Overview

Antrim Wind Energy LLC (AWE) is proposing a new wind project in Antrim, New Hampshire, that will consist of 9 turbines, as well as the construction of an access road, an electrical substation, collector lines, a meteorological tower, a small operation and maintenance facility, and a temporary construction equipment laydown yard and work trailers. This new proposal comes after the unsuccessful permitting of a 10-turbine project at the same location. The Site Evaluation Committee (SEC), in their Order of Denial dated April 25, 2013, cited three primary reasons under aesthetics for their rejection of that project¹:

1. The turbines would be out of scale and out of context with the region and the viewsheds of “significant value within the State of New Hampshire.”
2. The impact on Willard Pond would be unreasonably adverse (citing again context and scale).
3. The mitigation measures presented by the applicant were not sufficient.

The SEC stated that the decision was based “solely” on the information provided in the docket, primarily by the applicant’s consultant Saratoga Associates, and Counsel for the Public’s consultant Ms. Jean Vissering, and “is not a determination that a wind facility should never be constructed in the Town of Antrim or on the Tuttle Hill/Willard Mountain ridgeline” (pg. 70). Even though the SEC believed that mitigation measures suggested by Ms. Vissering might “substantially mitigate the unreasonable adverse effect on aesthetics,” it felt it might change other dynamics of the Project that they could not assess at that time (pg. 53-54).

Given these considerations, AWE chose to reassess and design a new Project to specifically address the mitigation measures suggested by Ms. Vissering. Turbine 10 has been completely removed from the design and Turbine 9 has reduced in height, whereby eliminating those turbines that were most prominent, particularly when viewed from Willard Pond and Bald Mountain. The removal of Turbine 10 also eliminates the construction of additional access/ridgeline road and the clearing of vegetation and cut and fill. The Project will also include an extensive and expanded conservation benefit package that will permanently conserve over 908 acres of valuable forestland and habitat. This includes 100 more acres than was proposed in Docket 2012-01 and will now permanently conserve 100% of the ridgeline. It also includes an agreement with the New England Forestry Foundation (“NEFF”), a partner in the Quabbin to Cardigan Initiative, in which AWE has agreed to fund \$100,000 for the acquisition of new permanent conservation lands in the general region of the Project for the “enhancement and maintenance of the region’s aesthetic character, wildlife habitat, working landscape, and public use and enjoyment.”

AWE began working with LandWorks in early 2014 to prepare a Visual Assessment (VA) that would be logical, intuitive, efficient and comprehensive to satisfy the requirements of NH RSA 162-H and to fully inform the SEC in its decision-making concerning this new proposal. This process and the development of a verifiable approach are based, in part, on the work and general approach of Ms. Vissering, which incorporates the methodologies of the United States Forest Service (USFS). Section 2 of this VA provides a summary of the USFS approach referenced by Ms. Vissering, and how it is incorporated into the overall methodology. The USFS is only one of several established and respected processes that are frequently identified in academic publications and professional VA’s.

¹ NH SEC Docket No. 2012-01 Re: Application of Antrim Wind Energy, LLC for a Certificate of Site and Facility for a Renewable Energy Facility Proposed to be Located in Antrim, Hillsborough County, New Hampshire, DECISION AND ORDER DENYING APPLICATION FOR CERTIFICATE OF SITE AND FACILITY, April 25, 2013

Thus, this VA lays out a clear approach with measurable results. It provides a well-defined, step-by-step process by which to determine 1) the sensitivity of a resource, 2) the visual change the project may have to that sensitive resource, 3) the effect the visibility may have on the reasonable person, and 4) an overall conclusion on whether the project has an unreasonable adverse effect on aesthetics given the visual change and other mitigating factors.

B. Conclusion

The multi-step methodology presented in this VA is an amalgamation of a number of established processes, as well as decades of professional experience in this industry, and provides an objective, comprehensive analysis. After a thorough inventory of scenic resources, a detailed review of each resource's sensitivity, a measurable analysis of visual effect, and an inclusive evaluation of affect on the reasonable viewer, it is determined that this project will not have an unreasonable adverse effect on aesthetics.

There are no National Parks, National Natural Landmarks, National Scenic Trails or other highly revered scenic resources within the study area, and no other resource of National significance has visibility of the Project. Of the 290 identified scenic resources, only 30 have the potential for visibility, and only 10 of those are considered sensitive (3.4% of all resources). None of these 10 resources are of State significance (i.e. designated primarily for their scenic value, such as a State Scenic Byway or a State Park). Moreover, within the 353.2 square mile study area, only 8.8 square miles or 2.5% has potential visibility of the Project.² Additionally, the average viewing distance of all resources with potential visibility will be 5 or more miles, and typically 6 or more miles for sensitive resources, which is considered background view.

Overall, the new Project fits well within the topography of the region, and vegetation hides it from most locations. Although the Project area has landscape qualities and recreational resources that are appealing to those who live in and travel to the area, these resources do not have characteristics that are unique to this region, or possess highly sensitive visual qualities that preclude the addition of an array of wind turbines within their viewshed. Moreover, the rolling hills and common vegetation found here do not include distinctive geomorphological characteristics. There is widespread agreement among aesthetic experts that landscapes that are very scenic or outstanding and very sensitive to change usually have intact, prominent distinctions between landforms, such as open water in combination with a steeply rising mountain, or have unique focal points and distinct, memorable characteristics that cannot be found elsewhere. Those types of features are not present here and, as a result, the landscape in the Project area is generally able to accommodate the presence of turbines without fundamentally changing the character of the area or adversely impacting recreational uses of the scenic resources.

Aesthetic experts also measure scenic quality by the intactness of the landscape. The Project area is not pristine, and has long been developed and altered for human use, from forestry to agriculture to harnessing energy. Based on this history of use, and the alterations already present, the perception of an untouched, unalterable environment is not present here.

A more detailed basis for this determination is presented in the proceeding analysis.

² Visibility based on Exhibit 4: Viewshed Map [topography and vegetation/from the turbine hub]. An additional 2.6 square miles or 0.7% has visibility of the turbine tips.

2. Methodology

A. Overview

New Hampshire law requires that a project not have an “unreasonable adverse effect on aesthetics,” but it does not define the methodology or criteria for determining how to assess whether a project will result in this conclusion. A clear precedent for preparing a visual assessment (VA) has not evolved from previously reviewed SEC projects (approved or denied). Such VA’s could provide a model methodology, but no two VA’s have been alike in their approach³. Wind energy projects such as Antrim require a clear, comprehensive, objective, and efficient visual analysis methodology. This VA presents such a methodology.

There are a multitude of resources and approaches that have been developed across the United States and the world for conducting a visual assessment. Each have their differences, and no one method has risen to the top as the “best” process or preeminent source⁴. There are, however, several established and respected processes that are frequently identified in academic publications and professional VA’s. These include the Bureau of Land Management’s (BLM) *Visual Resource Management* (VRM), the United States Forest Service’s (USFS) Scenery Management System (SMS) outlined in *Landscape Aesthetics* (which Ms. Vissering references), and the Federal Highway Administration’s (FHWA) *Visual Impact Assessment for Highway Projects* (FHWA-VIA). The BLM VRM and the USFS SMS were used as primary sources in the development of the methodology for this VA. The FHWA-VIA was used minimally, as it evolved largely out of the USFS Visual Resource Management (VRM), which was later replaced by the SMS, and many of the concepts overlap between the two. Relevant aspects from each of these three VA methodologies are applied, but as described below, due to the specificity of their intended uses, no single methodology was exclusively employed in their entirety.

The VRM was developed to ensure that the visual impacts of surface disturbing activities or developments would meet the specific management objectives established for BLM-managed areas. The majority of BLM-managed lands (surface and mineral) are located west of the Mississippi, typically in far less developed and settled regions and within a landscape that is vastly different from that of the northeast. The activity types are generally resource extraction. The USFS VRM, and later the SMS, were developed to evaluate changes in land cover of USFS managed lands caused by land management practices, primarily resource extraction (e.g. forestry). The majority of USFS managed lands are also located in the west (only two USFS areas are found in New England – one in Vermont and one in New Hampshire), and most of the photographs and character descriptions are of western forests or grasslands. The FHWA-VIA was developed to provide guidance to state DOTs on how to address NEPA criteria, which ensures that visual quality is maintained along the National Highway System (NHS) corridor.

Although each of these visual analysis processes was developed for a specific purpose and specific types of lands or land uses, all methodologies share some commonalities. Each characterizes the landscape’s baseline visual condition, which establishes a point of comparison for any proposed changes; defines the geographic scope or area to be studied; conducts a viewshed analysis, site visits and/or visual simulations;

³ All “Current and Past Projects” listed on the SEC website were reviewed. Of the thirty-three that were listed, only three had detailed Visual Assessments prepared by professional consultants. These include Antrim Wind Energy, LLC SEC Docket No. 2011-02, Granite Reliable Power, LLC Docket No. 2008-04, and Groton Wind, LLC SEC Docket No. 2010-01. All three include the basic components of a VA, such as a landscape overview, definition of geographic scope, viewshed mapping, resource identification, visual simulations, and an evaluation of visual effect; however, each varies in its approach, from delineation of viewshed to identification of resources to determination of visual effect, and none emerge as a preeminent source.

⁴ NCHRP Report 741: Evaluation of Methodologies for Visual Impact Assessments, Transportation Research Board, Washington D.C., 2013

identifies sensitive receptors or locations and the attributes that determine their visual quality or value; and, establishes a method for understanding the effect the proposed change may have on the landscape.

Determining the visual effect of the proposed change is perhaps the least similar or precise in approach between each. For the SMS and VRM, a natural-looking scene is always most desirable, and is considered the baseline condition. The FHWA-VIA on the other-hand considers human-made aspects of the landscape since highways pass through and are inevitably a part of that developed landscape (“natural” is only desired in certain locations). Additionally, the management objectives outlined by the USFS and BLM establish the criteria for determining the impact of the visual change for the SMS and VRM. These vary between the two agencies and the different types of management areas. SMS measures visual impact through landscape character goals and scenic integrity objectives. VRM measures visual impact as the contrast between the existing and proposed condition. The FHWA does not have a clear set of management standards or objectives from which to evaluate the effect of visual change, so the FHWA-VIA assesses change to “visual quality” based on “vividness, intactness and unity.”

The methodology developed for Antrim Wind has also drawn upon our extensive experience in conducting VA’s for wind energy projects in Maine and Vermont. In Vermont, VA’s for wind energy projects must complete the two-steps of the so-called Quechee test, in which a determination must first be made as to whether a proposed project will have an adverse effect on aesthetics and the scenic and natural beauty of an area. If the answer is in the affirmative, the inquiry then advances to the second step to determine if the adverse effect would be undue. This approach identifies similar values addressed by the VRM, SMS, and FHWA-VIA, such as identifying the nature of the project surroundings, where the project is visible from, if the project violates a clearly written community standard, and if the project is shocking or offensive to the average person.

In Maine, state statute outlines six criteria Maine Department of Environmental Protection (DEP) must consider when determining whether a project has an “unreasonable adverse effect on the scenic character and existing uses related to scenic character of a scenic resource of state or national significance.” These criteria include the significance of the resource, the existing character of the area, the expectations of the typical viewer, the project purpose and context, the extent, nature and duration of public use and the project’s impact on continued public use, and the scope and scale of visibility. Maine also identifies what resources are significant and must therefore be analyzed.

In New York, the Department of Environmental Conservation (DEC) has developed a review policy for facilities that are proposed within the viewshed of a designated aesthetic resource. DEC’s policy defines what the scenic resources are, what visual and aesthetic impacts are, describes when a visual assessment is necessary and how to review a visual assessment, differentiates State and local concerns, and defines possible mitigation measures to reduce or eliminate negative visual effects.

There are also a number of publications developed specifically for and about wind projects from which relevant criteria can be drawn. *Environmental Impacts of Wind-Energy Projects*, published by the National Research Council, includes an evaluation guide to aid in the decision-making of projects. *Wind Power in View: Energy Landscapes in a Crowded World*, by Pasqualetti, Gipe, and Righter, addresses aesthetic concerns about the placement, number, and location of large wind turbines for electricity generation, and provides guidelines concerning the visual aspects of wind turbines. A guide issued by the Clean Energy States Alliance, *A Visual Impact Assessment Process for Wind Energy Projects*, was developed to “facilitate the adoption and use of effective state and local policies, practices, and methodologies to evaluate the visual impacts associated with

wind development projects.”⁵ Other relevant publications, though not wind specific, were also used in preparing the methodology for this VA, which include but are not limited to *Guidelines for Landscape and Visual Impact Assessment*; *Visual Simulation: A User’s Guide for Architects, Engineers, and Planners*; *Evaluation of Methodologies for Visual Impact Assessments*; *Foundations for Visual Project Analysis*; *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands*; *Energy and Environment*; and, *National Forest Landscape Management Vol. 2 Ch. 2 Utilities* (see bibliography for complete citations).

Because not one of these processes or publications emerges as the finest, most pertinent, or directly applicable option, we have drawn upon relevant portions or elements of each so as to prepare an approach that is most logical, intuitive, efficient and comprehensive to satisfy the requirements of NH RSA 162-H. It is an exhaustive, multi-step approach and screening process that helps to determine: 1) determine the sensitivity of a resource, 2) the visual change the project may have to that sensitive resource, 3) the effect the visibility may have on the reasonable person, and 4) an overall conclusion on whether the project has an unreasonable adverse effect on aesthetics given the visual change.

B. Project Description, Geographic Scope and Existing Landscape Character

VA’s typically begin by providing background information, to define the project, the geographic scope of the analysis, and the existing condition and landscape character of the study area to form a baseline of information from which to conduct the review.

1. PROJECT DESCRIPTION

An essential first step is to understand the details of the project, which may have potential visual effects. This includes but is not limited to type, size, number, colors, materials, lighting, and location of all project components. Associated facilities such as roads, transmission lines, operation and maintenance facilities, storage areas are also detailed. Additional information that may be identified, as applicable, is site clearing, cut and fill, landscaping and site regrading. This information forms the basis for the visual assessment.

2. GEOGRAPHIC SCOPE

It is important to define or limit the geographic scope or area to be studied. This area is typically defined by the project’s viewshed, the area that would be visible to or from the proposed project. For the purposes of this VA the geographic scope, or study area, has been delineated as a typical 10-mile radius from each of the wind turbines. This delineation is based on documented research⁶ and precedents established in similar projects and the fact that the visibility and visual effect from wind generating facilities generally diminishes beyond 7 miles.⁷

⁵ *A Visual Impact Assessment Process for Wind Energy Projects*, Clean Energy States Alliance, May 2011, Principal Author Jean Vissering, pg. 3

⁶ *Environmental Impacts of Wind-Energy Projects*, published by the National Research Council, pg. 147; *A Visual Impact Assessment Process for Wind Energy Projects*, Clean Energy States Alliance, May 2011, Principal Author Jean Vissering, pg. 6

⁷ Wind projects in Vermont have established a study area of 10 miles from the turbines. In Maine, the Wind Energy Act requires that resources within 3-miles of generating facilities be reviewed, but may require up to 8 miles, though an 8-mile radius is used as standard practice. Recent wind projects before the SEC such as Granite Reliable reviewed a 10-mile study area.

3. EXISTING LANDSCAPE CHARACTER

A description of the surrounding natural and cultural landscape within the 10-mile study corridor includes typical features such as landform, water, and vegetation, as well as land use (i.e. urban, agricultural) and distinctive features (i.e. prominent ridgelines) that contribute to the visual character. This information describes how the area looks today, and from which the proposed change can be compared. It is the reference point from which the effect of the project will be evaluated.

C. Inventory

The next step of the project analysis is to conduct an inventory of all public viewpoints. This is also considered the first step of the screening process, which identifies the specific resources to be analyzed. This includes extensive research as well as field visits and site photography, and provides the basis for determining visual sensitivity and evaluating extent of visibility. Data is obtained from local town plans and regional documents, online media sources such as local, state, national, and organizational websites, reference books on geology/geomorphology/physiography/ecology, topographic maps, aerial photography, road atlases, and field observation⁸.

1. IDENTIFICATION OF SCENIC RESOURCES

The New Hampshire permitting process requires an applicant to demonstrate that the project as proposed will not have an “unreasonable adverse effect on aesthetics...” There is no specific guidance or requirement as to what resources shall be analyzed or assessed for potential effects under the reference to “aesthetics.”

Assessing views from every possible vantage point within a 10-mile radius has been shown to be unnecessary, overly burdensome and is not typical protocol for a VA. However, a generally consistent set of resources to be analyzed has emerged from the review of a range of projects that have been decided before the SEC, as well as other state regulatory bodies reviewing electrical generation or transmission projects⁹.

While there is some variation between VA's, almost all analyses include scenic resources designated by local, regional, state and/or national authorities or inventories. Publically conserved areas and land trust or non-profit properties with a publicly accessible recreational or scenic component are also typically included in a visual assessment. Tourism destinations connected with scenic resources or that have an aesthetic component are also identified and inventoried. This VA is focused on those resources that have a scenic value or purpose associated with them and where public access is established.

Not included in this VA are private commercial businesses and residences, since admission to these locations is prohibited, fee-based, or not readily accessible to the public at large. They also are generally not accessible to the consultant conducting the inventories. For purposes of this VA, historic sites and resources are also not analyzed, with the exception of National Historic Landmarks. Historic sites and resources are reviewed as a separate component of the application.

⁸ See also Section 6. Bibliography for a complete list of sources used.

⁹ In Vermont, the Quechee Analysis establishes aesthetic and/or scenic resources that are clearly defined in a local planning document (e.g. town plan). Recent cases before the SEC in NH, such as Granite Reliable and Groton Wind, primarily reviewed resources with public access or interest. Maine WEA specifies the scenic resources of state or national significance to be analyzed, such as great ponds, national natural landmarks, or viewpoints along the Appalachian Trail. In New York, the Department of Environmental Conservation (DEC) has also identified resources of “statewide significance,” such as State or National Parks.

The resource identification phase relies primarily on the fieldwork of the VA team and any applicable or publicly available information or descriptions of the resource found in books, pamphlets, magazines, GIS data, or the Internet¹⁰.

Visual assessments for wind energy projects commonly have a defined listing of resource categories as a starting point for the inventory process; a project may have some or all of these types of resources within the project area. These include national, state, and local recreational and scenic resources that are accessible to the public. Only those resources that fall within one of the listed categories are typically analyzed, which include:

National Resources

- National Park System Areas¹¹
- Affiliated Areas of the National Park Service
- National Heritage Areas
- National Historic Landmarks
- National Natural Landmarks
- National Scenic Byways
- National Trails
- National Wild and Scenic Rivers
- National Wildlife Refuges
- Other Federal Lands with a Specific Public Use or Scenic Resource Component (e.g. U.S. Army Corps of Engineers, Bureau of Land Management)

State Resources

- State Parks
- State Conserved Lands with a Specific Public Use or Scenic Resource Component (e.g. Wildlife Management Areas, State Forests)
- Non-Motorized Trails in New Hampshire's State Parks, Forests and on Recreational Rail Trails
- Covered Bridges Maintained by NH Department of Transportation
- NH Department of Transportation Designated Scenic and Cultural Byways
- NH Department of Transportation Designated Scenic Overlooks and Rest Areas
- Fire Towers Listed in the Fire Lookout Tower Quest Program by the NH Division of Forest and Lands
- Rivers Designated by the NH Rivers Management and Protection Program
- Public Waters¹² with Designated State Access Areas (i.e. NH Fish and Game)

¹⁰ Information used to identify resources was derived from over 100 publicly available sources, including GIS data (available through NH Granit, USGS), town plans, published guidebooks (e.g. Explorer's Guide to New Hampshire), publications (e.g. local recreational brochures), online media (e.g. visitNH.org), as well as general field observations. See also Section 6. Bibliography for a complete list of sources used. Collectively, the different data sources provide a comprehensive understanding of the scenic resources to be evaluated, and the potential effect the Project may have on users of those resources.

¹¹ "In the Act of August 18, 1970, the National Park System was defined in law as 'any area of land and water now or hereafter administered by the Secretary of the Interior through the National Park Service for park, monument, historic, parkway, recreational or other purposes.'" National Park System Areas are directly administered by the National Park Service and include Memorials, National Battlefields, National Battlefield Parks, National Historical Parks, National Historic Sites, National Lakeshores, National Monuments, National Memorials, National Military Parks, National Parks, National Preserves, National Recreation Areas, National Recreational Rivers, National Reserves, National Seashores, National Scenic Riverways, National Scenic Trails, or Parkways. *The National Parks: Index 2009-2011*, U.S. Dept. of the Interior National Park Service, Jan. 3, 2009, pg. 96. Note that for purposes of this VA, historic sites and resources are not analyzed with the exception of National Historic Landmarks. Historic sites and resources are reviewed as a separate component of the application.

Local Resources

- Scenic Drives or Locally Identified Scenic Roads
- Locally Identified Scenic Vistas, Viewsheds or Resources
- Covered Bridges Maintained by Local or Non-Government Groups
- Non-Motorized Trails in Conserved or Public Lands (other than state or national) or as Locally Identified
- Public Parks and Recreational and Gathering Areas (such as village greens, picnic areas, or day use areas)
- Public Waters with Designated Local Access Areas (i.e. town beaches or boat launches)
- Conserved Lands (other than state or national) with a Specific Public Use or Scenic Resource Component
- Other Resources with a Public Use or Recreational Opportunity (e.g. waterfalls, visitor centers)

2. FIELD VISITS AND SITE PHOTOGRAPHY

Once scenic resources have been identified, field visits and site photography are conducted. LandWorks uses viewshed maps, topographic maps, aerial photography, field guides, books, brochures, pamphlets, websites, local information sources and the New Hampshire Atlas & Gazetteer to provide information regarding access to the sites, and to orient and determine visibility in the field.

Throughout the field visits, a variety of digital photographs are taken: 1) to provide information on area context, 2) to provide information on resource quality, 3) to illustrate scenic views, 4) to demonstrate intervening vegetation or lack of visibility, 4) to document existing structures, land uses, and other cultural modifications, and 5) for the purpose of developing visual simulations. For general photographs of the project area, LandWorks uses a Canon PowerShot SD850 IS set at varying focal lengths to capture the intended image. For visual simulations, LandWorks uses a Canon EOS 6D DSLR or an Olympus Stylus TG-3 with a 50 mm (35 equivalent) lens for the photography and the camera's built-in GPS to collect waypoint data. Field notes are also recorded from all locations with visibility using a Field Record, which includes fields for noting such things as time of day, direction of view, cultural modifications, landforms, and site amenities.

D. Determination of Visibility

There are a number of industry standard tools and techniques that are used in this VA to determine visibility and to understand the nature of that visibility.

1. VIEWSHED MAPPING

An important step in the VA process is to conduct a viewshed analysis to determine which of the identified resources may have potential visibility of the Project. A viewshed is all the area that is visible from a particular viewing location or selected vantage point(s) within a given area (i.e. 10-mile radius). It is a computer-intensive process prepared using industry standard methodologies and software, such as Geographic Information Systems (GIS). A viewshed analysis is used to determine how visible the Project might be in the landscape.

Viewshed analyses are used mainly as a point of departure for identifying areas with potential visibility. They show that, due to topography or intervening vegetation, that some resources will have no views of the Project and therefore will not be affected. Due to the coarseness and uncertainty of the quality of the data, viewsheds cannot be relied upon to represent what will actually be seen on the ground from a specific location (i.e. the

¹² "Public waters in New Hampshire are prescribed by common law as great ponds (natural waterbodies of 10 acres or more in size), public rivers and streams, and tidal waters. These common law public waters are held by the State in trust for the people of New Hampshire. The State holds the land underlying great ponds and tidal waters (including tidal rivers) in trust for the people of New Hampshire...Public waters include artificial impoundments of 10 acres or more in size..." *NH Official List of Public Waters Revision Date January 17, 2014*, New Hampshire Department of Environmental Services Water Division Dam Bureau (pg. 2)

view from someone's second story bedroom window). While viewsheds can indicate how many turbines can be seen from each location (i.e. 3 turbines will be visible), they can not specify how much (just the tip of a blade or the entire turbine), which one (when there are multiple observation points), or perspective (how big or small it will appear in the landscape). They also do not account for any clearing. Therefore, the viewshed analyses prepared for this Project provide the first step in ruling out those areas with no visibility, and identifying what areas **might** have visibility. Additional visual studies (e.g. visual simulations, line-of-sight sections, 3D modeling, field analysis) are necessary to understand the details and context of a view from any location.

A viewshed analysis is prepared using the elevation values of a digital elevation model (DEM) – a digital representation of the ground surface, or topography. DEM's are represented as a raster (grid of pixels or cells), each with an assigned value (i.e. elevation), and are typically created using remote sensing (i.e. collection of data by satellite, airplane or other high altitude origin). The sharpness or accuracy of maps created from raster data depends on the size of the pixel relative to the size of the area being mapped (i.e. the larger the pixel cell the less accurate the viewshed). Typical cell size for a DEM ranges from 10-30 meters¹³. As such, they are generally designed for regional scale analyses.

To prepare a viewshed, two files are input into the GIS software – the DEM and a file containing the point or points you want to analyze (i.e. wind turbines). The GIS software then estimates the difference of elevation from the top of the structure to the ground. To determine the visibility of a structure, each point (or pixel) between the top of the structure and ground is examined for line of sight. If any pixels of higher value are between the top of the structure and the ground, then the line of sight is obstructed. If the line of sight is obstructed (e.g. by a hill) then the structure is determined to not have visibility. If it is not blocked then it is included in the raster viewshed output file.

Viewshed analyses based solely on DEMs account only for topography and not other possible obstructions such as buildings and trees, overestimating what is actually visible. To improve the model, several variables can be included to adjust the calculation to ensure the most accurate results. For example, height can be added to the DEM by integrating land cover data (i.e. forested areas). A prescribed tree height can be attributed to the DEM for those areas identified as having forested land cover to model the limited visibility from adjacent areas.

Once the software analyzes the two data inputs to produce an output viewshed raster, which records the number of times each area can be seen from the input point (i.e. turbines), the output is further reduced by eliminating areas that are forested because it is assumed visibility is not probable from these areas. The final output, as illustrated in the viewshed exhibits, is displayed using color-coding to show the number of structures that are potentially visible.

A viewshed analysis has been conducted for this Project using ArcMap GIS 10.1 software¹⁴ to identify areas with potential visibility using two input datasets. It is based on the elevation values of the National Elevation Dataset (NED), the primary elevation data product of the United States Geological Survey (USGS), at a resolution of 1/3 arc-second (about 10 meters). The turbine dataset used for this analysis includes turbine

¹³ The National Elevation Dataset (NED) is the primary elevation data provided by United States Geological Survey (USGS) and all data is in public domain (ned.usgs.gov). NED data is generally available at resolutions of 1 arc-second (about 30 meters) and 1/3 arc-second (about 10 meters), and in limited areas at 1/9 arc-second (about 3 meters).

¹⁴ ArcGIS for Desktop by ESRI (<http://www.esri.com/software/arcgis/arcgis-for-desktop>)

locations, turbine heights, ground elevation of turbine pads, and viewer height.¹⁵ Four viewsheds were completed for this VA, which include:

1. Exhibit 1: Viewshed Map [topography only/from the tip of the blade] – this map identifies potential visibility from the blade tip (149 m for turbines 1-8, and 136 m for turbine 9) and does not account for the screening effects of vegetation, buildings and other structures that may block views.
2. Exhibit 2: Viewshed Map [topography only/from the turbine hub] – this map identifies potential visibility from the turbine hub (92.5 m for turbines 1-8, and 79.5 m for turbine 9) and does not account for the screening effects of vegetation, buildings and other structures that may block views;
3. Exhibit 3: Viewshed Map [topography and vegetation/from the tip of the blade] – this map identifies potential visibility from the turbine tip (149 m for turbines 1-8, and 136 m for turbine 9) and accounts for the screening effects of three types of vegetation. Adding a standardized height of 40 feet to the three classes identified as forest (Classes 41, 42, and 43 of the NLCD 2006 land cover database¹⁶) provides a more realistic yet still conservative representation of potential visibility; and,
4. Exhibit 4: Viewshed Map [topography and vegetation/from the turbine hub] – this map identifies potential visibility from the turbine hub (92.5 m for turbines 1-8, and 79.5 m for turbine 9) and accounts for the screening effects of three types of vegetation. **This map represents the most reasonable approach to potential visibility.** It is agreed by most experts that viewsheds generated from the hub provide a more realistic representation of potential visibility, since the view of a hub and rotor has a greater effect than turbine blades because turbine blades that rise above treeline are not typically visible or dominant, and the difference in overall percent of visibility between hub and tip of the blade is usually insignificant. As such, the numbers of turbines visible and percent of visibility represented in this analysis are taken from this viewshed map.

The viewshed mapping prepared for this analysis does not account for other factors such as buildings and structures, actual tree height and density, site-specific vegetation and/or removal (e.g. landscaping around residences), variations in eyesight, and atmospheric and weather conditions. **Therefore, the viewshed maps will often overstate potential visibility.** In particular, 40-foot tree height is conservative for much of this area and can have a significant effect on potential visibility, i.e. indicating much more potential visibility of the project than if 50-foot or 60-foot tree heights were used. Tree heights in this region are more characteristically an average of 50 feet or higher, as was confirmed in site visits conducted in the Summer of 2014 using a hypsometer, an instrument for measuring height. Limiting vegetation to only the three forest classes is also conservative because other areas likely have vegetation that screens views such as in forested wetlands. It should be noted that this regional scale viewshed analysis does not, and cannot, represent actual conditions on the ground. Due to the coarseness of the data (i.e. each cell represents a 32.8 square foot area), not every tree or structure can be accounted for, and vice versa. As such, there are areas that depict visibility of turbines when in fact they may not be visible due to existing on ground screening, and vice versa.

¹⁵ The average height of all adults in the United States is 5.5 feet according to the Centers for Disease Control and Prevention (http://www.cdc.gov/nchs/data/series/sr_11/sr11_252.pdf)

¹⁶ National Land Cover Database 2006 (NLCD 2006) is a 16-class land cover classification scheme that has been applied consistently across the conterminous United States at a spatial resolution of 30 meters. NLCD 2006 is based primarily on a decision-tree classification of circa 2006 Landsat satellite data. The forest classifications are as follows:

41, Deciduous Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.

42, Evergreen Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.

43, Mixed Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.

<http://www.mrlc.gov/nlcd2006.php>

The results of the viewshed mapping are illustrated in map form, as well as a Resource and Visibility Matrix that identifies the resource, and whether or not it has potential views of the Project.

2. 3D MODELING

LandWorks uses basic 3D modeling to generate three-dimensional digital representations of perspective scenes. While not a perfect tool, it can be a valuable tool for evaluating the context of a view and the potential visual effect the project might have. 3D models help determine:

- what terrain and vegetation features block or affect views to the project
- which structures are visible
- where structures are visible
- how much of a structure(s) is visible
- how big or small structures appear in the landscape
- how much of the angle of view the project occupies

3D models can be generated using GIS based software, such as the ArcView 3D Analyst extension, which is used for this project. The types of input can vary, from raster to vector data. For this Project, contour data derived from the digital surface model are used in combination with structure location data (the same data used in the viewshed mapping).

3. VISUAL SIMULATIONS

Visual simulations provide a photo-realistic perspective view of proposed project elements in the landscape, thereby allowing people to clearly visualize how a project might look from a particular vantage point. Visual simulations are useful in terms of revealing the nature and extent of potential visibility of a project from key vantage points, providing more accurate and refined information than a viewshed analysis or 3D model can provide. They often reveal how topography and vegetation can limit or block project views, sometimes in surprising ways.

Visual simulations are used in this analysis to better understand the presence the Project might have within the context of the existing landscape. They add a higher level of detail that 3D modeling cannot do. The simulations presented in this VA are from a sampling of sensitive scenic resources and represent one or more of the following features: 1) a point within an area of the resource identified by the viewshed analysis that has the highest range of structures potentially visible, 2) a point where the highest amount of use is anticipated from the resource, or 3) a point where access to the resource is most easily or likely achieved (See Exhibits 5-13).

The weather and atmospheric conditions presented in the visual simulations depict a range of conditions experienced during our site visits. While every effort was made to plan field visits on days where weather and atmospheric conditions were forecast to be most favorable, due to the highly variable and changing weather of the northeast, not all photos depict sunny, blue-sky conditions. However, the visual simulations depict a range of weather and light conditions that are typical of the area.

In order to mimic the perceived scale of the views in the field, the recommended viewing distance for the simulations is approximately 19". The simulations represent the central angle of view, which occurs within 40-

60 degrees, and is the area that most highly influences human perception of a scene given a fixed viewing direction.¹⁷

Simulations were developed for this Project using the following methodology:

Step 1: Data Gathering

- A. Site Visit: Site information for simulation viewpoint is recorded, including view location (GPS point), date, time and weather.
- B. Site Photography: Site photographs are taken for use in simulation. Camera type, focal length (approx. 50-55mm), camera elevation, direction of view, and horizontal angle of view are noted.

Step 2: Model Creation

- A. Base map & Terrain Model: A digital base map is created of the project and view areas. GIS data acquired from United States Geological Survey (USGS) National Elevation Dataset (NED) 1/3 Arc-Second and the client; Aerial photographs and USGS maps used as needed. Utilizing the base map and GIS data, a 3D digital terrain model is created. Where forested, the terrain model is adjusted to account for the additional height contributed by trees. When tree height information is available from LIDAR or in field hypsometer readings it is incorporated. If specific information is unavailable an average height of 40' is used.
- B. 3D model: Using data and drawings obtained from the project engineer, a 3D digital model is created for each type and size of structure. This model is then merged with the terrain model, placing the structures at their appropriate proposed locations and elevations.
- C. View Setting: The existing conditions photograph is imported into the terrain model. The data gathered from the site visit is then inputted into the modeling program (VectorWorks 2015), and a "camera view" matching the original site conditions is created. A digital image of this view is exported for use in the next step.

Step 3: Simulation Rendering

- A. Conditions Overlay: Using a photo editing and rendering program (Photoshop CS5), the exported digital image of the perspective view is precisely overlaid and registered to the original existing conditions photograph. Simulations are typically composed of a single photo taken with a Full Frame Sensor camera that represents the way views are actually perceived given the normal range of eye and head motion.
- B. Structure Placement: High resolution images of the Structure or models (from SketchUp Pro 8) are placed at proper locations, scale and perspective to match the exported view image.
- C. Final Rendering: Structures are adjusted to mimic quality of light, distance and detail in site photograph. Vegetation and other visual obstructions are accounted for. Using a perspective view created in 3D Analyst that models required project clearing, visual effects from right-of-way clearing is rendered and reflected in all the visual simulations.

E. Identification of Sensitive Scenic Resources

The next step in the screening and analysis process is to determine each of the resource's visual sensitivity. Typically, the lower its visual sensitivity, the higher its ability to accept change. Each resource identified as scenic in Section 2.C.1 and with potential visibility as determined in Section 2.D.1, is evaluated for its visual sensitivity based on two distinct categories:

¹⁷ The viewing distance was calculated using the method described in "Visual Simulation: A User's Guide for Architects, Engineers and Planners," by Stephen R. J. Sheppard.

1. **Cultural Designation** – how a resource has been valued by the public through official designation (e.g. conserved) or advertisement
2. **Scenic Quality** - the character and features of a resource that make it scenic

These two criteria were selected as the key factors in establishing a ranking of sensitivity of visual resources in terms of both their inherent value as scenic/recreational/cultural/natural resources and the anticipated level of sensitivity reasonable viewers would have to potential alteration of the landscape within view of those resources. Each criterion for each resource is given a rating between ‘Low’ and ‘High,’ as defined in the subsections that follow. Note that this is a step in the process of determining whether the effect is adverse. In this stage of the screening process, “High” does NOT translate into an unreasonable adverse determination. This determination is still dependent on other factors yet to be considered in the subsequent process.

1. CULTURAL DESIGNATION

This indicator considers the local, regional, statewide or national cultural significance of a particular resource, often indicated by formal designation or inclusion in a current or recent community (or official) planning document that recognizes its cultural, natural resource, recreational, or scenic value. The resource may not necessarily have high scenic quality, but visual character could be important to how it is valued. Many places have been recognized for their beauty and designated through Federal or State democratic political processes, reinforcing the notion that aesthetic values are shared (e.g. National Forests or State Parks). Similarly, local communities may have given a resource some sort of protection due to its cultural value or listed it as a recognized local feature. The FHWA–VIA¹⁸ considers local values and the cultural association of a resource, often found in local publications and municipal planning documents, as helpful in determining the importance of a landscape or as an indication of the visual significance of a resource.

This criterion is assessed in order to assign value to the relative importance of scenery assigned to that resource by the public. Some resources with lower scenic quality may have identified scenic management/protection goals that would elevate the visual sensitivity of these resources (e.g. scenic road designation). Likewise some resources with higher scenic quality may have reduced visual sensitivity due to the fact that they are designated for purposes other than purely scenic. Their scenic value may also be diminished if the resource is primarily restricted to local users of the resources, especially if scenic quality is not of primary importance to the users based on their typical activities (e.g. town beach restricted to local resident use only).

Rating descriptions are as follows:

- **Low:** Local, quasi-public and private conserved or designated resources that are identified primarily for values other than purely scenic (e.g. forest or wildlife management). Examples include town greens, town/community forests, playgrounds and recreational fields, public waters with locally maintained access (i.e. town beach), or private conserved lands with public access. Also includes non-motorized trails in conserved or public lands (other than state or national) or as locally identified. The rating for a trail or other local resource can be elevated to moderate if it is found on regional or state websites, or identified in several guidebooks. A low rating would also include resources that are mentioned on local/town websites for their local interest or recreational value, but not typically found in guidebooks appealing to or used by a wider potential user or interest group.

¹⁸ See *Visual Impact Assessment for Highway Projects*, FHWA, Publication No. FHWA-HI-88-054 (pg. 97-98)

- **Moderate:** State or federal resources that have been conserved or designated primarily for purposes or values other than purely scenic. State forests or wildlife management areas, National wildlife refuges, or public waters with NH Fish and Game access are examples of resources considered for a moderate cultural value rating. Also includes non-motorized trails in New Hampshire's State Parks, Forests and Recreational Rail Trails. Resources that are found on regional websites for their scenic/recreational values, but may not be in a guidebook may also be considered moderate.
- **High:** Resources that have been conserved or designated because scenery and scenic quality are **primary** to their value. National parks, National trails (e.g. Appalachian Trail), state scenic byways, state parks, and scenic easements are examples of resources with a high cultural value rating. Also includes non-motorized trails in National Parks and Forests or other National Park System areas. Local community resources (e.g. scenic roads, scenic vistas) that are specifically identified in a comprehensive plan or other regulatory document because of their scenic value would warrant a high rating, as would a resource that is highly advertised in numerous guidebooks, websites, and brochures for its scenic value.

2. SCENIC QUALITY

From a visual perspective, highly scenic landscapes are typically considered more valuable than less scenic ones and are subsequently more sensitive to alteration.¹⁹ Depending on the level of access, highly scenic landscapes tend to draw more visitors and are crucial in defining the character of New Hampshire. Often highly scenic and unique landscapes have some sort of protection status or particular management objectives to ensure that their scenic quality is maintained. By contrast, common landscapes or those with lower scenic quality are typically less valuable from a visual perspective, and their scenic qualities are less likely to be a draw for visitors.

The Bureau of Land Management (BLM) has developed a clear, consistent, and objective process to help its managers rate the visual quality of a resource that becomes part of a resource management plan.²⁰ In this process each resource is evaluated and scored using the seven key factors that make up the landscape: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. The scores for each factor are added up to determine which scenic quality class the resource belongs in (A, B, or C). An important premise to the BLM evaluation is that all BLM lands have scenic value, but areas with the most variety and most harmonious composition have the greatest scenic value.

The BLM process for determining visual quality is applicable beyond BLM lands, and the BLM Scenic Quality Inventory and Evaluation Chart (the "Chart") on the following page has been adapted with minor modification to analyze the scenic quality of each identified public resource with potential visibility (based on the Viewshed Analysis) for the project. Landform descriptions in the Chart were adjusted to depict the northeastern landscape, and the BLM scenic quality classes A, B, and C become High, Moderate, and Low, respectively, for this analysis.

For this project the Chart is administered in the office by at least two staff members, and up to four, which greatly reduces the possibility of bias affecting the rating for this criterion. Professional Landscape Architects and Planners compare notes, field observations, photographs and general knowledge of each resource to make a rating determination. The transparent nature of the evaluation allows reviewers to make their own assessment if deemed necessary.

¹⁹ *Landscape Aesthetics: A Handbook for Scenery Management*. Rep. USDA Forest Service - Agriculture Handbook Number 701, 1995, pg. 30

²⁰ BLM Handbook H-8410-1, Visual Resource Inventory

2. METHODOLOGY

Each resource is evaluated using the seven rating criteria listed in the Chart (landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications) and given a score. The total scores for each resource are calculated and assigned one of three ratings based on the total points:

- **Low:** Resource has features that are fairly common to the physiographic region (11 or less points)
- **Moderate:** Resource has a combination of some outstanding features and some that are fairly common to the physiographic region (12-18 points)
- **High:** Resource combines the most outstanding characteristics of each rating factor (19 - 32 points)

SCENIC QUALITY INVENTORY AND EVALUATION CHART			
Key Factors	Rating Criteria and Score ⁽¹⁾		
1. Landform	High vertical or dramatic relief as expressed in prominent/distinct peaks, cliffs, or massive rock outcrops; or severe surface variation or highly eroded formations such as rockslides; or detail features dominant and exceptionally striking and intriguing. Score 5	Mountains of moderate elevation but not highly dramatic; or interesting erosional patterns or variety in size and shape of landforms; or detail features which are interesting though not dominant or exceptional. Score 3	Low rolling hills, foothills, or flat valley bottoms; or few or no interesting features. Score 1
2. Vegetation	A variety of vegetative types as expressed in interesting forms, textures, and patterns. Score 5	Some variety of vegetation, but only one or two major types. Score 3	Little or no variety or contrast in vegetation. Score 1
3. Water	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape. Score 5	Flowing, or still, but not dominant in the landscape. Score 3	Absent, or present, but not noticeable. Score 0
4. Color	Rich color combinations, variety or vivid color; or pleasing or dominant contrasts in the soil, rock, vegetation, water or snow fields. Score 5	Some intensity or variety in colors and contrast of the soil, rock, and vegetation, but not a dominant scenic element. Score 3	Subtle color variations, lack of contrast, or interest; generally muted tones. Score 1
5. Influence of Adjacent Scenery	Adjacent scenery greatly enhances visual quality. Score 5	Adjacent scenery moderately enhances overall visual quality. Score 3	Adjacent scenery has little or no influence on overall visual quality. Score 0
6. Scarcity	One of a kind; or uniquely memorable, or very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc. Score 5	Distinctive, though somewhat similar to others within the region. Score 3	Interesting within its setting, but fairly common within the region. Score 1
7. Cultural Modifications	Modifications add favorably to visual variety while promoting visual harmony. Score 2	Modifications add little or no visual variety to the area, and introduce no discordant elements. Score 0	Modifications add variety but are very discordant and promote strong disharmony. Score -4

(1) Values for each rating criteria are maximum and minimum scores only. It is also possible to assign scores between these ranges.

3. OVERALL SENSITIVITY RATING

The ratings for Cultural Designation and Scenic Quality for each resource are then combined to obtain an Overall Sensitivity Level rating²¹. The combination of the two criteria provides a good picture of visual sensitivity by considering the inherent scenic qualities of the landscape, and the value placed upon these resources by the public, either in the form of some sort of protection or by the way they are promoted as scenic/recreational destinations. The overall ratings are defined²² as follows:

- **Low (L)** – “having little value or quality; below an average or a standard”
- **Moderate (M)** – “within due or reasonable limits; of average quality or extent; having average or less than average quality”
- **High (H)** – “very important; of relatively great importance; of greater value than average, usual, or expected”

A resource that receives an Overall Sensitivity Level rating of ‘Low,’ ‘Low-Moderate’ or ‘Moderate’ has the ability to accept change in the landscape, and is not further analyzed i.e. the project will not have an unreasonable visual effect given the low to moderate sensitivity of the resource). Resources that receive a ‘Moderate-High’ or ‘High’ rating are more sensitive to changes in the landscape due to their greater visual quality or scenic value and are further analyzed to determine the level of visual effect the project may have on the resource. These resources are considered “sensitive.” Note that this is only one step in the process of determining whether the effect is adverse. In this stage of the screening process, “High” does NOT translate into an unreasonable adverse effect determination. This determination is still dependent on other factors yet to be considered in the subsequent process.

F. Determination of Visual Effect from Sensitive Scenic Resources

1. DETERMINING VISUAL EFFECT

Those resources that are determined to be sensitive, or receive an Overall Sensitivity Rating of ‘Moderate-High’ or ‘High’ as a result of the previous step, are further analyzed for Visual Effect, which is based on evaluating the following categories:

1. **Number of turbines visible** – how many turbine hubs are visible from a given resource
2. **Percent of visibility** – what percent of the resource has visibility of turbine hubs
3. **Proximity or distance** – how close/distant is the nearest visible hub
4. **Angle of view** – how much of the total possible field of view the project occupies

²¹ Rating system:

Each rating is assigned a point value:

Low = 1

Moderate = 2

High = 3

Total points are combined and assigned overall ratings based on the following breakdown:

Low = 2 points

Low-Medium = 3 points

Moderate = 4 points

Moderate-High = 5 points

High = 6 points

²² Definitions obtained online from the Collins English Dictionary and the Merriam-Webster’s Dictionary.

5. **Visual dominance** – what is the scale of the project in relation to the vantage point and the project surroundings
6. **Visual clutter/landscape coherence** – how discordant/balanced the turbine array appears in the landscape

These six criteria are considered to be the key factors in determining how visible a project may appear in the landscape from a particular resource. These factors consider not only how many turbines may be visible, but also the scale and contrast of the project in relation to the resource and the project surroundings. No single factor is considered in isolation, and mere visibility, even substantial visibility of a project, is not a threshold for a high visual effect rating. The evaluation includes determining the overall sense of presence of the project in the landscape and in the view by considering all the following:

- how many of the structures are visible above the tree line and to what extent;
- do the structures command/require the attention of the viewer;
- does the project deter the viewer from appreciating all of the other aspects of the landscape;
- are the structures in the center of an important view, and/or in close visual association with an important natural or cultural focal point; and,
- to what degree does the project contrast with the existing landscape in terms of form, line, color, and texture (which are typical elements that define landscape character.).

Each criterion for each resource is given a rating between 'Low' and 'High,' as defined in the subsections that follow. Note that this is a single step in the process of determining whether the effect is adverse. In this stage of the screening process, "High" does NOT translate into an unreasonable adverse effect determination. This determination is still dependent on other factors yet to be considered in the subsequent process.

2. VISUAL EFFECT CRITERIA

a. Number of turbines visible

This category accounts for the number of turbines (hub and above) visible.²³ The methodology for determining rating thresholds in this VA is an approach created by Dr. James Palmer, a known Visual Quality Expert, and has been used in wind applications in Maine.²⁴ His approach is to determine the average size of all wind power projects in the state and divide that number into thirds. In New Hampshire, there are three built wind projects: Groton Wind at 24 turbines, Granite Reliable Power at 33 turbines, and Lempster Wind at 12 turbines. The average of these three projects is 23 turbines. We consider this rating breakdown to be a reasonable, objective standard for visible turbine thresholds. The thresholds are as follows:

- **Low:** 1-7 turbine hubs
- **Moderate:** 8-15 turbine hubs
- **High:** 16+ turbine hubs

²³ Visibility based on the viewshed analysis presented in Exhibit 4.

²⁴ The regulatory review bodies in Maine have approved projects using this approach, most recently in the Bingham Wind project. Identifying the number of turbines visible has also been a common indicator of visibility for wind projects in Vermont, dating as far back as the Searsburg wind project in 1997. When creating viewshed maps, the number of turbines visible is typically displayed, as was seen in New Hampshire for the Granite Reliable and Groton Wind projects. Many books cited by scenic quality professionals also reference number of turbines visible as an indicator of project visibility and appearance, such as *Environmental Impacts of Wind-Energy Projects*, or the Clean Energy States Alliance's *Visual Impact Assessment Process for Wind Energy Projects*.

b. Percent of visibility

This category measures what percent of a scenic resources area (or length, as in a hiking trail) has potential visibility of at least one turbine hub. We are again using the thresholds developed by Dr. Palmer for this indicator (simple breakdown into thirds). The thresholds are as follows:

- **Low:** 33% or less
- **Moderate:** 34-66%
- **High:** 67% or more

c. Proximity or distance

Aesthetic experts agree that visual perception of landscape elements change or become less obvious with distance. The National Forest's Handbook on Scenery Management, which is based on years of research and work in the National Forest, and is relied on as a basis for visual assessment by professional and regulatory review bodies, sets forth the use of distance zones for "classification, analysis, and simplification of inventory data" (pg. 4-5).²⁵

These distance zones are related to the types of objects and level of detail that are typically perceptible in the landscape at these distances under ideal viewing conditions. The Handbook identifies the fact that visual effect is based, in part, on the "degree of discernible detail" and that the background of a view has less detail, insofar as "texture has disappeared and color has flattened," and indicates that with increased distance the "concern" level for visual effect or impacts to overall scenic integrity lessens (pg. 4-11). The BLM VRM and FHWA-VIA also use or refer to distance zones, and the table below provides a comparison and similarities between the three:

TABLE 1. COMPARISON OF DISTANCE ZONES

	FOREGROUND	MIDDLEGROUND	BACKGROUND
SMS	< 1/2 mile	1/2 to 4 miles	> 4 miles
VRM	< 3-5 miles		< 15 miles
FHWA-VIA	< 1/4 mile	1/4 to 3 miles	> 3 miles

Distance zones are used in this VA as one indicator for helping to determine the effect of the Project's visibility. For a given resource, a rating is determined by measuring from the closest point of a resource to the nearest potentially visible turbine. This analysis has defined the following ratings, which are derived in part by the work of the Forest Service, but have been refined based on LandWorks' experience with wind projects:

- **Low:** (> 6 miles) At this distance range, turbines are far less likely to dominate a view due to their apparent visual scale.
- **Moderate:** (2 to 6 miles) Turbines diminish in scale over this four-mile span, but they still have the potential to dominate a view depending on other factors.
- **High:** (< 2 miles) Turbines may appear very large and can dominate the view at this distance range.

²⁵ *Landscape Aesthetics: A Handbook for Scenery Management*. Rep. USDA Forest Service - Agriculture Handbook Number 701, 1995. Print.

2. METHODOLOGY



Diagram 1. From a location at the Sheffield Wind Farm in Vermont, this turbine within a few hundred feet appears large and commands the view.

2. METHODOLOGY



Diagram 2. This photo of the Rollins Wind project in Maine is approximately 2.5 miles away. Even at this distance the rotors are difficult to discern.



Diagram 3. Another photo of the Rollins Wind project at approximately 2.5 miles away. Even on a blue-sky, sunny day the turbines do not dominate the view and are actually difficult to see.

2. METHODOLOGY



Diagram 4. This photo taken from Signal Mountain Fire tower in Millsfield, New Hampshire shows the Granite Reliable Project in the distance at approximately 4.24 miles away. Turbines have begun to diminish in size and scale and appear less prominent.



Diagram 5. This photo taken from Belvidere Mountain in Vermont shows the Kingdom Community Wind Project in the distance at approximately 5.5 miles away. The size and scale of turbines continue to diminish and do not dominate the view.

2. METHODOLOGY



Diagram 6. This photo is taken from Crystal Lake Beach approximately 5.6 miles to the closest turbine of the Sheffield Wind Project in Vermont. Turbines are present but do not dominate the view or overwhelm the landscape.



Diagram 7. This photo taken more than halfway across Crystal Lake, or about 2 miles closer to the wind project (about 3.26 miles away), shows that, even though there is some sharpening of form and detail, the visual presence of the turbines does not noticeably increase, and the number of visible turbines begins to diminish.

d. Angle of view

A turbine array that occupies a narrow angle of view typically has less visual effect than one that occupies a wide angle of view. Numerous factors can affect the angle of view from a given vantage point, including number of visible turbines, distance, and location of viewer in relation to the turbine array alignment (i.e. broad view vs. head-on view down a line of turbines). The angle of view typically gets larger when getting closer to a project (see Diagram 8 below). When observing a project on hilly terrain, however, the angle of view from a closer vantage point can sometimes be reduced as some turbines become obscured by intervening topography and/or vegetation.

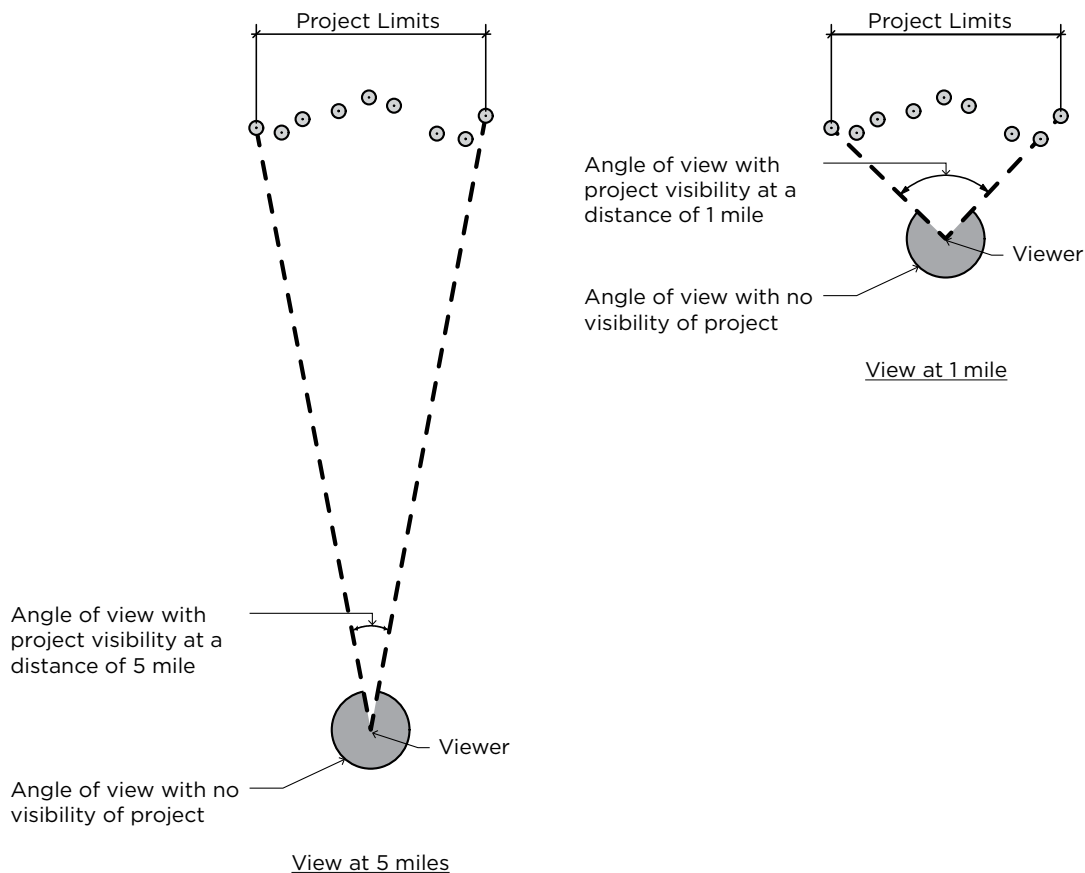


Diagram 8. Effect of Distance on View Angle

The human field of view for stereoscopic vision is approximately 120 degrees, while our peripheral vision extends to approximately 180 degrees. The central field of view occurs within 40-60 degrees and is the area that most highly influences human perception of a scene, given a fixed viewing direction. The simulations prepared for this report depict this central angle/field of view. Vantage points within open areas such as lakes typically allow for 360-degree views, and in such cases a proposed project may occupy a limited portion of this overall view. The following ratings have been developed as a means of assessing the contribution of angle of view to visual effect. (See Exhibit 14: Angle of View Thresholds: 180° Total Possible View, and Exhibit 15: Angle of View Thresholds: 360° Total Possible View.) Note that the percentage is calculated based on the angle of view encompassing visible turbine hubs divided by the total possible view angle from a given resource (e.g. for

a lake 360 degree views would be possible, while a scenic pull-off with a fixed view would potentially have a total possible view of 180 degrees or less, depending on site conditions):

- **Low:** (< 7%) Turbines take up a small percentage of the total possible field of view and have the potential to effect only a minor portion of a fixed view toward the project site.
- **Moderate:** (7% to 21%) Turbines take up a moderate percentage of the total possible field of view and have the potential to occupy a significant portion of a fixed view toward the project site.
- **High:** (> 21%) Turbines take up a substantial percentage of the total possible field of view and have the potential to dominate a fixed view toward the project site.

e. Visual dominance

This indicator considers the scale of the project in relation to a specific vantage point and the project surroundings, as well as its contrast with those surroundings. A project that is “dominant” is one in which the project characteristics are pre-eminent in the landscape, diminishing the visual presence and effect of other components of the existing landscape or view.²⁶ Several questions are typically posed when considering visual dominance: Do the turbines command the attention of the viewer away from all other aspects of the landscape? Are there other ridges and landforms without turbines visible from a given resource as well as other extant landscape elements that help to visually absorb the project - either by reducing or accommodating the visual presence of the project? Or are the turbines a focal point - are they in the center of an important view and as a result diminish the natural, scenic or cultural characteristics of the landscape context?

The siting and design of a wind energy project can reduce or eliminate visual dominance using tools such as turbine placement or eliminating possible turbine locations that might result in potential dominance when seen from a sensitive or valued resource. Intervening topography and vegetation can often obscure all or portions of turbine towers, thereby reducing their prominence on a ridge. The potential for this effect is related to the landscape’s visual absorption capability (VAC), which is another factor we consider when determining a project’s potential for visual dominance.

Visual absorption capability was a concept originally developed by the U.S. Forest Service as a tool to assess a landscape’s susceptibility to visual change caused by human activities. In other words, it is a measure of a land’s ability to absorb alteration, yet retain its visual integrity. A landscape defined by numerous rolling hills is more able to visually absorb a wind project than one that is located on a sole hill surrounded by a flat landscape. *Landscape Aesthetics: A Handbook for Scenery Management*, a key reference document in the field of aesthetic assessment, lists a number of factors affecting VAC, including:

- Variety or diversity of landscape pattern affects visual absorption capability, particularly the amount and extent provided by landform, rockform, waterform, or vegetative cover.
- Tall vegetation such as trees screen and break up the visual continuity of landscape alteration. Short vegetation, such as grasses and low shrubs, does not.
- Heavily patterned and diverse, dense vegetative cover, especially if mixed with waterforms like lakes, rivers or streams, break up the perceived continuity of landscape alterations. Homogeneous vegetative cover and lack of waterforms do not.

²⁶ pp. 297, Smardon, Palmer and Felleman, *Foundations for Visual Project Analysis*, John Wiley and Sons, 1986. The authors of this publication state that dominance is considered to be determined by key factors that are consistently used in visual analysis: color, shape, scale, line and texture: “The contrast between the visual elements of the environment and the installation can be provoked by one or several of those elements...the impact on the sensorial role becomes apparent by the visual dominance of the introduced elements in relation to those already existent, especially in terms of scale and position in space.”

2. METHODOLOGY

The concept of VAC is also applicable in more developed landscapes. In those locales where the evidence of human alteration and infrastructure are readily visible, additional development of energy and utility infrastructure may be less discordant and more readily absorbed visually – it does not appear as a foreign or singular element in such a landscape. The more readily a landscape can visually absorb a new element or elements, the less potential there is for the project to be visually dominant from that vantage point.



Diagram 9. Example of landscape with LOW visual absorption capability and HIGH prominence. This mountain is a prominent feature in the landscape. The open water and steeply rising rock face that projects out of the water stands out amongst the surrounding landscape.



Diagram 10. Example of landscape with MODERATE to HIGH visual absorption capability and LOW prominence. The topographical diversity and variety of visual elements, combined with the wooded landscape and developed shoreline, lessens potential project visibility and focuses viewers' interest in a number of directions.

For this criteria, visual dominance is rated using the following thresholds:

- **Low:** The visibility, contrast, aesthetic qualities (such as form, color, texture) and apparent scale of the proposed project is very limited, potentially due to a high percentage of structures or elements such as the road clearing being obscured by intervening topography/vegetation. The landscape remains clearly dominant, and the project may not be readily perceptible.
- **Moderate:** The visibility, contrast, aesthetic qualities and apparent scale of the project in relation to the existing landscape is sufficient enough to be visible and potentially attract attention. The character of the view has changed, but the change is limited and not extensive and other features in the landscape remain the primary focus. Components of the project are absorbed by the existing landscape to a moderate (vs. minimal) extent.
- **High:** The visibility, contrast, aesthetic qualities and apparent scale of the project appears to significantly alter or overwhelm the landscape, potentially due to a number of factors, including the landscape's visual absorption capability, the location of the project within an important natural focal point, or the extent of change or alteration of visual patterns that results from the new construction. The character of the view has changed such that the modification now competes for the viewer's attention as a primary feature in the landscape, and it becomes a substantial element within the view.



Diagram 11. This photo of a project in New York shows an example of HIGH visual dominance. From this perspective these turbines tower over the barn and farmhouse, dominating the view and overwhelming the landscape.



Diagram 12. This photo shows an example of **LOW to MODERATE** visual dominance. Turbines from the Granite Reliable Project are visible from Dummer Pond at just 2.34 miles away. Though the distance is near and the character of the view has changed, the turbines do not dominate or overwhelm the landscape.

f. Visual clutter/landscape coherence

Clusters of turbines or structures of different designs can create a potentially discordant appearance and reduce the coherence of the landscape. Turbines spaced in a linear fashion at fairly regular intervals can be more aesthetically pleasing than turbines that overlap each other and appear jumbled. Ratings for visual clutter/landscape coherence are as follows:

- **Low:** Turbines are sited in a linear fashion, spaced at fairly regular intervals, and viewed at a broad angle with minimal or no overlapping turbines.
- **Moderate:** Turbine spacing is only slightly irregular with some clustering/overlap, but still maintains unity overall.
- **High:** Turbines are located on several ridges or at varying distances to the viewer, viewed at an angle that results in a high degree of visual chaos due to their overlapping, jumbled appearance.

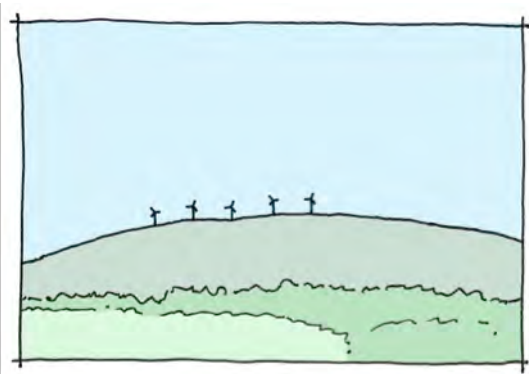


Diagram 13. An illustrative view of how equally spaced turbines in a linear manner create more landscape coherence and **LOW** visual clutter.

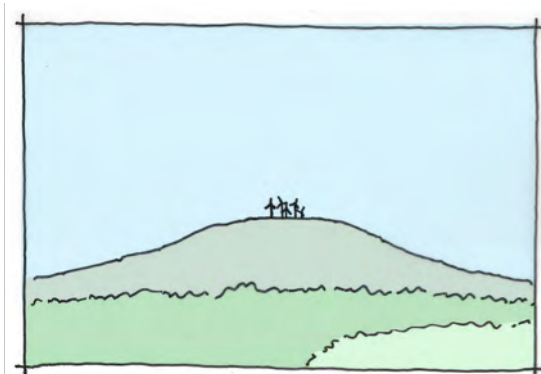


Diagram 14. An illustrative view of a turbine array with **MODERATE to HIGH** visual clutter due to the overlapping, jumbled appearance.

3. OVERALL VISUAL EFFECT

The ratings for each of the six aforementioned criteria for each resource are then combined to obtain an Overall Visual Effect rating.²⁷ The combination of the six criteria provides a good picture of visual effect by considering all the factors that relate not only to the surrounding context of the site, but to the project itself, and how it is seen from the selected locations.

Those resources that emerge with a 'Moderate-High' or 'High' Overall Visual Effect rating may potentially be affected by the visual change that may result if the project is constructed, and additional analysis is conducted in the following section. No additional evaluation is provided for those resources that emerge with a 'Low' to 'Moderate' rating because the visibility of the project is not considered significant. Note that this is another step in the process of determining whether the effect is adverse. In this stage of the screening process, "High" does NOT translate into an unreasonable adverse effect determination. This determination is still dependent on other factors yet to be considered in the subsequent process.

G. Determining Effect on the Viewer from Sensitive Scenic Resources

1. DETERMINING VIEWER EFFECT

For those resources determined to have the potential for a 'Moderate-High' or 'High' Overall Visual Effect rating as identified in Section F, additional analysis is provided (on a resource by resource basis) that incorporates and weighs a range of possible factors to determine how a reasonable person may be affected by the visibility of the project. The expectations of the reasonable viewer can be assessed using a multitude of sources such

²⁷ Rating system:

Each rating is assigned a point value:

Low = 1

Moderate = 2

High = 3

Total points are combined and assigned overall ratings based on the following breakdown:

Low = 8 points or less

Low-Medium = 9-11 points

Moderate = 12-14 points

Moderate-High = 15-17 points

High = 18 points

as guide books, publications, online media, anecdotal and interview sources, background polling, user surveys, studies, as well as general field observations and professional expertise. As such, this step in the assessment requires a judgment informed by both quantitative *and* qualitative data, as well as professional experience and expertise. The considerations and thresholds for determining what the project's effect will be to the reasonable person from a particular sensitive scenic resource include:

a. Activity

The type of activity users are engaged in can influence their expectations, since scenic quality may not be central to some types of activities, and vice versa. This consideration has been established in both the BLM VRM and the USFS SMS. Thresholds for activity types include the following:

- **Low:** Activities where visual quality and scenery of the landscape are unimportant to the experience. This would include activities such as visiting museums or historic architecture, or ice fishing in a shanty.
- **Moderate:** Activities where visual quality and scenery of the landscape are important but secondary to the experience. This would include activities such as fishing, motorboating, camping, hunting, rafting, and snowmobiling.
- **High:** Activities in which visual quality and scenery of the landscape are central to and significantly affect the experience. This would include activities such as paddling, viewing wildlife or scenery, and hiking.

b. Extent of Use

This indicator measures the amount of use of the resource. Both the BLM VRM and the USFS SMS reference this consideration, contending that areas seen and used by large numbers of people are potentially more sensitive. VRM states "Protection of visual values usually becomes more important as the number of viewers increase" and SMS says "A landscape readily accessible to viewing by large numbers of people is often subject to greater scrutiny of its landscape character and scenic integrity." The extent of use can be determined quantitatively by user surveys, trail logs, visitor records, etc. However, because this information is not always available, or not statistically reliable, other measures must be used to ascertain extent of use. This includes qualitative considerations: how easy or difficult is the resource to access, and what types of facilities are available that may attract potential users (e.g. campgrounds, picnic areas, boat launches, beaches, etc.). Resources that are more difficult to access are typically less visited and therefore experience lower overall use. Likewise, the easier the access the higher the potential for use. Resources that are highly publicized and with available and attractive facilities such as campgrounds, boat launches, picnic areas or beaches, also tend to draw in more users. Therefore, thresholds for extent of use are defined by the following:

- **Low:** Access is difficult, limited and/or unclear (e.g. walk-in, portage). Interaction between users is extremely rare, and evidence of other users is negligible. There are no boat launches, campsites, picnic areas or other maintained facilities. Motorized or mechanized use is not permitted or not possible.
- **Moderate:** Access is somewhat evident and available. Interaction between users may be low to moderate. There are boat launches, campsites, picnic areas or other maintained facilities, but they are limited and not always noticeable. Motorized or mechanized use may be possible.
- **High:** Access is quick, obvious, and easy. Interaction between users is moderate to high. There are multiple boat launches, campsites, picnic areas or other maintained facilities, which can accommodate a large number of people (i.e. pavilions, parking lots). Motorized or mechanized use is allowed and evident.

c. Duration of View

The type of activity and location must be considered when evaluating duration of view. An activity with a fixed and involuntary view of a project would have a higher potential for effect, whereas an activity with limited exposure to the view would have lower potential for effect, either due to the limited extent of visibility from the resource or because the context and nature of the user's activity allows for other unaffected views. Thresholds include the following:

- **Low:** Activities whose focus would be away from a project or would be constrained due to limited viewing opportunities (e.g. ice fishing in a shanty; visibility limited to small portion of the resource). Effect may also be low due to limited use of the resource (i.e. as activity/visitation decreases the duration of view decreases).
- **Moderate:** Views of a project would be tempered by focusing on the activity (i.e. fisherman focusing on the water), shifting location and altering context and viewpoint (i.e. views are continually changing as in rafting, motorboating or fishing), and access to 360° views. In this situation, the potential effect lessens, because, although views would be present, they would be ever-changing and mitigated by the activity.
- **High:** Activities whose primary focus would be toward a project and fixed on a project. For example, a scenic pull-off with static, unchanging views focused entirely on a project site would have a high potential effect, even though a visitor may only stay at the site for 5 to 10 minutes.

d. Remoteness

Remoteness indicates the absence of development and a primitive character and experience. Generally, the more remote the resource, the higher its contribution to scenic character, the higher a user's expectation for a natural experience. Using the Recreation Opportunity Spectrum (ROS), it is possible to determine a resource's remoteness. The ROS was originally formulated in the late 1970's for use on public lands in the Western United States to help plan and manage recreation resources that match the qualities, settings and experiences that recreationists might expect. The ROS is divided into six, well-defined classes for understanding these relationships and interactions: Urban (U), Rural (R), Roaded Natural (RN), Semi-Primitive Non-Motorized (SPNM), Semi-primitive Motorized (SPM), and Primitive (P). Each class is delineated by a typical setting based on a number of factors such as size, naturalness, and the presence of motorized vehicles. The different settings inform expected experiences such as a sense of isolation, self-reliance, and closeness to nature at the primitive end.

The ROS was later adapted for use on non-federal lands in New England.²⁸ One of the most evident changes was the renaming of some classes to better represent the landscape conditions of New England. The six ROS classes for New England are summarized as follows (see Tables 1-7 of Appendix II of *Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide*):

- **Primitive (P)** – Area appears to be an essentially unmodified natural environment of relatively large size. Interaction between users is very low, and evidence of other users is minimal. The area is essentially free from evidence of management restrictions and controls. Motorized or mechanized use is not permitted. Extremely high probability of experiencing isolation from human development, use, and impact. Extremely high probability of experiencing independence, closeness to nature, tranquility, and self-reliance by applying outdoor skills in an environment that offers a high degree of

²⁸ More, Thomas A., Susan Bulmer, Linda Henzel, and Ann E. Mates. 2003. *Extending the Recreation Opportunity Spectrum to Nonfederal Lands in the Northeast: An Implementation Guide*. Gen. Tech. Rep. NE-309. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station

challenge and risk. Area is 2-3 miles from maintained roads, railroads or trails with designated motorized or mechanized use.

- **Semi-Primitive Non-Motorized (SPNM)** - Area appears to be a predominantly natural or natural appearing environment of relatively medium-to-large size. Interaction between users is low, but there is often evidence of other users. The area is managed so that minimum on-site controls and restrictions, if needed, are subtle. Non-mechanized uses predominate. Mechanized uses may be permitted. Motorized use is not permitted. Moderately high probability of experiencing isolation from human development, use, and impact. High probability of experiencing independence, closeness to nature, tranquility, and self-reliance by applying outdoor skills in an environment that offers challenge and risk. Area is at least 0.5 mile (but not farther than 2 miles) from all maintained roads, railroads, or trails with designated motorized or mechanized use; can include unimproved roads and trails if usually closed to motorized use.
- **Semi-Primitive Motorized (SPM)** - Area appears to be a predominantly medium-to-large size natural or natural appearing environment. Interaction between users is low, but there is often evidence of other users. The area is managed so that minimum on-site controls and restrictions, if needed, are subtle. Mechanized uses may be permitted. Moderate probability of experiencing isolation from human development, use, and impact. Opportunity for high degree of interaction with the natural environment. Moderate probability of experiencing independence, closeness to nature, tranquility, and self-reliance by applying outdoor skills in an environment that offers challenge and risk. Opportunity to use motorized equipment. Area may contain unimproved roads or secondary trails but is at least 0.5 mile from any improved, maintained roads, railroads, or primary motorized or mechanized trails.
- **Semi-Developed Natural (SDN)** - Area is a natural appearing environment. Evidences of the sights and sounds of people are moderate. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but evidence of other users is prevalent. Resource modification and utilization practices are evident but harmonize with the natural environment. Construction standards and facility design accommodate conventional motorized and mechanized uses. About equal probability of encountering other user groups and isolation from sights and sounds of people. Opportunity for a high degree of interaction with the natural environment. Challenge and risk opportunities generally are not important. Practicing and testing outdoor skills might be important. Opportunities for both motorized and nonmotorized forms of recreation are possible. Area is within 0.5 mile from improved, maintained roads, railroads, or trails.
- **Developed Natural (DN)** - Area is a substantially modified natural environment. Resource modification and utilization practices enhance specific recreation activities and maintain vegetative cover and soil. Sights and sounds of people are readily evident. Interaction between users often is moderate to high. Many facilities are designed for use by a large number of people. Density levels decline with increasing distance from developed sites. Facilities often are provided for special activities. Facilities for intensified motorized and mechanized uses and parking are available. Encounters with other individuals and groups are common. Site/activity access is convenient. The physical setting is not as important as the activity opportunity. Wildland challenges, risk taking, and testing of outdoor skills generally are unimportant except for specific activities in which challenge and risk-taking are important elements, e.g. mountain skiing. No distance criteria.
- **Highly Developed (HD)** - The setting contrasts with the surrounding cityscape, but urban elements are common and readily apparent. Large numbers of users can be expected, both onsite

and in nearby areas. Facilities are designed to serve individuals or small groups but can accommodate high use. Facilities accommodate access by a variety of means, including pedestrian, motorized, mechanized, and mass transit. Design generally offers users a choice between social encounters and solitude in an urban setting. Observing natural appearing elements is important. Nature related challenge and risk opportunities generally are not important. No distance criteria.

Thresholds for determining remoteness are therefore derived from the ROS classes of the East and are defined by the following:

- **Low:** (HD and DN) - Resource is noticeably developed. Interaction between users is moderate to high. There are boat launches, campsites, picnic areas or other maintained facilities, which can accommodate a large number of people (i.e. pavilions, parking lots). Motorized or mechanized use is allowed and evident.
- **Moderate:** (SPNM, SPM, and SDN) - Resource appears to maintain its natural quality. Development is present but is not always noticeable by the average person and usually harmonizes with the natural environment. Interaction between users may be low to moderate. There are boat launches, campsites, picnic areas or other maintained facilities, but they are limited and not always noticeable. Motorized or mechanized use may be possible.
- **High:** (P) - Resources that are essentially unmodified and pristine. Interaction between users is extremely rare, and evidence of other users is negligible. There are no boat launches, campsites, picnic areas or other maintained facilities. Motorized or mechanized use is not permitted or not possible.

2. OVERALL VIEWER EFFECT

The ratings for each of the four-abovementioned criteria for each resource are then combined to obtain an Overall Viewer Effect rating.²⁹ The combination of the four criteria provides a good picture of how the project may affect the reasonable viewer's experience. For those resources that emerge with a 'Low' to 'Moderate' rating, the effect to the reasonable viewer is not considered significant. Those resources that emerge with a 'Moderate-High' to 'High' Overall Viewer Effect rating may result in a significant change to a reasonable viewer. Note that this is another step in the process of determining whether the effect is adverse. In this stage of the screening process, "High" does NOT translate into an unreasonable adverse effect determination. This determination is still dependent on other factors that will be considered in the next step of the process.

H. Overall Conclusion and Determination of Reasonable/Unreasonable

This section provides an overall summary and professional opinion as to whether the project, as proposed, will have an unreasonable, adverse effect on aesthetics. A number of considerations are factored in to this final

²⁹ Rating system:

Each rating is assigned a point value:

Low = 1

Moderate = 2

High = 3

Total points are combined and assigned overall ratings based on the following breakdown:

Low = 5 points or less

Low-Moderate = 6-7 points

Moderate = 8-9 points

Moderate-High = 10-11 points

High = 12 points

analysis, in addition to the foregoing work, that helps inform LandWorks' final conclusion. These include: 1) The development and completion (in this section) of a comprehensive, systematic, defensible, visual analysis methodology that integrates qualitative and quantitative considerations; 2) The proposed site and its characteristics as an appropriate location for wind energy and this project in particular; 3) The regional landscape and viewshed and the project's place in that landscape and viewshed; 4) Night lighting of the project; 5) Local conditions in the immediate vicinity of the project and the potential visual effects of the project within that context; and, 6) The efficacy of mitigation measures being proposed by the developer. Taken together, these analyses and considerations will yield the overall conclusion and determination of the project's potential effect on the aesthetics within the 10-mile radius of the project site.

3. Background

A. About the Project

1. PROJECT FACILITIES

The Antrim Wind Project is proposed to include nine 3.2 megawatt (MW) turbines, capable of generating up to 28.8 MW of electricity. The turbines will be located in the Town of Antrim, Hillsborough County, New Hampshire, on the Tuttle Hill ridgeline spanning southwestward to the northeastern slope of Willard Mountain. The turbine rotors and towers will be a light or white color, which is the best choice for enabling the structures to blend into background sky and atmospheric conditions when viewed from the ground, and is recommended by the FAA to provide the maximum daytime visibility for pilots in the air. For purposes of this analysis, it is assumed that a Siemens SWT-3.2-113 turbine will be used. Turbines 1 through 8 will have a hub height of 92.5 meters (303.5 feet), a rotor diameter of 113 m (370.7 feet), with a maximum height of 149 meters (488.8 feet) to the tip of the blade when in an upright, vertical position. Turbine 9, on the northeastern slope

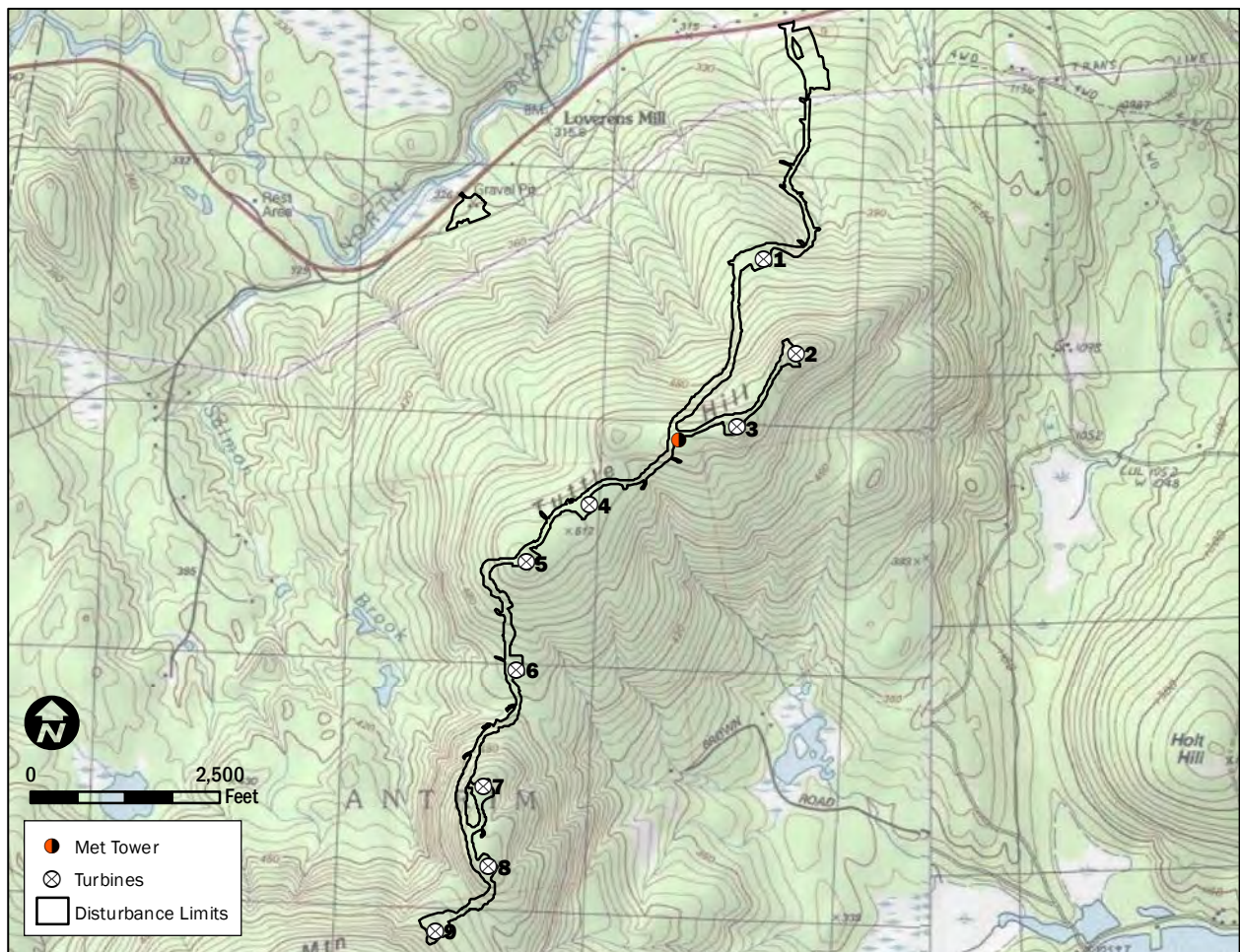


Diagram 15. Project Base Map

3. BACKGROUND

of Willard Mountain, will have a hub height of 79.5 meters (260.8 feet), a rotor diameter of 113 meters (370.7 feet), with a maximum height of 149 meters (446.2 feet). In addition to the turbines, the Project will require the construction of an access road, an electrical substation, collector lines, a meteorological tower (free standing lattice structure), a small operation and maintenance facility (O&M), a construction equipment laydown yard, and temporary work trailers.

To access the turbines, a new road will be constructed that originates on NH State Route 9 approximately 2.3 miles east of the Antrim town line, and proceeds along the northern ridgeline of Tuttle Hill, then follows in a general southwest direction to all turbine locations. To interconnect the generated electrical power to the PSNH 115 kV line, underground 34.5 kV collector lines will run along the ridgeline road between turbines, and then switch to pole-mounted lines down the access road from the collector system bus to the substation. The substation will “step up” the power to 115 kV and tie into the existing PSNH line. The O&M facility and substation will be located approximately 500 feet off the southern side of Route 9 in an approximately 3-acre cleared area. The only possible visibility of these facilities will be at the access road entrance along Route 9 and only briefly, if at all, given the dense vegetative buffer that will remain between the highway and the



Diagram 16. Project Access and Associated Areas

cleared area, the gradual uphill slope, as well as the low profile of these facilities (i.e. generally do not rise above tree level). There will be a staging area of less than 2 acres cleared to the north of the substation and O&M facility that will benefit from the existing buffer along Route 9, and 100 feet of vegetation will be retained along and parallel to the highway. Once construction is complete, this area will be allowed to revegetate naturally, which is often quicker and more effective than planting measures. To reinforce the buffer along Route 9, an area adjacent to the southern edge of the buffer and where clearing abuts the buffer, will be planted with a dense landscape screen of evergreen and deciduous trees. Additionally, some landscape plantings will be added to the entry area adjacent to the access road to close the opening and provide further screening of the facility (see Exhibit 19). The 3-acre temporary laydown area will be situated approximately a mile east of the access road on the southern side of Route 9. This area will also be screened by an existing vegetative buffer, and will be allowed to revegetate once construction is complete. Collectively, the turbine foundations, construction pads, access roads, O&M facility, substation, laydown area, and electrical upgrades are anticipated to directly impact an area of about 57.1 acres, including initial clearing for construction. After all post construction restoration and revegetation is complete (45.8 acres), the footprint of the physical facilities will impact an area of 11.3 acres.

2. PROJECT LIGHTING

The wind turbines and permanent met tower will be illuminated in accordance with FAA requirements for turbine lighting in order to address aviation safety. The FAA requires lighting of perimeter turbines, as well as interior turbines with a maximum gap between lit turbines of no more than $\frac{1}{2}$ mile (2,640 feet). The FAA has recently issued its determinations of no hazard for the Antrim Project. As expected, 6 turbines will require nighttime red lights. These turbines are 1, 3, 4, 6, 7, and 9. Turbines 2, 5, and 8 will not have lights. One aviation obstruction light will be affixed to the rear portion of the nacelle on each turbine to be illuminated. The lights will flash simultaneously with a rapid discharge strobe (slow-on, slow-off profile), which will remain on at night to warn aircraft of the existence of the structures. According to the governing FAA standard³⁰, lights typically used in these types of applications are omni-directional, L-864 Red Flashing Lights (incandescent or rapid discharge [strobe]) with a minimum 750 candela with a 3-degree vertical beam spread.

Although the impact of the required nighttime lighting is minimized through use of a limited vertical beam spread and other mitigating factors, the Project has proposed the use of a radar-assisted lighting system to reduce the effects of nighttime lighting. Although not yet approved by the FAA for use on wind turbines in the United States, the new nighttime lighting mitigation systems utilize radar mounted on the turbines or in close proximity to the turbines to detect aircraft when they are approaching the structure at night and automatically turn on the FAA lights. The lights then automatically turn off once the aircraft has left the airspace in proximity to the wind farm. These systems permit wind turbine obstruction lights to remain off at all times unless an aircraft is operating in the vicinity of the wind farm, thus greatly reducing nighttime lighting at these wind projects. The Project has committed to install this technology as soon as the FAA approves it. The installation would either occur during construction or during operations based on when the FAA approves the technology and a commercially-viable product is available. This mitigation technology will essentially eliminate the impacts of nighttime lighting on potential users of the Project area resources.

³⁰ U.S. Department of Transportation Federal Aviation Administration. Obstruction Marking and Lighting Chapter 13, February 2007. (FAA AC 70/7460-1K)

B. Project Area/Landscape Character³¹

1. INTRODUCTION

An integral part of the aesthetic assessment for the Antrim Wind Project, it is important to reference the existing “landscape character.” Landscape character is a function of the innate natural and physiographic components of an area coupled with the effects of human use and development.

The State of New Hampshire has been delineated by a number of different physiographic and political regions, which include but are not limited to: 1) Planning Regions - overseen by the Regional Planning Commissions and Agencies; 2) Marketing and Tourism Regions--designed to promote investment, development and tourism; 3) Ecological Regions derived from habitat and the distribution of flora and fauna coupled with landform; and 4) Physiographic Regions, which are simply a delineation of basic landforms and topography.

The New Hampshire landscape can be characterized in terms that provide a basis for understanding the context for new development on a local, regional or statewide scale. It is important to understand that there are two distinct descriptive categories: 1) the natural environment and 2) the human-altered environment. In the review of a project such as the one proposed for Antrim, a three-step approach is required to understand the visual and physical setting for the project. First, it is the natural environment that is to be characterized and visualized. Secondly, the elements of the human-altered environment (also referred to as the “built environment”) are articulated and recognized as an influential landscape determinant. These two components are integrated to provide an overall summary of the key elements that characterize the context for this particular project. It is important to note that nowhere within the Antrim project corridor does there exist a totally pristine, unaltered natural environment.

The natural environment includes both an understanding of eco-regions, habitat and physiography, and how these physical elements are translated into visual patterns. Physiography is defined as the geography of the earth’s natural physical features. New Hampshire can be divided into 3 basic regions:

1. The White Mountains
2. The Eastern New England Upland
3. The Coastal Lowlands

A more detailed manner in which to look at the state’s regions is to use the “Ecological Regions” delineation as set forth in the publication *The Nature of New Hampshire* (Sperduto and Kimball). These 8 regions incorporate physiography, land cover, and habitat to set forth the distinct ecological boundaries of the state. The Project, as proposed, and its overall study area, is located within the Monadnock-Sunapee Highlands region and the Southwest NH Lowlands region.

³¹ Note that this section is based, in part, on previously conducted research and writing by LandWorks.

3. BACKGROUND

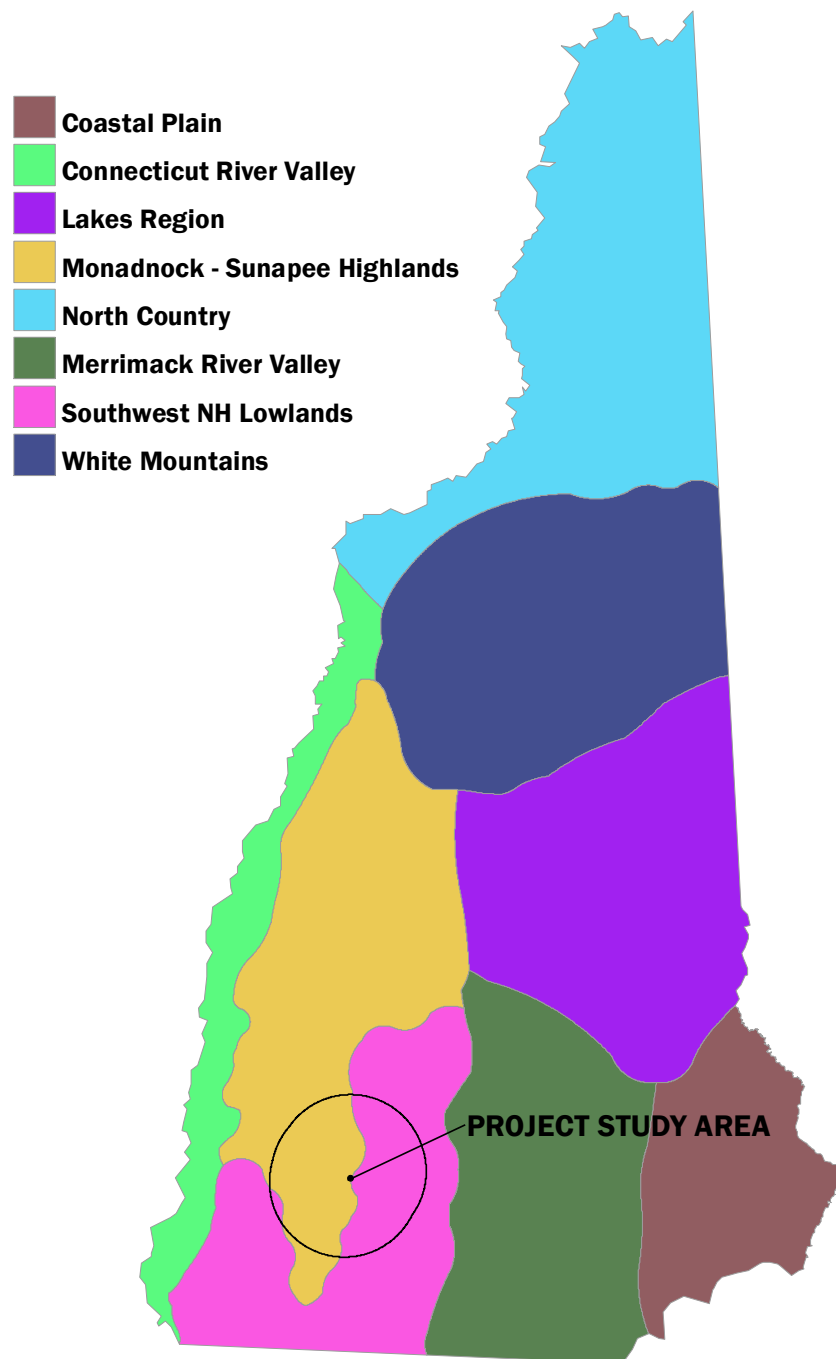


Diagram 17. Ecological Regions of New Hampshire as delineated in *The Nature of New Hampshire*

The human-altered environment includes local, regional and statewide infrastructural networks such as roads and highways, rail and transmission corridors. Connected to these networks are the physical patterns and density of urban, suburban and rural land uses. Finally, the land uses are typically categorized into several major types: 1) urban developed areas which include residential, commercial and municipal/cultural/institutional land uses; 2) village and town centers which often include some, if not all, of

the uses found in urban centers; 3) suburban residential; 4) rural residential; 5) industrial/infrastructural; 6) forestry-related land uses and 7) agricultural land uses.

In order to describe the project context within New Hampshire's physical environment, the patterns of the natural landscape are considered together with the development and management patterns of the human environment. While there exists examples of "working landscapes"³² - land in productive use for silvicultural and agricultural purposes - this area, the Monadnock-Sunapee Highlands and the Southwest Lowlands, presents more of a settled, residential, and village-oriented landscape.

2. THE NATURAL ENVIRONMENT

The Monadnock-Sunapee Highlands and Southwest NH Lowlands Ecological Regions will be described together from a physiographic and climate perspective for the purposes of this review, as the project area is located where the two regions abut. Therefore, in this particular location, these regions share similar key landscape elements: geomorphological, vegetative, hydrological, and climate patterns.

a. Geomorphology

Resistant to weathering, granite and metamorphic rocks make up most of the bedrock, and glacial till covers the sloped uplands. The typical elevation ranges in this section are not as dramatic as that of the White Mountains region. The Monadnock Sunapee Highlands region includes elevations between 500' and more than 3000', and generally less than 1000' in the Lowlands. In the project vicinity Thumb Mountain, Mount Skatutakee, Bald Mountain, Crotched Mountain, and Pitcher Mountain reach to 1978', 1998', 2037', 2063', and 2153', respectively.

Additionally, "tributaries to the Merrimack and Connecticut Rivers form relatively steep, narrow valleys among low hills and small mountains...rocky ridges, small cliffs, and talus slopes are common".³³ Further into the Lowlands, the terrain becomes increasingly complex, "with rolling hills of small to moderate size, many of which are drumlins, larger bedrock-controlled hills, and narrow and broad stream and river valleys."³⁴ Thus, the terrain of the project area is hilly and variable with its microtopography.

b. Vegetative Patterns

"Marshes, swamps, and peatlands are common, but relatively small compared to wetlands in regions with more extensive lowland areas"³⁵ and Laurentian mixed forests (northern hardwood forests, and hemlock-hardwood-pine forests) remain the most common forest type in both the regions. Common understory plants include northern wood sorrel, shining clubmoss, bluebead lily, twisted stalk, hobblebush, and striped maple. Acadian spruce-fir forests are present on many of the higher summits.³⁶

³² "Working Landscape" is defined extensively in the 2010 Report entitled "Strategies for Promoting Working Landscapes in North America and Europe" A Report for the Vermont Council on Rural Development, principal author, Cheryl E. Morse, Ph.D, which states (with regard to Vermont, but applicable to New Hampshire as well) that "The term points to the unique environmental history of the state, in which agriculture - particularly sheep, dairy, haying, vegetable and orchard farming - as well as timber, forest products, and maple syrup production have sustained the extractive economy and shaped the natural landscape."

³³ Sperduto, Dan and Ben Kimball. The Nature of New Hampshire. Lebanon, New Hampshire: University Press of New England, 2011. 34. Print.

³⁴ Sperduto 34.

³⁵ Sperduto 35.

³⁶ Sperduto 35.

From a visual perspective, the vegetated landscape provides an almost continuously wooded environment and backdrop, as there are few cleared or agricultural areas in this region, with the exceptions being areas that are or have been subject to timber harvesting, which disrupts the natural vegetative patterns. The color range of this wooded background varies seasonally from the contrasting lighter greens of the deciduous species in early spring with the persistent dark green of conifers, to the deep green of summer and then the culmination of the fall season with the spectacular red, yellow and orange colors that are distinctive in northern New Hampshire and New England. The 5-month period when deciduous trees have lost their leaves is also distinct for the contrast between the extensive grey to brown, to even black branching of the deciduous trees in contrast with the deep green and conical or windswept forms of spruce, cedar, fir, and even white pine. Thus, the visual background of an almost continuous drape of woodland over the terrain provides at times a homogenous textural character, and at other times a distinct level of vivid contrast between winter colors and conifers, or the fall coloration of the deciduous foliage.

c. Surface Water Features

In addition to the numerous marshes and swamps, there are a number of small and medium-sized water bodies in the project vicinity. The major surface water features include the Contocook River, Highland Lake at 697 acres; Nubanusit Lake (715 acres); Franklin Pierce Lake (520 acres); Powder Mill Pond (435 acres) and Deering Reservoir (323 acres, artificially created), along with their corresponding streams and wetlands. In the project area, these include the North Branch and Piscataquog Rivers, and Cochran, Great, Moose, Salmon, Fisher, and Dudley Brooks, to name a few.

3. BACKGROUND

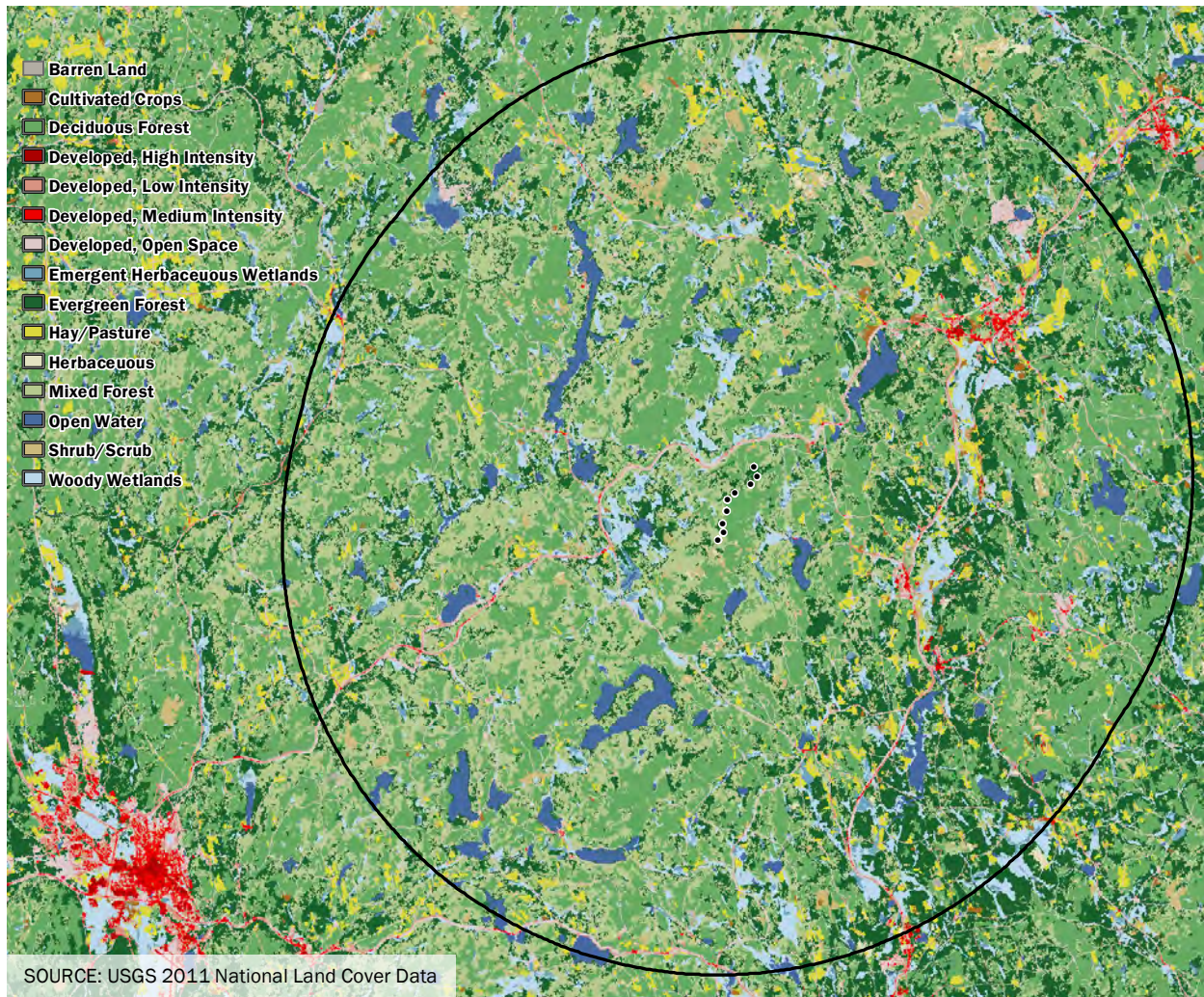


Diagram 18. Land Cover Map (SOURCE: USGS 2011 National Land Cover Data)

3. THE HUMAN-ALTERED ENVIRONMENT

a. A Historical Perspective Regarding New Hampshire Land Use

“In fact, the very idea of “untouched” wilderness may be an illusion. There is no such thing as stasis in nature; nature IS change.”³⁷ This holds true for New Hampshire, where nature’s slow, relentless change has accelerated ever since the first settlers realized they could make a profit from the rugged landscape.

European interest in New Hampshire began in the 1500s, though New Hampshire itself has been inhabited for about 12,000 years prior to now, by many Native Americans seasonally fishing, hunting, gathering, and

³⁷ Rous, Emma. North Country, New Hampshire Stories. Web. 18 Nov. 2013.
<http://www.northcountrynhstories.org/story_Emma_Rous.html>.

planting various crops.³⁸ European settlement began permanently in 1623, and in 1788, New Hampshire became the ninth state to ratify the U.S. Constitution.

Located geographically closer to the coast, which throughout history and around the world has been the beginning point of countless settlements and cities, the southern portion of New Hampshire began as, and remains, the most developed area of the state. This is due to its proximity to the seacoast, and, ultimately, the greater Boston metro area. “The economic and social life of the Seacoast revolved around sawmills, shipyards, merchants’ warehouses, and established village and town centers.” Meanwhile, farmers, who used most of the land for agriculture, but also some portions for the production of lumber and grain, mainly inhabited the northern and western portions of the state.

As roads increased in size and use, they followed the paths of the state’s major rivers north to south, as did railroads later on. To the south and over the border, Boston was growing rapidly and much commerce and business occurred between there and the southern portion of New Hampshire.

Change was inevitable. “Throughout the 1800s, the Seacoast declined as a commercial center...It was the Merrimack Valley [areas of Concord, Manchester, and Nashua³⁹] however, that took over as the social, political, and economic center of the state...Concord’s central location and diversified economy made it well-suited to serve as the new state capital.”⁴⁰

Agriculture eventually began a steady decline, as “New Hampshire hill farms could not compete with farms in the Midwest”.⁴¹ Wallace goes on to explain how the state persevered during this downturn:

Logging railroads were built into once-inaccessible forests. Other forests sent their logs to mills in Groveton, Berlin, and Massachusetts via log drives down the Connecticut and Androscoggin Rivers. Meanwhile, urban areas around Boston and Portland needed daily shipments of perishable foods. By 1870, New Hampshire’s railroad network was largely complete, and farmers near the various rail depots found a ready market for dairy and poultry products, as well as fresh fruit.

However, forestry soon became, and continues to be, the most widespread use of the landscape, from logging to exporting lumber to paper mills that created towns.

To help bolster the economy after the paper and pulp downturn, people turned to the landscape once again, this time seeing it through the lens of tourism. Tourism was not new to the state either, as the Seacoast and southern portions of New Hampshire had long been a destination for those in search of a respite from city life, as well a chance to ogle the fall foliage. Many of the old hill farms, no longer serving their original purpose after the decline of agricultural production, were bought and converted into summer homes.

³⁸ Wallace, R. Stuart. “New Hampshire History in Brief.” New Hampshire Division of Historical Resources. 2007. Web. 18 Nov. 2013. <<http://www.nh.gov/nhdhr/markers/brief.html>>.

³⁹ “Merrimack Valley.” New Hampshire Department of Resources and Economic Development. 2014. Web. 2 Jan 2014. <<http://www.visitnh.gov/welcome-to-nh/about-the-regions/merrimack-valley.aspx>>

⁴⁰ Wallace, R. Stuart. “New Hampshire History in Brief.” New Hampshire Division of Historical Resources. 2007. Web. 18 Nov. 2013. <<http://www.nh.gov/nhdhr/markers/brief.html>>.

⁴¹ Wallace, R. Stuart. “New Hampshire History in Brief.” New Hampshire Division of Historical Resources. 2007. Web. 18 Nov. 2013. <<http://www.nh.gov/nhdhr/markers/brief.html>>.

It is clear that New Hampshire, though appearing rugged and wild to many today, has been the subject of dramatic landscape change since the mid-1600s.⁴² This is not by any means a “pristine” landscape; it has been changed repeatedly over the years at the whim of economic, industrial and touristic fluctuation. Broadly put, this state has a strong identity as a rugged, working landscape.

b. The Human Environment of the Monadnock-Sunapee Highlands Region and Southwest NH Lowlands Region

Overview

The focus for this description is an area that straddles both the Monadnock-Sunapee Highlands and the Southwest NH Lowlands regions. These two regions share much in terms of development patterns and landscape qualities as they relate to land use and visual character. The predominant landscape features near to, and as part of the corridor in the two regions, is the general 400’-2500’ elevation of the topography with rounded hills and summits interspersed with streams, wetlands and several lakes. Overall, this area has a denser network of state and federal routes than areas in the north, and also a greater overall development density—more settled towns and developed areas within it.

The Working Landscape

Although timber harvesting is not as extensive as New Hampshire’s North Country, as seen in the map that follows, it is still an influential element in this regional landscape. Tracts of logged areas are visible in aerial photography, and evidence of silviculture is present as one travels around the area. Outside the valley areas, the landscape is typically rocky and hilly - enough to limit farming activities to small-scale agricultural enterprises. There are small patches of agricultural lands scattered throughout, particularly along the river and transportation corridors, as seen along US Route 202 and the Contoocook River Valley. It is also likely that there are stands of sugarbush and therefore maple syrup production in this region, but, as stated previously, this type of working landscape is not a major determinant of landscape character.

⁴²Wallace, R. Stuart. “New Hampshire History in Brief.” New Hampshire Division of Historical Resources. 2007. Web. 18 Nov. 2013. <<http://www.nh.gov/nhdhr/markers/brief.html>>.

3. BACKGROUND

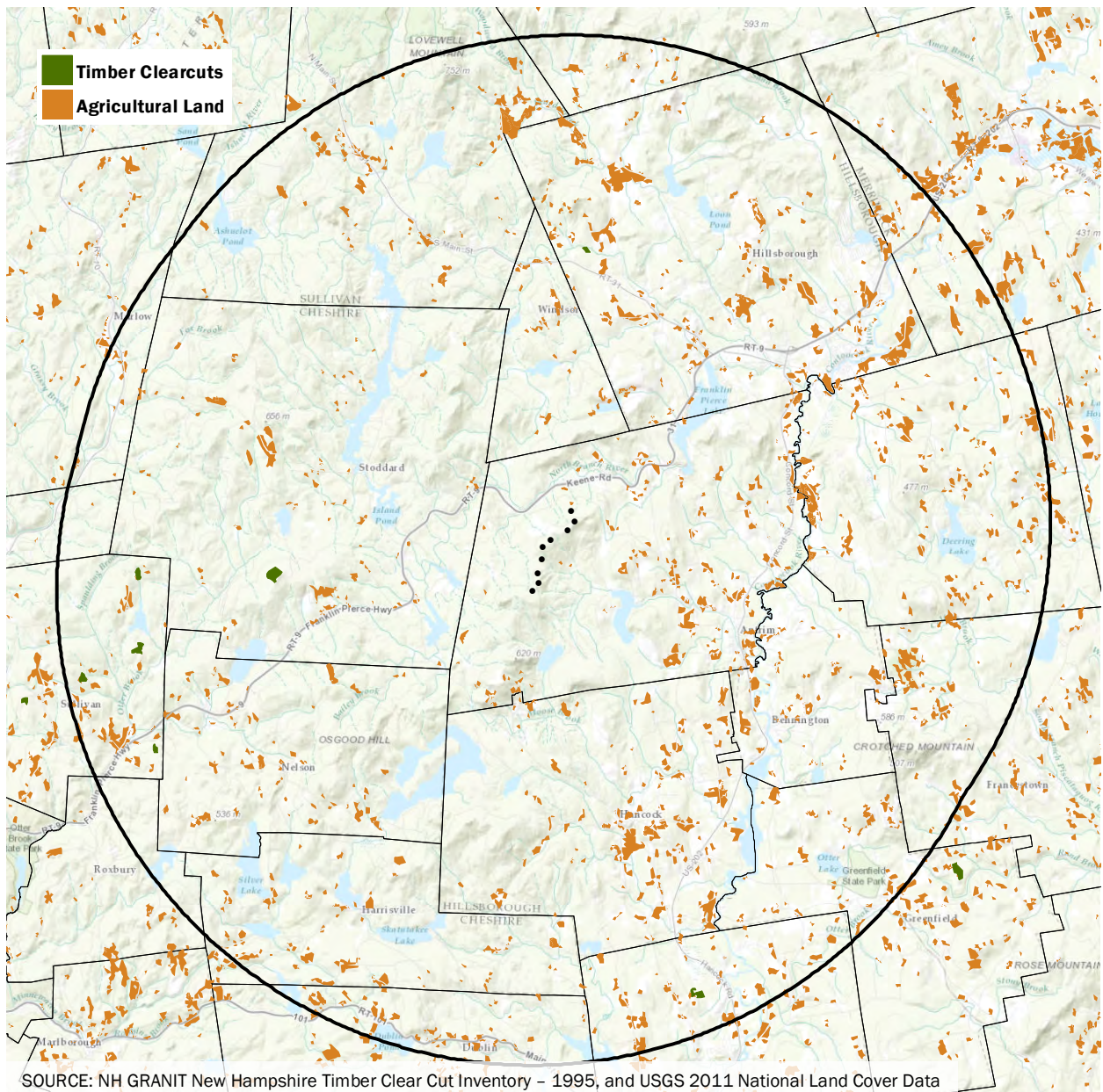


Diagram 19. The Working Landscape

Infrastructure and Development

The project study area has well-established infrastructure when compared to the north and central regions of New Hampshire, forming an interconnected web of transportation and electrical networks. Due to the rolling and sometimes rocky terrain, development typically follows the river valleys, highway corridors and lakeshores. The primary roadways include Routes 9, 202 (Currier & Ives Scenic Byway), 123, 31, 47 and 149. There is also a statewide electric transmission corridor that bisects the project study area. Average population of town's in this area is around 2,000 people, with Peterborough at the highest with 6,286 people, and Windsor with the lowest at 224 people. Antrim's population is among the highest with 2,637 people. With roughly 108 people per square mile, the development pattern of the study area can be considered generally rural

3. BACKGROUND

residential interspersed with pockets of agricultural development and small commercial or village centers. Development follows a general linear pattern along the established roadways and river corridors. Major community hubs in this area are found primarily to the east of the Project and include Hillsborough, Antrim and Bennington. To the west of the Project, development is less intense due to the number of conserved lands in the area (particularly Stoddard).

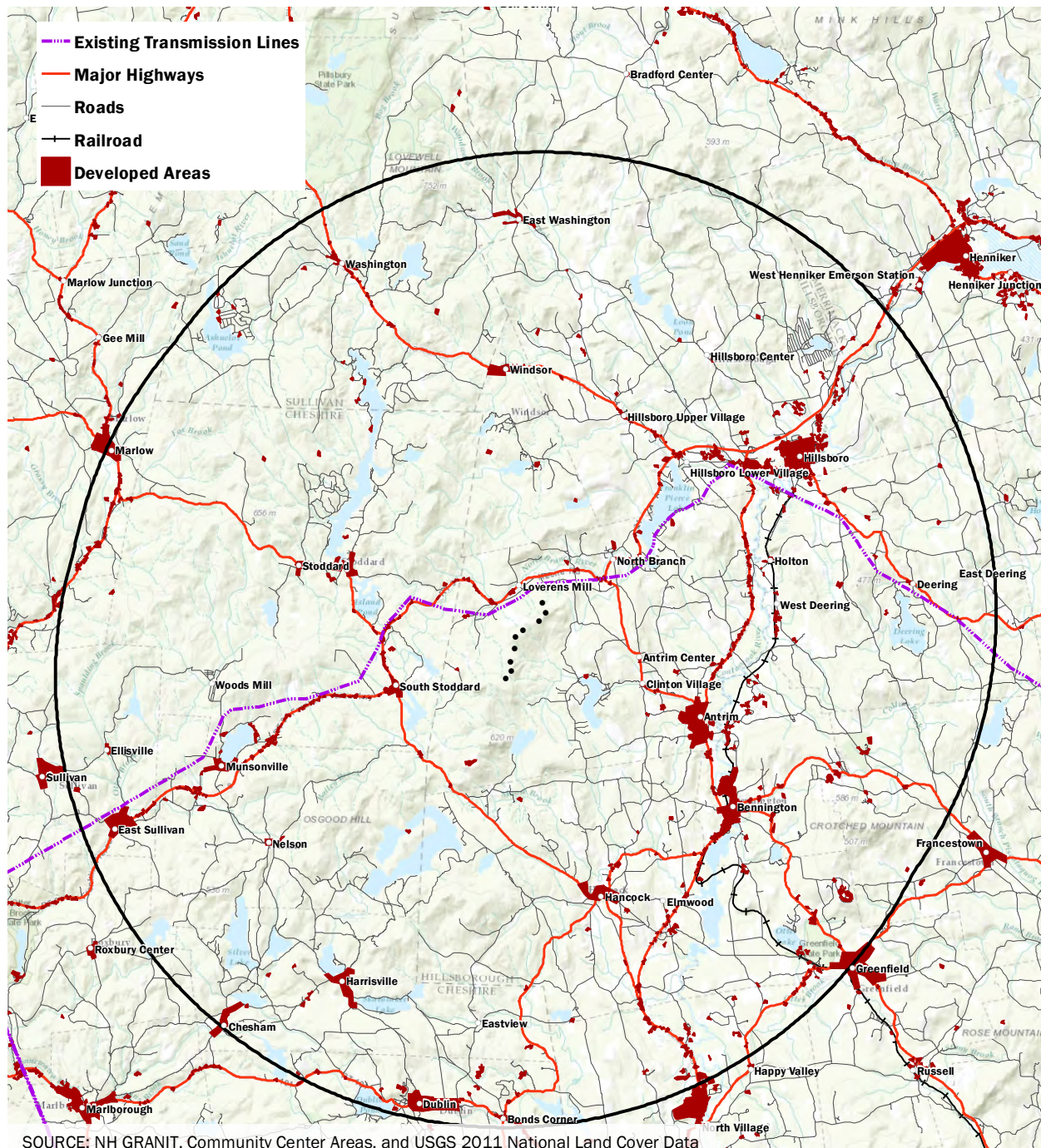


Diagram 20. Infrastructure and Development

3. BACKGROUND

Tourism

Research indicates that the 10-mile study area, while located within the Monadnock tourism region⁴³, is not the primary hub of visitor and tourism activity. There are very few, if any, key destinations or recreational activities advertised for the study area, as evidenced from a comprehensive search in NH Guidebooks and on the NH Tourism website⁴⁴. Most activities seem to be geared around, and in the vicinity, of Mt. Monadnock. Moreover, the qualities one would typically find as a key destination for tourists or visitors from outside of the region are not found here, such as motels, souvenir shops, or restaurants. The more frequented and popular destinations, like Keene or Peterborough, are located well outside the limits of the study area. While there may be a few exceptions (e.g. Pitcher Mountain Fire Tower), this area and its resources are primarily visited by local residents, and do not appear to be a consistent draw for visitors from afar.

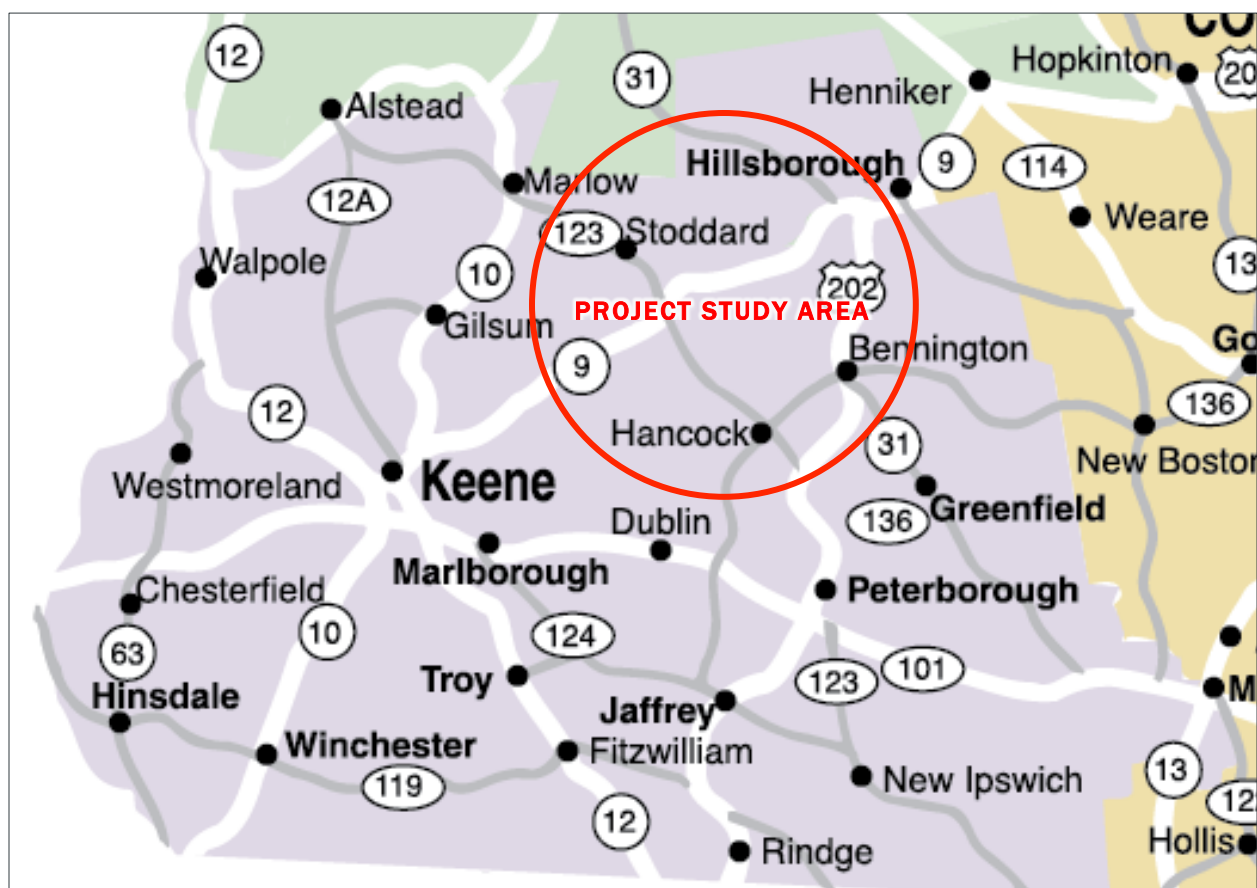


Diagram 21. Monadnock Tourism Region⁴⁵

⁴³ <http://www.visitnh.gov/welcome-to-nh/about-the-regions/maps.aspx#>

⁴⁴ <http://www.visitnh.gov>

⁴⁵ Map from the NH Tourism website, NH Department of Resources and Economic Development

4. The Visual Assessment

A. Inventory of Scenic Resources

A comprehensive inventory of potential local, state, and national scenic, recreational, and publicly accessible resources was conducted for the 10-mile study area. The identification of resources was a time intensive process, requiring a great deal of research to ensure that all possible resources were identified. Resources were identified on a town-by-town basis (20 towns total) through a consistent and systematic process.

First, GIS data available from NH Granit was collected and reviewed, which included:

- Geographic Names Information System (GNIS)
- Key Destinations
- OEP Recreation Inventory: Points
- OEP Recreation Inventory: Polygons
- Recreation Facilities

Next the NH Gazetteer (DeLorme) was reviewed. Any resources found in this source that were not already identified through the GIS data were added to the list. The official website of the New Hampshire Office of Travel and Tourism⁴⁶ was then studied. A search was completed for every town within the 10-mile study area for key destinations⁴⁷ that fell within the primary categories (local, state, national). Any resources not already identified in the previous steps were added to the list. All available guidebooks were then reviewed, such as *An Explorer's Guide to NH* or *Quiet Water New Hampshire & Vermont 2nd Edition* (see Section 6. Bibliography for a detailed list). Any new resources not already identified were added to the list. Each regional and town website and applicable regulatory or guiding documents were then reviewed (i.e. Town Plans, Open Space Plans, Recreational Plans, etc.) to identify any new resource not identified in the previous steps. New resources were again added to the list. Next, a variety of additional sources were reviewed for every town to confirm or identify new resources within each, such as:

- NH Byways and Scenic Tours website (<http://www.nh.gov/dot/programs/scbp/tours/index.htm>)
- NH Division of Parks and Recreation website (nhstateparks.org) – includes Heritage Trail, Rail Trails, State Parks, etc.
- Area Chambers of Commerce websites
- NH designated rivers (<http://des.nh.gov/organization/divisions/water/wmb/rivers/designriv.htm>)
- NH Covered Bridges website (<http://www.nh.gov/nhdhr/bridges/table.html>)
- NH Fish & Game website (http://www.wildnh.com/Fishing/bathy_maps.htm)
- NH Division of Forest and Lands website (<http://www.nhdf.org>)

Finally, for every resource identified in the list, additional searches were conducted online using the resources name as the key word (e.g. Monadnock-Sunapee Greenway or Edward MacDowell Lake), to obtain specific information about that resource, or to aid in the identification of any new resource within the area that was not already identified. Therefore, the resource list presented in Table 2 below is considered to be all-inclusive.

⁴⁶ <http://www.visitnh.gov>

⁴⁷ <http://www.visitnh.gov/what-to-do/key-attractions/default.aspx>

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
NATIONAL RESOURCES			
National Park System Areas ⁵⁰			
NONE			
Affiliated Areas of the National Park Service			
NONE			
National Heritage Areas			
NONE			
National Historic Landmarks			
1.	Harrisville Historic District	Harrisville	No Project Visibility
2.	Franklin Pierce Homestead	Hillsborough	No Project Visibility
National Natural Landmarks			
NONE			
National Scenic Byways			
NONE			
National Trails			
NONE			
National Wild and Scenic Rivers			
NONE			
National Wildlife Refuges			
NONE			
Other Federal Lands with a Specific Public Use or Scenic Resource Component (e.g. U.S. Army Corps of Engineers, Bureau of Land Management)			
3.	Edward MacDowell Lake	Dublin, Peterborough	No Project Visibility
4.	Edward MacDowell Lake Recreation Area	Dublin, Peterborough	No Project Visibility
5.	Edward MacDowell Lake “Project Lands”	Hancock, Harrisville, Peterborough	No Project Visibility
STATE RESOURCES			
State Parks			
6.	Greenfield State Park	Greenfield	No Project Visibility
7.	Pillsbury State Park	Washington	No Project Visibility

⁴⁸ Measurements are approximate.

⁴⁹ Visibility based on Exhibit 4: Viewshed Map, as well as field visit and/or 3D modeling, as noted.

⁵⁰ "In the Act of August 18, 1970, the National Park System was defined in law as 'any area of land and water now or hereafter administered by the Secretary of the Interior through the National Park Service for park, monument, historic, parkway, recreational or other purposes.'" National Park System Areas are directly administered by the National Park Service and include Memorials, National Battlefields, National Battlefield Parks, National Historical Parks, National Historic Sites, National Lakeshores, National Monuments, National Memorials, National Military Parks, National Parks, National Preserves, National Recreation Areas, National Recreational Rivers, National Reserves, National Seashores, National Scenic Riverways, National Scenic Trails, or Parkways. *The National Parks: Index 2009-2011*, U.S. Dept. of the Interior National Park Service, Jan. 3, 2009, pg. 96. Note that for purposes of this VIA, historic sites and resources are not analyzed. Historic sites and resources are reviewed as a separate component of the application.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
State Conserved Lands with a Specific Public Use or Scenic Resource Component (e.g. Wildlife Management Areas, State Forests)			
8. Contoocook River Shorebank Angling Area	Antrim	No Project Visibility ⁵¹	
9. Hosmer State Wildlife Management Area	Antrim	No Project Visibility	
10. NH Fish and Game North Branch River Shorebank Access	Antrim	No Project Visibility	
11. Low State Forest	Bradford, Hillsborough	No Project Visibility	
12. Peterson State Wildlife Management Area	Dublin	No Project Visibility	
13. Powder Mill Pond Wildlife Management Area	Greenfield, Hancock	No Project Visibility	
14. Carpenter Marsh State Wildlife Management Area	Hancock	No Project Visibility	
15. Evas Marsh State Wildlife Management Area	Hancock	No Project Visibility	
16. Louis Cabot Preserve	Hancock, Nelson	No Project Visibility	
17. Farrar Marsh State Wildlife Management Area	Hillsborough	No Project Visibility	
18. Fox State Forest	Hillsborough	No Project Visibility	
19. Kinson Wildlife Management Area	Marlow	No Project Visibility	
20. Pitcher Mountain State Forest	Stoddard	6.35 mi.	0 to 9
Non-Motorized Trails in New Hampshire's State Parks, Forests and on Recreational Rail Trails			
21. Hillsborough Rail Trail	Bennington, Deering, Hillsborough	4.65 mi.	0 to 9
Covered Bridges Maintained by NH Department of Transportation			
22. County Bridge	Greenfield, Hancock	No Project Visibility	
NH Department of Transportation Designated Scenic and Cultural Byways			
23. Currier & Ives Scenic Byway	Henniker	No Project Visibility	
NH Department of Transportation Designated Scenic Overlooks and Rest Areas			
NONE			
Fire Towers Listed in the Fire Lookout Tower Quest Program by the NH Division of Forest and Lands			
24. Pitcher Mountain Fire Tower	Stoddard	6.38 mi.	0 to 9
Rivers designated by the NH Rivers Management and Protection Program			
25. Contoocook River	Antrim, Bennington, Deering, Greenfield, Hancock, Henniker, Hillsborough, Peterborough	No Project Visibility ⁵²	
26. North Branch River	Antrim, Stoddard	No Project Visibility ⁵³	
27. Ashuelot River	Gilsum, Marlow, Washington	No Project Visibility	
28. Piscataquog River	Deering	No Project Visibility	

⁵¹ No project visibility confirmed by field visit.

⁵² No project visibility confirmed by field visit.

⁵³ No project visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
Public Waters⁵⁴ with Designated State Access Areas (i.e. NH Fish and Game)			
29. Willard Pond	Antrim	1.37 mi.	0 to 8
30. Powder Mill Pond	Bennington, Greenfield, Hancock	6.08 mi.	0 to 8
31. Otter Lake	Greenfield	No Project Visibility	
32. Childs Bog	Harrisville	No Project Visibility	
33. Seavers Reservoir	Harrisville	No Project Visibility	
34. Silver Lake	Harrisville, Nelson	No Project Visibility	
35. Center Pond	Nelson	No Project Visibility	
36. Cold Spring Pond	Stoddard	No Project Visibility	
37. Robb Reservoir	Stoddard	3.04 mi.	0 to 4
38. Halfmoon Pond	Washington	No Project Visibility	
LOCAL RESOURCES			
Scenic Drives or Locally Identified Scenic Roads			
39. Sunapee Loop	Antrim, Bennington, Hillsborough, Washington, Windsor	1.44 mi.	0 to 8
40. Monadnock Region Loop	Antrim, Gilsum, Hancock, Marlow, Peterborough, Stoddard	2.37 mi.	0 to 9
41. Clement Hill Road	Deering	No Project Visibility	
42. Fisher Road	Deering	No Project Visibility	
43. Glen Road	Deering	No Project Visibility	
44. Mountain View Lane	Deering	No Project Visibility	
45. Old Clement Road	Deering	No Project Visibility	
46. Old Francetown Road	Deering	No Project Visibility	
47. Pleasant Pond Road	Deering	No Project Visibility	
48. Wolf Hill Road	Deering	No Project Visibility	
49. Oak Hill Road	Francetown	No Project Visibility	
50. Old County Road North	Francetown	No Project Visibility	
51. Pleasant Pond Road	Francetown	No Project Visibility	
52. Schoolhouse Road	Francetown	No Project Visibility	
53. Second NH Turnpike North	Francetown	No Project Visibility	
54. Cavendar Road	Greenfield	No Project Visibility ⁵⁵	
55. Colonial Drive	Greenfield	No Project Visibility	
56. County Road	Greenfield	No Project Visibility	
57. Muzzy Hill Road	Greenfield	6.72 mi.	0 to 8
58. Old Bennington Road	Greenfield	No Project Visibility ⁵⁶	

⁵⁴ "Public waters in New Hampshire are prescribed by common law as great ponds (natural waterbodies of 10 acres or more in size), public rivers and streams, and tidal waters. These common law public waters are held by the State in trust for the people of New Hampshire. The State holds the land underlying great ponds and tidal waters (including tidal rivers) in trust for the people of New Hampshire...Public waters include artificial impoundments of 10 acres or more in size..." *NH Official List of Public Waters Revision Date January 17, 2014*, New Hampshire Department of Environmental Services Water Division Dam Bureau (pg. 2)

⁵⁵ No project visibility confirmed by field visit.

⁵⁶ No project visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
59. Riverbend Drive	Greenfield	No Project Visibility	
60. Sunset Lake Road	Greenfield	No Project Visibility	
61. Swamp Road	Greenfield	No Project Visibility	
62. Baker Road	Henniker	No Project Visibility ⁵⁷	
63. Bear Hill Road	Henniker	No Project Visibility ⁵⁸	
64. Western Avenue	Henniker	No Project Visibility	
65. Barden Hill Road	Hillsborough	No Project Visibility	
66. Beard Road	Hillsborough	No Project Visibility ⁵⁹	
67. Danforth Corners Road	Hillsborough	No Project Visibility ⁶⁰	
68. Jones Road	Hillsborough	No Project Visibility ⁶¹	
69. Second N.H. Turnpike	Hillsborough	No Project Visibility ⁶²	
70. Shedd Road	Hillsborough	No Project Visibility	
71. Crosby Road	Peterborough	No Project Visibility	
72. Windy Row Road	Peterborough	No Project Visibility ⁶³	
Locally Identified Scenic Vistas, Viewsheds or Resources			
73. Black Fox Pond Scenic Viewshed	Deering	No Project Visibility	
74. Clark Summit Scenic Viewshed	Deering	6.93 mi.	0 to 9
75. Clement Hill Road Scenic Viewshed (1)	Deering	No Project Visibility	
76. Clement Hill Road Scenic Viewshed (2)	Deering	No Project Visibility	
77. Codman Hill Scenic Viewshed	Deering	No Project Visibility	
78. Cove Hill Scenic Viewshed	Deering	No Project Visibility	
79. Deering Reservoir Scenic Viewshed (1)	Deering	No Project Visibility	
80. Deering Reservoir Scenic Viewshed (2)	Deering	No Project Visibility	
81. Deering Reservoir Scenic Viewshed (3)	Deering	No Project Visibility	
82. Gregg Hill Road Scenic Viewshed	Deering	No Project Visibility	
83. Hedgehog Mountain Summit Scenic Viewshed	Deering	5.68 mi.	0 to 9
84. Hodgen Scenic Viewshed	Deering	No Project Visibility	
85. Old County Road Scenic Viewshed (1)	Deering	No Project Visibility	
86. Patten Brook Scenic Viewshed	Deering	No Project Visibility	

⁵⁷ No project visibility confirmed by field visit.

⁵⁸ No project visibility confirmed by field visit.

⁵⁹ No project visibility confirmed by field visit.

⁶⁰ No project visibility confirmed by field visit.

⁶¹ No project visibility confirmed by field visit.

⁶² No project visibility confirmed by field visit.

⁶³ No project visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
87. Peter Wood Hill Road Scenic Viewshed	Deering	No Project Visibility	
88. Pleasant Pond Road Scenic Viewshed	Deering	No Project Visibility	
89. Range Road Scenic Viewshed	Deering	No Project Visibility	
90. Rangeway Road Scenic Viewshed	Deering	No Project Visibility	
91. Scenic Viewshed (north of Clark Summit)	Deering	7.02 mi.	0 to 9
92. Sodom Hill Scenic Viewshed	Deering	6.84 mi.	0 to 8
93. Smith Brook Scenic Viewshed	Deering	No Project Visibility	
94. Tubs Hill Road Scenic Viewshed (1)	Deering	No Project Visibility	
95. Tubs Hill Road Scenic Viewshed (2)	Deering	No Project Visibility	
96. West Deering Scenic Viewshed	Deering	No Project Visibility	
97. Wilson Hill Scenic Viewshed	Deering	7.05 mi.	0 to 3
98. Baker Road Scenic Vista	Henniker	No Project Visibility	
99. Bear Hill Road (1) Scenic Vista	Henniker	No Project Visibility ⁶⁴	
100. Bear Hill Road (2) Scenic Vista	Henniker	No Project Visibility ⁶⁵	
101. Browns Way Scenic Vista	Henniker	No Project Visibility ⁶⁶	
102. NH Route 202 Scenic Vista	Henniker	No Project Visibility ⁶⁷	
103. Western Avenue Scenic Vista	Henniker	No Project Visibility	
104. Kimball Hill Road Scenic Views	Hillsborough	7.72 mi.	0 to 9
Covered Bridges Maintained by Local or Non-Government Groups			
NONE			
Non-Motorized Trails in Conserved or Public Lands (other than state or national) or as Locally Identified			
105. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary	Antrim	1.62 mi.	0 to 6
106. Goodhue Hill Trail at DePierrefeu-Willard Pond Wildlife Sanctuary	Antrim	2.00 mi.	0 to 8
107. Hurlin Trail	Antrim	No Project Visibility	
108. Lily Pond Trail	Antrim	No Project Visibility	
109. Lovern's Trail at Lovern's Mill Cedar Swamp	Antrim	1.13 mi.	0 to 5 ⁶⁸
110. McCabe Forest Trail	Antrim	No Project Visibility	
111. Meadow Marsh Trail	Antrim	1.37 mi.	0 to 9

⁶⁴ No project visibility confirmed by field visit.

⁶⁵ No project visibility confirmed by field visit.

⁶⁶ No project visibility confirmed by field visit.

⁶⁷ No project visibility confirmed by field visit and 3D modeling.

⁶⁸ Project will only be visible from the trailhead parking area. There will be no visibility from within the swamp and along the wooded trails.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
112. Mill Pond Trail at Dierrefue-Willard Pond Wildlife Sanctuary	Antrim	No Project Visibility	
113. Tamposi Trail at Dierrefue-Willard Pond Wildlife Sanctuary	Antrim	No Project Visibility	
114. Tudor Trail at Dierrefue-Willard Pond Wildlife Sanctuary	Antrim	No Project Visibility	
115. Bennington Trail	Bennington	No Project Visibility	
116. Shannon's Trail to Crotched Mountain Summit	Bennington, Frankestown, Greenfield	No Project Visibility	
117. Bradford Bog Trail	Bradford	No Project Visibility	
118. County Road Trail	Bradford	No Project Visibility	
119. Deer Valley Road Trail	Bradford	No Project Visibility	
120. Penhallow Road Trail	Bradford	No Project Visibility	
121. Black Fox Pond Trail at Deering Wildlife Sanctuary	Deering	No Project Visibility	
122. Smith Brook Trail at Deering Wildlife Sanctuary	Deering	No Project Visibility	
123. Patten Farm Trail at Deering Wildlife Sanctuary	Deering	No Project Visibility	
124. Dublin Nordic Center Trails	Dublin	No Project Visibility	
125. Monadnock-Sunapee Greenway	Dublin, Harrisville, Nelson, Stoddard, Washington	6.35 mi.	0 to 9
126. Dutton Brook Accessible Trail	Frankestown, Greenfield	No Project Visibility	
127. Summit Trail at Crotched Mountain	Frankestown	8.09 mi.	0 to 9
128. Other Trails at Crotched Mountain	Frankestown	No Project Visibility	
129. Trails at Dinsmore Brook Conservation Area	Frankestown	No Project Visibility	
130. Trails at Shattuck Pond Town Forest	Frankestown	No Project Visibility	
131. Gregg Accessible Trail	Greenfield	8.35 mi.	0 to 8
132. Cobb Hill Trail (Harris Center)	Hancock, Harrisville	No Project Visibility	
133. East Side Trails at Harris Center	Hancock	No Project Visibility	
134. Pierce Trail	Hancock	No Project Visibility	
135. Old Railroad Trail	Hancock	No Project Visibility	
136. Other West Side Trails at Harris Center (Briggs Reserve)	Hancock	No Project Visibility	
137. Skatutakee Mountain Summit Trail at Harris Center (Briggs Reserve)	Hancock	No Project Visibility ⁶⁹	
138. Thumb Mountain Summit Trail at Harris Center (Briggs Reserve)	Hancock	No Project Visibility ⁷⁰	

⁶⁹ No project visibility confirmed by field visit.

⁷⁰ No project visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
139. Trail around Half Moon Pond at Sargent Center	Hancock	No Project Visibility	
140. Contoocook Riverwalk	Hillsborough	No Project Visibility	
141. Thompson Mountain Trail at Wenny-Baker Forest	Hillsborough	8.89 mi.	0 to 9
142. Trails at Fox Forest	Hillsborough	No Project Visibility	
143. Kulish Ledges Trail	Nelson	No Project Visibility	
144. Trails at Otter Brook Preserve	Nelson, Stoddard, Sullivan	No Project Visibility	
145. The Common Pathway	Peterborough	No Project Visibility ⁷¹	
146. Trails at Andorra Forest	Stoddard, Washington	No Project Visibility ⁷²	
147. Trout-n-Bacon Trail at Pierce Reservation	Stoddard	No Project Visibility ⁷³	
148. Trails at Camp Morgan Town Forest	Washington	No Project Visibility	
149. Oak Hill Summit Trail at Clark Robinson Memorial Forest	Washington	No Project Visibility ⁷⁴	
Public Parks and Recreational and Gathering Areas (such as village greens, local parks, picnic areas or day use areas)			
150. Gregg Lake Town Beach Area	Antrim	1.66 mi.	0 to 8
151. Memorial Park	Antrim	No Project Visibility ⁷⁵	
152. Shea Field	Antrim	No Project Visibility ⁷⁶	
153. Newhall Field	Bennington	No Project Visibility ⁷⁷	
154. Town Ball Field	Bennington	No Project Visibility	
155. Deering Town Beach	Deering	No Project Visibility	
156. Town Ball Field	Dublin	No Project Visibility	
157. Sunset Lake Town Beach	Greenfield	No Project Visibility	
158. Oak Park	Greenfield	No Project Visibility ⁷⁸	
159. Moose Brook Park	Hancock	No Project Visibility ⁷⁹	
160. Town Beach at Norway Pond	Hancock	No Project Visibility	
161. Seaver Pond Picnic Area	Harrisville	No Project Visibility	
162. Sunset Beach	Harrisville	No Project Visibility	
163. Beard Brook Park	Hillsborough	No Project Visibility	
164. Butler Park	Hillsborough	No Project Visibility	
165. Grimes Field/Park	Hillsborough	No Project Visibility	
166. Manahan Park	Hillsborough	No Project Visibility	
167. Town Beach at Gould Pond	Hillsborough	No Project Visibility	

⁷¹ No project visibility confirmed by field visit.

⁷² Does not include Monadnock-Sunapee Greenway.

⁷³ No project visibility confirmed by field visit.

⁷⁴ No project visibility confirmed by field visit and 3D modeling.

⁷⁵ No project visibility confirmed by field visit.

⁷⁶ No project visibility confirmed by field visit.

⁷⁷ No project visibility confirmed by field visit.

⁷⁸ No project visibility confirmed by field visit.

⁷⁹ No project visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
168. Baptism Beach	Marlow	No Project Visibility	
169. Route 10 Picnic Area	Marlow	No Project Visibility	
170. Bosworth Field	Nelson	No Project Visibility	
171. Town Common	Nelson	No Project Visibility	
172. Town Beach	Washington	No Project Visibility	
173. Washington Town Common	Washington	No Project Visibility ⁸⁰	
174. Washington Wayside Park	Washington	No Project Visibility	
Public Waters with Designated Local Access Areas (i.e. town beaches or boat launches)			
175. Campbell Pond	Antrim	No Project Visibility	
176. Franklin Pierce Lake	Antrim, Hillsborough	2.87 mi.	0 to 8
177. Gregg Lake	Antrim	1.51 mi.	0 to 8
178. Mill Pond	Antrim	No Project Visibility ⁸¹	
179. Rye Pond	Antrim, Nelson, Stoddard	No Project Visibility	
180. Cold Spring Pond	Bennington	No Project Visibility	
181. Whittemore Lake	Bennington	No Project Visibility ⁸²	
182. Dudley Pond	Deering	No Project Visibility	
183. Deering Reservoir	Deering	No Project Visibility	
184. Dark Pond	Dublin	No Project Visibility	
185. Dublin Lake	Dublin	No Project Visibility	
186. Howe Reservoir	Dublin, Harrisville	No Project Visibility	
187. Mud Pond	Dublin	No Project Visibility	
188. Wood Pond	Dublin	No Project Visibility	
189. Pleasant Pond	Fracestown	No Project Visibility	
190. Shattuck Pond	Fracestown	No Project Visibility	
191. Sunset Lake	Greenfield	No Project Visibility	
192. Halfmoon Pond	Hancock	No Project Visibility	
193. Hunts Pond	Hancock	No Project Visibility	
194. Juggernaut Pond	Hancock	No Project Visibility	
195. Norway Pond	Hancock	No Project Visibility	
196. Nubanusit Lake	Hancock, Nelson	No Project Visibility	
197. Harrisville Pond	Harrisville	No Project Visibility	
198. Russell Reservoir	Harrisville	No Project Visibility	
199. Skatutakee Lake	Harrisville	No Project Visibility	
200. Gould Pond	Hillsborough	No Project Visibility ⁸³	
201. Sand Brook Marsh	Hillsborough	No Project Visibility	
202. Village Pond	Marlow	No Project Visibility	

⁸⁰ No project visibility confirmed by field visit.

⁸¹ No project visibility confirmed by field visit.

⁸² No project visibility confirmed by field visit and 3D modeling.

⁸³ No project visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
203. Village Tin Shop Pond	Marlow	No Project Visibility	
204. Granite Lake	Nelson, Stoddard	No Project Visibility	
205. Spoonwood Pond	Nelson	No Project Visibility	
206. Center Pond	Stoddard	No Project Visibility ⁸⁴	
207. Highland Lake	Stoddard	No Project Visibility ⁸⁵	
208. Island Pond	Stoddard	3.05 mi.	0 to 7
209. Trout Pond	Stoddard	No Project Visibility	
210. Bolster Pond	Sullivan	No Project Visibility	
211. Chapman Pond	Sullivan	No Project Visibility	
212. Ashuelot Pond	Washington	No Project Visibility	
213. Barrett Pond	Washington	No Project Visibility	
214. Island Pond	Washington	No Project Visibility ⁸⁶	
215. Mill Pond	Washington	No Project Visibility	
216. Millen Pond	Washington	No Project Visibility	
217. Smith Pond	Washington	No Project Visibility	
218. Black Pond	Windsor	3.04 mi.	0 to 9
Conserved Lands (other than state or national) with a Specific Public Use or Scenic Resource Component			
219. DePierrefeu-Willard Pond Wildlife Sanctuary	Antrim	No Project Visibility ⁸⁷	
220. Hurlin Forest	Antrim	No Project Visibility	
221. Lovern's Mill Cedar Swamp	Antrim, Windsor	No Project Visibility ⁸⁸	
222. McCabe Forest	Antrim	No Project Visibility ⁸⁹	
223. Virginia Baker Natural Area	Antrim	No Project Visibility	
224. Bennington Town Land (Cold Spring Pond)	Bennington	No Project Visibility	
225. Bruce Edes Forest	Bennington	No Project Visibility	
226. Aiken Pasture Town Forest	Bradford	No Project Visibility	
227. Bradford Bog	Bradford	No Project Visibility	
228. Bradford Springs and Hotel Site	Bradford	No Project Visibility	
229. Burke Family Wildlife Preserve	Deering	No Project Visibility	
230. Deering Wildlife Sanctuary	Deering	No Project Visibility	
231. Back Woods Easement	Dublin	No Project Visibility	
232. Beech Hill Easement	Dublin	10.75 mi.	0 to 2
233. Brewster Forest	Dublin	No Project Visibility	
234. Dark Pond Easement	Dublin	No Project Visibility	

⁸⁴ No project visibility confirmed by field visit and 3D modeling.

⁸⁵ No project visibility confirmed by field visit and 3D modeling.

⁸⁶ No project visibility confirmed by 3D modeling.

⁸⁷ No project visibility confirmed by field visit. See also Bald Mountain Trail and Goodhue Trail at DePierrefeu-Willard Pond Wildlife Sanctuary, and Willard Pond, for other areas at the sanctuary with visibility.

⁸⁸ No project visibility confirmed by field visit. See also Lovern's Trail at Lovern's Mill Cedar Swamp for other areas at the swamp with visibility.

⁸⁹ No visibility confirmed by field visit.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
235. Dublin Lake Scenic Area	Dublin	No Project Visibility	
236. Dublin Town Parcel	Dublin	No Project Visibility	
237. Dublin Town Land (at Howe Reservoir)	Dublin	No Project Visibility	
238. Dublin Town Land (at Mud Pond)	Dublin	No Project Visibility	
239. Dinsmore Brook Conservation Area	Francestown	No Project Visibility	
240. Crotched Mountain Town Forest	Francestown	No Project Visibility	
241. Shattuck Pond Town Forest	Francestown	No Project Visibility	
242. Andorra Forest	Gilsum, Marlow, Stoddard, Sullivan, Washington	No Project Visibility ⁹⁰	
243. Emerson Brook Forest	Gilsum, Marlow	No Project Visibility	
244. Briggs Preserve	Hancock	No Project Visibility	
245. John Kulish Forest	Hancock	No Project Visibility	
246. Norway Pond Nature Preserve	Hancock	No Project Visibility	
247. McGreal Forest Ecological Reserve	Hancock	No Project Visibility	
248. Walcott Forest	Hancock	No Project Visibility	
249. Welch Family Farm and Forest	Hancock	No Project Visibility	
250. Wellington Wells Memorial Forest	Harrisville	No Project Visibility	
251. Contoocook River Access	Henniker	No Project Visibility	
252. Chute Forest	Hillsborough	No Project Visibility	
253. Coffin Wildlife Sanctuary	Hillsborough	No Project Visibility	
254. Wenny-Baker Forest	Hillsborough	8.70 mi.	0 to 8
255. Stickey Wicket Wildlife Sanctuary	Marlow	No Project Visibility	
256. Claus Wildlife Sanctuary	Nelson	No Project Visibility	
257. The Great Meadow	Nelson	No Project Visibility	
258. Otter Brook Preserve	Nelson, Stoddard, Sullivan	No Project Visibility	
259. Sucker Brook Cove Wildlife Sanctuary	Nelson	No Project Visibility	
260. Otter Brook Farm	Peterborough	No Project Visibility	
261. Parker Hill Forest	Roxbury	No Project Visibility	
262. Taves Reservation	Roxbury	No Project Visibility	
263. Charles L. Pierce Wildlife and Forest Reservation	Stoddard, Windsor	No Project Visibility	
264. Crider Forest	Stoddard	No Project Visibility	
265. Daniel Upton Forest	Stoddard	No Project Visibility	
266. Pickerel Cove	Stoddard	No Project Visibility	
267. Nye Meadow Sanctuary	Stoddard	No Project Visibility	

⁹⁰ See also Monadnock-Sunapee Greenway.

4. VISUAL ASSESSMENT

TABLE 2. SCENIC RESOURCE INVENTORY LIST

Resource	Town	Distance to Nearest Visible Turbine ⁴⁸	# of Turbines Potentially Visible ⁴⁹
268. Rumrill Family Forest	Stoddard	No Project Visibility	
269. Stoddard Rocks-Pioneer Lake Reservation	Stoddard	No Project Visibility	
270. Thurston V. Williams Forest	Stoddard	No Project Visibility	
271. Hoffman Conservation Easement	Sullivan	No Project Visibility	
272. Olsen Family Forest	Sullivan	No Project Visibility	
273. Ashuelot Wildlife Sanctuary	Washington	No Project Visibility	
274. Barrett Pond Town Forest	Washington	No Project Visibility	
275. Camp Morgan Town Forest	Washington	No Project Visibility	
276. Clark Robinson Memorial Forest	Washington	No Project Visibility ⁹¹	
277. Eccardt Farm Conservation Easement	Washington	No Project Visibility	
278. Farnsworth Hill Town Forest	Washington	No Project Visibility	
279. Huntley Mountain Town Forest	Washington	No Project Visibility	
280. Journey's End, Bell-Cofield Forest	Washington	No Project Visibility	
281. Nuthatch Way Town Forest	Washington	No Project Visibility	
282. Old Meadow Town Forest	Washington	No Project Visibility	
283. Webb Forest Preserve LLC	Washington	No Project Visibility	
Other resources with a Public Use or Recreational Opportunity (e.g. waterfalls, visitor centers)			
284. Harris Center For Conservation Education	Hancock	No Project Visibility	
285. Eliza Adams Gorge	Harrisville	No Project Visibility	
286. Gleason Falls	Hillsborough	No Project Visibility	
287. Bailey Brook Falls	Nelson	No Project Visibility	
288. Robinson Brook Cascades	Stoddard	No Project Visibility	
289. Stoddard Rocks	Stoddard	No Project Visibility	
290. Stone Arch Bridge	Stoddard	No Project Visibility	

B. Identification of Sensitive Scenic Resources

The next step in the screening and analysis process is to determine each of the resources' visual sensitivity. Typically, the lower its visual sensitivity, the higher its ability to accept change. Each resource identified as scenic in Section 4.A above and with potential visibility, is evaluated for its visual sensitivity based on two distinct categories:

1. **Cultural Designation** – how a resource has been valued by the public through official designation (e.g. conserved) or advertisement
2. **Scenic Quality** - the character and features of a resource that make it scenic

⁹¹ No project visibility confirmed by field visit. See also Oak Hill Summit Trail at Clark Robinson Memorial Forest for other areas at the forest with project visibility.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

LandWorks visited 127 of the 290 scenic resources identified (see Exhibit 22: Resources LandWorks Visited). Only 30 have potential visibility of the Project, which are listed in Table 3 below.

TABLE 3. RESOURCES WITH POTENTIAL VISIBILITY

RESOURCE WITH POTENTIAL VISIBILITY	NEAREST VISIBLE TURBINE ⁹²	# OF TURBINES POTENTIALLY VISIBLE ⁹³
1. Pitcher Mountain State Forest (#20)	6.35 mi.	0 to 9
2. Hillsborough Rail Trail (#21)	4.65 mi.	0 to 9
3. Pitcher Mountain Fire Tower (#24)	6.38 mi.	0 to 9
4. Willard Pond (#29)	1.37 mi.	0 to 8
5. Powder Mill Pond (#30)	6.08 mi.	0 to 8
6. Robb Reservoir (#37)	3.04 mi.	0 to 4
7. Sunapee Loop (#39)	1.44 mi.	0 to 8
8. Monadnock Region Loop (#40)	2.37 mi.	0 to 9
9. Muzzy Hill Road (#57)	6.72 mi.	0 to 8
10. Clark Summit Scenic Viewshed (#74)	6.93 mi.	0 to 9
11. Hedgehog Mountain Summit Scenic Viewshed (#83)	5.68 mi.	0 to 9
12. Scenic Viewshed (north of Clark Summit) (#91)	7.02 mi.	0 to 9
13. Sodom Hill Scenic Viewshed (#92)	6.84 mi.	0 to 8
14. Wilson Hill Scenic Viewshed (#97)	7.05 mi.	0 to 9
15. Kimball Hill Road Scenic Views (#104)	7.72 mi.	0 to 9
16. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	1.62 mi.	0 to 6
17. Goodhue Hill Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#106)	2.00 mi.	0 to 8
18. Lovern's Trail at Lovern's Mill Cedar Swamp (#109)	1.13 mi.	0 to 5
19. Meadow Marsh Trail (#111)	1.37 mi.	0 to 9
20. Mondanock-Sunapee Greenway (#125)	6.35 mi.	0 to 9
21. Summit Trail at Crotched Mountain (#127)	8.09 mi.	0 to 9
22. Gregg Accessible Trail (#131)	8.35 mi.	0 to 8
23. Thompson Mountain Trail at Wenny-Baker Forest (#141)	8.89 mi.	0 to 9
24. Gregg Lake Town Beach Area (#150)	1.66 mi.	0 to 8
25. Franklin Pierce Lake (#176)	2.87 mi.	0 to 8
26. Gregg Lake (#177)	1.51 mi.	0 to 8
27. Island Pond (#208)	3.05 mi.	0 to 7
28. Black Pond (#218)	3.04 mi.	0 to 9
29. Beech Hill Easement (#232)	10.75 mi.	0 to 2
30. Wenny-Baker Forest (#254)	8.70 mi.	0 to 8

⁹² Distances are approximate

⁹³ Based on Exhibit 4 Viewshed Map

1. CULTURAL DESIGNATION

This indicator considers the local, regional, statewide or national cultural significance of a particular resource, often indicated by formal designation, ownership or inclusion in a current or recent community (or official) planning document that recognizes its cultural, natural resource, recreational, or scenic value. Ratings are given to those resources identified as having potential visibility, as indicated in Table 3 above. Ratings for cultural designation are shown in Table 5 below and were determined as follows:

- **Low:** Local, quasi-public and private conserved or designated resources that are identified primarily for values other than purely scenic (e.g. forest or wildlife management). Examples include town greens, town/community forests, playgrounds and recreational fields, public waters with locally maintained access (i.e. town beach), or private conserved lands with public access. Also includes non-motorized trails in conserved or public lands (other than state or national) or as locally identified. The rating for a trail or other local resource can be elevated to moderate if it is found on regional or state websites, or identified in several guidebooks. A low rating would also include resources that are mentioned on local/town websites for their local interest or recreational value, but not typically found in guidebooks appealing to or used by a wider potential user or interest group.
- **Moderate:** State or federal resources that have been conserved or designated primarily for purposes or values other than purely scenic. State forests or wildlife management areas, national wildlife refuges, public waters with NH Fish and Game access are examples of resources considered for a moderate cultural value rating. Also includes non-motorized trails in New Hampshire's State Parks, Forests and Recreational Rail Trails. Resources that are found on regional websites for their scenic/recreational values, but may not be in a guidebook may also be considered moderate.
- **High:** Resources that have been conserved or designated because scenery and scenic quality are **primary** to their value. National parks, National trails (e.g. Appalachian Trail), state scenic byways, state parks, and scenic easements are examples of resources with a high cultural value rating. Also includes non-motorized trails in National Parks and Forests or other National Park System areas. Local community resources (e.g. scenic roads, scenic vistas) that are specifically identified in a comprehensive plan or other regulatory document because of their scenic value would warrant a high rating, as would a resource that is highly advertised in numerous guidebooks, websites, and brochures for its scenic value.

In addition to reviewing relevant municipal and regional planning documents, twenty (20) different guidebooks, books, publications, and websites of statewide and national appeal were evaluated to see if any of the 30 resources were identified as possible destinations. The results of this research are shown in Table 4 that follows.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 4. INVENTORY OF RESOURCES (BOOKS, WEBSITES, ETC.) OF STATEWIDE OR NATIONAL APPEAL

RESOURCE	Resources mentioned: yes (y), no (n)	BOOKS/PUBLICATIONS													WEBSITES								
		The Official 2014-2015 NH Visitor's Guide	Flyfisher's Guide to Northern New England VT, NH, ME	The New Hiking the Monadnock Region	Quiet Water NH & VT, 2nd ed.	Fodor's ME, VT, & NH	Southern NH Trail Guide, 3rd ed.	New Hampshire: An Explorer's Guide, 7th ed.	Hiking NH-2nd ed.	Moon NH Hiking	Off the Beaten Path NH	Monadnock-Sunapee Greenway Trail Guide, 7th ed.	The Wildlife of New England	TOTAL BOOKS RESOURCE WAS MENTIONED IN	U.S. National Park Service Website	USFS Discover the Forest Website	U.S. DOT National Scenic Byways Website	NH DOT/ Scenic and Cultural Byways Website	Visit NH Website	NH Parks and Recreation Website	NH Fish and Game Website	NH Division of Forest and Lands Website	TOTAL WEBSITES RESOURCE WAS MENTIONED IN
1. Pitcher Mountain State Forest (#20)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	y ⁹⁴	n	n	n	1	1
2. Hillsborough Rail Trail (#21)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	y ⁹⁵	y ⁹⁶	y ⁹⁷	n	n	3	3
3. Pitcher Mountain Fire Tower (#24)		y ⁹⁸	n	y ⁹⁹	n	n	y ¹⁰⁰	y ¹⁰¹	n	n	n	y ¹⁰²	n	5	n	n	n	n	y ¹⁰³	n	y ¹⁰⁴	2	7
4. Willard Pond (#29)		n	y ¹⁰⁵	y ¹⁰⁶	y ¹⁰⁷	n	y ¹⁰⁸	y ¹⁰⁹	y ¹¹⁰	n	n	n	y ¹¹¹	7	n	n	n	n	n	y ¹¹²	n	1	8

⁹⁴ <http://www.visitnh.gov/search-results.aspx?kw=pitcher+mountain>

⁹⁵ http://www.nh.gov/dot/programs/bikeped/maps/documents/Rail_Trails_2013.pdf

⁹⁶ <http://www.visitnh.gov/search-results.aspx?kw=hillsborough+rail+trail>

⁹⁷ <http://www.nhstateparks.org/explore/bureau-of-trails/hillsborough-recreational-trail.aspx>

⁹⁸ pg. 72

⁹⁹ pg. 109, 122

¹⁰⁰ pg. 96, 106

¹⁰¹ pg. 152

¹⁰² pg. 36-37

¹⁰³ <http://blog.nhstateparks.org/enjoying-natures-candy-at-pitcher-mountain/>

¹⁰⁴ <http://www.nhdfi.org/fire-control-and-law-enforcement/fire-towers.aspx>

¹⁰⁵ pg. 169

¹⁰⁶ pg. 185-188

¹⁰⁷ pg. 31

¹⁰⁸ pg. 93-94

¹⁰⁹ pg. 152, 154

¹¹⁰ pg. 57-60, 58, 59

¹¹¹ pg. 125-127

¹¹² http://www.wildlife.state.nh.us/Fishing/fishing_forecast/Locations_Southwest.htm

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 4. INVENTORY OF RESOURCES (BOOKS, WEBSITES, ETC.) OF STATEWIDE OR NATIONAL APPEAL

RESOURCE	Resources mentioned: yes (y), no (n)	BOOKS/PUBLICATIONS												WEBSITES									
		The Official 2014-2015 NH Visitor's Guide	Flyfisher's Guide to Northern New England VT, NH, ME	The New Hiking the Monadnock Region	Quiet Water NH & VT, 2nd ed.	Fodor's ME, VT, & NH	Southern NH Trail Guide, 3rd ed.	New Hampshire: An Explorer's Guide, 7th ed.	Hiking NH-2nd ed.	Moon NH Hiking	Off the Beaten Path NH	Monadnock-Sunapee Greenway Trail Guide, 7th ed.	The Wildlife of New England	TOTAL BOOKS RESOURCE WAS MENTIONED IN	U.S. National Park Service Website	USFS Discover the Forest Website	U.S. DOT National Scenic Byways Website	NH DOT/ Scenic and Cultural Byways Website	Visit NH Website	NH Parks and Recreation Website	NH Fish and Game Website	NH Division of Forest and Lands Website	TOTAL WEBSITES RESOURCE WAS MENTIONED IN
5. Powder Mill Pond (#30)		n	y ¹¹³	y ¹¹⁴	y ¹¹⁵	n	n	y ¹¹⁶	n	n	n	n	4	n	n	n	n	n	n	y ¹¹⁷	n	1	5
6. Robb Reservoir (#37)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	y ¹¹⁸	n	1	1
7. Sunapee Loop (#39)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	y ¹¹⁹	n	n	n	1	1
8. Monadnock Region Loop (#40)		y ¹²⁰	n	n	n	n	n	n	n	n	n	n	1	n	n	n	n	y ¹²¹	n	n	n	1	2
9. Muzzy Hill Road (#52)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0
10. Clark Summit Scenic Viewshed (#69)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0

¹¹³ pg. 168

¹¹⁴ pg. 192

¹¹⁵ pg. 13

¹¹⁶ pg. 153

¹¹⁷ http://www.wildlife.state.nh.us/Fishing/fishing_forecast/Locations_Southwest.htm

¹¹⁸ http://www.wildnh.com/Fishing/bathy_maps/robb_stoddard.pdf

¹¹⁹ <http://www.visitnh.gov/what-to-do/scenic-drives/dartmouth-lake-sunapee.aspx>

¹²⁰ pg. 70

¹²¹ <http://www.visitnh.gov/what-to-do/scenic-drives/monadnock.aspx>

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 4. INVENTORY OF RESOURCES (BOOKS, WEBSITES, ETC.) OF STATEWIDE OR NATIONAL APPEAL

RESOURCE	Resources mentioned: yes (y), no (n)	BOOKS/PUBLICATIONS												WEBSITES									
		The Official 2014-2015 NH Visitor's Guide	Flyfisher's Guide to Northern New England VT, NH, ME	The New Hiking the Monadnock Region	Quiet Water NH & VT, 2nd ed.	Fodor's ME, VT, & NH	Southern NH Trail Guide, 3rd ed.	New Hampshire: An Explorer's Guide, 7th ed.	Hiking NH-2nd ed.	Moon NH Hiking	Off the Beaten Path NH	Monadnock-Sunapee Greenway Trail Guide, 7th ed.	The Wildlife of New England	TOTAL BOOKS RESOURCE WAS MENTIONED IN	U.S. National Park Service Website	USFS Discover the Forest Website	U.S. DOT National Scenic Byways Website	NH DOT/ Scenic and Cultural Byways Website	Visit NH Website	NH Parks and Recreation Website	NH Fish and Game Website	NH Division of Forest and Lands Website	TOTAL WEBSITES RESOURCE WAS MENTIONED IN
11. Hedgehog Mountain Summit Scenic Viewshed (#77)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0
12. Scenic Viewshed (north of Clark Summit) (#85)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0
13. Sodom Hill Scenic Viewshed (#86)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0
14. Wilson Hill Scenic Viewshed (#91)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0
15. Kimball Hill Road Scenic Views (#98)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 4. INVENTORY OF RESOURCES (BOOKS, WEBSITES, ETC.) OF STATEWIDE OR NATIONAL APPEAL

RESOURCE	Resources mentioned: yes (y), no (n)	BOOKS/PUBLICATIONS												WEBSITES										
		The Official 2014-2015 NH Visitor's Guide	Flyfisher's Guide to Northern New England VT, NH, ME	The New Hiking the Monadnock Region	Quiet Water NH & VT, 2nd ed.	Fodor's ME, VT, & NH	Southern NH Trail Guide, 3rd ed.	New Hampshire: An Explorer's Guide, 7th ed.	Hiking NH-2nd ed.	Moon NH Hiking	Off the Beaten Path NH	Monadnock-Sunapee Greenway Trail Guide, 7th ed.	The Wildlife of New England	TOTAL BOOKS RESOURCE WAS MENTIONED IN	U.S. National Park Service Website	USFS Discover the Forest Website	U.S. DOT National Scenic Byways Website	NH DOT/ Scenic and Cultural Byways Website	Visit NH Website	NH Parks and Recreation Website	NH Fish and Game Website	NH Division of Forest and Lands Website	TOTAL WEBSITES RESOURCE WAS MENTIONED IN	TOTAL
16. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#99)		n	n	y ¹²²	n	n	y ¹²³	y ¹²⁴	y ¹²⁵	n	n	n	y ¹²⁶	5	n	n	n	n	n	n	n	n	0	5
17. Goodhue Hill Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#100)		n	n	n	n	n	y ¹²⁷	n	n	n	n	n	n	1	n	n	n	n	n	n	n	n	0	1
18. Lovern's Trail at Lovern's Mill Cedar Swamp (#103)		n	n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	y ¹²⁸	1	1
19. Meadow Marsh Trail (#105)		n	n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0

¹²² pg. 186

¹²³ pg. 94

¹²⁴ pg. 441

¹²⁵ pg. 57-60

¹²⁶ pg. 125-127

¹²⁷ pg. 95

¹²⁸ <http://nhdfl.org/events-tours-and-programs/visit-nh-biodiversity/loverens-mill-preserve.aspx>

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 4. INVENTORY OF RESOURCES (BOOKS, WEBSITES, ETC.) OF STATEWIDE OR NATIONAL APPEAL

RESOURCE	Resources mentioned: yes (y), no (n)	BOOKS/PUBLICATIONS												WEBSITES										
		The Official 2014-2015 NH Visitor's Guide	Flyfisher's Guide to Northern New England VT, NH, ME	The New Hiking the Monadnock Region	Quiet Water NH & VT, 2nd ed.	Fodor's ME, VT, & NH	Southern NH Trail Guide, 3rd ed.	New Hampshire: An Explorer's Guide, 7th ed.	Hiking NH-2nd ed.	Moon NH Hiking	Off the Beaten Path NH	Monadnock-Sunapee Greenway Trail Guide, 7th ed.	The Wildlife of New England	TOTAL BOOKS RESOURCE WAS MENTIONED IN	U.S. National Park Service Website	USFS Discover the Forest Website	U.S. DOT National Scenic Byways Website	NH DOT/ Scenic and Cultural Byways Website	Visit NH Website	NH Parks and Recreation Website	NH Fish and Game Website	NH Division of Forest and Lands Website	TOTAL WEBSITES RESOURCE WAS MENTIONED IN	TOTAL
20. Mondanock-Sunapee Greenway (#119)		n	n ^{y129}	n	n	y ¹³⁰	y ¹³¹	y ¹³²	n	n	y ¹³³	n	5	n	n	n	n	y ¹³⁴	y ¹³⁵	n	y ¹³⁶	3	8	
21. Summit Trail at Crothed Mountain (#127)		n	n ^{y137}	n	n	y ¹³⁸	y ¹³⁹	y ¹⁴⁰	n	n	n	n	4	n	n	n	n	n	n	n	n	0	4	
22. Gregg Accessible Trail (#125)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0	
23. Thompson Mountain Trail at Wenny-Baker Forest (#135)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0	
24. Gregg Lake Town Beach Area (#144)		n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0	

¹²⁹ pg. 13, 105, 243, 245

¹³⁰ pg. 95-102, 106, 107, 108

¹³¹ pg. 37

¹³² pg. 64-97, 95, 96

¹³³ whole book

¹³⁴ <http://www.visitnh.gov/what-to-do/key-attractions/business-detail.aspx?business=8969>

¹³⁵ <http://www.nhstateparks.org/experience/hiking/>; <http://www.nhstateparks.org/experience/hiking/trail-information.aspx>

¹³⁶ <http://www.nhdfi.org/library/pdf/Forest%20Protection/Part%20II%20of%20Fire%20Tower%20Brochure.pdf>

¹³⁷ pg. 189-194

¹³⁸ pg. 84-86, 107

¹³⁹ pg. 154

¹⁴⁰ pg. 54-57

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 4. INVENTORY OF RESOURCES (BOOKS, WEBSITES, ETC.) OF STATEWIDE OR NATIONAL APPEAL

Resources mentioned: yes (y), no (n)	BOOKS/PUBLICATIONS												WEBSITES										
	The Official 2014-2015 NH Visitor's Guide	Flyfisher's Guide to Northern New England VT, NH, ME	The New Hiking the Monadnock Region	Quiet Water NH & VT, 2nd ed.	Fodor's ME, VT, & NH	Southern NH Trail Guide, 3rd ed.	New Hampshire: An Explorer's Guide, 7th ed.	Hiking NH-2nd ed.	Moon NH Hiking	Off the Beaten Path NH	Monadnock-Sunapee Greenway Trail Guide, 7th ed.	The Wildlife of New England	TOTAL BOOKS RESOURCE WAS MENTIONED IN	U.S. National Park Service Website	USFS Discover the Forest Website	U.S. DOT National Scenic Byways Website	NH DOT/ Scenic and Cultural Byways Website	Visit NH Website	NH Parks and Recreation Website	NH Fish and Game Website	NH Division of Forest and Lands Website	TOTAL WEBSITES RESOURCE WAS MENTIONED IN	TOTAL
25. Franklin Pierce Lake (#170)	n	n	n	n	n	n	y ¹⁴¹	n	n	n	n	n	1	n	n	n	n	n	n	y ¹⁴²	n	1	2
26. Gregg Lake (#171)	n	n	n	n	n	n	y ¹⁴³	n	n	n	n	n	1	n	n	n	n	n	n	y ¹⁴⁴	n	1	2
27. Island Pond (#202)	n	n	y ¹⁴⁵	n	n	n	n	n	n	n	n	n	1	n	n	n	n	n	n	y ¹⁴⁶	n	1	2
28. Black Pond (#212)	n	n	n	n	n	n	y ¹⁴⁷	n	n	n	n	n	1	n	n	n	n	n	n	y ¹⁴⁸	n	1	2
29. Beech Hill Easement (#226)	n	n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0
30. Wenny-Baker Forest (#248)	n	n	n	n	n	n	n	n	n	n	n	n	0	n	n	n	n	n	n	n	n	0	0

TABLE 5. CULTURAL DESIGNATION RATINGS

RESOURCE WITH POTENTIAL VISIBILITY	DESIGNATION/OWNERSHIP/ MANAGEMENT	CULTURAL DESIGNATION RATING
1. Pitcher Mountain State Forest (#20)	STATE (NH Department of Resources and Economic Development) NO SCENIC DESIGNATION	MODERATE
2. Hillsborough Rail Trail (#21)	STATE (NH Parks and Recreation) NO SCENIC DESIGNATION	MODERATE

¹⁴¹ pg. 152, 155

¹⁴² http://www.wildnh.com/Fishing/bathy_maps/franklinpierce_hillsboro.pdf

¹⁴³ pg. 152

¹⁴⁴ http://www.wildnh.com/Fishing/bathy_maps/gregg_antrim.pdf

¹⁴⁵ pg. 121

¹⁴⁶ http://www.wildnh.com/Fishing/bathy_maps/island_stoddard.pdf

¹⁴⁷ pg. 331

¹⁴⁸ http://www.wildnh.com/Fishing/bathy_maps/black_windsor.pdf

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 5. CULTURAL DESIGNATION RATINGS

RESOURCE WITH POTENTIAL VISIBILITY	DESIGNATION/OWNERSHIP/ MANAGEMENT	CULTURAL DESIGNATION RATING
3. Pitcher Mountain Fire Tower (#24)	STATE (NH Division of Forest & Lands Quest Program) NO SCENIC DESIGNATION	MODERATE
4. Willard Pond (#29)	STATE (NH Fish and Game Access) NO SCENIC DESIGNATION	MODERATE
5. Powder Mill Pond (#30)	STATE (NH Fish and Game Access) NO SCENIC DESIGNATION	MODERATE
6. Robb Reservoir (#37)	STATE (NH Department of Resources and Economic Development and the Harris Center Access) NO SCENIC DESIGNATION	MODERATE
7. Sunapee Loop (#39)	STATE (NH Department of Resources and Economic Development Division of Travel and Tourism Development) SCENIC DRIVE	HIGH
8. Monadnock Region Loop (#40)	STATE (NH Department of Resources and Economic Development Division of Travel and Tourism Development) SCENIC DRIVE	HIGH
9. Muzzy Hill Road (#57)	LOCAL (Town of Greenfield) SCENIC ROAD	HIGH
10. Clark Summit Scenic Viewshed (#74)	LOCAL (Town of Deering) SCENIC VIEWSHED	HIGH
11. Hedgehog Mountain Summit Scenic Viewshed (#83)	LOCAL (Town of Deering) SCENIC VIEWSHED	HIGH
12. Scenic Viewshed (north of Clark Summit) (#91)	LOCAL (Town of Deering) SCENIC VIEWSHED	HIGH
13. Sodom Hill Scenic Viewshed (#92)	LOCAL (Town of Deering) SCENIC VIEWSHED	HIGH
14. Wilson Hill Scenic Viewshed (#97)	LOCAL (Town of Deering) SCENIC VIEWSHED	HIGH
15. Kimball Hill Road Scenic Views (#104)	LOCAL (Town of Deering) SCENIC VIEW	HIGH
16. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	PRIVATE (NH Audubon Society) NO SCENIC DESIGNATION	MODERATE
17. Goodhue Hill Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#106)	PRIVATE (NH Audubon Society) NO SCENIC DESIGNATION	LOW
18. Lovern's Trail at Lovern's Mill Cedar Swamp (#109)	PRIVATE (The Nature Conservancy) NO SCENIC DESIGNATION	LOW
19. Meadow Marsh Trail (#111)	LOCAL (Town of Antrim) NO SCENIC DESIGNATION	LOW
20. Mondanock-Sunapee Greenway (#125)	PRIVATE (Monadnock-Sunapee Greenway Trail Club) NO SCENIC DESIGNATION	MODERATE
21. Summit Trail at Crotched Mountain (#127)	PRIVATE (Crotched Mountain Foundation) NO SCENIC DESIGNATION	MODERATE
22. Gregg Accessible Trail (#131)	PRIVATE (Crotched Mountain Foundation) NO SCENIC DESIGNATION	LOW
23. Thompson Mountain Trail at Wenny-Baker Forest (#141)	PRIVATE (Society for the Protection of NH Forests) NO SCENIC DESIGNATION	LOW

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 5. CULTURAL DESIGNATION RATINGS

RESOURCE WITH POTENTIAL VISIBILITY	DESIGNATION/OWNERSHIP/ MANAGEMENT	CULTURAL DESIGNATION RATING
24. Gregg Lake Town Beach Area (#150)	LOCAL (Town of Antrim) NO SCENIC DESIGNATION	LOW
25. Franklin Pierce Lake (#176)	LOCAL (Town of Hillsborough) NO SCENIC DESIGNATION	LOW
26. Gregg Lake (#177)	LOCAL (Town of Antrim) NO SCENIC DESIGNATION	LOW
27. Island Pond (#208)	LOCAL (Town of Stoddard) NO SCENIC DESIGNATION	LOW
28. Black Pond (#218)	LOCAL (Town of Windsor) NO SCENIC DESIGNATION	LOW
29. Beech Hill Easement (#232)	PRIVATE (Monadnock Conservancy) NO SCENIC DESIGNATION	LOW
30. Wenny-Baker Forest (#254)	PRIVATE (Society for the Protection of NH Forests) NO SCENIC DESIGNATION	LOW

2. SCENIC QUALITY

This indicator considers the scenic quality of the resource to help determine its sensitivity to alteration. Using the BLM Scenic Inventory and Evaluation Chart as a reference, each of the resources identified as having potential visibility in Table 3 were visited and assessed to determine their scenic quality rating. Each resource is evaluated using the seven rating criteria listed in the Chart (landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications) and given a score. The total scores for each resource are calculated and assigned one of three ratings based on the total points:

- **Low:** Resource has features that are fairly common to the physiographic region (11 or less points)
- **Moderate:** Resource has a combination of some outstanding features and some that are fairly common to the physiographic region (12-18 points)
- **High:** Resource combines the most outstanding characteristics of each rating factor (19 to 32 points)

TABLE 6. SCENIC QUALITY RATINGS

RESOURCE WITH POTENTIAL VISIBILITY	SCENIC VALUE CRITERIA							TOTAL SCORE	SCENIC QUALITY RATING
	(a) Landform	(b) Vegetation	(c) Water	(d) Color	(e) Adjacent Scenery	(f) Scarcity	(g) Cultural Modification		
1. Pitcher Mountain State Forest (#20)	3	2	2	3	4	3	-2	15	MODERATE
2. Hillsborough Rail Trail (#21)	1	1	3	1	1	3	-3	7	LOW
3. Pitcher Mountain Fire Tower (#24)	3	2	3	3	4	4	0	19	HIGH
4. Willard Pond (#29)	4	2	4	2	3	4	0	19	HIGH

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 6. SCENIC QUALITY RATINGS

RESOURCE WITH POTENTIAL VISIBILITY	SCENIC VALUE CRITERIA							TOTAL SCORE	SCENIC QUALITY RATING
	(a) Landform	(b) Vegetation	(c) Water	(d) Color	(e) Adjacent Scenery	(f) Scarcity	(g) Cultural Modification		
5. Powder Mill Pond (#30)	2	3	4	2	2	2	0	15	MODERATE
6. Robb Reservoir (#37)	1	3	3	2	1	1	0	11	LOW
7. Sunapee Loop (#39)	2	2	1	1	2	1	0	9	LOW
8. Monadnock Region Loop (#40)	2	2	1	1	2	3	0	11	LOW
9. Muzzy Hill Road (#57)	2	2	0	2	3	2	0	11	LOW
10. Clark Summit Scenic Viewshed (#74)	4	2	0	3	4	4	-1	16	MODERATE
11. Hedgehog Mountain Summit Scenic Viewshed (#83)	4	2	0	3	4	4	-2	15	MODERATE
12. Scenic Viewshed (north of Clark Summit) (#91)	4	2	0	3	3	3	-1	14	MODERATE
13. Sodom Hill Scenic Viewshed (#92)	2	1	0	3	3	1	-2	8	LOW
14. Wilson Hill Scenic Viewshed (#97)	3	2	1	2	3	2	0	13	MODERATE
15. Kimball Hill Road Scenic Views (#104)	2	3	0	2	4	3	-1	13	MODERATE
16. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	4	3	4	2	4	2	0	19	HIGH
17. Goodhue Hill Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#106)	3	2	1	2	3	2	-4	9	LOW
18. Lovern's Trail at Lovern's Mill Cedar Swamp (#109)	2	3	3	2	2	4	0	16	MODERATE
19. Meadow Marsh Trail (#111)	2	3	3	2	3	1	0	14	MODERATE
20. Mondanock-Sunapee Greenway (#125)	4	4	3	3	4	2	-1	19	HIGH
21. Summit Trail at Crotched Mountain (#127)	4	2	4	3	4	3	-1	19	HIGH
22. Gregg Accessible Trail (#126)	3	3	1	2	4	4	0	17	MODERATE
23. Thompson Mountain Trail at Wenny-Baker Forest (#141)	3	3	0	3	3	2	0	14	MODERATE
24. Gregg Lake Town Beach Area (#150)	3	2	4	2	2	1	0	14	MODERATE
25. Franklin Pierce Lake (#176)	2	1	4	2	4	3	-3	13	MODERATE
26. Gregg Lake (#177)	3	2	4	2	2	1	0	14	MODERATE
27. Island Pond (#208)	2	2	4	2	2	2	-1	13	MODERATE
28. Black Pond (#218)	2	3	4	3	3	1	-1	15	MODERATE
29. Beech Hill Easement (#232)	3	2	2	2	3	2	0	14	MODERATE
30. Wenny-Baker Forest (#254)	3	3	0	3	3	2	0	14	MODERATE

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

3. OVERALL SENSITIVITY RATING

The ratings for Cultural Designation and Scenic Quality for each resource are combined in Table 7 below to obtain an Overall Sensitivity Level rating. Of the 30 resources identified as having potential visibility, 10 have a rating of Moderate-High and are therefore considered sensitive to visual change.

TABLE 7. OVERALL SENSITIVITY RATINGS

RESOURCE WITH POTENTIAL VISIBILITY	CULTURAL DESIGNATION RATING	SCENIC QUALITY RATING	OVERALL SENSITIVITY RATING
1. Pitcher Mountain State Forest (#20)	MODERATE	MODERATE	MODERATE
2. Hillsborough Rail Trail (#21)	MODERATE	LOW	LOW-MODERATE
3. Pitcher Mountain Fire Tower (#24)	MODERATE	HIGH	MODERATE-HIGH
4. Willard Pond (#29)	MODERATE	HIGH	MODERATE-HIGH
5. Powder Mill Pond (#30)	MODERATE	MODERATE	MODERATE
6. Robb Reservoir (#37)	MODERATE	LOW	LOW-MODERATE
7. Sunapee Loop (#39)	HIGH	LOW	MODERATE
8. Monadnock Region Loop (#40)	HIGH	LOW	MODERATE
9. Muzzy Hill Road (#57)	HIGH	LOW	MODERATE
10. Clark Summit Scenic Viewshed (#74)	HIGH	MODERATE	MODERATE-HIGH
11. Hedgehog Mountain Summit Scenic Viewshed (#83)	HIGH	MODERATE	MODERATE-HIGH
12. Scenic Viewshed (north of Clark Summit) (#91)	HIGH	MODERATE	MODERATE-HIGH
13. Sodom Hill Scenic Viewshed (#92)	HIGH	LOW	MODERATE
14. Wilson Hill Scenic Viewshed (#97)	HIGH	MODERATE	MODERATE-HIGH
15. Kimball Hill Road Scenic Views (#104)	HIGH	MODERATE	MODERATE-HIGH
16. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	MODERATE	HIGH	MODERATE-HIGH
17. Goodhue Hill Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#106)	LOW	LOW	LOW
18. Lovern's Trail at Lovern's Mill Cedar Swamp (#109)	LOW	MODERATE	LOW-MODERATE
19. Meadow Marsh Trail (#111)	LOW	MODERATE	LOW-MODERATE
20. Mondanock-Sunapee Greenway (#125)	MODERATE	HIGH	MODERATE-HIGH
21. Summit Trail at Crotched Mountain (#127)	MODERATE	HIGH	MODERATE-HIGH
22. Gregg Accessible Trail (#131)	LOW	MODERATE	LOW-MODERATE
23. Thompson Mountain Trail at Wenny-Baker Forest (#141)	LOW	MODERATE	LOW-MODERATE
24. Gregg Lake Town Beach Area (#150)	LOW	MODERATE	LOW-MODERATE
25. Franklin Pierce Lake (#176)	LOW	MODERATE	LOW-MODERATE
26. Gregg Lake (#177)	LOW	MODERATE	LOW-MODERATE
27. Island Pond (#208)	LOW	MODERATE	LOW-MODERATE
28. Black Pond (#218)	LOW	MODERATE	LOW-MODERATE
29. Beech Hill Easement (#232)	LOW	MODERATE	LOW-MODERATE
30. Wenny-Baker Forest (#254)	LOW	MODERATE	LOW-MODERATE

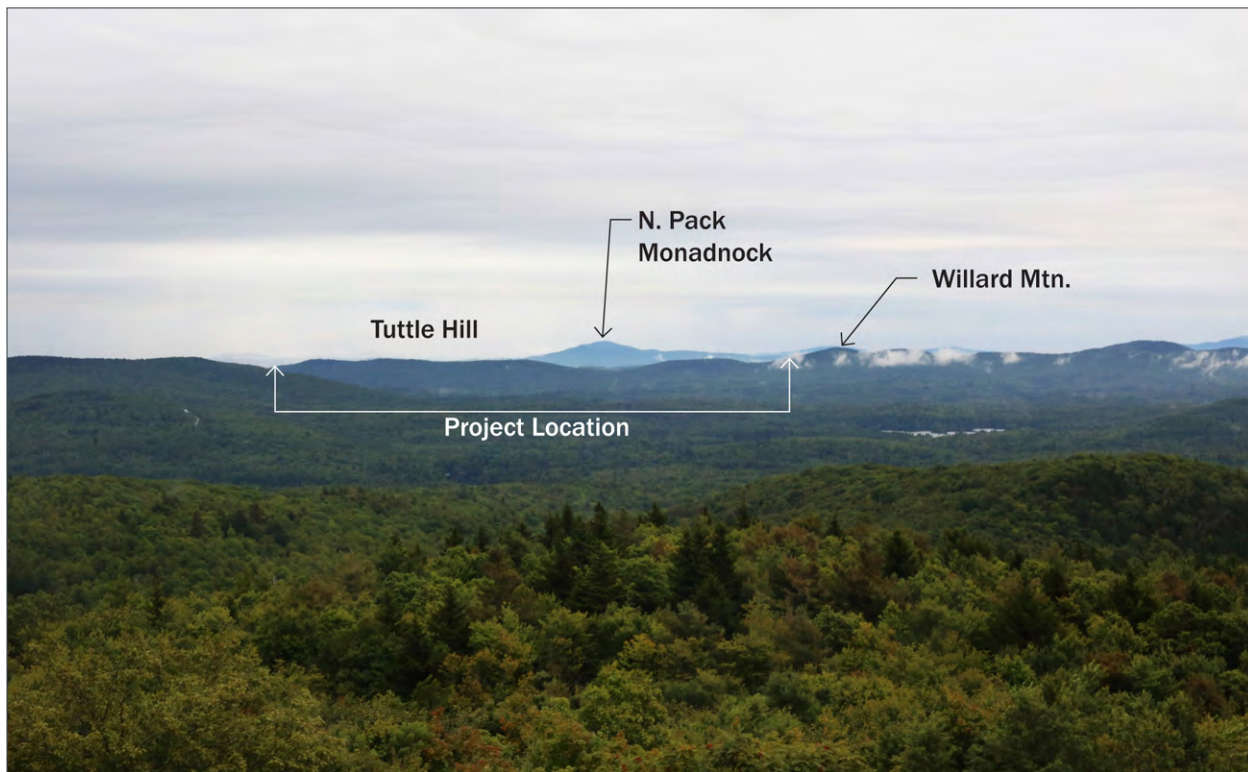
C. Determination of Visual Effect from Sensitive Scenic Resources with Potential Visibility

Those resources that were determined to be sensitive in Section 4.B.3 above, or receive an Overall Sensitivity Rating of 'Moderate-High' or 'High' as a result of the previous step, are further analyzed for Visual Effect, which is based on evaluating the following categories:

1. **Number of turbines visible** – how many turbine hubs are visible from a given resource
2. **Percent of visibility** – what percent of the resource has visibility of turbine hubs
3. **Proximity or distance** – how close/distant is the nearest visible hub
4. **Angle of view** – how much of the total possible field of view the project occupies
5. **Visual dominance** – what is the scale of the project in relation to the vantage point and the project surroundings
6. **Visual clutter/landscape coherence** – how discordant/balanced the turbine array appears in the landscape

Of the 30 scenic resources identified as having potential visibility, only 10 are considered to be sensitive. Note that this is a single step in the process of determining whether the effect is unreasonably adverse. In this stage of the screening process, "High" does NOT translate into an unreasonable adverse effect determination. This determination is still dependent on other factors yet to be considered in the subsequent process.

PHOTOGRAPHS FROM SENSITIVE SCENIC RESOURCES WITH POTENTIAL VISIBILITY

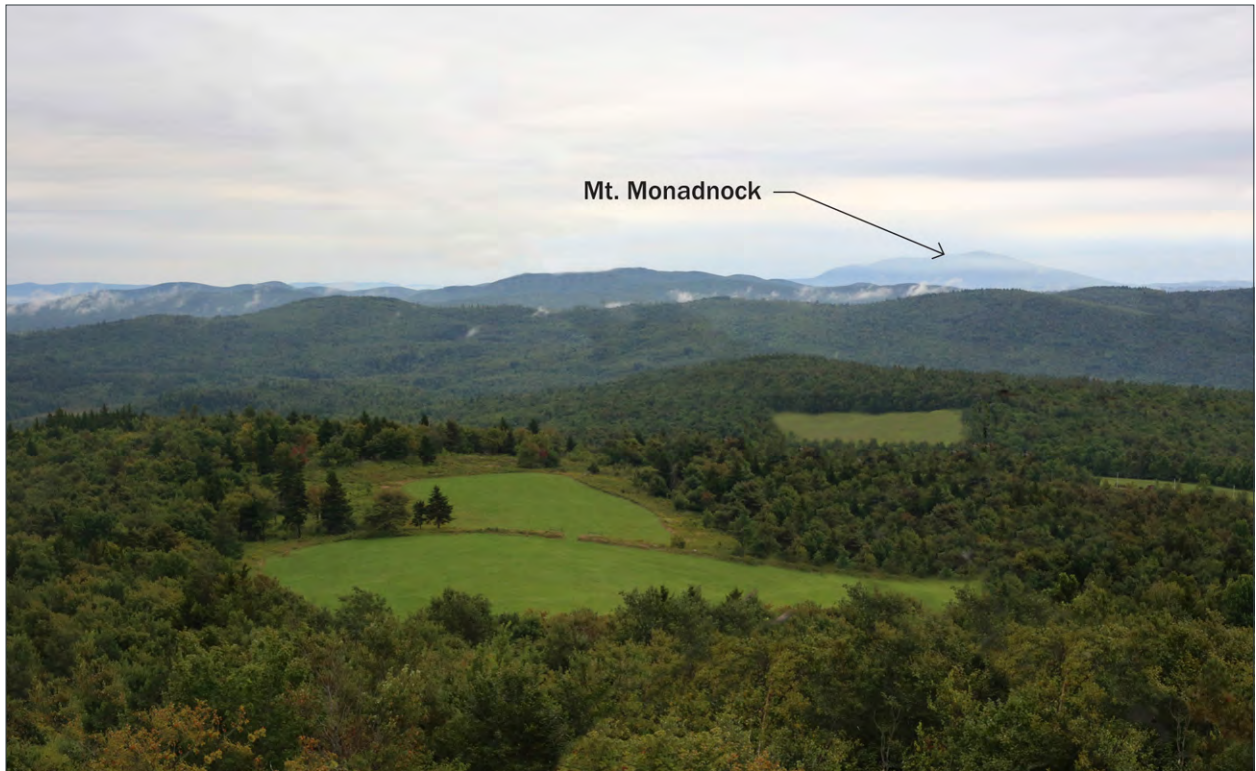


1. Pitcher Mountain Fire Tower (#24): View Towards Project

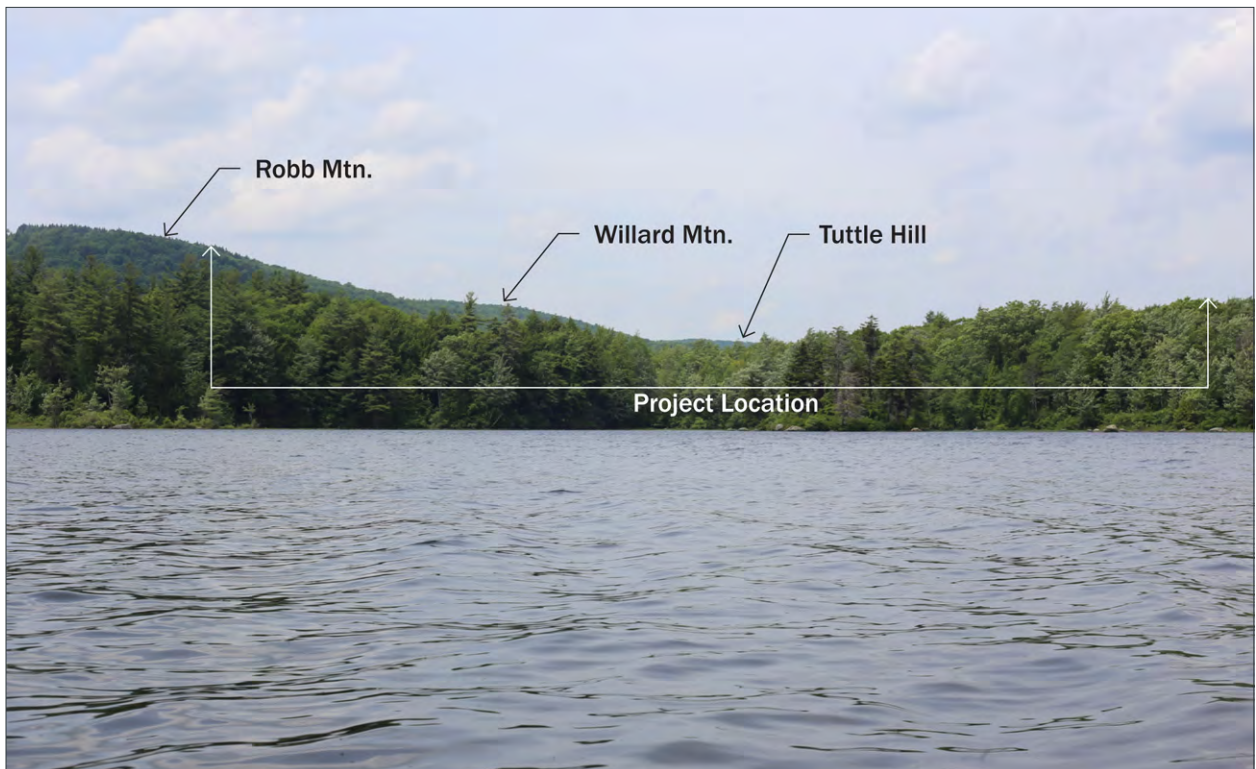
4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



2. Pitcher Mountain Fire Tower (#24): Alternate View

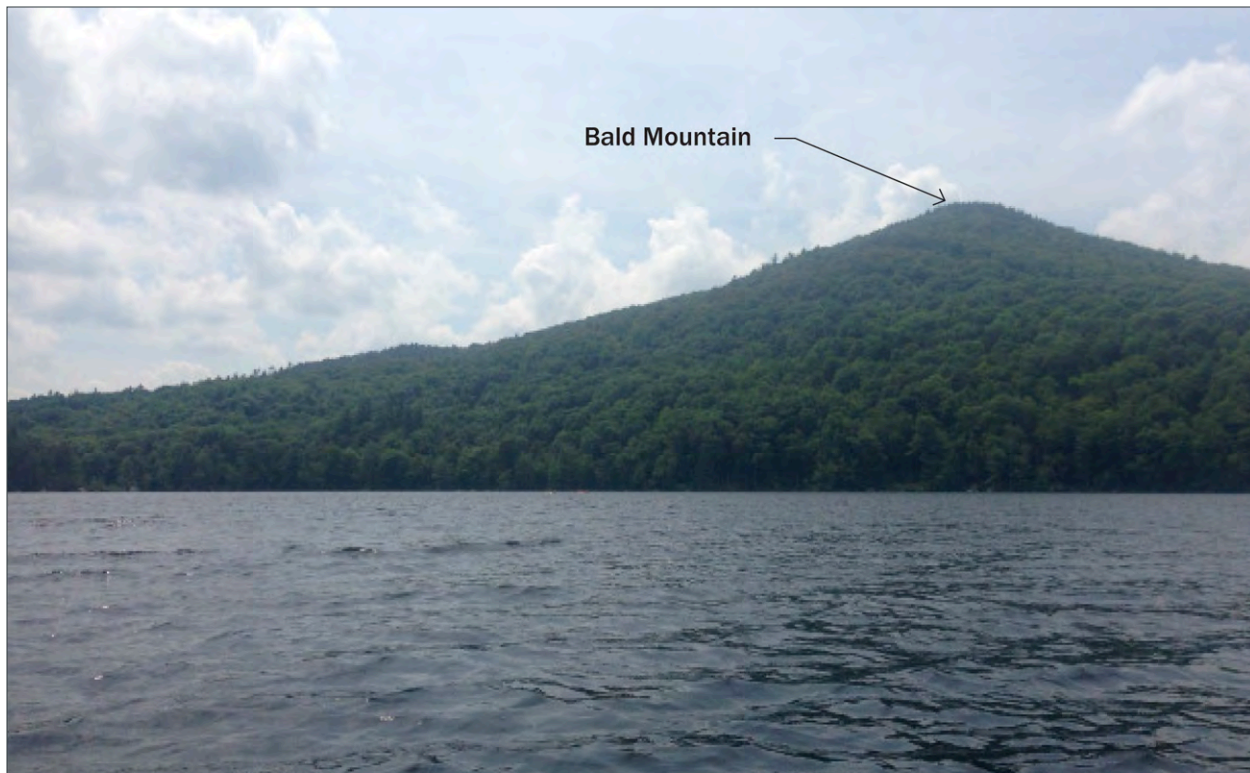


3. Willard Pond (#29): View Towards Project

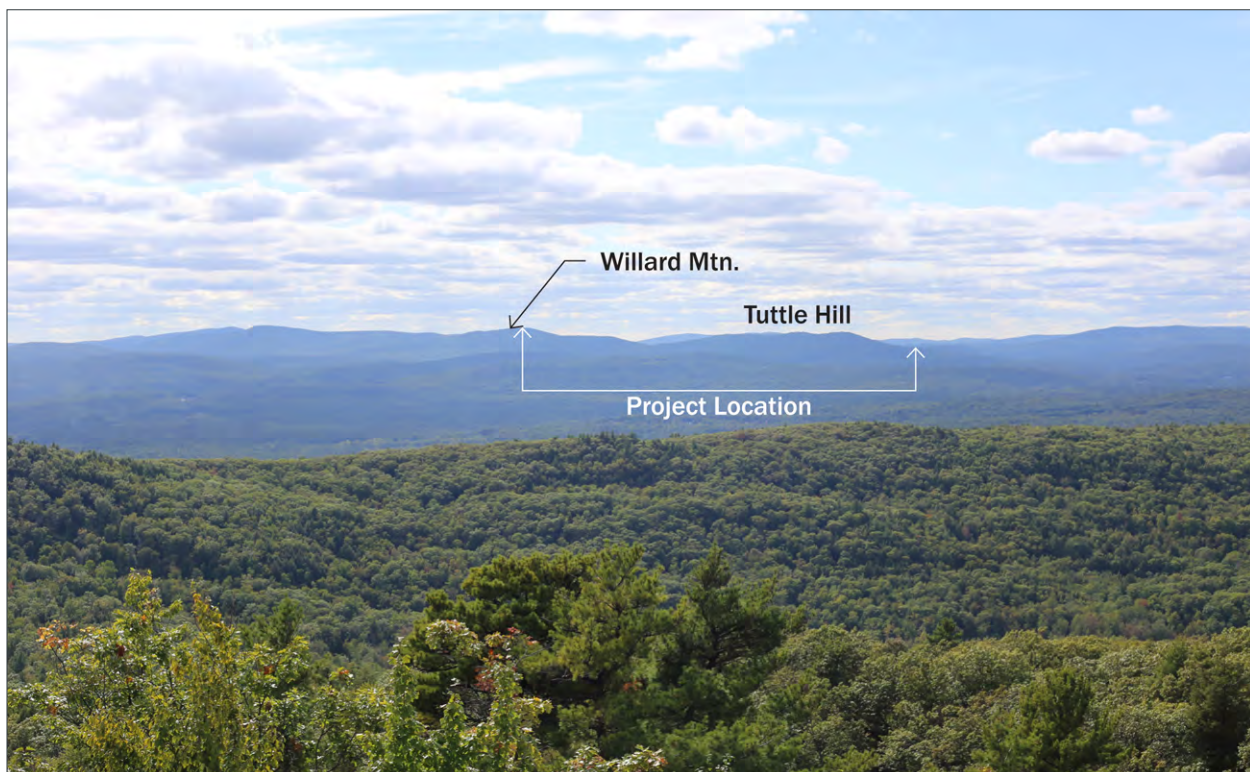
4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



4. Willard Pond (#29): Alternate View



5. Clark Summit Scenic Viewshed (#74): View Towards Project

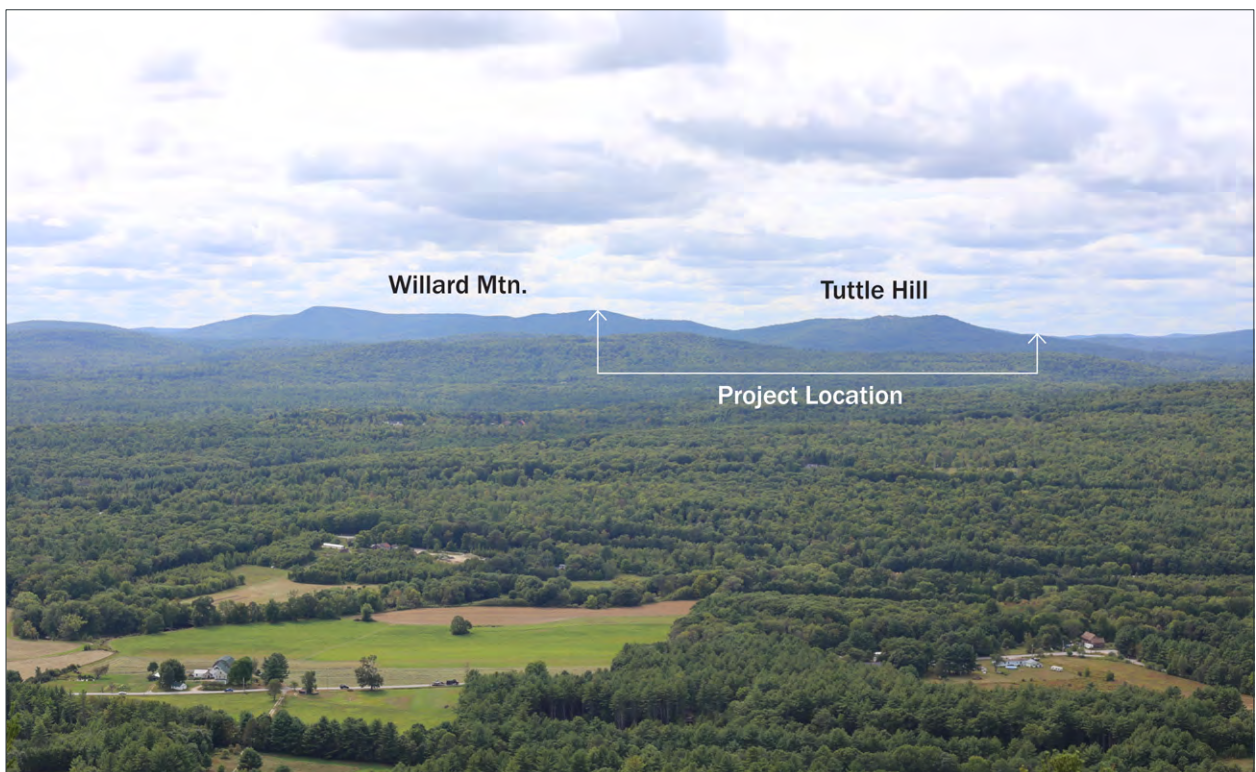
4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



6. Clark Summit Scenic Viewshed (#74): Alternate View



7. Hedgehog Mountain Summit Scenic Viewshed (#83): View Towards Project

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



8. Hedgehog Mountain Summit Scenic Viewshed (#83): Alternate View



9. Scenic Viewshed (north of Clark Summit) (#91): View Towards Project

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

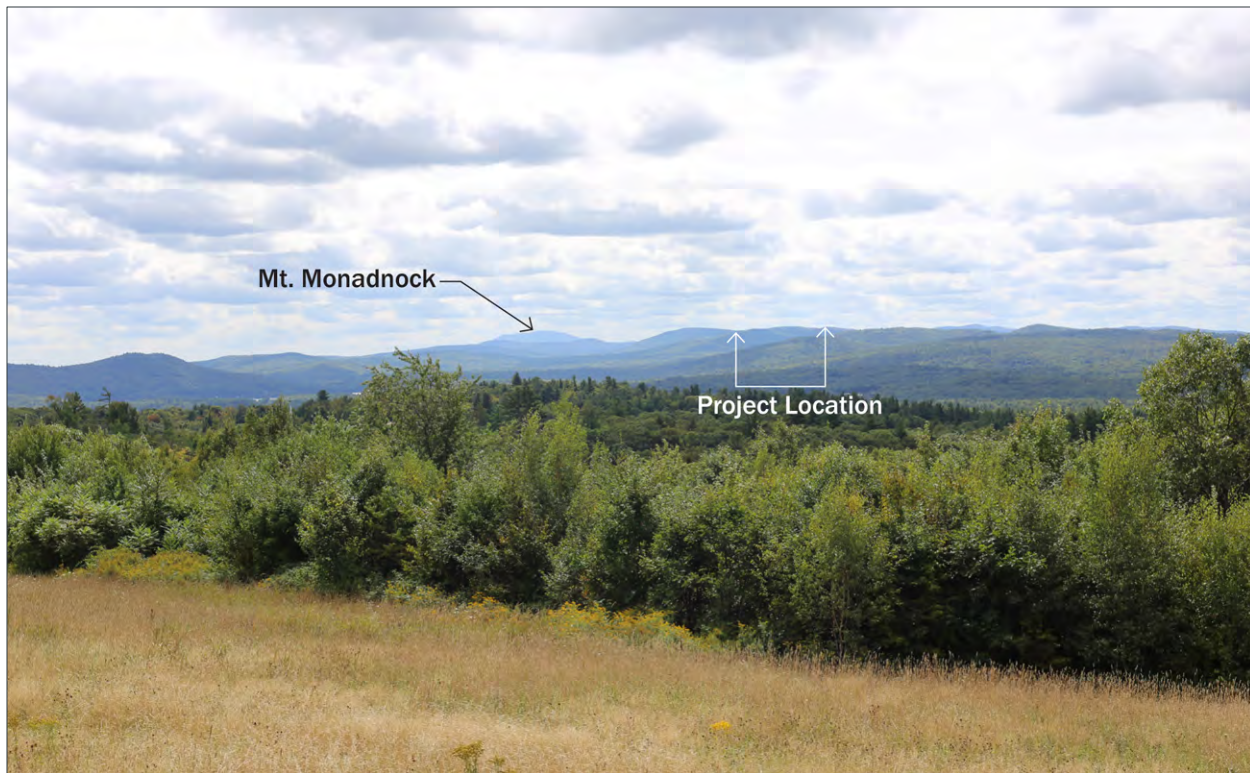


10. Scenic Viewshed (north of Clark Summit) (#91): Alternate View

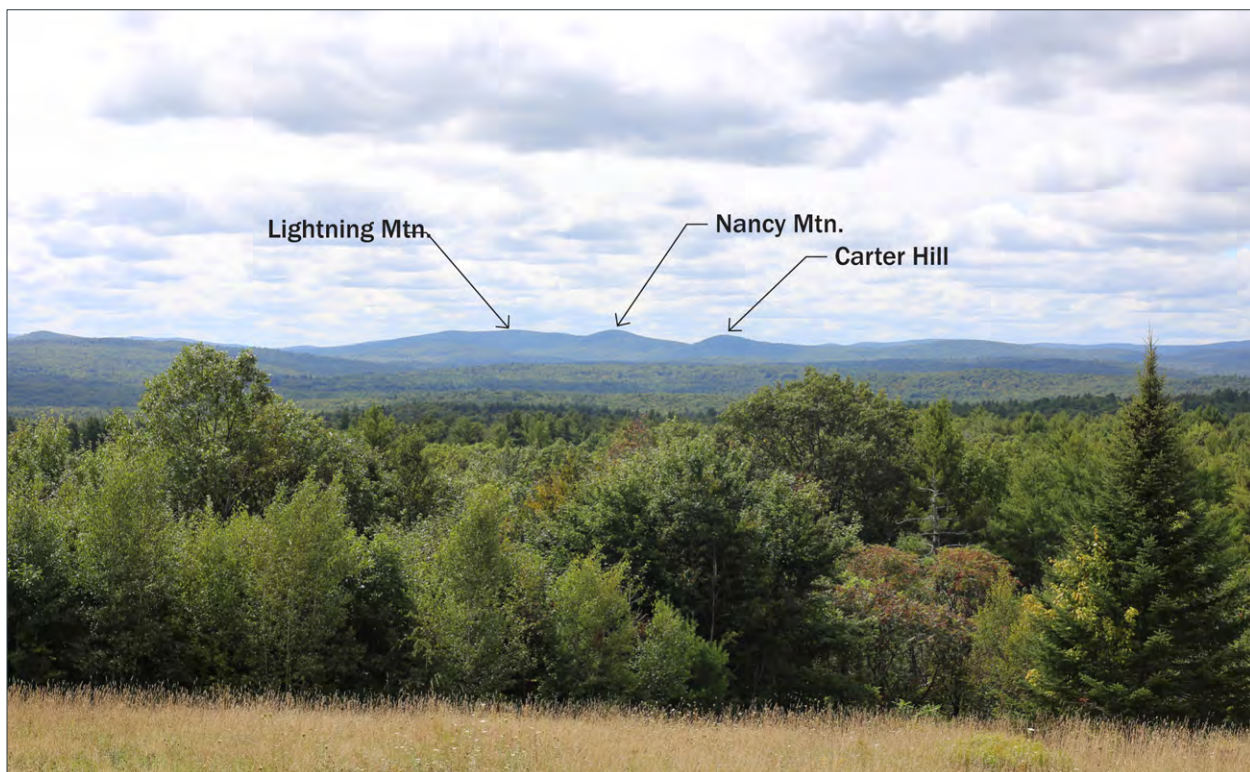


11. Wilson Hill Scenic Viewshed (#97): Alternate View

4. VISUAL ASSESSMENT



12. Kimball Hill Road Scenic Views (#104): View Towards Project

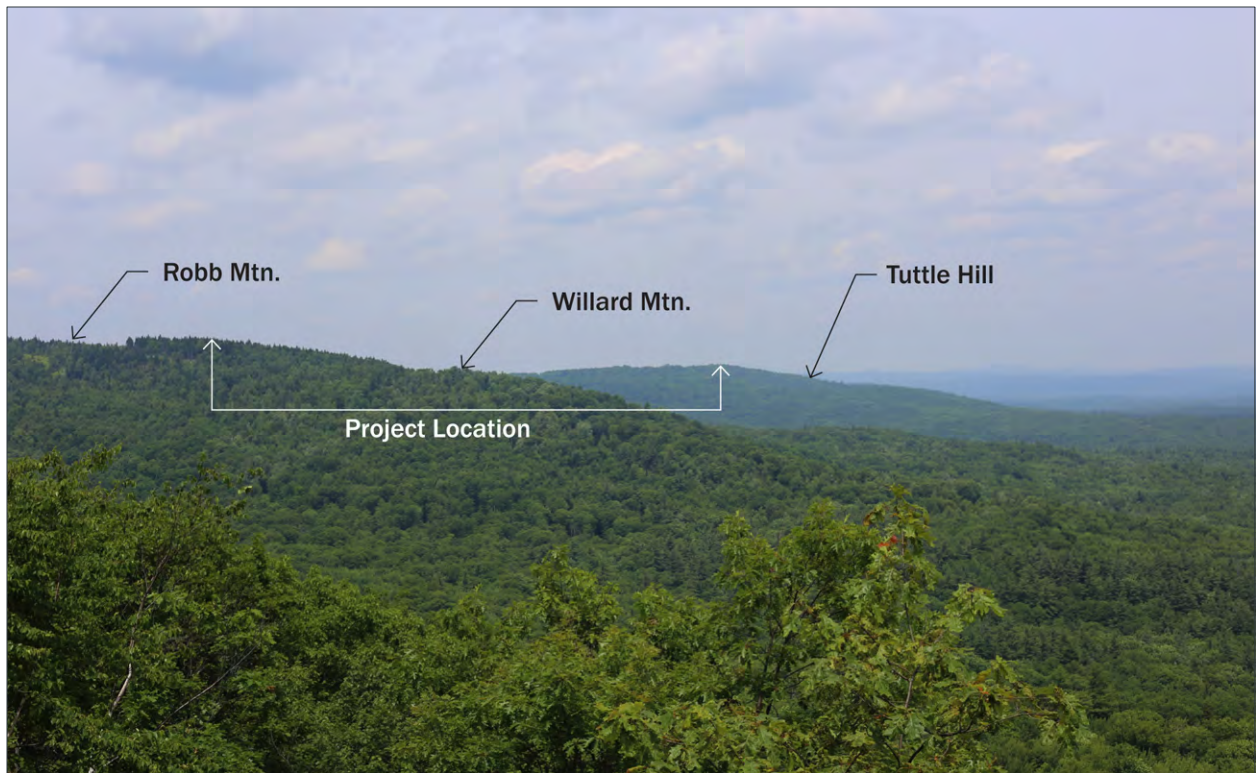


13. Kimball Hill Road Scenic Views (#104): Alternate View

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



14. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105): View Towards Project



15. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105): Alternate View

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



16. Monadnock-Sunapee Greenway (#120): View Towards Project

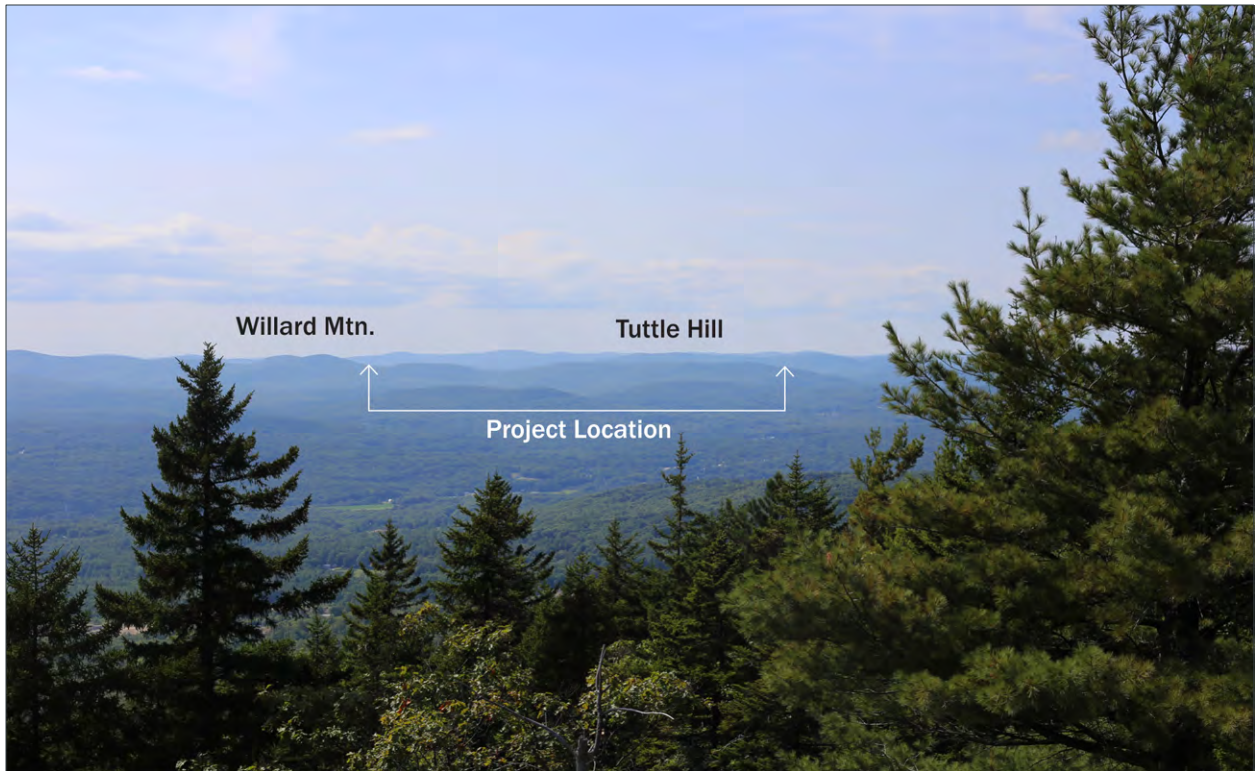


17. Monadnock-Sunapee Greenway (#120): Alternate View

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015



18. Summit Trail at Crotched Mountain (#127): View Towards Project



19. Summit Trail at Crotched Mountain (#127): Alternate View

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

1. NUMBER OF TURBINES POTENTIALLY VISIBLE

Threshold ratings for number of turbines visible are as follows:

- **Low:** 1-7 turbine hubs
- **Moderate:** 8-15 turbine hubs
- **High:** 16+ turbine hubs

TABLE 8. NUMBER OF TURBINES VISIBLE

SENSITIVE RESOURCE	# OF TURBINES POTENTIALLY VISIBLE ¹⁴⁹	RATING
1. Pitcher Mountain Fire Tower (#24)	9	MODERATE
2. Willard Pond (#29)	8	MODERATE
3. Clark Summit Scenic Viewshed (#74)	9	MODERATE
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	9	MODERATE
5. Scenic Viewshed (north of Clark Summit) (#91)	9	MODERATE
6. Wilson Hill Scenic Viewshed (#97)	9	MODERATE
7. Kimball Hill Road Scenic Views (#104)	8	MODERATE
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	6	LOW
9. Mondanock-Sunapee Greenway (#125)	9	MODERATE
10. Summit Trail at Crotched Mountain (#127)	9	MODERATE

2. PERCENT OF VISIBILITY

Threshold ratings for percent of visibility are as follows:

- **Low:** 33% or less
- **Moderate:** 34-66%
- **High:** 67% or more

TABLE 9. PERCENT OF VISIBILITY

SENSITIVE RESOURCE	PERCENT OF VISIBILITY	RATING
1. Pitcher Mountain Fire Tower (#24)	100%	HIGH
2. Willard Pond (#29)	80%	HIGH
3. Clark Summit Scenic Viewshed (#74)	100%	HIGH
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	100%	HIGH

¹⁴⁹ Based on Exhibit 4 Viewshed Map

4. VISUAL ASSESSMENT

TABLE 9. PERCENT OF VISIBILITY

SENSITIVE RESOURCE	PERCENT OF VISIBILITY	RATING
5. Scenic Viewshed (north of Clark Summit) (#91)	100%	HIGH
6. Wilson Hill Scenic Viewshed (#97)	100%	HIGH
7. Kimball Hill Road Scenic Views (#104)	100%	HIGH
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	1.07%	LOW
9. Mondanock-Sunapee Greenway (#125)	1.45%	LOW
10. Summit Trail at Crotched Mountain (#127)	0.35%	LOW

3. PROXIMITY OR DISTANCE

Thresholds ratings for proximity or distance are as follows:

- **Low:** (> 6 miles) At this distance range, turbines are far less likely to dominate a view due to their apparent visual scale.
- **Moderate:** (2 to 6 miles) Turbines diminish in scale over this four-mile span, but they still have the potential to dominate a view depending on other factors.
- **High:** (< 2 miles) Turbines may appear very large and can dominate the view at this distance range.

TABLE 10. PROXIMITY OR DISTANCE

SENSITIVE RESOURCE	DISTANCE TO NEAREST VISIBLE TURBINE	RATING
1. Pitcher Mountain Fire Tower (#24)	6.35 mi.	LOW
2. Willard Pond (#29)	1.62 mi.	HIGH
3. Clark Summit Scenic Viewshed (#74)	6.93 mi.	LOW
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	5.68 mi.	MODERATE
5. Scenic Viewshed (north of Clark Summit) (#91)	7.02 mi.	LOW
6. Wilson Hill Scenic Viewshed (#97)	7.05 mi.	LOW
7. Kimball Hill Road Scenic Views (#104)	7.72 mi.	LOW
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	1.62 mi.	HIGH
9. Mondanock-Sunapee Greenway (#125)	6.33 mi.	LOW
10. Summit Trail at Crotched Mountain (#127)	8.09 mi.	LOW

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

4. ANGLE OF VIEW

Threshold ratings for angle of view are as follows:

- **Low:** (< 7%) Turbines take up a small percentage of the total possible field of view and have the potential to effect only a minor portion of a fixed view toward the project site.
- **Moderate:** (7% to 21%) Turbines take up a moderate percentage of the total possible field of view and have the potential to occupy a significant portion of a fixed view toward the project site.
- **High:** (> 21%) Turbines take up a substantial percentage of the total possible field of view and have the potential to dominate a fixed view toward the project site.

TABLE 11. ANGLE OF VIEW

SENSITIVE RESOURCE	PROJECT ANGLE OF VIEW	TOTAL POSSIBLE FIELD OF VIEW	% OF VIEW OF PROJECT	RATING
1. Pitcher Mountain Fire Tower (#24)	16.10°	360°	4.47%	LOW
2. Willard Pond (#29)	26.85°	360°	7.46%	MODERATE
3. Clark Summit Scenic Viewshed (#74)	11.63°	125.5°	9.27%	MODERATE
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	12.90°	134.78°	9.57%	MODERATE
5. Scenic Viewshed (north of Clark Summit) (#91)	10.99°	109.2°	10.06%	MODERATE
6. Wilson Hill Scenic Viewshed (#97)	13.57°	360°	3.77%	LOW
7. Kimball Hill Road Scenic Views (#104)	2.30°	185.11°	1.24%	LOW
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	13.05°	143.37°	9.10%	MODERATE
9. Mondanock-Sunapee Greenway (#125)	16.30°	138.11°	11.80%	MODERATE
10. Summit Trail at Crotched Mountain (#127)	13.07°	162.00°	8.07%	MODERATE

5. VISUAL DOMINANCE

Threshold ratings for visual dominance are as follows:

- **Low:** The visibility, contrast, aesthetic qualities (such as form, color, texture) and apparent scale of the proposed project is very limited, potentially due to a high percentage of structures or elements such as the road clearing being obscured by intervening topography/vegetation. The landscape remains clearly dominant, and the project may not be readily perceptible.
- **Moderate:** The visibility, contrast, aesthetic qualities and apparent scale of the project in relation to the existing landscape is sufficient enough to be visible and potentially attract attention. The character of the view has changed, but the change is limited and not extensive and other features in the landscape

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

remain the primary focus. Components of the project are absorbed by the existing landscape to a moderate (vs. minimal) extent.

- **High:** The visibility, contrast, aesthetic qualities and apparent scale of the project appears to significantly alter or overwhelm the landscape, potentially due to a number of factors, including the landscape's visual absorption capability, the location of the project within an important natural focal point, or the extent of change or alteration of visual patterns that results from the new construction. The character of the view has changed such that the modification now competes for the viewer's attention as a primary feature in the landscape, and it becomes a substantial element within the view.

TABLE 12. VISUAL DOMINANCE

SENSITIVE RESOURCE	VISUAL DOMINANCE	RATING
1. Pitcher Mountain Fire Tower (#24)	Apparent scale of project is limited due to expansive view, with many individual ridgelines and mountains that remain dominant.	LOW
2. Willard Pond (#29)	Project is visible within close proximity and will become a substantial element within some views, but is not the main element within all views given the 360° angle of view, much of which does not include the project.	HIGH
3. Clark Summit Scenic Viewshed (#74)	Project is visible and potentially will attract attention because of location within view, however other landscape features are primary focus.	MODERATE
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	Scale of project against Mtn. ridges will potentially attract attention while other structures and human elements remain as the focus.	MODERATE
5. Scenic Viewshed (north of Clark Summit) (#91)	Project scale versus overall view limits any dominance while number of ridges and other landscape features remain the prominent features.	MODERATE
6. Wilson Hill Scenic Viewshed (#97)	Foreground landscape dominates view while expansive distant views dominate project scale.	LOW
7. Kimball Hill Road Scenic Views (#104)	Number of ridges, mountains and landscape features within view remain prominent over visibility and scale of project.	LOW
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	Project is visible within close proximity, but views away from the project toward other more prominent landscape elements remain the primary focus of the view.	MODERATE
9. Mondanock-Sunapee Greenway (#125)	Intervening vegetation and topography limit views to project. Mid-ground and foreground landscape elements dominate view.	LOW
10. Summit Trail at Crotched Mountain (#127)	Scale of project versus expansive view limits dominance. Number of ridgelines behind and in front of project remain the focus of view.	LOW

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

6. VISUAL CLUTTER/LANDSCAPE COHERENCE

Threshold ratings for visual clutter/landscape coherence are as follows:

- **Low:** Turbines are sited in a linear fashion, spaced at fairly regular intervals, and viewed at a broad angle with minimal or no overlapping turbines.
- **Moderate:** Turbine spacing is only slightly irregular with some clustering/overlap, but still maintains unity overall.
- **High:** Turbines are located on several ridges or at varying distances to the viewer, viewed at an angle that results in a high degree of visual chaos due to their overlapping, jumbled appearance.

TABLE 13. VISUAL CLUTTER/LANDSCAPE COHERENCE

SENSITIVE RESOURCE	VISUAL CLUTTER	RATING
1. Pitcher Mountain Fire Tower (#24)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW
2. Willard Pond (#29)	Slightly irregular spacing and overlap due to proximity, but maintains general unity.	MODERATE
3. Clark Summit Scenic Viewshed (#74)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW
5. Scenic Viewshed (north of Clark Summit) (#91)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW
6. Wilson Hill Scenic Viewshed (#97)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW
7. Kimball Hill Road Scenic Views (#104)	Some irregular spacing and overlap but tempered by distance (> 7 miles).	LOW
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	Some irregular spacing and overlap due to proximity, but maintains general unity.	MODERATE
9. Mondanock-Sunapee Greenway (#125)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW
10. Summit Trail at Crotched Mountain (#127)	No overlapping turbines. Evenly spaced. Low angle of view.	LOW

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

7. OVERALL VISUAL EFFECT

The ratings for each of the six aforementioned criteria for each resource are combined to obtain an Overall Visual Effect rating.¹⁵⁰

TABLE 14. OVERALL VISUAL EFFECT RATINGS

SENSITIVE RESOURCE	NUMBER OF TURBINES VISIBLE	PERCENT OF VISIBILITY	PROXIMITY OR DISTANCE	ANGLE OF VIEW	VISUAL DOMINANCE	VISUAL CLUTTER/ LANDSCAPE COHERENCE	OVERALL VISUAL EFFECT RATING
1. Pitcher Mountain Fire Tower (#24)	M	H	L	L	L	L	LOW-MODERATE
2. Willard Pond (#29)	M	H	H	M	H	M	MODERATE-HIGH
3. Clark Summit Scenic Viewshed (#74)	M	H	L	M	M	L	LOW-MODERATE
4. Hedgehog Mountain Summit Scenic Viewshed (#83)	M	H	M	M	M	L	LOW-MODERATE
5. Scenic Viewshed (north of Clark Summit) (#91)	M	H	L	M	M	L	LOW-MODERATE
6. Wilson Hill Scenic Viewshed (#97)	M	H	L	L	L	L	LOW-MODERATE
7. Kimball Hill Road Scenic Views (#104)	M	H	L	L	L	L	LOW-MODERATE
8. Bald Mountain Trail at DePierrefeu-Willard Pond Wildlife Sanctuary (#105)	L	L	H	M	M	M	LOW-MODERATE
9. Mondanock-Sunapee Greenway (#125)	M	L	L	M	L	L	LOW
10. Summit Trail at Crotched Mountain (#127)	M	L	L	M	L	L	LOW

¹⁵⁰ Rating system:

Each rating is assigned a point value:

Low = 1

Moderate = 2

High = 3

Total points are combined and assigned overall ratings based on the following breakdown:

Low = 8 points or less

Low-Moderate = 9-11 points

Moderate = 12-14 points

Moderate-High = 15-17 points

High = 18 points

D. Determining Effect on the Viewer from Sensitive Scenic Resources

For those resources determined to have the potential for a 'Moderate-High' or 'High' Overall Visual Effect rating as identified in Section 4.C.6 above, additional analysis is provided that incorporates and weighs a range of possible factors to determine how a reasonable person may be affected by the visibility of the project, which include:

1. **Activity** – the primary type of activity users are engaged in at the resource
2. **Extent of use** – the amount of use the resource receives
3. **Duration of view** – the extent or exposure to the project
4. **Remoteness** – the absence of development or primitive character or experience of the resource

Only Willard Pond results in an overall visual effect of Moderate-High. Note that this is a step in the process of determining whether the effect is unreasonably adverse. In this stage of the screening process, "High" does NOT translate into an unreasonable adverse effect determination. This determination is still dependent on other factors yet to be considered in the subsequent process.

1. ACTIVITY

Threshold ratings for activity types include the following:

- **Low:** Activities where visual quality and scenery of the landscape are unimportant to the experience. This would include activities such as visiting museums or historic architecture, or ice fishing in a shanty.
- **Moderate:** Activities where visual quality and scenery of the landscape are important but secondary to the experience. This would include activities such as fishing, motorboating, camping, hunting, rafting, and snowmobiling.
- **High:** Activities in which visual quality and scenery of the landscape are central to and significantly affect the experience. This would include activities such as paddling, viewing wildlife or scenery, and hiking.

TABLE 15. ACTIVITY

RESOURCE	PRIMARY ACTIVITIES	RATING
Willard Pond (#29)	Fly fishing only (no ice fishing), canoeing/kayaking, and nature observation	HIGH

2. EXTENT OF USE

Threshold ratings for extent of use are defined by the following:

- **Low:** Access is difficult, limited and/or unclear (e.g. walk-in, portage). Interaction between users is extremely rare, and evidence of other users is negligible. There are no boat launches, campsites, picnic areas or other maintained facilities. Motorized or mechanized use is not permitted or not possible.
- **Moderate:** Access is somewhat evident and available. Interaction between users may be low to moderate. There are boat launches, campsites, picnic areas or other maintained facilities, but they are limited and not always noticeable. Motorized or mechanized use may be possible.
- **High:** Access is quick, obvious, and easy. Interaction between users is moderate to high. There are multiple boat launches, campsites, picnic areas or other maintained facilities, which can accommodate a large number of people (i.e. pavilions, parking lots). Motorized or mechanized use is allowed and evident.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 16. EXTENT OF USE

RESOURCE	EXTENT OF USE	RATING
Willard Pond (#29)	Readily accessible gravel boat launch off of a major road (Route 123). Maintained by NH Dept. of Fish & Game. Interaction between users is low to moderate. No petroleum motor use.	MODERATE

3. DURATION OF VIEW

Threshold ratings for duration of view include the following:

- **Low:** Activities whose focus would be away from a project or would be constrained due to limited viewing opportunities (e.g. ice fishing in a shanty; visibility limited to small portion of the resource). Effect may also be low due to limited use of the resource (i.e. as resource activities/visitation decreases the duration of view decreases).
- **Moderate:** Views of a project would be tempered by focusing on the activity (i.e. fisherman focusing on the water), shifting location and altering context and viewpoint (i.e. views are continually changing as in rafting, motorboating or fishing), and access to 360° views. In this situation, the potential effect lessens, because, although views would be present, they would be ever-changing and mitigated by the activity.
- **High:** Activities whose primary focus would be toward a project and fixed on a project. For example, a scenic pull-off with static, unchanging views focused entirely on a project site would have a high potential effect, even though a visitor may only stay at the site for 5 to 10 minutes.

TABLE 17. DURATION OF VIEW

RESOURCE	DURATION OF VIEW	RATING
Willard Pond (#29)	Views of the project are present but they are ever changing due to shifting location and viewpoint (i.e. a paddler or fisherman is constantly moving and shifting direction). There are 360° views from the pond and some areas have no visibility at all. The primary route of paddle appears to be along the western edge of the pond to Pine Point, where there is no visibility. Views are continually changing and are mitigated by the activity (e.g. paddling or fishing – focus is ever changing from immediate shoreline, to distant shoreline, to long distance views, to water). Primary views are to the west toward Bald Mountain.	MODERATE

4. REMOTENESS

Threshold ratings for determining remoteness are defined by the following:

- **Low:** Resource is noticeably developed. Interaction between users is moderate to high. There are boat launches, campsites, picnic areas or other maintained facilities, which can accommodate a large number of people (i.e. pavilions, parking lots). Motorized or mechanized use is allowed and evident.
- **Moderate:** Resource appears to maintain its natural quality. Development is present but is not always noticeable by the average person and usually harmonizes with the natural environment. Interaction between users may be low to moderate. There are boat launches, campsites, picnic areas or other maintained facilities, but they are limited and not always noticeable. Motorized or mechanized use may be possible.
- **High:** Resources that are essentially unmodified and pristine. Access is generally difficult and off-the-beaten path. Interaction between users is extremely rare, and evidence of other users is negligible. There are no boat launches, campsites, picnic areas or other maintained facilities. Motorized or mechanized use is not permitted or not possible.

4. VISUAL ASSESSMENT

ANTRIM WIND VISUAL ASSESSMENT

September 3, 2015

TABLE 18. REMOTENESS

RESOURCE	REMOTENESS	RATING
Willard Pond (#29)	This is not a remote wilderness pond. It is a human-altered pond where water levels are regulated. It is not identified by NH Dept. of Fish & Game as a "remote trout fishery." ¹⁵¹ There is a maintained boat launch that is readily accessible off of a major road (Route 123). Interaction between users is common and can range from low to moderate. Development is minimal though not noticeable and harmonizes with the natural environment.	MODERATE

5. OVERALL VIEWER EFFECT

The ratings for each of the four-abovementioned criteria for the resource are combined to obtain an Overall Viewer Effect rating.¹⁵² The combination of the four criteria provides a good picture of how the project may affect the reasonable viewer's experience. Any resource that emerges with a 'Low' to 'Moderate' rating, the effect to the reasonable viewer is not considered significant. A resource that emerges with a 'Moderate-High' to 'High' Overall Viewer Effect rating may result in a significant change to the reasonable viewer.

TABLE 19. OVERALL VIEWER EFFECT RATINGS

L = LOW M = MODERATE H = HIGH					
RESOURCE	ACTIVITY	EXTENT OF USE	DURATION OF VIEW	REMOTENESS	OVERALL VIEWER EFFECT RATING
Willard Pond (#29)	H	M	M	M	MODERATE

¹⁵¹ http://www.wildlife.state.nh.us/Fishing/trout_remote.htm

¹⁵² Rating system:

Each rating is assigned a point value:

Low = 1

Moderate = 2

High = 3

Total points are combined and assigned overall ratings based on the following breakdown:

Low = 5 points or less

Low-Moderate = 6-7 points

Moderate = 8-9 points

Moderate-High = 10-11 points

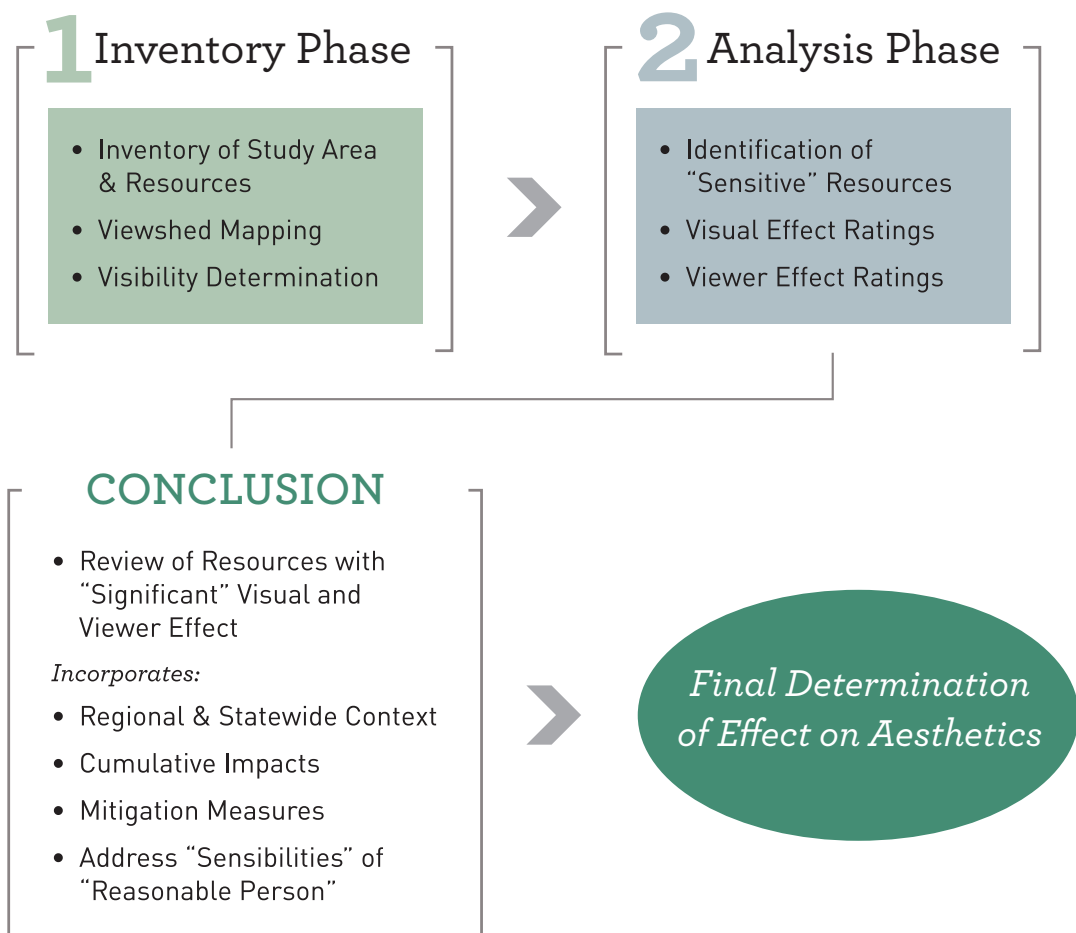
High = 12 points

5. Overall Conclusion

This section provides an overall summary and professional opinion as to whether the project, as proposed, will have an unreasonable, adverse effect on aesthetics. A number of considerations are factored in to this final analysis, in addition to the foregoing work, that helps inform LandWorks' final conclusion. These include: 1) The development and completion (in this section) of a comprehensive, systematic, defensible, visual analysis methodology that integrates qualitative and quantitative considerations; 2) The proposed site and its characteristics as an appropriate location for wind energy and this project in particular; 3) The regional landscape and viewshed and the project's place in that landscape and viewshed; 4) Night lighting of the project; 5) Local conditions in the immediate vicinity of the project and the potential visual effects of the project within that context; and, 6) The efficacy of mitigation measures being proposed by the developer.

A. The Visual Analysis Methodology

LandWorks has employed a systematic, objective methodology that identified all the scenic resources within 10-miles of the turbines, which constitutes the project area. As stated in the section of this report on Methodology, the visual analysis approach incorporated and integrated several well-established and accepted techniques and processes that experts use for analysis of visual effect. A progression of the analysis allowed independent reviewers on the consultant team to develop a consistent set of conclusions. The chart below simplifies the methodology process.



Based on this multi-step approach, a total of 290 resources were identified for an initial visibility analysis, and of those resources identified, it was determined, through viewshed mapping, 3D modeling and field visits, that only 30 had potential visibility of the project. These 30 resources were then evaluated for their overall sensitivity, an analysis based on each resource's inherent scenic quality and designated cultural value. A total of only 10 resources were determined to have a moderate-high to high overall visual sensitivity and were thus evaluated further for visual change, or visual effect. None of these 10 resources are of National or State scenic significance (i.e. designated primarily for their scenic value, such as a State Scenic Byway or National Scenic Trail). The results of that step identified only 1 resource with moderate-high visual effect, requiring the final analysis of viewer effect – Willard Pond.

B. The Proposed Project Site and Characteristics

This wind project is a reasonably scaled, 9 turbine project located on Tuttle Hill and the slope of Willard Mountain. From a visual analysis perspective, these ridges represent an ideal location for such a project given several key factors:

1. As the project viewshed map demonstrates (see Exhibit 4), there is an exceedingly limited area of potential project visibility in the overall project area. Within the 353.2 square mile study area, only 8.8 square miles or 2.5% has potential visibility of the Project. This percentage of visibility is calculated using the visibility of the hub of the turbines – rather than the tip of the blade at its highest point.¹⁵³

Calculating the viewshed based on visibility of the turbine hubs has become an accepted practice among visual experts as the hub is usually the primary element visible from longer distances; the visibility of the individual turbine rotors or blades is less noticeable and substantially diminished beyond a distance of 6 miles. Even when compared to one other built project in New Hampshire, the percentage of overall visibility from blade tip for the Antrim Project (3.2%) is less than the Groton wind project (4%) even with a taller overall height (399 ft. Groton vs. 489 ft. Antrim). In fact, this is one of the lowest percentages of visibility within a wind energy project's viewshed that LandWorks has worked on.

Primary project visibility is limited to several local ponds and lakes and a few local and regional summits. These views are predominantly in the middle- to background distance zones, further reducing their visual effect. Of the 55 public lakes and ponds identified within the 10-mile study area (there are several more without delineated access areas), only 7 have potential visibility of the project, and only 1 is considered sensitive.

Traveling on almost all of the local and adjacent roads provides little if any project visibility given the local terrain and the nature of the wooded landscape, with many areas of mature evergreen and deciduous forests. The state scenic byway that runs through this region will have no visibility of the project. In fact, it is often difficult to locate the ridges that will host the project due to these conditions. The project ridges are also surrounded in most every direction by mountains and hills (i.e. Bald Mountain, Goodhue Hill, Meetinghouse Hill, Windsor Mountain, Round Mountain, Morrison Hill and Fletcher Hill), which block or greatly reduce local visibility. The similarity and limited visibility of these ridges indicates their low prominence in the region. Even when viewing from high points such as Pitcher Mountain, the project ridges are difficult to discern. Mount Monadnock, North Pack Monadnock and other ridges to the south and east are of primary focus and prominence in this region. This limited visibility throughout the study

¹⁵³ An additional 2.6 square miles or 0.7% has visibility of the turbine tips.

5. OVERALL CONCLUSION

area means those who live and work here, and who drive these roads every day, will be minimally impacted.

2. No new transmission lines are required to serve this project – by contrast, most wind energy projects require varying lengths of new transmission lines to be developed. The 3 acre interconnection and operations and maintenance facilities for the project are also well located – 500 feet from Route 9 and directly adjacent to a PSNH transmission corridor with two high voltage lines - and will have limited, if any visibility. It is located near to an area that has been logged previously so thus is not a sensitive area. Additionally, a landscape plan has been developed to ensure that there will be no visibility of a proposed staging/work area adjacent to the O&M facility and located behind a 100 foot existing tree buffer along Route 9, which will be retained to the north of the cleared area. A continuous hedge of native evergreen and deciduous species will be added to ensure complete screening from Route 9. Likewise some plantings will be added at the entrance to the project at Route 9 to limit visibility into the site.
3. Given the close proximity to NH Route 9, the total length of the access road is relatively short, thus reducing visual impacts associated with clearing and grading for site access, another positive element of this project. Other notable elements include 1) the undergrounding of the connector line between the individual turbines, 2) the reduction of clearing and road lengths from the previous project proposal with the removal of turbine 10, and 3) the commitment to minimize clearing for roads and turbine sites and to promote revegetation in these locations.
4. FAA required night time obstruction lighting, given the overall limited visibility, will not have substantive effects on the viewshed, and most of the public areas of project visibility are not typically used or frequented in the nighttime. Moreover, the issue of night lighting will all but disappear once radar-detected lighting is installed/activated.
5. The local context of the project also supports the fit of a project developed on a basis of a natural resource present – wind. The town and environs represent a long history of the working landscape and an economy based on local resource use and development – whether for forest products, agriculture or hydropower. This is a “settled” rural residential landscape with associated land-based economies and it is appropriate that areas such as Antrim and this portion of New Hampshire continue a tradition of locally generated energy.
6. The local leadership of Antrim has accepted and supported this project. The Antrim Board of Selectmen, in its Motion for Rehearing and/or Reconsideration of Docket No. 2012-01, stated, among other reasons, that it supports the project because it believes it will not have an unreasonable adverse effect on aesthetics and that the Town of Antrim is “fully aware of the Project’s physical dimensions and impacts.” The Town has also entered into an agreement with the applicant that specifically allows for up to 10 turbines up to 500 feet tall to be installed in the proposed locations as well as others no longer being utilized. On September 29, 2014, the Board of Selectmen voted unanimously to reaffirm their support for the Project and they cited this support and the longstanding collaboration with AWE in a letter to the SEC on November 6, 2014.
7. Finally, there will be no cumulative visual impact resulting from the Project. With the exception of Pitcher Mountain, there are no resources that will have views of both the Antrim and Lempster wind projects, nor will there be views of more than one wind project as a person travels along roads or water bodies. Views of either project also will not appear repeatedly as one travels throughout the region given the roadside vegetation and topography of the area and overall limited visibility as established in the viewshed mapping and field study. Even from Pitcher Mountain, views of the two projects are not within the same

viewing arc and thus cannot be seen simultaneously. Additionally, the sheer breadth of the 360 degree view from this resource, and the fact that there are compelling views, which do not even include the two projects (westerly, to the southern Green Mountains, and southerly, to Mount Monadnock), diminishes any sense whatsoever that these two wind projects are overly prominent or have an unacceptable or unreasonable visual effect when taken together.

LandWorks has been involved in approximately 18 different wind energy projects throughout New England and has worked for regulatory bodies, developers, communities and landowners. Of all these projects, this site in Antrim is one of the best locations we have studied due to the site characteristics and the overall limited visual effect.

C. Night Lighting of the Project Turbines

Night lighting for the project is another important factor regarding the project's overall visual effect. The visual impact from the required night lighting of the Project is minimal for several reasons:

1. The number of potentially visible turbine lights from any resource is limited and with a maximum of up to 6 lights potentially visible, the scale of the potential impact is restricted to a relatively narrow portion of the horizon. This conclusion is based on the view of the project from a number of resources in the project area, such as the view from Pitcher or Crotched Mountain, which demonstrate that the project itself, whether viewed in daytime or nighttime, does not occupy a substantive portion of the overall 180 or 360 degree view of the horizon line.
2. There is visibility of lit turbines only from a relatively small percentage of the total resources identified – only 10% of all the resources identified will even have possible nighttime visibility – and for the lakes and ponds, the entire spread of the night lights will not be visible.
3. The visibility of any lights will be reduced due to the limited vertical beam spread. Warning lights must be visible horizontally from the light and higher and do not direct light of any significant intensity below minus 10 degrees of the horizontal plane created by the direct cast of the light itself. Because of the limited vertical beam spread, visibility is reduced since viewers typically do not see these lights directly, and they do not create glare or untoward light impacts to the naked eye situated below the tower base.
4. There is no impact to night sky viewing and the quality of the night sky (except on the horizon lines beyond or in the vicinity of the lights, but stargazing or the night experience is not typically focused on the horizon). The visibility of these lights will be mitigated by their distance from potential viewing locations – particularly from the distant summits – which are primarily in the middle- to background view.
5. Exposure to users is very limited. FAA studies have suggested that the use of red light emitting diode or rapid discharge style fixtures limits exposure time, thus creating less of an effect (as compared to a constant red light). Moreover, very few people hike, paddle or fish at night, primarily for reasons of safety, orientation, navigation and overall enjoyment. Fisherman and others may see the lights at dawn and at dusk when they are arriving or departing from some of the lakes or ponds, but this would only be for a very limited duration and users are typically focused on preparing and launching their boats and gathering their equipment.