Black Nubble Wind Farm

Section 6

Visual Impact Assessment

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1.0 Introduction

1.1 Summary of Changes

The revised application for the Black Nubble Wind Farm (BNWF) eliminates 12 wind turbines on Redington Range and proposes the development of 18 turbines on Black Nubble. Although there will be some visual impacts on scenic and recreational resources within the viewshed of the BNWF, those impacts have been minimized to the maximum extent possible by reducing the size and scope of the project. In no instances will the wind turbines or the transmission structures block views of or from scenic resources.

To the hiker on the Appalachian National Scenic Trail (AT), the BNWF may first be visible from the Bigelow Range (depending upon weather and atmospheric conditions) at 9.5 to ll.4 miles. At that distance, the turbines will scarcely be visible and will be seen in the context of the development on Sugarloaf Ski area. Once the hiker descends the Bigelow Range, there will be no open views of the wind farm on the AT until Saddleback Junior, a distance of approximately 26.5 miles (which should take three± days to hike). In the original application, there would have been views of the turbines from South Crocker Mountain, Sugarloaf Cirque, and the trail to Spaulding Mountain.

BNWF will be visible from less than 5% of the 15-mile radius study area. Most of the community views will be at distances of greater than ten miles, which is beyond the recognition distance threshold that Dr. Palmer described in his testimony at the LURC public hearings held last August.[1] Views from scenic resources such as the Route 16 Scenic Byway (10 – 12 miles away) and Rangeley Lake (9 – 14 miles away) will be marginally affected, due to the distance from the project and the nature and intensity of the surrounding land use.

[1] July 17, 2006 Prefiled Testimony of Dr. James Palmer, at p. 7. In his testimony, Dr. Palmer noted that the human eye would not be able to recognize turbine bases at distances greater than 8.5 miles.

Table 6-1 summarizes some of the most significant visual characteristic of the BNWF and compares them with the original application. Further detail is found in Mitigation 9.9.

Table 6-1: Comparison of Visual Characteristic

	Original Application	**BNWF**
Wind Turbines	30	18
Mountains	Redington Ridge Black Nubble	Black Nubble only
Scale (Land to be Rezoned)	1,004 acres	487 acres
Visible Lights	15 turbines lit	7 turbines lit
Closest Point from the AT	1.0 mile (From Crocker Mtn. to Redingon Ridge)	3.1 miles (From Poplar Ridge to Black Nubble)
Proximity to AT	17.0 miles of the AT within four miles	7.7 miles of the AT within four miles
Closest View from the AT	1.5 miles at South Crocker	3.2 miles at Poplar Ridge
Midground Views (within four miles)	0.21 miles of open views 0.24 miles of filtered views	0.1 miles of open views 0.1 miles of filtered views
Proximity to Mt. Abraham	4.1 miles	6.5 miles
View Angles	Saddleback: 35º The Horn: 43º Saddleback Junior: 54º Mt. Abraham: 26º	Saddleback: 15º The Horn: 18º Saddleback Junior: 22º Mt. Abraham: 12º

1.2 Overview of Visual Impact Assessment Methodology

The Black Nubble Wind Farm is a utility scale wind farm being developed by Maine Mountain Power (MMP) and managed by Endless Energy Corporation (EEC) and Edison Mission Energy. The design of the wind farm is the result of a collaborative effort between engineers, meteorologists with a specialty in wind energy, biologists, soils scientists, construction specialists, landscape architects, and other professionals experienced in wind energy development. It also involved considerable discussions with regulatory agencies and local officials, all who had substantial input into the design of the project.

The methodology used in the visual impact assessment (VIA) of the Black Nubble Wind Farm is based upon a thorough understanding of the existing visual environment and the sensitivity level of people who live in and visit the area. Many of the concepts developed by the USDA Forest Service, the Bureau of Land Management, the State of New York, and visual impact specialists at the State University of New York School of Landscape Architecture, College of Environmental Science and Forestry, have been incorporated in the evaluation methodology.

The methodology for assessing the visual impacts of the wind farm employs both a professional and a public approach. The professional approach involved the judgment of experienced landscape architects in the selection of factors chosen to evaluate scenic quality and determine the magnitude of visual impact. This approach, widely used in permitting work in Maine and elsewhere throughout the country, is based upon current studies of what constitutes scenic landscapes and visual impacts. The public approach involved professionally developed intercept surveys of hikers (1994, 2003, and 2004) and local hunters, snowmobilers, skiers, and residents (1994), as well as a 2006 statewide survey to gain an understanding of their attitudes toward wind energy in Maine and the use of this site for a wind farm.

1.3 LURC Standards Regarding Scenic Impacts

The Maine Land Use Regulation Commission (LURC) will be the lead reviewing agency, since the majority of the land utilized by the project lies within Maine's unorganized territories subject to LURC review. A small portion of the project (a section of the transmission line) falls within the town of Carrabassett Valley and will be subject to the Maine Department of Environmental Protection (MDEP) review.

LURC's regulations (Subchapter III, Section 10.24 General Criteria for Approval of Permit Applications) require that applicants demonstrate that:

Adequate provision has been made for fitting the proposal harmoniously into the existing natural environment in order to assure there will be no undue adverse effect on existing uses, scenic character, and natural and historic resources in the area likely to be affected by the proposal.

Section 10.25 Development Standards contain review standards for structures and uses that will be reviewed by LURC. Section 10.25.E provides review standards for Scenic Character, Natural and Historic Features. The following standards apply to the visual impacts of the BNWF:

1. Scenic Character

a. The design of a proposed development shall take into account the scenic character of the surrounding area. Structures shall be located, designed and landscaped to reasonably minimize their visual impact on the surrounding area, particularly when viewed from existing roadways or shorelines.

b. To the extent practicable, proposed structures and other visually intrusive development shall be placed in locations least likely to block or interrupt scenic views as seen from traveled ways, water bodies, or public property.

c. If a site includes a ridge elevated above surrounding areas, the design of the development shall preserve the natural character of the ridgeline.

In the absence of an accepted methodology for performing a visual impact assessment within LURC's jurisdiction, MMP has elected to use the methodology described in the Maine Department of Environmental Protection's Natural Resource Protection Act (NRPA) Chapter 315 Regulations. Chapter 315 requires an applicant to demonstrate that a proposed activity will not unreasonably interfere with existing scenic and aesthetic uses

of a scenic resource. A *scenic resource* is defined as "Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities". A scenic resource is the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed. A *viewshed* is defined as "the geographic area as viewed from a scenic resource, which includes the proposed activity." For purposes of this assessment, the study area (the limits of the project viewshed) extends 15 miles from the proposed wind farm. (See Section 6.4.3 for a description of the limits of the project study area.)

This VIA describes the location and visual characteristics of the BNWF facilities and provides an inventory of scenic resources within the BNWF viewshed. The MDEP Visual Evaluation Field Survey Checklist (see Figure 6-3 in Section 5: Scenic Resources Within the Viewshed) is included to summarize the visual impacts of the project on the identified scenic resources. These resources include the following locations of national, state, and local scenic significance (lettering is taken from the Field Survey Checklist):

B. State Preserves
C. A State or Federal trail.
D. A property on or eligible for inclusion in the National Register of Historic Places
E. A State Park
F. Public natural resources or public lands

Section 3, Project Study Area, describes all known scenic resources within this 15-mile area. Section 8, Visual Impact Assessment, describes how the BNWF will comply with the LURC standards for Scenic Character. Section 9, Mitigation Strategies, describes the mitigation strategies that have been taken to minimize potential visual impacts.
Since the terminology used in the report is specific to VIA's, a glossary of terms is provided in Appendix G. A listing of references is also provided at the end of the report in Section 10.

2.0 Data Collection

Terrence J DeWan & Associates ("TJD&A") staff collected field data during the course of this study by a variety of means:

- Visiting and photographing the study area during leaf-off and leaf-on seasons on foot and by automobile. (July 5 and 6, 1998, September 5, 1998, October 11, 2003, March 27, 2004, May 17, 2004; June 20, 2006; July 5, 10, 11, 2006).

- Hiking the surrounding mountains and hills that may have a view of the BNWF, the collection or transmission lines, or the access roads: North and South Crocker Mountains (July 6, 1998 and June 19, 2006), Mount Abraham (September 5, 1998), Eustis Ridge and Bald Mountain (October 10, 2003), and Rangeley Lakes State Park and Sandy River Plantation (March 11, 2004); and The Horn, West Peak, and Milton Avery Peak in the Bigelow Range (August 9, 2006).

- Touring the project area on Black Nubble and Mount Redington with LURC personnel (September 15, 2003 and July 5 and 11, 2006).

- Hiking the Appalachian Trail from Caribou Valley Road (on the south side of Route 27) to Route 4 (on the south side of Saddleback Mountain) on August 4-6, 2004 to photograph the views from the trail and record where vegetation will obscure views of the wind farm.

- Field trip to the Mars Hill wind farm to observe and photograph a Maine installation with similar project characteristics (May 31, 2007). A selection of photographs of Mars Hill from various distances is included in Appendix G – Photography: 6-P169 through 6-P175.

Extensive photographic documentation was made, using Nikon digital cameras. For most photographs the camera was set to record at a 'normal' focal length, i.e., equivalent to that found on a 50mm SLR camera. A selection of representative views within the study area is included in Appendix C Photography. These photographs were also used as the basis for the visualizations (photosimulations) provided in Appendix B. Copies of all photographs, as well as all visualizations, are available on CD.

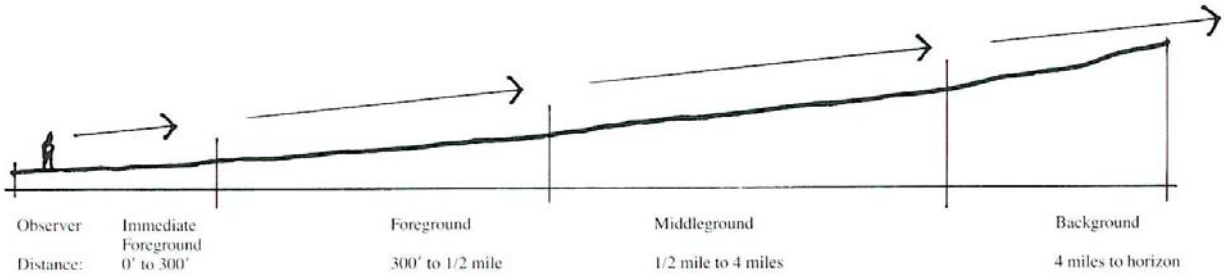
Photographs were also supplied by Endless Energy (Saddleback: Gilbert and Harley Lee, August 7, 2002) and Greg Thomas (Bald Mountain and Eustis Ridge, Summer 2003).

This report is based upon design plans for the proposed Black Nubble Wind Farm prepared by DeLuca-Hoffman Associates, with input from many other professional members of the design team. As is the case in most complex projects, this application is the result of a collaborative effort among all team members, with substantial input from the Land Use Regulation Commission, the Department of Environmental Protection, the Department of Inland Fisheries and Wildlife, and other state and federal agencies.

3.0 Project Study Area

3.1 Introduction

Visual assessments determine whether the action proposed is in the foreground, midground, or background. The concept of distance zones is based upon the U.S. Forest Service visual analysis criteria for forested landscapes, and is based upon the amount of detail that an observer can differentiate at varying distances. The distance zones used for the study of the Black Nubble Wind Farm are defined as:



From: *Landscape Aesthetics: A Handbook for Scenery Management*. USDA Forest Service. Agriculture Handbook Number 701, December 1995

- **Foreground: 0 to 1/2 mile in distance**. Within the foreground the observer will be able to detect surface textures, details, and a full spectrum of color. For example, the shape of the blades on the wind turbines or the transmission line conductors will be readily apparent within the foreground viewing distance. It should be noted that there are currently no scenic resources (as defined by Chapter 315 regulations) or any other locations where the casual observer will be able to see any of the proposed turbines in the foreground. (Access footpaths have been cut by the applicant to gain access to the project area, but they are not designed for public use.) Since there are no publicly accessible foreground views

of the project, interested parties who wish to see the BNWF will need to go up the proposed access roads to get a closer view of the turbines.

- **Midground: 1/2 mile to 4[2] miles in distance**. The midground is a critical part of the natural landscape. Within this zone the details found in the landscape become subordinate to the whole: individual trees lose their identities and become forests; buildings are seen as simple geometric forms; roads and rivers become lines. Edges define patterns on the ground and hillsides. Patterns of cultural modifications (paved roads, timber haul roads, transmission lines, clearcuts) are readily apparent, especially where there is noticeable contrast in scale, form, or line. Colors of new structures become somewhat muted and the details become subordinate to the whole. In panoramic views, the midground landscape is the most important element in the composition in determining visual impact. To give a sense of relativity, Rangeley Lake is approximately five miles in length, measured from the eastern foot of Bald Mountain to Rangeley Village.

  Approximately 7.7 miles of the AT will be within four miles (midground) of the BNWF:

  - 2.5 miles along either side of Crocker Mountain
  - 5.2 miles along the trail between Saddleback Junior and Lone Mountain.

  Within the midground, BNWF turbines will be visible from two locations on the Appalachian Trail, for a total of 1,150± feet:

  - Filtered openings on the eastern flank of Poplar Ridge (150± feet),
  - The top of Saddleback Junior, where turbines will be 4.0 to 5.2 miles from the observer (500± feet of open views, 500± feet of filtered views).

[2] See July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal at p. 22, referring to the midground as 0.5 miles to 4 miles in distance.

Turbines will also be visible from the surveyors cut off the AT, below the North Summit of Crocker Mountain. From this viewpoint turbines will be 3.3 to 4.7 miles from the observer.

Within the midground, the patterns and rhythm formed by the wind turbines, the lines and contrast created by the access roads and transmission lines, and the scale of the project relative to the larger landscape are important considerations in determining visual impact.

- **Background**: greater than 4 miles. Most views in Maine are limited to midground distances by topography and vegetation. The background distance zone provides the setting for panoramic views. Many of the mountains of western Maine offer significant panoramas where the views extend for five miles or greater. When objects are seen at distances greater than four miles, the effects of distance and atmospheric perspective often will obliterate the surface textures, detailing, and form of any project components. The appearance of the BNWF turbines will be reduced to neutral shades of gray. Objects seen at this distance will be highly visible only if they present a noticeable contrast in form or line.[3] Based upon observations in various sites in California, Vermont, Maine, and elsewhere, wind turbines are barely visible at distances greater than 15 miles under typical atmospheric conditions.

3.2 Regional Description

In The Natural Regions of Maine, Paul Adamus divided the state into distinct geographic areas – relatively homogeneous in nature – based primarily on the physical characteristics of landform (relief, elevations, surficial geology, wetlands) and major plant communities. Maine is composed of five regions and 17 subregions, as shown in Figure 6-1, The

Natural Regions of Maine. The BNWF is located in the Alpine Subregion of the Mountains Region. Much of the wind farm's viewshed extends out to the Rangeley Lakes Subregion.

The Mountains Region is characterized by its relatively high elevation and significant topographic relief. Average elevation is 1,500–2,000 feet above mean sea level.

To describe the climate of the Mountains Region, Adamus quotes from T. Hanstedt[4]

> *The climate of the mountain environment is generally more severe than the surrounding lowlands. It becomes increasingly severe in the higher elevations to a point where altitudes over 2,500 feet in Maine generally experience a subarctic climate…*
>
> *While the average temperature and number of annual frost-free days are reduced with elevation, precipitation increases substantially. Studies in Vermont have found an increase of thirty percent more annual precipitation on the mountain summits than on the lowlands. Fog and low lying clouds frequent the mountain tops, increasing the humidity…*
>
> *In addition to the low temperatures, high precipitation levels and the frequency of fog, strong surface winds are often found in the mountain regions…. Wind velocities exceeding 100 miles per hour are not uncommon on the summits of many Maine mountains.*[5]

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[3] The reflection of sunlight off moving wind turbine blades may also be noticeable in the background viewing distance, even though the turbines themselves may not be visible due to distance and/or atmospheric perspective,

[4] T. Hanstedt, Mountain Areas in Maine: Report No. 1 – Background and work program. Maine State Planning Office, Augusta. 1975

[5] There does not seem to be any accurate data on the percentage of days that will afford clear views of the wind farm from either the mountaintops (hiking trails and ski areas) or the valley below (local roads, scenic byway, lake and ponds, and other areas.

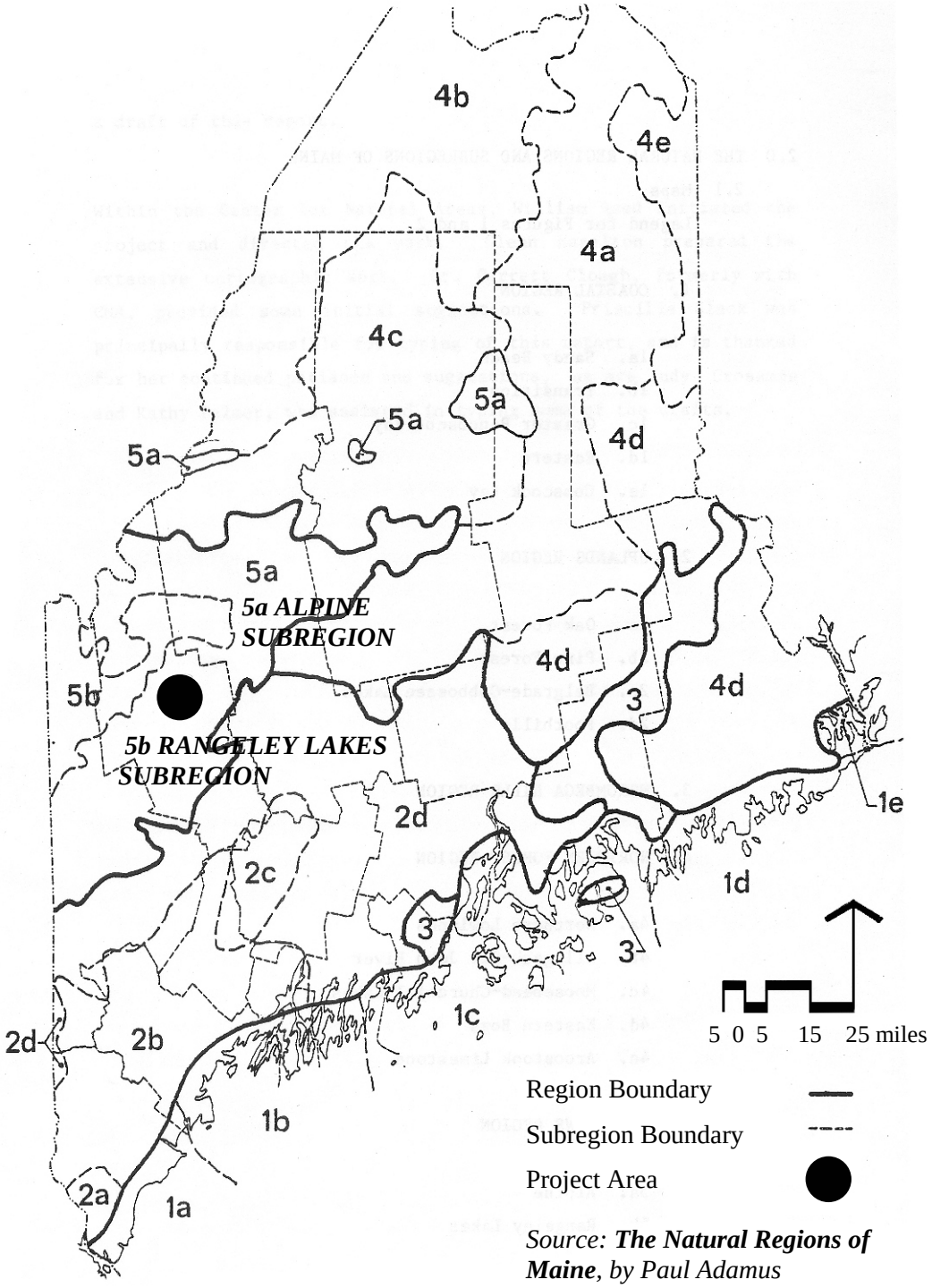


Figure 6-1: Natural Regions of Maine

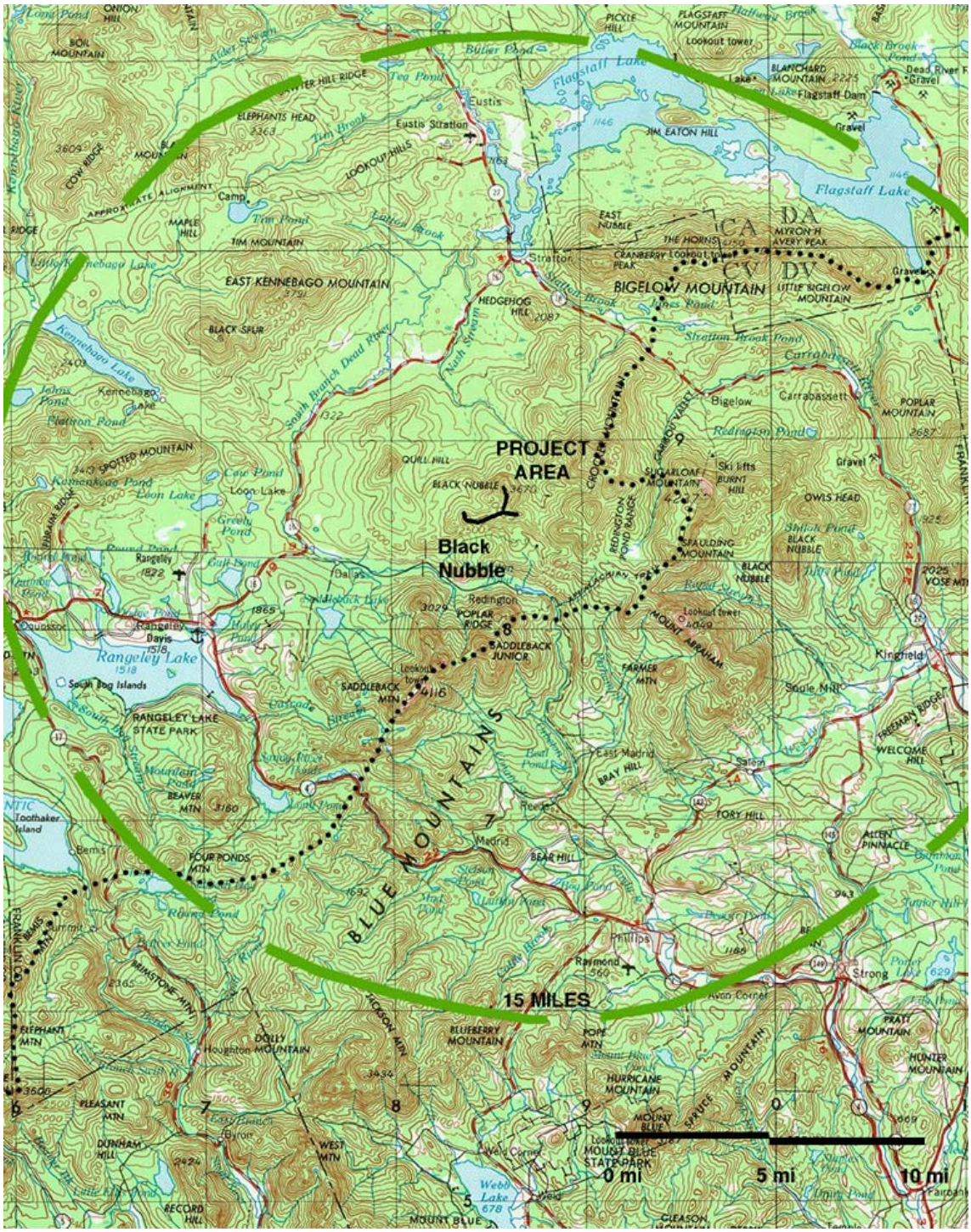
The Alpine Subregion has relatively few wetlands, rivers, or lakes. Water-bodies found here are primarily small mountain ponds and tributaries of larger rivers. The few wetlands that are found are usually associated with streams. Vegetation is primarily spruce-fir near the summits of the mountains, with northern hardwoods typically occurring at lower elevations, often mixed with spruce-fir. Logging operations are common throughout the subregion, especially at the lower elevations. Patterns of clearcuts, along with gravel access roads, are evident from most of the major peaks within view of the project area. Land use activities include small scale residential development, scattered villages, major ski areas, golf courses, other recreational development, and large scale timber harvesting operations.

The Rangeley Lakes Subregion, to the south and west of the proposed BNWF, is characterized by its abundance of lakes and ponds, generally lower elevations, and less dramatic relief. The most significant water bodies include Rangeley Lake, Mooselookmeguntic Lake, Cupsuptic Lake, and Flagstaff Lake.

3.3 Landscape within Fifteen Miles of the Project

The fifteen-mile radius represents the outer limit of the area that was studied in the assessment of visual impacts (See Figure 6-2, Study Area). Most visual impact assessments typically extend out at least five miles, which is considered the start of the background distance zone. Fifteen miles was used as the study area in recognition of the size and scope of this proposal, the sensitivity of the resource, and expressed public sentiment. The study area does not extend the full fifteen miles to the east due to the presence of Sugarloaf Mountain, Spaulding Mountain, and Mount Abraham that will block the view of the wind farm.

The following section describes the study area in terms of its physical characteristics: landforms, water bodies, vegetation patterns, and cultural modifications.



Source: Sherbrooke and Lewiston USGS Quads 1:250,000

Figure 6-2: Study Area

3.3.1 Landform

BNWF will be set among a group of prominent mountains that help define the Mountains Region of western Maine. The following is a listing of peaks in excess of 3,000 feet found within the study area (listed in order of descending height):

Within five miles (foreground and midground)

- North Crocker Mountain (el. 4228)
- South Crocker Mountain (el. 4040)
- Mount Redington (el. 4000)
- Black Nubble (el. 3670)
- Poplar Ridge (el. 3142)

Within ten miles (background)

- Sugarloaf Mountain (el. 4237)
- Saddleback Mountain (el. 4116)
- Mt. Abraham (el. 4090)
- The Horn (Saddleback) (el. 4073)
- Spaulding Mountain (el. 3986)
- The Horns (Bigelow) (el. 3805)
- East Kennebago Mountain (el. 3791)
- Saddleback Junior (el. 3640)
- Burnt Hill (el. 3595)
- Lone Mountain (el. 3270)
- Cranberry Peak (el. 3213)
- Farmer Mountain (el. 3201)
- Potato Nubble (el. 3029)

Within fifteen miles (background)

- West Peak (el. 4150)
- Myron H. Avery Peak (el. 4088)
- Spotted Mountain (el. 3268)
- Beaver Mountain (el. 3160)
- Little Bigelow Mountain

3.3.2 Water Bodies

The presence of water – either in the form of lakes, ponds, rivers, and streams – is an important indicator of visual quality in the landscape. Water bodies add contrast in color, form, and texture to the landscape. Water reflects surrounding landforms, creating a sense of depth and variety.

3.3.2.1 Lakes and Ponds

The characteristic landscape of this part of Western Maine includes a scattering of small ponds and large lakes, surrounded by mountains (see Maps 6-1 through 6-4 in Appendix A). Most of the lakes have varying amounts of development activity on their shoreline. Table 6-2, Lake and Ponds within the Study Area, summarizes the physical characteristics of the lakes and ponds within a fifteen mile radius of the BNWF, as inventoried in the Maine Wildlands Lake Assessment and the Maine Lakes Study. The scenic quality of five of the lakes and ponds within the study area (Kennebago Lake, Rangeley Lake, Stratton Brook Pond, The Horns Pond, and Tim Pond) has been rated 'Outstanding'. The scenic quality of four lakes and ponds (Beal Pond, Beaver Mountain Pond, Flagstaff Lake, and Redington Pond in Redington Township) has been rated as 'Significant'.

Table 6-2 shows which waterbodies are within the viewshed of the BNWF (VIS) and the distance to the nearest visible turbine (DIST). An 'X' in the 'VIS' column indicates that

Table 6-2: Lakes and Ponds within the Study Area

WATERBODY	LOCATION	VIS	DIST (Mi)	SIZE (Ac)	RESOURCE RATINGS							RES CLASS	LAND USE	
					FSH	WL	SC	SH	BOT	CLT	PHY		ACCESS	DEV
Beal Pond	Madrid		7.9	32	S		S					2		
Beaver Mtn. L. (Long Pd)	Sandy River Plt.		11.0	543	S		S					2	AC	DEV
Caribou Pond	T4 R1 Mt Abram Twp.		3.8	10	S							2	AC	U
Cow Pond	T2 R3 Lang Twp.	X	8.5	62	S							2	AC	U
Dodge Pond	Rangeley	X	12.0	230	S							2	AC	DEV
Flagstaff Lake	Dead River Twp.	X	7.3	20300	O	O	S	S				1A	AC	U
Greeley Pond	Dallas Plt.	X	6.7	42		S						2	INAC	U
Greeley Pond (Little)	Dallas Plt.		7.2	15	S	S						2	INAC	U
Greeley Pond (Third)	Dallas Plt.		7.5	14								3	INAC	U
Gull Pond	Dallas Plt.	X	7.3	281	S							2	AC	DEV
Haley Pond	Dallas Plt. / Rangeley	X	8.2	170	S							2	AC	U
Jones Pond	T4 R3 Wyman Twp.		7.0	36		O						1B	INAC	U
Kennebago Lake	T3 R3 Davis Twp.	X	10.6	1700	O	O	O	O		S-	O	1A	AC	DEV
Loon Lake	Dallas Plt / Rangeley	X	8.0	168	S					S-		2	AC	DEV
Quimby Pond	Rangeley	X	13.0	165	O							1B	AC	DEV
Rangeley Lake	Rangeley Plt.	X	9.1	6000	O	S	O	S	S	O	O	1A	AC	DEV
Redington Pond	R1 R2 Redington Twp.		2.2	37	S		S					2	AC	DEV
Round Pond	Rangeley	X	11.7	166	S							2	AC	DEV
Saddleback Lake	Dallas Plt.	X	4.8	358	S					S-		2	AC	U?
Sandy River Pond (Lower)	Sandy River Plt.		9.3	17								3	AC	DEV
Sandy River Pond (Mid)	Sandy River Plt.		9.3	70	S							2	AC	DEV
Sandy River Pond (Upper)	Sandy River Plt.		9.3	28								3	AC	DEV
Stratton Brook Pond	T4 R3 Wyman		6.6	26		O	O					1A	AC	U
Tea Pond	T1 R5 Jim Pond		14.0	90	S	S					O	1B	AC	U
The Horns Pond	T4 R3 Wyman		9.3	10	S		O	O				1A	INAC	U
Tim Pond	T2 R4 Tim Pond		12.5	320	O		O			+	S-	1A	AC	U

Resource Ratings: FSH – fisheries; WL – wildlife; SC – scenic quality; SH – shoreline character; BOT – botanical features; CLT- cultural resources; PHY – physical resources; 0 – Outstanding (clearly of statewide significance); S – Significant (met a predetermined standard)

Resource Class: 1A – Statewide sig. with >1 outstanding nat. value; 1B – Statewide sig. with 1 outstanding nat. value; 2 – Regional significance (no outstanding values but at least one significant resource value) ; 3 – Local or unknown significance

Land Use: AC – Relatively accessible; INAC – Relatively inaccessible (no roads within 1/4 mile of lake shore; DEV – Relatively developed; UNDEV – Less than one development unit per shore mile

some or all of the BNWF will be visible. Section 6.9, Visual Impact Assessment, provides a description of how the lakes and ponds will be affected by the presence of the wind farm. Appendix D provides a series of cross-sections that illustrate the relationship between the BNWF and a representative sample of local lakes.

3.3.2.2 River and Streams

Most of the flowing water in the study area is in the form of small mountain streams bordered by densely vegetated riparian zones. The streams tend to be relatively small in size and are generally not dominant visual features.

Three rivers flow through the study area. The South Branch Dead River is a meandering stream that parallels Route 16 between Rangeley and Stratton, emptying into Flagstaff Lake. The North Branch Dead River follows Route 27 from Chain of Ponds down to Flagstaff Lake. In Eustis the North Branch widens out and becomes part of Flagstaff Lake, affording a partial view of the BNWF from a few locations. The Carrabassett River starts at Caribou Pond just east of Mount Redington and flows to the north until it reaches Route 27 in Carrabassett Valley. It then parallels Route 27 through Carrabassett and Kingfield. With the exception of the section of the North Branch described above, the BNWF will not be visible from the rivers due to the surrounding topography and dense stream-side vegetation.

3.3.2.3 Waterfalls

The study area also has at least two significant waterfalls that provide aesthetic enjoyment for those who seek them out: Redington Pond Falls (two miles south of Black Nubble) and Poplar Steam Falls (11 miles to the east northeast in Carrabassett Valley), These features tend to be well off the beaten track, requiring a thorough knowledge of the area to find them. The BNWF will not be visible from either waterfall. See Section 5.1A of this report for additional information.

3.3.3 Vegetation

The forestland surrounding the BNWF is covered with mixed softwood-hardwood in the valleys and a predominantly spruce-fir cover on the summits. Much of the forestland within the study area has been extensively cut over, with clear cuts and some selective thinning evident throughout. Areas that have not been cut include state-mandated buffer zones around lakes, ponds, streams, and the summits of the higher mountains. For additional information on vegetation, see Section 7.

3.3.4 Cultural Features

The cultural features are man-made changes to the visible landscape found within the viewshed of the proposed wind farm. These features include small towns and villages, four-season trails and major recreational areas, scenic roadways, and natural resource-based industrial development.

Within four miles (foreground and midground)

- U. S. Navy Survival, Escape, and Evasion Training Facility
- Caribou Valley Road, leading to Caribou Pond
- Extensive network of haul roads for timber harvesting
- Appalachian Trail and other hiking trails

Within ten miles (background)

- Sugarloaf USA Ski area (ski trails, lifts, residential villages, slopeside condominium development, and commercial buildings)
  Sugarloaf Golf Course (championship golf course, residential village, access roads, support facilities)
- Single family homes along Route 16 in Coplin Plantation.
- Village of Stratton (relocated when Flagstaff Lake was created)
- Stratton Energy (woodchip-fired electrical producer)

- Route 16/27 (Maine Scenic Byway) between Carrabassett Valley and Stratton
- Sugarloaf USA spray irrigation ponds
- Route 16 between Stratton and Rangeley (known as "Moose Alley")
- Village of Rangeley
- Rangeley Municipal Airport
- Sections of Route 4 (Rangeley Lakes National Scenic Byway)
- Saddleback Mountain Ski Area (ski trails, lifts, residential development)
- Carrabassett Village
- Carrabassett Regional Airport
- Commercial development along Route 27
- Rural residential development and seasonal cottages throughout
- Extensive network of haul roads for timber harvesting
- Appalachian Trail
- East Kennebago Trail (10.0 miles from nearest turbine to summit)
- Other hiking trails

Within fifteen miles (background)

- Villages of Eustis, Madrid, and Phillips
- Cathedral Pines Campground (Eustis)
- Eustis Ridge Picnic Area (private)
- Tim Pond camps
- Rangeley Lake residential/commercial development
- Mingo Springs Golf Course
- Wilhelm Reich Museum/Orgone Energy Observatory, (Dodge Pond, Rangeley)
- Rangeley Lakes State Park
- Route 4 (Rangeley Lakes National Scenic Byway)
- Town of Kingfield
- Extensive network of haul roads for timber harvesting
- Appalachian Trail and other hiking trails
- Spotted Mountain Trail (12.5 miles from nearest turbine to summit).

4.0 SCENIC RESOURCES WITHIN THE VIEWSHED

Public natural resources and public lands are usually visited by the general public, in part with the purpose of enjoying their visual quality. Under Chapter 315 regulations, MDEP considers a scenic resource as the typical point from which an activity in, on, over, or adjacent to a protected natural resource is viewed. Scenic resources include, but are not limited to, locations of national, state, or local scenic significance. The following narrative supplements the information provided in Figure 6-3 MDEP Visual Evaluation Field Survey Checklist (doc. #DEPLW0540).

4.1 WOULD THE ACTIVITY BE VISIBLE FROM:

4.1.A. National Natural Landmarks and other outstanding natural and cultural features.

Bigelow Mountain is the only National Natural Landmark (NNL) within 15 miles of the proposed BNWF according to the NNL website:
www.nature.nps.gov/nnl/Registry/USA_Map/States/Maine/maine.htm
Bigelow is noted on the website as "One of the best and most representative alpine vegetation zones among lower elevation New England Mountains."

The National Natural Landmarks Program recognizes and encourages the conservation of outstanding examples of our country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. National Natural Landmarks (NNLs) are designated by the Secretary of the Interior, with the owner's concurrence. To date, fewer than 600 sites have been designated[6]. The National Park Service administers

[6] According to the NNL website there are 14 NNL's in Maine. The other Landmarks in Maine include Number 5 Bog in Somerset County, New Gloucester Black Gum Stand, Monhegan Island, Gulf Hagas, The Hermitage, Colby-Marston Preserve, Penny Pond – Joe Pond Complex in Kennebec County, Mount

the NNL Program, and if requested, assists NNL owners and managers with the conservation of these important sites.

The BNWF turbines will be located at distances ranging from 8 to over 11 miles from the Bigelow Range (See View Location Map 6-2). Within the Bigelow Range, some of the turbines and a portion of the collection line may be visible from Cranberry Peak (8.0 miles to the nearest turbine), The Horns (9.5 miles), West Peak (10.8 miles), and Milton Avery Peak (11.4 miles. At these distances the turbines will be very difficult to see, especially under hazy weather conditions. The 115kV transmission line will be visible in some locations but it will be seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27. See Table 6-4 Summary of Visual Impacts for a complete description of visibility.

The Maine Atlas and Gazetteer lists the following unique natural areas within a 15-mile radius:

- **Crocker Cirque**, a glacial cirque between Crocker and South Crocker Mountains, accessible via the Appalachian Trail and the Caribou Pond Road off Route 27. The cirque is on the east side of Crocker Mountain and therefore not within the viewshed of the BNWF. A Maine Appalachian Trail Conference campsite is located at the base of the cirque. A considerable amount of timber harvesting has occurred along the Caribou Pond Road in recent years, opening up views toward Mount Redington.

- **Redington Pond Falls**, north of Redington Pond, two miles south of Black Nubble. The Maine Atlas and Gazetteer describes this feature as a "Spectacular series of waterfalls and cascades on mountain stream – total drop 107 yds. Great Views. Difficult access; no marked trails." None of the turbines on Black Nubble

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Katahdin, Crystal Bog, Passadumkeag Marsh, Meddybemps Heath, Carrying Place Cove Bog, Orono Bog, and Appleton Bog.

will be visible from the falls due to the configuration of the landforms and the vegetation in the immediate vicinity.

- **Poplar Stream Falls**, 11 miles to the east-northeast in Carrabassett Valley. The BNWF will be screened from view by Crocker and Sugarloaf Mountains.

4.1.B. State or National Wildlife Refuges, Sanctuaries, or Preserves and State Game Refuges

There are no State or National Wildlife Refuges, Sanctuaries, or State Game Refuges within 15 miles of the proposed BNWF. The Maine Atlas and Gazetteer lists the following Maine Public Reserved Lands (PRL) within a 15-mile radius:

- **Bigelow PRL**: 30,000 acres of land between Route 27 and Flagstaff Lake just east of Stratton and 7-13 miles from the BNWF. The preserve encompasses the seven peaks that make up the Bigelow Range. The preserve is a popular three-season recreation area according to the Bureau of Parks and Lands' website (spring sees few visitors). The primary activities include hiking the numerous trails, fishing in the preserve's brooks and ponds, cross country skiing, snowmobiling, camping, swimming, hunting, and trapping. The Appalachian Trail crosses most of the peaks, affording panoramic views to the nearby lakes and mountains.

  See narrative under 4.1.A National Natural Landmarks (above) and Table 6-4 Summary of Visual Impacts for a description of the visibility from the Bigelow Range.

Figure 6-3: MDEP Visual Evaluation Field Survey Checklist

APPENDIX B: MDEP VISUAL EVALUATION

FIELD SURVEY CHECKLIST

(Natural Resources Protection Act, 38 M.R.S.A. §§ 480 A - Z)

Name of applicant: **Maine Mountain Power, LLC** Phone: **207-847-9323**

Application Type: **NRPA, Fragile mountain ecosystem**

Activity Type: **Utility scale wind farm on Black Nubble**

Activity Location: **Redington Township**

County: **Franklin**

GIS Coordinates, if known: **See project location maps**

Date of Survey: **7/98, 9/98, 9/15/03, 10/10/03** Observer: **T. DeWan, T. Farmer, A. Segal**

Phone: **207-846-0757**

Distance Between the Proposed Activity and Resource (in Miles)
Visibility

1.Would the activity be visible from:	0-1/4	1/4 -1	1+
A. A National Natural Landmark or other outstanding natural feature?	☐	☐	▮
B. A State or National Wildlife Refuge, Sanctuary, or Preserve or a State Game Refuge?	☐	☐	▮
C. A state or federal trail?	☐	☐	▮
D. A public site or structure listed on the National Register of Historic Places?	☐	☐	▮
E. A National or State Park?	☐	☐	▮
F. 1) A municipal park or public open space?	☐	☐	▮
2) A publicly owned land visited, in part, for the use, observation, enjoyment and appreciation of natural or man-made visual qualities?	☐	☐	▮
3) A public resource, such as the Atlantic Ocean, a great pond or a navigable river?	☐	☐	▮

Figure 6-3: MDEP Visual Evaluation Field Survey Checklist (Continued)

	0-1/4	1/4 -1	1+
2. What is the closest estimated distance to a similar activity?	☐	☐	▮
3. What is the closest distance to a public facility intended for a similar use?	☐	☐	▮
4. Is the visibility of the activity seasonal? (i.e., screened by summer foliage, but visible during other seasons)		☐Yes	▮No
5. Are any of the resources checked in question 1 used by the public during the time of year during which the activity will be visible?		▮Yes	☐No

- **Dead River PRL**: 4,771 acres of land on the shoreline of Flagstaff Lake and the first few miles of the North Branch Dead River. Lakefront camping, accessed by vehicle and by boat, is the primary recreational activity. The turbines on Black Nubble will be visible from portions of the reserve near the Dead River at a distance of 11 miles.

- **Bald Mountain PRL**: 1,873 acres of preserved land just south of the village of Oquossoc on the western end of Rangeley Lake. A popular one-mile hike to the summit of Bald Mountain offers a 360-degree panorama that encompasses Rangeley Lake, Cupsuptic Lake, and Mooselookmeguntic Lake as well as the Bigelow Range and East Kennebago Mountain. From Bald Mountain the closest wind turbines on Black Nubble will be 15.7 miles away. Visualization 6-1a is a panorama of the view from Bald Mountain. Visualization 6-1b is a photosimulation of the same scene with the wind farm in place. Visualization 6-1c is a 'normal' lens (50mm) visualization of the scene. See Photos 6-P1-14 in Appendix C.

- **Four Ponds PRL**: 6,000 acres between Mooselookmeguntic Lake and Route 4. Visitor activities include swimming, hiking, fishing, and snowmobiling. A section of the Appalachian Trail crosses the southern half of the reserve. The BNWF will be located 11-17 miles to the northeast and should not be visible from any portion of the reserve.

4.1.C. A state or federal trail

The Appalachian National Scenic Trail and Side Trails

The Appalachian National Scenic Trail (AT), a unit of the National Park Service, starts at Mount Katahdin and runs 2,100 miles to Springer Mountain in Georgia. Over 281 miles of the trail are in Maine. Approximately 34 miles are within the 15-mile radius study area. The AT crosses diagonally through the middle of the study area, starting at the Bigelow Range on the north and extending to Saddleback Mountain in the south. The Appalachian Trail Guide to Maine describes the section from Route 16/27 in Carrabasset Valley south to Route 4 in Rangeley as the "most difficult along the AT in Maine."

The majority of the trail in the study area is wooded, providing limited opportunities for visual contact with the surrounding mountains and the proposed BNWF. The wind farm may be fully or partially visible from 2.6 miles of the AT, as well as some segments along several side trails. Maps 6-5 and 6-6, Views from Hiking Trails Maps, and Maps 6-7, 6-8, and 6-9, Views from the Appalachian Trail[7], show the AT as it passes through the study area and the location of areas of both full and partial visibility. These maps also illustrate where the BNWF may be visible from other trails in the area. The maps also show the location of photographs that were taken along the AT (in Appendix C) and visualizations showing 'before' and 'after' views from several locations along and within the study area (See Visualizations V6-2 through V6-6 in Appendix B).

[7] August 3, 2006, Presented as part of testimony of Terrence DeWan and Amy Segal at LURC Hearings.

For the south-bound hiker, the first views of the wind farm will be on Myron Avery Peak in the Bigelow Range. Here the turbines on Black Nubble may be seen at a distance of 11.4 miles to the southwest (depending upon weather and haze conditions). As the hiker heads west along the crest of the Bigelow Range, views of the BNWF will change with intervening topography and vegetation patterns. As shown on Map 6-4, portions of the wind farm will be seen intermittently along the AT on mountain tops and forest openings from Myron Avery Peak to the junction with the Bigelow Range Trail (leading to Cranberry Peak).

At this distance the turbines will appear as tall as an object 0.2" in height (or approximately the thickness of three stacked nickels) held at arms length (24"). See Table 6-4 Summary of Visual Impacts for a discussion on the visibility and relative size (R/S) of the BNWF throughout the length of the AT.

Once the hiker descends the Bigelow Range, there will be no open views of the wind farm on the AT until Saddleback Junior, a distance of approximately 26.5 miles (which should take three± days to hike). As noted below, there are a few brief filtered views of Black Nubble on the eastern flank of Poplar Ridge at the southerly end of this distance. See Maps 6-7, 6-8, and 6-9.

A narrow opening in the forest starts at a point near the north summit of Crocker Mountain and heads down its southwestern flank. Its straight alignment and disregard for the steep topography suggest that it may have been a traverse line cut by a survey crew within the past decade. Hikers venturing off the Appalachian Trail 250± feet down this cut would encounter a panoramic view of the BNWF site at a distance of 3.1 miles. (The Appalachian Trail Guide to Maine makes no mention of the clearing or the view.) See

Photos 6-P16, 17, and 18. Visualization 6-3 has been prepared to illustrate what the wind farm will look like from this viewpoint even though it is not on the AT.[8]

In an effort to minimize potential visual impacts on the AT and a trailhead parking area, EEC will be locating the 115 kV transmission line underground in the vicinity of the Route 27 crossing. See Section 6.8 for a description of this section of the transmission line. Photographs 6-P77 through P84 provide views of the AT and the area surrounding the Route 27 road crossing.

A 0.6-mile side trail off the AT takes hikers to the summit of Sugarloaf Mountain. (At elevation 4,237, it is the second highest mountain in Maine.) Hikers and skiers on the mountain have panoramic views of the Bigelow Range to the north, the western mountains to the west (including the northern section of Black Nubble), and the development of Sugarloaf USA below. Visualization 6-3a is a panorama of the view from Sugarloaf Mountain. Figure 6-3b is a visualization of the same scene with the BNWF in place. Figure 6-3c is a 'normal' lens view of the projected view from Sugarloaf with the BNWF in place. From this location skiers and hikers are now able to see signs of recent cutting operations, timber haul roads, and the infrastructure of Sugarloaf Mountain ski area.

The summit of Spaulding Mountain is wooded and affords no views of the BNWF. A side trail leads to a viewpoint off the AT with a filtered view of Black Nubble at a distance of 5.3 miles.

A 1.7-mile side trail (off the AT) leads to the ruins of a fire tower at the summit of Mount Abraham. The view is a panorama of mountains, forests, and cutting patterns to the west (see photos 6-P40-43). The summit of Black Nubble is 7.3 miles away and is seen over Mount Redington. From the summit of Mt. Abraham, Saddleback and Sugarloaf

[8] Just as the south summit of Crocker has a side trail leading to an overlook toward Sugarloaf Mountain, this site on the north summit of Crocker could be developed as a vantage point for hikers who wanted to

Mountains are dominant focal points in the view; Black Nubble is a much less significant landform. Photo 6-4a is a panorama of the view from Mount Abraham. Visualization 6-4b is a visualization of the same scene with the BNWF in place. Visualization 6-4c is a 'normal' lens view of the projected view from Mount Abraham with the BNWF. From the summit of Mt. Abraham hikers now see evidence of commercial forest operations, i.e., extensive clearcuts and logging roads, as noted in Photos 6-P42 and P43.

The AT is at its closest point to the BNWF on the eastern flank of Poplar Ridge at a distance of 3.1 miles, although the turbines are not visible at this location. At several places along this section of the trail on Poplar Ridge the forest cover opens up to provide short open views toward the wind farm at a distance of 3.2 miles. The lean-to on Poplar Ridge will not have views of the BNWF site. Photos 6-P48-P62 are a sequence of images along AT showing the characteristic landscape, filtered views, and the occasional open panorama.

The southernmost segment of the AT on Saddleback Mountain is well known for its concentration of open mountain views. The summit of Saddleback Junior, 1.9 miles south of Poplar Ridge, affords hikers 360-degree views of the western mountains (see photos 6-P63-P66). At this point hikers will be 4.0 to 5.2 miles south of the turbines on Black Nubble. Visualization 6-5a is a panorama of the view from the summit of Saddleback Junior looking toward the wind farm site. Visualization 6-5b is a computer-enhanced view of the same scene with the BNWF in place. Visualization 6-5c is a 'normal' lens view of the projected view from Saddleback Junior with the BNWF in place.

On the west side of Saddleback Junior the trail descends into the woods for another 1.3 miles. At elevation 3,600' (0.4 miles east of The Horn), the trail emerges from the treeline and starts a 3± mile section of open ridgelines. The AT passes over The Horn

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see the wind farm.

and the summit of Saddleback Mountain, providing panoramic mountain views in all directions. The wind farm will be visible for 1.5± miles of this exposed ridgeline.[9]

At the northern end of this open ridgeline (0.4 miles east of The Horn) the nearest wind turbines will be 4.5 miles to the north. The viewshed of the wind farm will extend south to Saddleback Mountain where the turbines will be seen at distances of 5.7 to 7.2 miles.

Photographs 6-P67 through P70 provide images from The Horn. Photographs 6-P71 though P76 were taken from the summit of Saddleback Mountain by two different photographers under varying weather conditions.

Visualization 6-6a is a panorama of the view from the summit of Saddleback Mountain looking toward the wind farm site. Visualization 6-6b is a computer-enhanced view of the same scene with the BNWF in place. Visualization 6-6c is a 'normal' lens view of the projected view from Saddleback Mountain with the BNWF in place.

In addition to the views of the surrounding mountains from the open summits on Saddleback Mountain and The Horn, hikers also see the ski runs, lifts, base lodge, parking areas, and housing development at Saddleback Ski Resort; operations areas at the U.S. Navy Escape and Evasion Facility; ongoing timber harvesting activities; and the highways and haul road in the surrounding area.[10]

The hiked distance from Myron Avery Peak in the Bigelow Range (where the BNWF will first come into view) to Saddleback Mountain is 34.2 miles, according to the Appalachian Trail Guide to Maine. Based upon the description in the Guide, 1997 USGS aerial photographs, and TJD&A field investigations, open and filtered views to the wind farm will be seen for a total of approximately 2.7 miles (8%) of this distance, most of it in

[9] The BNWF will not be visible throughout a 0.6 mile segment of the AT on the southwest side of The Horn. This segment is not included in the 1.5 miles of ridgeline described above. Mileage is horizontal distance derived from USGS topo quads. Actual on-the-ground distance may vary.
[10] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, p. 32.

the background at distances greater than 4 miles. The Guide estimates that the hike over the Bigelow Range, from Long Falls Dam Road (east of Flagstaff Lake) to Route 27 should take 1-2 days. The Guide estimates the hike from Crocker Mountain to Saddleback Mountain (from Route 27 to Route 4) should take 2-4 days.

Hikers on the AT are exposed to a number of cultural features (man-made changes to the landscape) within the foreground and midground (within four miles) while they are in the study area. These include Sugarloaf USA Ski area (ski trails, mechanized ski lifts, residential villages, condominium development, and commercial buildings), Sugarloaf Golf Course (championship golf course, residential village, access roads, support facilities), Carrabassett Village (commercial development, Carrabassett Valley Academy), Saddleback Mountain Ski Area (ski trails, ski lifts, base lodge, summit structures, communication towers, parking lots, condominium development), United States Navy Escape and Evasion Facility, Bigelow substation on Route 27, AT parking lot on Route 27, single family homes, and an extensive network of timber haul roads. Cultural features beyond four miles (in the background) include the Village of Stratton, Stratton Energy (biomass-fired electrical producer), Route 16/27 (Maine Scenic Byway) between Carrabassett Valley and Stratton, Sugarloaf USA sewage treatment ponds, Route 16 between Stratton and Rangeley, Village of Rangeley, Rangeley Lakes State Park, Rangeley Municipal Airport, Route 4/17 (Rangeley Lakes National Scenic Byway), rural residential development, and seasonal cottages.[11]

State-Designated Snowmobile Trails

The Rangeley area is a popular destination for snowmobiling in Maine. The Interstate Trail System (ITS), a comprehensive network of snowmobile trails in Maine, has several routes in the vicinity of the wind farm. ITS 84/89, a 15-mile segment that extends east out of Rangeley, provides access to the south side of Saddelback Mountain. ITS 89 is a 35-mile connection between Stratton and Rangeley. This route is west of the project

[11] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, pp. 8-9.

area. In addition, there are many other routes maintained by local snowmobile clubs in the area that afford wintertime access to the forestland in the region. Maps 6-2 through 6-6 show the approximate location of known routes on the USGS base map.

4.1.D. A property on or eligible for inclusion in the National Register of Historic Places pursuant to the National Historic Preservation Act of 1966, as amended.

The following is a listing of National Register properties within 15 miles of the BNWF, organized by township. The only site with views of the proposed wind farm is shown *in italics.*

Dallas Plantation

- Upper Dallas School, Saddleback Road. 8 miles west of the BNWF. The school faces Rangeley Lake and is not within the viewshed of the wind farm.

Kingfield

- Frank Hutchins House, High Street.
- William F. Norton House, 1 Stanley Avenue.
- Amos G. Winter House, Winter's Hill off Route 27.

Views of the BNWF from all structures in Kingfield (13± miles south-southeast of the BNWF) will be blocked by Sugarloaf and Spaulding Mountains.

Madrid

- Madrid Village Schoolhouse, Reeds Mills Road. 11 miles south-southwest of the BNWF. View will be blocked by Saddleback Mountain.

Phillips

- Maine Woods Office, Main Street.
- Captain Joel Whitney House, 8 Pleasant Street.

Both structures are 13± miles south of the BNWF, which will be screened by Potato Hill, Mecham Hill, and other low hills on the north side of Phillips.

Rangeley

- Wilhelm Reich Energy Observatory, Dodge Pond Road off Routes 4/16. BNWF may be visible at distances of 12-15 miles to the east from a few points on the grounds of the Observatory, but not from the historic structures (see Photos 6-P147 and P147).
- Oquossoc Log Church, Route 4. >15 miles from wind farm.
- Rangeley Trust Company Building, Main Street. 9 miles west of the BNWF.
- Rangeley Public Library, Lake Street. 9 miles west of the BNWF.

The top portion of the turbines will be visible over Haley Pond within Rangeley Village at a distance of approximately 9 miles. (see Photos 6-P153 and 154).

Stratton

- Ora Blanchard House, Main Street. 7 miles north of BNWF. View will screened by vegetation and structures in the immediate vicinity.
- *Coplin Plantation Schoolhouse,* Route 16, 4.5 miles from the junction of Route 27. Turbines on Black Nubble will be partially visible at a distance of 4.5 miles. See Photos 6-P123 and P124.

4.1.E. National or State Parks

As noted in 4.1.C above, portions of the Appalachian National Scenic Trail, a unit of the National Park Service, are within the viewshed of the BNWF. There are no other units of the National Park Service within the viewshed of the BNWF. Acadia National Park is over 100 miles to the southeast and will not be affected by the project.

Rangeley Lake State Park, located on the southerly shore of Rangeley Lake, is an 869-acre park featuring camping, swimming, picnicking, boating, wildlife watching, photography, and hiking. The park is connected to the regional snowmobile trail

network, as well as to ITS 89. Cross sectional analysis indicates that portions of the turbines on Black Nubble may be visible from the eastern shoreline of the park during clear weather at a distance of 12.7 miles. While Rangeley Lake State Park is officially closed from October 2 through May 14, it still attracts winter hikers, cross-country skiers, and snowmobilers. See Photos 6-P85 and P86 for winter views from the park. At this distance the turbines will be barely visible, except on very clear days. The view from the State Park across Rangeley Lake is focused due east on Saddleback Mountain. From this vantage point, Black Nubble is visible to the northeast as a much less prominent feature in the overall landscape.

4.1.F. Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment and appreciation of natural or cultural visual qualities.

4.1.F.1. Municipal park or public open space. While most of the local communities within 15 miles of the BNWF have parkland or public open space, there are few that have any views of the proposed wind farm. There are no public parks within five miles of Black Nubble.

The closest public park within ten miles of Black Nubble is Lakeside Park on Rangeley Lake in Rangeley village. The park is a focal point for activity in the community, featuring a boat launch, small beach, picnic grounds, a town green, and dramatic southwesterly views down the lake. However, the park is not within the viewshed of the BNWF and will not be affected by it. (See Photos 6-P87 and 88.)

In Carrabassett Valley the town owns 1,000 acre of land on the south side of Route 27. This land is primarily used for cross-country skiing and other winter pursuits. The heavily wooded land is eight miles east of Black Nubble and will not have any views of the wind farm.

A small private picnic area on Eustis Ridge above Cathedral Pines Campground on Flagstaff Lake will have filtered views of the BNWF. This locally recognized overlook is less than an acre in size with two picnic tables and grills. The picnic area provides a panoramic view of the Bigelow Range and Flagstaff Lake to the southeast and east. The wind farm will be partially visible at a distance of 12 miles, looking south across the Eustis Ridge Road and through roadside trees. (See Photos 6-P89 through P92.) The views to the BNWF will be more open during the leaf-off season, but picnic areas generally get little use during this time of the year.

Another private viewpoint that will afford views of the BNWF is a field below Viles Road, further up the Eustis Ridge Road in Eustis. Visualization 6-7a is a panorama of the view from the field below Viles Road on Eustis Ridge. Visualization 6-7b is a visualization with the BNWF in place. Visualization 6-7c is a 'normal' lens view of the projected view from this viewpoint with the BNWF in place.

4.1.F.2. A publicly owned land visited, in part, for the use, observation, enjoyment and appreciation of natural or man-made qualities.

Mt. Abraham (locally known as Mt. Abram). The summit of Mt. Abraham (4,049 feet) offers panoramic views of Maine's western mountains and is one of the most popular side trails off the Appalachian Trail. In addition to its panoramic views, the mountain is recognized for its old-growth forests and extensive arctic-alpine plant communities. These factors led to its designation as an ecological reserve, the first to be donated to the State under a program the Legislature established in 1999 to preserve representative examples of Maine's natural communities as habitat for native plants and animals and as places for ecological research. In 2002, the Appalachian Trail Conference (ATC) donated 4,033 acres on Mount Abraham (exclusive of the summit) to the State, with funding from a wide variety of sources, including the Land

for Maine's Future (LMF) Program. In 2004, an additional 1,159 acres were turned over to the state to add to the ecological reserve. [12]

The view from Mt. Abram extends from Sugarloaf Mountain on the north to Saddleback Mountain on the west, and includes Spaulding, Crocker, Redington Pond Range, Black Nubble, Poplar Ridge, Saddleback Junior, and The Horn. On a clear day, the turbines on Black Nubble will be seen from Mt. Abram at distances of 6.5 to 7.3 miles to the northeast. As noted above hikers on the summit can also see extensive areas of harvesting and timber haul roads.

Scenic Byways. Between the 1960's and the early 80's, the Maine Department of Transportation (MaineDOT, formerly the Maine State Highway Commission) undertook a program to identify scenic state-assisted highways throughout the state. Eight roadways, with a total length of 200 miles, were nominated by a Committee convened by MaineDOT, using Federal Highway Beautification Act funds. This program resulted in the placement of a green line on the official Highway Map and roadside markers designating Scenic Highways. While the initial program did raise public awareness, it did not result in any additional protection to the lands abutting the roadways.

In recent years, as part of a nationwide movement to recognize the value of scenic byways, MaineDOT started to take a more active interest in these roadways. The state established a Scenic Byways program to help communities develop plans and receive state and federal funding. In 1999 and 2000 MaineDOT focused on the four byways in the western mountains of Maine, working with local citizen advisory groups to establish corridor management plans to guide the management and enhancement of the byway corridors. Two of these byways traverse portions of the BNWF study area:

[12] Land for Maine's Future Board website: www,maine.gov/spo/lmf/projects. Maine Appalachian Trail Land Trust website: www.matlt.org/Western%20Mountains.asp

- Route 27 Scenic Byway, from Kingfield to the Canadian Border (47 miles).
- Rangeley Lakes National Scenic Byway, from Madrid through Rangeley and Oquossoc and Height of Land to the Franklin County line in Township D (36 miles).

As shown on Map 6-2, the only place along the Route 27 Scenic Byway where the BNWF will be visible from is on the Flagstaff Lake causeway (see Photos 6-P97 and 98). During clear weather, southbound motorists at this location may be able to see the turbines at a distance of 8 miles as they negotiate the S-curve on the causeway. During winter months the turbines might be seen at other locations, but deciduous roadside trees will filter the view.

On the Rangeley Lakes National Scenic Byway (Route 4/16) the turbines will be momentarily visible to eastbound motorists during the summer months as the road crosses over the top of several hills in the six miles between Oquossoc and Rangeley. These points are 10-13 miles from the BNWF (see Map 6-3). As noted in Table 6-4, Summary of Visual Impacts, the turbines may be visible for a total of 33 seconds for motorists traveling at 50 MPH. Visualization 6-8a is a panoramic view from Route 16 between Oquossoc and Rangeley. Visualization 6-8b is the same view with the BNWF in place. Visualization 6-8c is a 'normal' lens view of the projected view from Route 16 with the BNWF. The only other location along the Byway where there may be views is from Route 17 on the east side of Bald Mountain south of Oquossoc at a distance of 15 miles (see Photos 6-P99 through P112). Filtered views may be seen during leaf-off season through occasional breaks in the forest. At that distance the turbines should be scarcely visible.

The Rangeley Scenic Overlook[13] on Route 17, five miles north of Height of Land in Rangeley Plantation, provides a 180-degree panoramic view to the east. The view

[13] donated to the State of Maine by Shelton C. Noyes, Esq

encompasses Rangeley State Park (directly below the overlook), the Horns on Bigelow, Potato Nubble, Crocker Mountain, and Sugarloaf Mountain. Black Nubble and Mount Redington are visible at 14 and 18 miles respectively, well into the background. The wind farm will be seen against the backdrop of Sugarloaf and Crocker Mountains and will not be silhouetted against the sky (see Photos 6-P133 through P136). At this distance, the turbines would be scarcely visible.

The Height of Land, a well-known overlook 5 miles south of Rangeley Scenic Overlook in Township D, is oriented to the north and west and has no views of the BNWF.

4.1.F.3. Public resources, such as great ponds. As noted above, GIS and cross-sectional analysis indicates that portions of the BNWF may be visible from at least a portion of the following lakes and ponds within the 15-mile study area during clear weather. (See also Table 6-2 in Section 4.3.2.1 for a description and physical characteristics of the lakes and ponds within the viewshed of the project.)

- Cow Pond (8.5 miles)
- Dodge Pond (12.0 miles)
- Flagstaff Lake (7.3 miles)
- Gull Pond (7.3 miles)
- Haley Pond (8.2 miles)
- Kennebago Lake (10.6 miles)
- Loon Lake (8.0 miles)
- Quimby Pond (13.0 miles)
- Rangeley Lake (9.1 miles)
- Round Pond (11.7 miles)
- Saddleback Lake (4.8 miles)

Maps 6-2, 6-3, and 6-4 illustrate where the wind farm will be visible from on the lakes and ponds in the study area. Cross-sectional analysis and GIS analysis has also shown that on most of the lakes and ponds only a portion of the BNWF will be visible. (See Appendix D for computer-generated cross-sections. See also Table 6-2, Lakes and Ponds within the Study Area.) Due to its distance, the BNWF should have a minimal visual impact on most of the lakes and ponds within its viewshed. The

wind farm will be most visible from the western portion of Saddleback Lake, which already has views of most of the ski trails on Saddleback Mountain.

4.2 WHAT IS THE CLOSEST ESTIMATED DISTANCE TO A SIMILAR ACTIVITY?

The closest wind energy facility in Maine is located at Mars Hill, 30 miles north of Houlton, approximately 163 miles northeast of Black Nubble.

The closest energy production facility is the Boralex Stratton Energy Plant, located 7 miles north of the BNWF in Stratton, adjacent to the Bigelow Public Reserve Land. This 50 MW energy plant is the largest of the biomass-fired independent power projects that were developed in this state in response to PURPA regulations enacted by the Maine Public Utility Commission. The plant went on line in November 1989. The facility is located on a side road off Route 27. The most visible elements of the plant are its 295-foot tall stack and occasional steam plume that are seen from parts of Cranberry Peak and most of Flagstaff Lake, Eustis Ridge, Sugarloaf Mountain, and Stratton Village.

4.3 WHAT IS THE CLOSEST DISTANCE TO A PUBLIC FACILITY INTENDED FOR A SIMILAR USE?

There are no public facilities intended for a similar use (wind power generation) in Maine.

4.4 IS THE VISIBILITY OF THE ACTIVITY SEASONAL?

The BNWF will be visible from most of the scenic resources described above throughout the year. The description indicates seasonal changes in vegetation that may affect the

visibility of the project. Furthermore, hazy conditions are more prevalent during the summer when more hikers are using the area.[14]

4.5 ARE ANY OF THE RESOURCES USED BY THE PUBLIC DURING THE TIME OF THE YEAR DURING WHICH THE ACTIVITY WILL BE VISIBLE?

All the resources listed above are used by the public to varying degree throughout the year.

[14] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, at pp. 24-25

5.0 PROJECT DESCRIPTION

The following section describes the components of the proposed BNWF relative to its location and scale within the viewshed of the surrounding scenic resources.

5.1 Wind Turbines

The basic unit of production will be the Vestas V90-3.0 MW turbine. This machine is a utility grade wind turbine incorporating state of the art mechanical and electronic technologies and aerodynamic design. Each turbine consists of three blades attached to a nacelle mounted on a tapered base. The turbines are controlled electronically so they always face into the wind.

All components of the turbine will be painted white. There will be no visible logos or company insignia on the sides of any of the turbine components. Black blades were considered, but were eliminated after testing public sentiment in the hiker's survey, comparing their visual impacts in photosimulations, and observing black bladed turbines in other locations (e.g., Searsburg, Vermont). Black blades would have introduced a sense of discontinuity between the bases, nacelles, and blades, calling more attention to the turbines. Gray was considered for the turbines, but FAA would have required white strobe lights during daylight hours.[15]

A total of 18 turbines will be installed on Black Nubble. The blades will be attached to a nacelle, a large aerodynamically designed housing at the rear of the turbine that contains all the mechanical and electronic equipment as well as the generators. The nacelle will be mounted on an 80-meter (263 feet) tapered tower set in a 20-foot diameter concrete foundation. The gray, smooth-finished towers will be 12.5 feet in diameter at the base, tapering to 7 feet in diameter at the top.

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[15] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, at pp. 24-25.

Each of the three blades is 44 meters (144 feet) in length (the blades describe a circle 90 meters in diameter). The total height from the concrete base to the top of the blade will be 125 meters (410 feet). See photographs 6-P159 and P160 of the V90-3.0 MW turbine.

The blades will spin very slowly in low wind and will begin producing power when the wind velocity reaches 9 mph. After the wind reaches a certain maximum velocity, which will vary with the intensity of turbulence, the machines will cut out. Some turbines may not be operational at other times, such as when the winds are in-line (wind direction is parallel to the string, which limits the number of turbines that can operate) or when they are taken out of service for repair.

Depending upon the wind velocity, the blades will rotate at 9–19 revolutions per minute (RPM). At 19 RPM (the top operational speed), one of the three blades will pass the apogee (highest point in the blade circle) slightly less than once every second. At 10 RPM (just above the minimum cut-in speed) one blade would pass the apogee every two seconds. Most first-time observers will remark how relatively slow this appears, especially if they have seen wind turbines that use older technology with rapidly spinning blades. Individual blades will still be visible while they rotate.

The turbines will be spaced a minimum of two rotor diameters apart (180 meters/590 feet). Turbine spacing is a function of meteorological considerations related to wind speed and direction, interference from adjacent turbines, and other technical factors. The siting of individual turbines has taken into account site-specific topography, access road locations, wetland boundaries, wildlife habitat considerations, and other unusual site conditions.

By using a constant tower height, each of the nacelles (the hub of the turbines) will be roughly parallel to the ridgeline. This will result in a line that follows the existing ridgeline, creating a sense of order in each group of turbines.

Installation procedures will require clearing an area approximately 50 feet by 160 feet, plus the area required for associated grading, at the base of each turbine for laydown and assembly. Since the majority of the viewpoints where the wind farm will be visible are below the elevation of the project site, the clearings for turbine installation should generally not be visible to most viewers.

5.2 Project Lighting

The Federal Aviation Administration (FAA) requires lighting on all structures above 200 feet in height for aircraft safety. Lighting will consist of slowly pulsing, synchronized red lights, for nighttime use only, mounted on the top of seven of the 18 nacelles. This will result in one warning light every 0.5± mile. Under normal operations, the lights will have a slow-on, slow-off profile (20-40 flashes/minute), similar to the rhythm and pattern produced by a lighthouse.

The turbine blades will not be lit, nor will the bases have any lights attached to them. There will not be any additional site lighting on the mountaintops. There will be no warning lights during daylight hours since the turbines will be painted white. The FAA has approved the final lighting plan. In addition to aircraft safety, FAA requirements are designed to recognize potential visual impacts on residential properties.[16]

5.3 Summit Roadways

Each wind turbine will be linked by a 32-foot± wide gravel road designed to provide safe and convenient access to the structures throughout construction. The road width will be reduced to 12-feet after construction to allow for inspection and maintenance. Where the terrain is relatively level, the roads will follow the ridgeline. In many instances, however, the topography will dictate a more circuitous route.

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[16] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, at pp. 11-12.

For the most part, the summit roadways will be built on relatively level ridge tops and will not be highly visible from outside the immediate area. The exceptions are on the east side of Black Nubble, where roads will be built on the side slope to provide access to three separate turbines, and the south side of Black Nubble, where summit roadways will connect turbines 9–11.[17] In these situations special treatments may be used to reduce the amount of cut and fill necessary and minimize visual impact.

5.4 Access Roads

The access roads to the turbines have been designed to follow existing haul roads wherever possible. Where new roads are required they have been designed to a maximum slope of 14 percent. Access roads are being kept as narrow as possible to minimize visual impacts. Following turbine installation, the travel way will be reduced to a maximum width of 12', with the remaining area allowed to revegetate.[18]

The most visible access road will be on the west side of Black Nubble. Individualized treatments of cuts and fills in this areas may be necessary to reduce contrasts in color and texture. (See Section 9 – Mitigation Strategies – for recommended construction and erosion/sedimentation control procedures that may be required in the more highly visible areas). Table 6-4, Summary of Visual Impacts, describes the viewpoints where portions of the access roads may be visible.

5.5 Electrical Collection System

Power generated by each turbine will be transmitted in a 34.5 kV cable, direct buried under the summit roadways to a single exit powerline at the north end of both mountains. Direct burial will be used to avoid overhead power lines visible against the skyline. Fiber

[17] See Basis of Design for the Roadways to Access Wind Turbines, DeLuca-Hoffman Associates, Inc. for detailed description of the road standards used for both the summit roadways and access roads.
[18] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, at p. 13.

optic communications cabling, telephone lines, and other communication lines to service the facility will also be buried in the road in their own conduit.

5.6 34.5 kV Collection Line

Electricity generated in the turbines will be carried above ground on a single pole line to the substation (see project base map). The transmission lines will consist of 40-foot ± wooden poles (out of ground height) spaced 300 to 350 apart in a 75-foot cleared right of way (or existing clear cuts). Three conductors will be attached to each pole with a cross arm. Since these collections lines will be approximately the same height as the tallest trees and similar in line and color, they should not have any significant visual impact where they will be seen. The right of way will be maintained to the full 75-foot width by periodic hand-cutting of any vegetation greater than six feet in height.

5.7 Substation

The 34.5 kV lines will tie into a new electrical substation, to be located on the Nash Stream Road. The substation will consist of a step-up transformer, a small enclosure for a back-up generator, and communications equipment in a 120-foot by 150-foot fenced area. All vegetation will be removed from an area 150-feet by 200-feet to provide a buffer for fire protection purposes outside the fence. A new gravel spur road will be constructed off an existing mountain road to provide access to the facility. The substation will not be visible from either the Appalachian Trail or Route 27.

5.8 115 kV Transmission Line

From the substation, the generated electricity will be carried over a 7.8-mile long, 115 kV transmission line to the existing substation off Route 27 in Carrabassett Valley. The right-of-way will be 150 feet wide and typically cleared for the full width. The transmission structure will typically be a double wood pole, H-frame construction,

similar in character to the existing transmission line on Hedgehog Hill in Stratton. Pole height will typically be 45 feet above the ground. The poles will be installed 500 to 600 feet apart. The conductors will be hung from insulators mounted on a 34' wide cross arm.

When the line approaches Route 27, it will be located underground for 2,500± feet, starting 600 feet± west of the highway. The line will be buried primarily to avoid visual impacts to the Appalachian Trail and the recently improved trailhead parking area on the southwest side of Route 27. The transmission line will cross Route 27 and proceed in a southerly direction under the east side shoulder within the state's right-of-way to the entrance to the existing Bigelow Substation. The line will cross the Appalachian Trail corridor and the Carrabassett Valley town line within this section. The Bigelow Substation is the wind farm's interconnection point with Central Maine Power's transmission grid. (See photographs 6-P77 through P84 for views of the area surrounding the Route 27 road crossing.)

The route selected for the 115 kV line generally follows township borders for the first 2/3's of its length to minimize conflict with ongoing timber harvesting operations. In Wyman Township down to Route 27 the line will share the existing 115 kV Boralex transmission corridor that serves the Stratton Biomass plant. Co-location of the transmission facilities will substantially reduce the amount of clearing required and minimize new visual impacts.

5.9 Meteorological Tower

A meteorological reference tower will be installed to provide ongoing monitoring of weather conditions at the site. The design will be 199 feet in height and cable guyed at three locations. Its slim profile and light color will make it virtually invisible at distances greater than one mile. Since it will be less than 200 feet, it will not require night lighting.

5.10 Laydown Area

The project will require the construction of one laydown area near the site entrance to receive incoming components and stage the towers, nacelles, and blades. The location will be sited in existing clearings off the main roads, in part to avoid visual impacts on the surrounding area. The laydown area will also serve as a parts depot, assembly area, and concrete batch plant. At the conclusion of the construction process, the area will be regraded and revegetated.

5.11 Maintenance Facility

The maintenance facility will consist of a small office and parking area, a 40' X 60' garage for maintenance and vehicle storage, and an outdoor storage area for turbine components (such as spare blades). A description of the facility is provided in Section 13: Property Maintenance.

5.12 Crane Pads and Crane Assembly Areas

A 50' X 160' cleared area will be required at the base of each turbine for staging, crane movement, and turbine installation. In three areas – one on the Redington Pond Range (near turbine 1) and two on top of Black Nubble (near turbines 19 and 26) – an additional area (25' X 240'±) will be cleared and graded for the assembly of the crane boom. Following their use, these areas will be revegetated. The three crane assembly areas are relatively flat and surrounded by dense vegetation and should be minimally visible from the identified viewpoints.

6.0 VISUALIZATIONS

A variety of graphic tools have been used to create the images in this Visual Assessment. This section describes the methodologies used and the interplay between them. In all cases the objective was to create images that were highly accurate and representative of the landscape that will be created by the wind farm.

The visualizations represent a point in time approximately 5-10 years after construction. During that period vegetation will have a chance to become reestablished on the roadsides, the rock cuts will have aged (either naturally or through the use of Permeon in critical areas), and the surrounding woodland will have grown at its natural rate. As noted elsewhere in this report, areas of particular visual sensitivity will be treated to minimize contrast in color and texture.

6.1 Visualizations (Photosimulations)

Visualizations (photosimulations, or computer-altered photographs) are used to illustrate the anticipated change to characteristic landscapes within the study area resulting from the installation of the Black Nubble Wind Farm. The following visualizations are provided in Appendix B:

V6-1 View from Bald Mountain
V6-2 View below Appalachian Trail on North Summit of Crocker Mountain
V6-3 View from Sugarloaf Mountain
V6-4 View from Mount Abraham
V6-5 View from Saddleback Junior
V6-6 View from Saddleback Mountain
V6-7 View from Eustis
V6-8 View from Route 16 in Rangeley

The following section describes the methodology used to develop these images:

1. Photographs of each site were taken by TJD&A and other photographers during the field trips noted earlier in 3.0 Data Collection. (See Appendix C Photography for a representative sampling of images taken during the course of fieldwork.) The position of the camera was recorded by TJD&A staff using GPS equipment or measured from known observation points (e.g., road intersections, observation towers, or mountain summits). Photographs were taken with both a Nikon FM film camera (using a zoom lens set at 50 mm) and Nikon digital cameras (set to shoot at a focal length equivalent to a 52 mm ("normal") lens).

2. Photographs were selected to provide the reviewer with characteristic views of the existing landscape and the scenic resources within and adjacent to the project. For most of the visualizations, two or three photographs were merged into a panorama (using Photoshop software) to provide a more representative view of how the observer experiences the landscape. (The disadvantage of this approach, however, is that the resultant 'wide-angle' view may visually diminish the size of individual elements within the scene, such as the wind turbines. In order to compensate for this effect, for each panorama the report also provides a 'normal' view that more accurately shows what the human eye will see.)

3. Spatial Alternatives, Inc. provided wireframe images of the views from the selected viewpoints (see 7.2 below). These included diagrammatic illustrations of the turbine bases, blades, roads, and transmission corridors that were combined with a 3D black and white model of the existing landscape.[19]

4. The existing conditions photographs were imported into Photoshop and digitally

[19] In most Visual Impact Assessments done by TJD&A, weather balloons are used to provide reference points in the landscape. These have proven to be very useful in establishing the heights of transmission lines , cell towers, and similar structures. However, due to the high wind conditions and the great distances that were being evaluated, the use of weather balloons proved to be infeasible.

superimposed over the computer-generated images of the wind farm. The photographs were then electronically modified in Photoshop to show the anticipated changes to the landscape. These include removal of vegetation, installation of the wind turbines, collector lines, and roadways. Adjustments were made to the images to account for the effects of atmospheric perspective and to correct uneven lighting conditions. Photographs of similar wind turbines from Vestas were used as the source imagery.

5. For each panorama a 'normal' view was created to give a more realistic representation of the scale of the turbines. Since panoramic views include much more of the landscape, they tend to understate the size of individual objects. Normal views are actually enlargements of the panoramas which allow the reviewers to examine the scene with more precision.

In reviewing the visualizations, the reader should keep in mind that these are reduced versions of the final products. Ideally, the reviewer should be able to project and enlarge the images onto a flat surface to approximate the size of the 'window' that the photographer saw when the photographs were taken. Alternatively, the PDF version of the visualizations should be viewed on a high resolution computer screen to enable the reviewer to look at the details of the BNWF.

6.2 3D Model Methodology

Spatial Alternatives, Inc., a GIS (Geographic Information Systems) consulting firm in Yarmouth, Maine, worked with TJD&A to create a three-dimensional computer model of the area surrounding the proposed turbine string on Black Nubble. The model was used in two ways:

- To create a wire frame image of the existing landscape with the proposed towers, access roads, and transmission lines in place. These images included enough of

the surrounding and background topography so the computer images could be registered (aligned) with the digital photographs.

- To plot the viewshed of the wind farm components in order to determine their visibility from lakes, ponds, mountains, scenic highways, and other scenic resources.

The base model was created from 10-meter Digital Elevation Model (DEM) data provide by the Maine Office of GIS.[20] Turbine locations, existing and proposed access roads, and transmission line alignments were provided by Deluca-Hoffman in the form of an AutoCAD drawing that was georeferenced to UTM Zone 19 (with units in feet). This information was converted to units in meters to match all the other data. Existing roads and trails, the Appalachian Trail, and hydrography are created from the USGS 7.5" Quads and were downloaded from the Maine Office of GIS. The USGS Digital Orthoquads and digital copies of the quad sheets were also downloaded for use as background information. Viewpoints were created from maps provided by TJDA.

Spatial Alternatives created a 3D model using ESRI's 3D Analyst software. The DEM data was combined into one large DEM that was placed in the computer model. All other features were draped over this model. Turbines were represented by simple 3D shapes. The tower was extruded as a cone 6.4 meter at the base and 80 meters in height. The blades were represented by a 90-meter diameter sphere that was placed on the top of the tower. The roads were portrayed as a ribbon 25 feet in width and the transmission lines a ribbon 75 feet in width.

The 3D views were created by digitally moving the observer to the viewpoint where the photograph was taken from. The viewer height and angle was then adjusted to match the ridgeline of existing photographs provided by TJD&A. The images were screen captured as BMP images and provided to TJD&A to be imported into Photoshop as noted above.

[20] The metadata referencing this data source is provided in the file medem10.htm

The viewshed analysis (Appendix D) shows what would be visible from the ground level and the top (125 meters) of the turbines. The model does not take into account tree cover or other features beyond ground elevations. The view sheds were created using ESRI's 3D Analysts viewshed model.

6.3 Cross Sections

Cross-sectional analysis was used in many instances to determine whether a portion of the wind turbines would be visible from specific viewpoints. (The results of this analysis were used in the preparation of Table 6-4 Summary of Visual Impacts on pages 6-54–6-57.) The cross sections were derived from USGS base maps and followed the methodology outlined in the MaineDEP NRPA Chapter 315 Appendix A (Guidance for the Preparation of Line of Sight Profiles).

7.0 AFFECTED POPULATION / USER EXPECTATIONS

7.1 Introduction

There are several groups of people who may be able to view the wind farm from the ground at some time during the year:

Residents. Year-round and seasonal residents of Rangely, Oquossoc, Carrabassett Valley, Stratton, Eustis, and other surrounding towns. Their level of sensitivity to changes in the landscape that surrounds their homes and communities is expected to be high, but as discussed earlier, there are very few locations where the wind turbines will be visible in the foreground or middle ground, with most views over 10 miles. None in Foreground… little in midground.

Working Population. Woods workers in the commercial forests that make up much of the land within the study area. These include people who are employed in land management activities, timber harvesting, hauling of logs, pulp, and chips. Their level of sensitivity to the visual changes that may result from the wind farm is expected to be minimal.

Recreating Population. The study area is well known for its abundance of natural resource-based recreational activities that attract people throughout the year. Table 6-3 summarizes the types of users who may come into contact with the wind farm, their relative numbers, and their anticipated level of expectation. [21]

As noted in the introduction, the methodology for assessing the visual impacts of the wind farm employed both a professional and a public approach. The professional approach (based upon the observation and judgment of experienced landscape architects)

[21] There are many other recreational activities enjoyed within the study area (e.g., golf, mountain biking, ATV riding) were not included in Table 6-2 since they would not likely be affected by the BNWF.

was supplemented by a public approach, which involved the use of professionally developed intercept surveys of people likely to be affected by the wind farm. EEC used four separate surveys[22] to gain an understanding of people's attitudes toward wind energy in Maine and the use of this site for a wind farm.

Table 6-3: Recreational Users

USERS	GENERAL LOCATION	RELATIVE USE	VIEWER EXPECTATION
Boaters / Canoers / Kayakers	Rangeley Lake, Flagstaff Lake, Kennebago Lake, and numerous smaller lakes and ponds; South Branch Dead River.	Moderate: variable with the season and water levels.	Moderate to high. Many of the lakes are enclosed or semi-enclosed by surrounding mountain ranges. Perception influenced by degree of development along shoreline, road noise, and conflicts with other boaters.
Fishermen	Lakes, ponds, rivers, and streams.	Moderate: seasonal	High. Many of the lake fishing areas are enclosed or semi-enclosed by surrounding mountain ranges. Perception influenced by degree of development along shoreline, road noise, and other factors.
Hikers	Appalachian Trail, Kennebago Ridge Trail, Mount Abraham, Sugarloaf, other mountains	High: seasonal	High: opportunity to hike above tree line on both Saddleback and Bigelow Range. Perception influenced by cutting operations, ski areas, transmission lines, development patterns, and other cultural modifications.
Hunters	In forestland throughout the study area	Low to moderate Seasonal	Low to moderate: hunters are often attracted to the edge conditions found along utility / road corridors and cutting operations.
Motorist Driving for Pleasure	Scenic Byways, local roads around lakes and in communities	Moderate	Moderate to high along the Scenic Byway and in proximity to mountain ranges. Perception influenced by views of timber harvesting and visible recreational, industrial, and residential development
Skiers (Downhill)	Sugarloaf USA and Saddleback Ski Areas	Very High: seasonal	High: Opportunities for people of all ability levels to ski in a variety of mountain terrain and challenge levels.
Snowmobilers	Throughout the study area; concentration in Rangeley and along ITS and other routes.	Moderate to high. Seasonal	Moderate to high: ITS offers riders a way to experience a highly varied landscape. Perception influenced by harvesting operations, power lines, and industrial facilities. However these facilities are often used as the basis for trail development.

[22] The fourth survey was conducted by the Potholm Group of Harpswell, Maine in April 2006. See Section 1, No Undue Adverse Effects, for a discussion of the findings.

7.2 1994 Intercept Surveys

In 1994 Endless Energy Corporation (EEC) initiated a series of surveys to test the public's reaction to a proposed wind farm that would have included turbines on both Black Nubble and Mount Redington. The initial survey was prepared, administered, and analyzed by Market Decisions (MDI), a market-research consulting firm in South Portland, Maine. This survey was used to gather objective data from hikers, hunters, local residents, skiers, and snowmobilers in the vicinity of the BNWF.

Early in the survey design process input was solicited and received from members of the Appalachian Trail Conference (ATC) and the Appalachian Mountain Club (AMC). This input included developing questions to be used, selecting the sites to interview hikers and the format of the survey instrument. Dr. James Palmer, State University of New York School of Landscape Architecture., also reviewed the survey[23]. The hiker survey then became the core survey instrument that was used in developing other questionnaires.

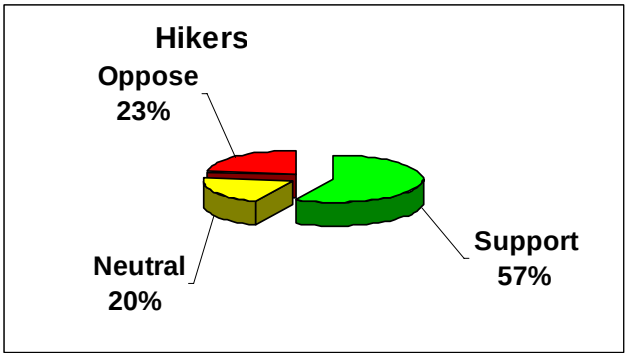
One question asked respondents to rate how appropriate wind power was for the Carrabassett Valley area while they were shown photo-simulated views of the Redington Wind Farm. The following is a narrative summary of the 1994 surveys.

7.2.1 Hikers

The survey of hikers was conducted at Mount Abraham, Sugarloaf Cirque, and the Horn on Saddleback Mountain. Over 160 intercept surveys were completed between July 2, 1994 and October 10, 1994.

- 57% saw the proposed wind farm as being appropriate. 20% were neutral. 23% felt that it was inappropriate.

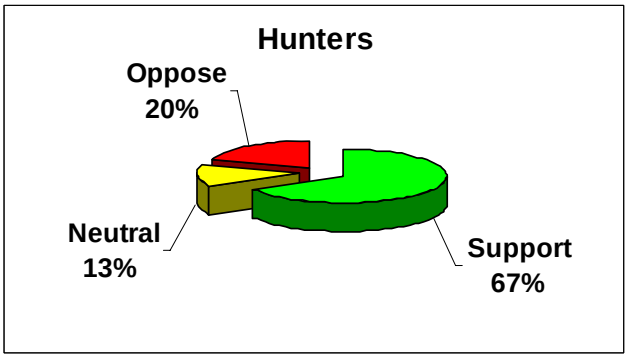
[23] Dr. Palmer is a recognized expert in visual impact assessment, having co-authored *Foundations for Visual Project Analysis* with Richard Smardon and John Felleman, one of the classic texts in the field.



7.2.2 Hunters

The survey of hunters was based upon intercept surveys at the Caribou Pond Road. Participants were shown images of the Mount Redington portion of the project as seen from the Caribou Pond Road.

- 67% saw the proposed wind farm as being appropriate. 13% were neutral. 20% felt that it was inappropriate.

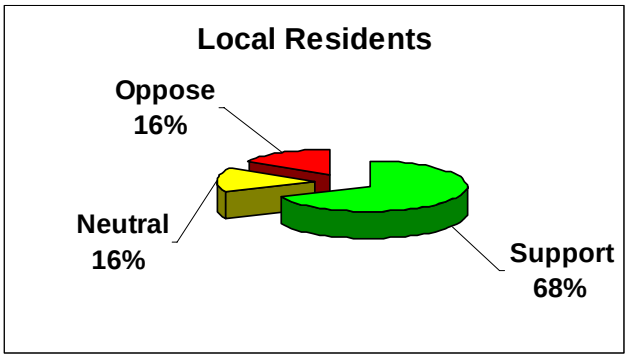


7.2.3 Local Residents

The survey was based on 101 interviews conducted in the Kingfield/Sugarloaf area using images of the Mount Redington string. Those who used the woods in the winter months (about half the respondents) were also shown a winter scene of Mount Redington from the Caribou Pond Road.

- Respondents noticed little impact of the project on Route 16.
- 65% saw the project as having a neutral or positive visual impact.
- 56% saw the project as harmonious with the natural environment or neutral.

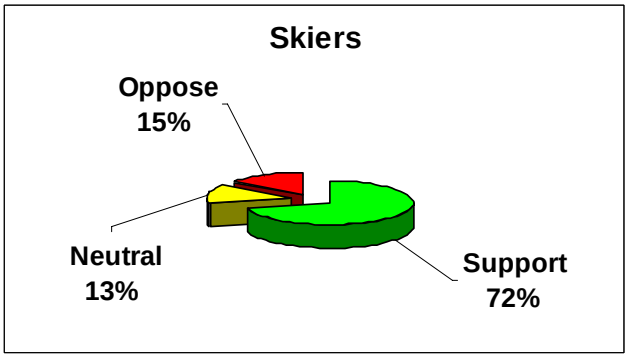
- 68% saw the proposed wind farm as being appropriate. 16% were neutral. 16% felt that it was inappropriate.



7.2.4 Skiers

The survey was based upon 100 interviews with skiers on Sugarloaf Mountain at the Spillway Chair Lift, halfway up the mountain and the base lodge. Respondents were shown images of the wind turbines on Redington Mountain as well as simulation of wind generators erected on Sugarloaf Mountain.

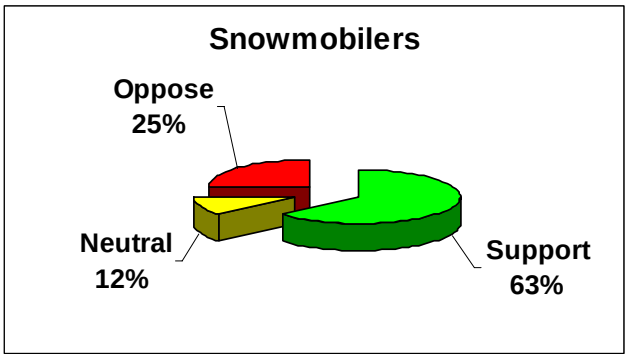
- 72% saw the proposed wind farm as being appropriate. 13% were neutral. 15% felt that it was inappropriate.



7.2.5 Snowmobilers

The survey was based on 52 interviews with snowmobile owners in the area surrounding Sugarloaf Mountain. Participants were shown images of the Mount Redington portion of the project as seen from the Caribou Pond Road.

- 52% saw the project as having a neutral or positive visual impact.
- 54% saw the project as harmonious with the natural environment or neutral.
- 13% saw the project as having a negative affect on their snowmobiling experience while 50% saw it as having a neutral impact, and 37% saw it has having a positive impact.
- Views of large clear cuts, industrial facilities, and roads were all seen as having a more negative impact on the snowmobile experience than the wind power project.
- 63% saw the proposed wind farm as being appropriate. 12% were neutral. 25% felt that it was inappropriate.



7.3 2003/2004 Hiker Surveys

In 2003 EEC again engaged the services of Market Decisions to conduct an intercept survey of hikers in the study area, with a concentration on those using the Appalachian Trail. To further validate results, the survey was given again in the summer of 2004 when a higher proportion of through hikers were on the trail. The survey instrument and methodology were very similar to the 1994 survey that was also conducted by Market Decisions. The results of this recent work are provided in Appendix E, Hikers Survey.

One of the main differences between the two sets of surveys was the quality of the visualizations (computer-enhanced photographs) that were shown to respondents to test their reaction to the wind farm. The 2003/2004 visualizations (included as part of Appendix B) represent a decade's worth of technological improvements that resulted in

more realistic, photographic-quality images that are the accepted standards among professionals who engage in visual impact assessments.

The following is a narrative summary of the 2003/2004 surveys. References made to a wind farm refer to MMP's earlier application that included turbines on both Black Nubble and Redington Range.

7.3.1 Overview

The Mount Redington Wind Farm Visual Analysis Survey is based on in-person interviews conducted from October 3rd to 13th, 2003 with 93 hikers at the Saddleback Mountain, Crocker Mountain, and Sugarloaf Mountain trailheads, then again from August 25 to 31, 2004, with 108 hikers at the Saddleback Mountain and Crocker Mountain trailheads. The sampling approach used during the course of this research was designed to target only those hiking along the trails and to exclude those using the areas for other purposes (such as picnics).

7.3.2 Hikers Survey

The survey instrument was designed to assess hikers' attitudes about the visual impact of the proposed wind farm and their views of wind power as a source of energy. The survey questions included in the survey covered the following topics:

- Respondent characteristics
- Participation in outdoor activities in the Carrabassett Valley/Rangeley area
- Factors that contribute to the quality of the hiking experience
- Impacts of human activity on the hiking experience
- Assessment of the appropriateness of wind power for Maine
- Assessment of the visual impact of the proposed Redington wind farm
- Impact of the Redington wind farm on the hiking experience

7.3.3 Visualizations

In evaluating their views, respondents were shown a series of visualizations and asked to evaluate their scenic value. The survey methodology used these visualization to assess the respondents' perceptions of the scenic value of viewpoints along hiking trails. Respondents were shown both a view of existing conditions and a view showing what it would look like with the RWF. The visualizations were all 30'' by 9'' and were prepared by TJD&A. The visualization provided views from a number of locations at varying distances (from approximately 6 miles to 1.5 miles). The viewpoints included:

- Mount Abraham
- Saddleback Mountain (on the Appalachian Trail)
- Crocker Mountain (below the Appalachian Trail)
- Sugarloaf Ski Area.

7.3.4 Respondent Characteristics

Seventy percent of the respondents were male. The ages of respondents varied from 18 to 81. Almost four in ten respondents (36%) lived in Maine. Twenty-two percent (22%) of respondents belonged to a club that helps maintain the Appalachian Trail. Sixteen percent (16%) of respondents were members of the Appalachian Trail Conference.

Ninety percent of the respondents had hiked in the area at least once before. Most had hiked sections of the Appalachian Trail at least once. Half of the respondents were day hikers. The respondents participated in a variety of outdoor activities during the past 12 months in the Carrabassett Valley/Rangeley area, including hiking, camping, canoeing or kayaking, cross-county skiing, and downhill skiing.

7.3.5 Assessment of Visual Impact

Visual Impact. Respondents were asked to evaluate their overall feeling of the visual impact of the RWF. On average, respondents rated the visual impact as 3.5 on a seven point scale, or slightly negative. Twenty-six percent of respondents rated the visual impact as positive while 21% rated the visual impact as neither positive nor negative. Thus, 47% of respondents felt that the RWF will not have a negative visual impact. Fifty percent of respondents indicated the RWF would have a negative visual impact.

Hiking Experience. 60% of respondents indicated that the RWF would have no effect or a positive effect on their hiking experience. Only 38% of respondents indicated the proposed wind farm would have a negative effect on the quality of their hiking experience. Among those indicating it would have a negative impact on the quality of their hiking experience, 48% indicated that it would alter the scenic view, 11% said that it would have no real affect and that they would tolerate it, 7% indicated it would lessen their enjoyment of the area, and 7% indicated it would disturb the solitude of the area.

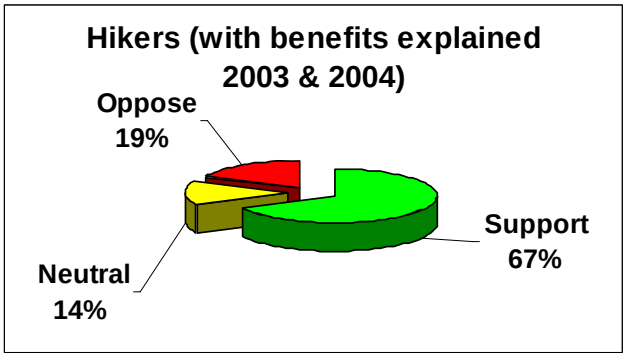
Effect of Distance. The presence of the wind farm will decrease the value of the scenic view from Saddleback Mountain, but it is important to note that even with the wind farm, respondents still rate the scenic value as high. The impact from Mount Abraham (4 miles) and North Crocker Mountain (1.5 miles) are comparable and significantly larger than that observed in the view from Saddleback Mountain. This suggests that there is somewhat of a threshold distance to the effect and the threshold is about 4 miles. That is, the impact on the scenic value of a view should be approximately the same from all distances of four miles or less.

Effects of Human Activity. The presence of other man made features has a strong moderating effect on the rating of the value of the scenic view including the RWF. The respondents rated other evidence of human activity as causing a greater negative impact on the quality of their hiking experience. Those with a significantly greater negative

impact include views of industrial facilities, views of large clear cuts, views of developed areas, and views of power lines. The negative impact of views of roads and views of ski trail and facilities were somewhat greater than the visual impact of the RWF.

Appropriateness. In all, 77% rated wind power as appropriate to some degree for the state of Maine as a whole. After assessing the visual impacts, respondents were asked about the appropriateness of the RWF. On average, respondents rated the appropriateness of the RWF as 4.7 on a seven-point scale, or slightly appropriate. Only 20% of respondents indicated that the RWF is inappropriate to some degree.

Potential Benefits. After their initial assessment of appropriateness, respondents were asked to reassess their views taking into consideration some potential benefits of the wind farm. In all cases, there was a significant increase in the average scale score and the percentage of respondents viewing the proposed wind farm as appropriate. The project's environmental benefits that seemed to resonate most strongly were the reduction in pollution and the decrease in fossil fuel consumption.



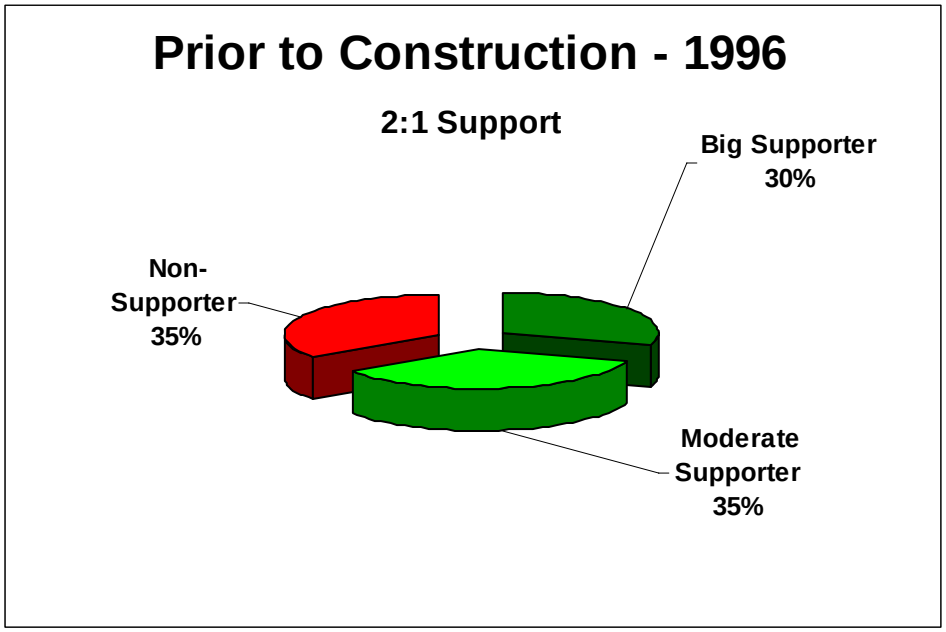
[24]

Dark Blades. The use of black blades on the wind turbines had no impact on the average assessment of the scenic value of the view, though it did slightly increase the percentage of those assessing the scenic value negatively.

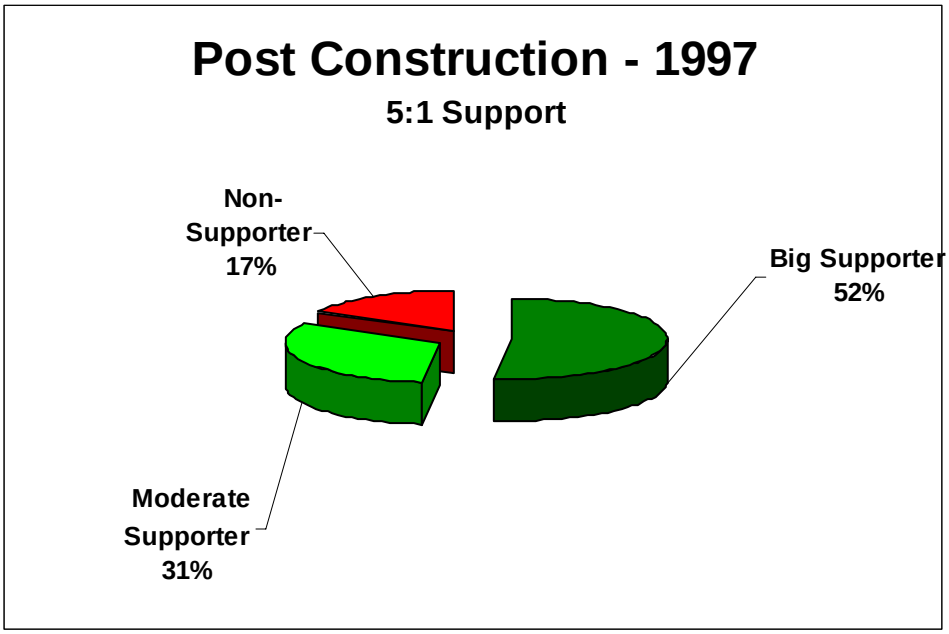
[24] Pie chart shows percentage of those responding to question.

7.4 Searsburg Community Acceptance Study

LURC's visual consultant, Dr. James Palmer, conducted pre- and post-construction surveys of residents in the area surrounding the Searsburg wind power project. His study found that in 1996, prior to construction, 30% of the 345 people surveyed identified themselves as strong supporters, 36% were moderate supporters, and 35% were non-supporters. People's reactions were based upon their evaluation of photosimulations of the proposed wind farm.



Following construction in 1997, the survey was repeated with the same group. The post-construction survey indicated that 52% were strong supporters, 31% were moderate supporters, and the number of non-supporters had dropped to 17%. Support for the project thus had risen from 2:1 in favor before construction to 5:1 in favor following construction. Half of the opponents became supporters.



The report attributes this shift in attitude to people gaining experience with the project:

> *Clearly, a large portion of this positive shift is based on the respondents' assessment of the completed project rather than the expectations they had prior to construction. As one person wrote, "I think once the turbines were up that people's initial doubts or fears lessened. There is nothing like seeing them 'in the flesh.' Anyone I've talked to thinks they're great."*

Of the group that was interviewed, 40% had been to the site to see it in person. The most common reaction was a sense of "awe" or expressed "amazement," while others find the rotating turbines "calming." For some the experience was "almost spiritual."[25]

[25] August 21, 2006 Rebuttal Testimony of Terrence DeWan and Amy Segal, p 4. From Clinton Solutions. Public Acceptance Study of the Searsburg Wind Power Project: Year One Post-Construction, December 1997.

8.0 VISUAL IMPACT ASSESSMENT

8.1 Summary of Impacts

Table 6-4, Summary of Visual Impacts, summarizes the visual impact of the BNWF on known scenic resources in the study area. *Scenic Resources* are those places identified in the Section 315 regulations as "Public natural resources or public lands visited by the general public, in part for the use, observation, enjoyment, and appreciation of natural or cultural visual qualities". In addition to these defined areas, Table 6-4 identifies other areas of local significance.

The *Distances* given is the horizontal distance, in miles, between the observer and the closest wind turbine, access road, 34.5 kV collection line, or the 115 kV transmission line.

The *Relative Size (R/S)* is a measurement of how large the nearest turbine will appear at various viewpoints. The R/S shows the height (in inches) the turbines will appear to be when measured at a distance of 24" (arms length) from the observer. For example, from Mount Abraham the nearest turbine on Black Nubble (6.5 miles away) will appear to be as large as an object 0.29" in height (slightly more than a quarter of an inch, or about the diameter of a pencil) held at arms length.

Visualizations of selected viewpoints that illustrate the anticipated changes are provided in Appendix B.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Dodge Pond Rangeley. Photo 6-P148.	Turbine: 12.0 34.5 kV line: 14.2	0.15"	The turbines on BN will be visible from the middle and southern half of the pond. Burnham and Chick Hill will block views from the northern portion of the pond.	The wind farm will not have any effect on the Wilhelm Reich Museum / Orgone Energy Observatory on the west side of the lake. At this distance the BNWF will be scarcely visible and should have a slight-negligible visual impact on the lake.
Greeley Pond Dallas Plt.	Turbine: 6.7 Access road: 7.5 34.5 kV line: 10.7	0.25"	Turbines will be visible from the west half of the pond. A portion of the upper access roads on BN may be visible.	Greeley Pond is one of several inaccessible, undeveloped waterbodies that are within the viewshed of the BNWF. Visual impact is expected to be negligible.
Gull Pond Dallas Plt.	Turbine: 7.3	0.22"	Turbines on BN will be visible from the western portion of the pond.	Most of the camp development on Gull Pond is on the eastern shore, oriented toward the west. The BNWF should have a slight visual impact on the resource.
Kennebago Lake T3 R3 T3 R4	Turbines: 10.6 - 15.0	0.18- 0.12"	BN will be visible from most of the lake, except for a small portion at the northern end. The turbines may be visible above the tops of the surrounding low hills, depending upon the viewer's position. The majority of the viewers who may be affected are concentrated at the northern end of the lake.	Kennebago Lake is accessible and developed at both the north and southern end (much of which is private and limited access). Viewer expectation is high; use levels are moderately low. At these distances the BNWF will be scarcely visible and should have a negligible-slight visual impact.
Loon Lake Dallas Plt.	Turbine: 8.0 Upper access road: 8.8 34.5 kV line: 12.2	0.21"	Turbines will be visible from 3/4 of the lake. A portion of the upper access roads may be visible.	Most of the camp development on Loon Lake is on the eastern shore, oriented toward the west. The BNWF should have a slight visual impact on the lake.
Round Pond Rangeley	Turbine: 11.7	0.15"	Half of the turbines may be visible from about 2/3 of the pond.	Round Pond is very lightly developed with minimal views of the surrounding mountains. Visual impact is expected to be negligible to slight.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Saddleback Lake Dallas Plt.	Turbines: 4.8	0.33”	Most of the turbines will be visible from approximately 3/4 of the lake. The western portion of Black Nubble will partially block the views of some of the turbines on the eastern half of BN.	Saddleback Lake currently has scattered development along the north shoreline, oriented to the south. Viewer expectation is high, moderated by the development associated with Saddleback ski area. The BNWF is expected to have a slight to moderate visual impact on the lake.
Myron Avery Peak, Bigelow Range: Wyman Twp.	Turbines: 11.4 –13.0 Access road: 10.1 34.5 kV line: 10.7 Trans. line: 5.0	0.16”	Most of the turbines, summit access roads, and collection line may be visible under optimal viewing conditions. The main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the Bigelow substation off Route 27. The turbines will be seen over a 6º angle of view.	Viewer expectation along the Bigelow Range is high, but tempered by views of Sugarloaf ski area, the golf course, roadways, clearcuts, and other cultural modifications. Hiker use is relatively heavy. At a distance of eleven miles, the wind turbines will be perceived as very small objects in a vast landscape. Visual impact is expected to be slight.
West Peak Bigelow Range: Wyman Twp.	Turbines: 10.8 – 12.6 Access road: 9.7 34.5 kV line: 10.4 Trans. line: 4.5	0.17”	Most of the turbines, summit access roads, and collection line on BN may be visible under ideal weather conditions. Portions of the main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27. The turbines will be seen over a 7º angle of view.	Viewer expectation along the Bigelow Range is high, but tempered by views of Sugarloaf ski area, the golf course, roadways, clearcuts, and other cultural modifications. Hiker use is relatively heavy. At a distance of over ten miles, the wind turbines will be perceived as very small objects in a vast landscape. Visual impact is expected to be slight.
The Horns Bigelow Range: Wyman Twp.	Turbines: 9.5 – 11.4 34.5 kV line: 9.1 Trans. line: 3.4	0.20”	Most of the turbines, summit roads and collection line on Black Nubble may be visible under optimal weather conditions. The main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27. The turbines will be seen over a 7º angle of view.	Viewer expectation along the Bigelow Range is high, but tempered by views of Sugarloaf ski area, the golf course, roadways, clearcuts, and other cultural modifications. Hiker use is relatively heavy. Much of the BNWF will be screened by nearby mountains. At a distance of over nine miles, the wind turbines will be perceived as very small objects in a vast landscape. Visual impact is expected to be slight.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Cranberry Peak Bigelow Range: Wyman Twp.	Turbines: 8.0 – 9.5 34.5 kV line:7.6 Trans. line: 2.7	0.23"	Most of the turbines, summit roads and transmission line on BN will be visible. The main 115kV transmission line will be visible but seen in conjunction with the existing Boralex Transmission line connecting to the substation off Route 27. The turbines will be seen over a 10º angle of view. Cranberry Peak is not on the Appalachian Trail.	Viewer expectation on Cranberry Peak is moderated by views of Sugarloaf ski area, the Stratton energy plant, the Boralex transmission line, roadways, clearcuts, and other cultural features. Hiker use is moderately heavy. More of the BNWF will be screened by nearby mountains than on other parts of the Bigelow Range. Visual impact is expected to be slight.
Bald Mountain Rangeley Photos 6-P3–13, Visualization 6-1.	Turbines: 15.7	0.11"	On exceptionally clear days it may be possible to see the turbines on BN.	Viewer expectation atop Bald Mountain is high, since it is a well-marked and easily accessed vantage point. Relative numbers of visitors is high. At this distance the BNWF will be scarcely visible and should have a negligible visual impact.
North Summit of Crocker Mountain, Carrabassett Vall. Photos 6-P16-20, Visualization: 6-2 (below AT).	Turbines: 3.3 – 4.7 Access road: 34.5 kV line:	0.56"	This viewpoint is from approximately 75 yards down a surveyor's cut off the AT. From this viewpoint most of the turbines will be visible. Portions of the access roads and minor portions of the summit roads on BN will be visible to varying degrees depending on the clearing necessary.	Since this viewpoint is well off the AT, there will be no visual impact on the trail itself. For hikers who are looking for a way to see the BNWF, this side route offers an excellent opportunity to see the wind farm. The route is presently unmarked and would need improvements to transform it into an overlook. The visual impact is expected to be moderate to strong for hikers purposely leaving the AT to see this view.
Sugarloaf Mtn, Carrabassett Vall. Visualization 6-3.	Turbines: 6.5 – 6.6 Access road: 3.4	0.29"	Less than half of the turbines and the upper portion of the summit road will be visible.	The view from Sugarloaf ski area (on a side trail off the AT) includes a significant amount of cultural modification: ski slopes, communication towers, golf course, roadways, etc. Ski population is heavy; viewer expectation is high, but tempered by existing ski area development. 85% of the skiers interviewed in the 1994 intercept survey rated the wind farm as appropriate or neutral. The visual impact is expected to be slight-moderate.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Mount Abraham. Mt. Abraham Twp. Photos 6-P40–43, Visualization 6-4.	Turbines: 6.5 – 7.3	0.29”	The turbines will be visible along with portions of the access roads The turbines will be seen over a 12º angle of view.	Viewer expectation is relatively high, tempered by the views of cutting patterns and development in the valley below. Visitor use is moderate-heavy. Viewpoint is off the AT. Visual impact is expected to be moderate to strong. Saddleback and Sugarloaf Mountains are dominant focal points in the view; BN is a much less significant landform. The scale of the surrounding mountains minimizes the impact.
Poplar Ridge Redington Twp. Photos 6-P51–60,	Turbine: 3.2	0.58”	The turbines and portions of the summit road will be intermittently visible from the eastern edge of Poplar Ridge. The Poplar Ridge lean-to will not have views of the BNWF. This is the closest view of the BNWF on the AT.	Viewer expectation along this segment of the AT is high; hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate due to the intermittent nature of the views.
Saddleback Junior Redington Twp. Photos 6-P63–66, Visualization 6-5	Turbines: 4.0 – 5.2 Access road: 4.0 34.5 kV line: 5.0	0.46”	The turbines will be visible along with some of the access roads The turbines will be seen over a 22º angle of view from this 360º panorama.	Viewer expectation along this segment of the AT is high, tempered by the views of cutting patterns in the surrounding mountains. Hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate-strong.
The Horn Madrid Twp. Photos 6-P67–70, Visualization 6-6.	Turbines: 4.5 – 6.0	0.41”	The turbines will be visible along with some of the summit roads. The turbines will be seen over a 18º angle of view from this 360º panorama.	Viewer expectation along this segment of the AT is high, tempered by views of Saddleback Ski area, cutting patterns, the US Navy facility, and haul roads. Hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate-strong. According to the 2003/2004 intercept surveys, even with the wind farm, hikers still rated the scenic value of Saddleback as high.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Saddleback Mtn. Sandy Ridge Twp Photos 6-P71–76, Visualization 6-6.	Turbines: 5.7 – 7.2	0.32”	The turbines will be visible along with some of the summit roads. The turbines will be seen over a 15º angle of view from this 360º panorama.	Viewer expectation along this segment of the AT is high, tempered by views of Saddleback Ski area, cutting patterns, the US Navy facility, and haul roads. Hiker use is relatively heavy. Collector lines and access roads have been sited to avoid visual impacts on the AT. Visual impact is expected to be moderate-strong. According to the 2003/2004 intercept surveys, even with the wind farm, hikers still rated the scenic value of Saddleback as high.
Rangeley Lake Rangeley Rangeley Plt. Photos 6-P85/86; 143–146; 149/150	Turbines: 9.1 -14.6 34.5 kV line: 16.3	0.20-0.13”	Turbines will be visible from over 3/4 of the lake, including the waterfront at Rangeley Lake State Park. Views from coves (e.g., Greenvale Cove and South Bog Cove) will be partially screened by foreground landforms and shorefront vegetation.	Rangeley is a very popular recreation destination during the summer, fall, and winter months. Visitor use levels are high; expectations are similarly high, but moderated by intense shorefront camp development throughout much of the lake. The BNWF should have a slight to moderate visual impact on the lake, depending upon the viewing distance.
Eustis Ridge Eustis Photos 6-P89–94, Visualization: 6-7	Turbines: 11.2 Access road: 11.4 34.5 kV line:10.9 Trans. line: 9.0	0.16”	Half of the turbines and a portion of the collection line may be visible under optimal weather conditions. The 115kV transmission line will be visible below Crocker Mountain where it is aligned with the viewer. It will be seen in conjunction with the existing Boralex transmission line that crosses over Hedgehog Hill to the Stratton Energy Plant.	This viewpoint affords a panoramic view of both the western mountains and the BNWF. However, it is on a private rural road overlooking private property. Viewer expectation is high; relative number of people who would be affected by the project is low. The visual impact is expected to be slight.
Flagstaff Lake Eustis Flagstaff Twp. Dead River Twp. Photos 6-P95-98.	Turbines: 7.3 - 14.0 Access road: 9.0 34.5 kV line: 7.4 Trans. line: 4.8	0.13-0.23”	Turbines and portions of the collection line and the 115 kV transmission line will be visible from the west half of Flagstaff Lake. The view from the east half of the lake is blocked by the Bigelow Range. The transmission line will be seen in context of the existing Boralex Transmission line.	Flagstaff Lake is an extensive, man-made waterbody on the north side of the Bigelow Range. Relative use is light-moderate (due to its shallow depth); viewer expectation is high in the shadow of the mountains, though it is tempered by the presence of the Stratton Energy Plant, the village of Stratton, and other cultural modifications. At these distances the BNWF will be scarcely visible and should have a slight visual impact on those portions of the lake where it will be seen.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Route 4/16 Rangeley, east of Quimby Road near existing radio tower. Photos 6-P99/ 100.	Turbines: 12.9 Upper access road: 13.7	0.14”	Under ideal weather conditions, BNWF and portions of the upper access road may be visible for approximately 300 yards along Route 16. Turbines will become visible as the viewer descends the hill. The view of BN diminishes and Saddleback Mt. becomes more dominant as the viewer continues easterly. The turbines will be seen over a 4º angle of view from this viewpoint.	This and the following two viewpoints are on the Rangeley Lakes Area National Scenic Byway, so visitor expectations are relatively high. Visitor perception along the byway is influenced by frequent cultural intrusions: e.g., utility lines, radio towers, roadside development, etc. At 50 mph, the motorist would experience the view of the BNWF for 12± seconds. The visual impact is expected to be slight at this distance.
Route 4/16 Rangeley, near Mingo Loop Road. Photos 6-P101–106.	Turbines: 11.1 Upper access road: 11.8	0.16”	From this point on the highway the turbines and portions of the upper access road may be visible for 250± yards. As the motorist reaches Proctor Road the view of the windfarm will have disappeared. The turbines will be seen over a 5º angle of view from this viewpoint.	At 50 mph, the motorist would experience the view of the BNWF for less than 9 seconds. The visual impact is expected to be slight at this distance.
Route 4/16 Rangeley, E of Wigon Road. Photos 6-P107/108, Visualization 6-8.	Turbines: 10.0 Access road: 10.9 34.5 kV line: 13.9	0.19”	The turbines and portions of the upper access road may be visible for approximately 300 yards. The turbines will be seen over a 6º angle of view.	Rangeley village is becoming a more prominent part of the view. At 50 mph, the motorist would experience the view of the BNWF for less than 12± seconds. The visual impact is expected to be slight to moderate at this distance.
Route 16, Dallas Plt. 0.8± miles w of South Branch of Dead River. Photos 6-P113–115.	Turbines: 5.9 Access road: 6.3 34.5 kV line: 9.9	0.32”	A portion of the turbines will be visible looking easterly from this viewpoint, which extends for approximately 1000 feet along Route 16.	Route 16 is a rural road connecting Rangeley and Stratton. Powerlines parallel the road in several locations. Viewer expectation for scenery is low-moderate, with few opportunities to see mountains. The road is better known for moose-watching. The visual impact is expected to be slight.
Route 16, Coplin Plt. near Green Farm Plant Works. Photos 6-P119/120.	Turbines: 5.0 Access road: 4.8 34.5 kV line: 5.5	0.37”	The turbines will be visible along with some minor notches in the forest cover resulting from road and transmission line clearing. The top 1/4 of the collection line from the summit may be visible.	Similar to Dallas Plantation viewpoint above. The visual impact is expected to be slight.

VIEWPOINT	DISTANCE (mi)	R/S	VISIBILITY OF PROJECT ELEMENTS	VISUAL IMPACT
Route 16, Coplin Plt. near intersection with Nash Stream Road / IP Road. Photos 6-P123/128	Turbines: 4.5 Access road: 5.1 34.5 kV line: 6.7	0.41"	Turbines and the upper portion of the collector line from Black Nubble will be visible over a field on the south side of Route 16. Turbines will also be intermittently visible from several points along Route 16 between Nash Stream Road and Stratton (see Photos 6-P129-130).	This viewpoint offers one of the few opportunities for an open view of Black Nubble along Route 16. The Coplin Plantation Schoolhouse (on the Nation Register of Historic Places) is located on Route 16 opposite the IP road. The visual impact is expected to be moderate due to the introduction of contrasting elements to a culturally significant landscape.
Rangeley Scenic Overlook, Route 17, Rangeley Plt. Photos 6-P133-136	Turbines: 14.5	0.13"	Under optimum weather conditions the turbines may be visible.	Viewer expectation at this scenic overlook is high; relative numbers of visitors is also high. At this distance the BNWF will be scarcely visible and should have a negligible visual impact on the view.
Route 4 Phillips Photos 6-P137-140.	Turbines: 13.0	0.14"	Under optimum weather conditions the turbines may be visible.	This panoramic view off Route 4 offers an unusual opportunity to experience the western mountains. Relative numbers of travelers is moderate; viewer expectation is moderate. The BNWF is expected to have a slight visual impact.
Haley Pond Rangeley Dallas Plt. Photos 6-P153/154	Turbines: 8.2	0.20"	Turbines on the upper elevations of BN may be visible from some points on the pond. Turbines at lower elevations on BN will be screened by topography and shorefront vegetation.	Haley Pond has seen relatively heavy development on the south shoreline. Viewer expectation is moderately high. The view of the upper sections of the turbines is expected to have a slight visual impact on the lake.

NOTES FOR TABLE 6-4.

VIEWPOINT: The actual point from which a viewer sees the landscape or a proposed alteration.
DISTANCE (mi): The horizontal distance, in miles, between the observer and the closest wind turbine, access road, 34.5 kV collection line, or the 115 kV transmission line.
R/S (Relative Size): The relative height (in inches) the turbines will appear at the selected viewpoint, when measured at a distance of 24" (arms length) from the observer.
BN: Black Nubble.

8.2 Assessment

This section evaluates the potential adverse impacts of the BNWF on existing scenic and aesthetic uses of protected natural resource (fragile mountain areas, streams, wetlands) within a fifteen-mile radius of Black Nubble. The assessment follows standard professional practice[26] to describe and illustrate the proposed change to the visual environment and the effectiveness of any proposed mitigation measures. The introductory paragraphs *in italics* are taken from the MDEP Chapter 315 Regulations.

A. Landscape compatibility, which is a function of the sub-elements of color, form, line, and texture. Compatibility is determined by whether the proposed activity differs significantly from its existing surroundings and the context from which they are viewed such that it becomes an unreasonable adverse impact on the visual quality of a protected natural resource as viewed from a scenic resource.

- Color. The white turbines will produce a noticeable contrast with the surrounding landscape when seen in the midground (up to four miles). However, as the distance between the turbines and the viewer increases, the contrast with the landscape will decrease (a phenomenon described as atmospheric perspective). Throughout most of the study area, especially when viewed as a background element (> 4 miles) the turbines will appear light gray. See photographs of Mars Hill Wind Farm that illustrate how the colors of the turbines change in different lighting conditions.

  In addition to distance, atmospheric conditions play a significant role in the visibility of the turbines. On misty or foggy days, visibility may be limited to a point where there are no views beyond the midground. Under cloudy conditions,

[26] This methodology is described in detail in Foundations for Visual Project Analysis, 1986, edited by Richard Smardon, James Palmer, and John Felleman. It is the core of many of the assessment techniques that have been developed by Federal agencies such as the USDA Forest Service and are used throughout the United States on similar projects.

the color of the turbines can appear to match the clouds, rendering the turbines almost invisible. Full sunlight will produce the maximum contrast by emphasizing the whiteness of the turbines.

The red warning lights required by FAA will produce a contrast in color when seen from certain vantage points, since there are few other similar lights in the study area. Red pulsing lights were selected in part to avoid the strobe effect of white lights that would have attracted more attention by their intensity and sequencing. Warning lights are seen at maximum intensity when viewed horizontally and at lesser intensities from points below the lights. Lights are designed to be visible to pilots at distances of 5-7 miles.

The dark color of erosion control mix used to treat side slopes along access roads will minimize color contrasts in road construction while providing a growing medium for native vegetation.

Based upon the effects of distance on color and the measures taken to minimize color contrasts in construction operations, there should be no undue adverse impacts due to color.[27]

- Form. Wind turbines are not indigenous elements in the western Maine landscape and will therefore present a contrast in form. As very tall, vertical forms with moving parts, they will tend to attract the eye. The appearance of wind turbines has greatly evolved over the past decade as manufacturers design forms that match their energy-producing function. "Clean, graceful, uncluttered" are terms that are often used to describe contemporary turbines.[28] Contrasts will be minimized by using the alignment of the ridge tops and preserving as much vegetation as possible at the base of the installations.

[27] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, pp. 24-25.
[28] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, p. 25.

- Line. The lines created by the access roads will be similar in appearance to the logging roads found throughout the study area and should not create a noticeable contrast in most locations due to the viewing distance. Where roads may be visible (e.g., on Black Nubble as seen on the surveyors' cut below the north summit of Crocker Mountain) special construction techniques will be used to preserve existing vegetation and provide opportunities for new growth to break up the line of new roads. There should be no undue adverse impacts due to the visible lines that are being created.[29]

  At this location the summit access roads will create a set of visible lines near the top of Black Nubble. The new roads will be seen in the context of a network of established logging roads visible between Crocker Mountain and Black Nubble. Preserving existing vegetation and providing opportunities for new vegetation that will help break up the line of the road will minimize the degree of visibility.

  Wherever possible the roads follow existing haul roads to minimize the amount of visible change. The lines created by the collection and transmission lines are familiar to people who will be viewing the BNWF. Existing transmission lines (e.g., the Boralex line in Stratton) and local distribution lines are an accepted part of the landscape.

- Texture. Contrasts in texture are most apparent within three ± miles of the observers (in the foreground and part of the midground viewing distances). The smooth surfaces of the towers and blades will be seen as a noticeable contrast with the texture of the surrounding forestland and mountainsides. Roads have been carefully designed to avoid steep slopes and minimize cuts and fills which will reduce contrasts in color and texture. Where steep slope crossings are unavoidable, additional mitigation measures will be utilized to minimize contrasts in texture and color.

[29] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, p. 26.

B. Scale contrast, which is determined by the size and scope of the proposed activity given its specific location within the viewshed of a scenic resource.

The scale of the landscape surrounding the wind farm site can be described as very large or expansive. Most of the mountains within the study area have a vertical rise of over a thousand feet and a separation of one to three miles between peaks. The lakes range in size from small ponds to some of the largest lakes in the state. Clear-cuts range in size from several dozen acres up to several hundred acres in size.

Even though the turbines are over 400 feet in height, they will be in scale with their mountaintop setting.

C. Spatial dominance, which is the degree to which an activity dominates the whole landscape composition or dominates landform, water, or sky backdrop as viewed from a scenic resource.

Robert Thayer, FASLA, in his research at California's Altamont Pass[30], determined that turbines dominate the observer's field of vision at a distance equivalent to about ten times the turbine's height. In the case of the BNWF, this is approximately 3/4 mile, or roughly equivalent to objects within the foreground viewing distance. Beyond that distance, turbines are seen, but become part of the visible landscape.

The closest observer will see the turbines at a distance of 1.5 miles (unless they choose to hike up the access road to see them up-close). The majority of the viewers will see the turbines at distances of 3-12 miles, where they will clearly be perceived as subordinate or co-dominant elements in the larger landscape.

The scenic resources identified in Table 6-4 were analyzed using the Basic Visual Impact Assessment Form contained in Appendix A of the Chapter 315 Regulations. The results

[30] Thayer, Robert, and Carla Freeman. Altamont: Public Perceptions of a Wind Energy Landscape.

were used to predict the relative severity of the anticipated visual impact from the BNWF. (Note that the term 'weak' was replaced with 'slight' in the descriptions.)

8.3 Compliance with LURC Section 10.25 Scenic Character Standards

LURC's Section 10.25 Development Standards contain three review criteria to evaluate the impact that proposed structures and uses may have on scenic character. The following narrative presents each of these criteria and describes how the BNWF is in compliance.

a. The design of a proposed development shall take into account the scenic character of the surrounding area. Structures shall be located, designed and landscaped to reasonably minimize their visual impact on the surrounding area, particularly when viewed from existing roadways or shorelines.

Black Nubble was selected with the recognition that wind energy production can be highly compatible with commercial forest practices. MMP selected this site in an active commercial forest because of a) its proximity to and ability to use existing transmission lines and roads, b) the ability to capture the available wind resource, and c) the limited number of public viewpoints.

The most significant mitigation measure has been the reduction of the number of turbines from 30 to 18 in response to concerns regarding potential visual impacts on the surrounding area. Chapter 9, Mitigation Strategies, describes the considerations that went into the planning and design of the facility and the benefits of the reduced numbers.

A series of different turbine models were initially evaluated for the wind farm. An older 1.5 MW turbine was initially evaluated. However, that option would have resulted in one third more turbines and would have produced one third less energy. Even the use of the Vestas V80 would have resulted in more turbines. By using the V90 turbine design, the

number of turbines has been reduced to 18. Both the V80 and the V90 use the same 80m hub height. The 10m difference in the blade diameter is a relatively insignificant change compared to the 14% reduction in number of turbines required to generate the same amount of capacity.

As previously noted, during the course of planning the wind farm, several alternatives were examined for the location of roads and transmission lines. The alignments that are being proposed have been selected in part because they minimize potential visual impacts from sensitive viewpoints. Access roads are being kept to a minimum width to preserve vegetation and minimize visual impacts. Following construction, the travel way for both the access roads and summit roads will be reduced to 12'.

The tapered tower, aerodynamic nacelle, and curved blades have been designed as individual components in an aesthetic whole. The height of the towers and the size of the turbines will be consistent throughout the BNWF to create a sense of visual uniformity. All electrical connections between turbines will be buried under the summit road. The laydown areas at each site will be revegetated to restore the landscape following construction to minimize contrasts in color and texture.

FAA requires that the BNWF be lit with pulsing red lights mounted on seven of the nacelles to alert aircraft. Lights are designed to be visible to oncoming aircraft at distances of 5-7 miles. Under certain atmospheric conditions, the lights may be visible at ten miles or greater, appearing as small points of light, similar to a star. The red lights may be visible at three locations on Route 4/16 between Oquossoc and Rangeley, a few places on Route 16 between Rangeley and Stratton, and on several of the lakes and ponds.

The number of nighttime hikers on the AT should be very limited. None of the turbines are located within view of the lean-to's on the AT, so most campers should not be able to see the lights at night. Horns Pond hut on the Bigelow Range is 9.2 miles from the

closest turbine. People watching the sunset from the Horns may see the lights come on after the sun sets. Black Nubble is 45º south of due west, so any lights that may be seen would not interfere with views of the sunset.

There is a symbolic, or connotational, aspect of the project that will affect how people perceive the visual impact of the wind farm. Some may find the presence of the wind turbines to be an intrusion; others may find them a reasonable and acceptable alteration to the landscape as a component of a renewable energy source. A parallel example might be a ski area, where the ski runs create meandering lines on a mountainside. To many observers, this is an acceptable – if not a positive – view, since it signifies recreational opportunities. People associate the clearing on the mountain with positive experiences. However, if the same mountain was altered by a patchwork of tree-harvesting, the reaction would likely be much more negative.

The scenic character of the surrounding area has been a major influence in the form and layout of the wind farm. The structures have been designed and sited to reasonably minimize their visual impact on the surrounding areas. The project will be visible from very few locations on public roadways. Where the RWF is visible from roadways or shorelines, it will usually be seen in the background and in the context of other development activities, and should have an acceptable level of visual impact.[31]

The narrative for LURC Section 10.25.b (below) describes the potential effect on views from public roadways and shorelines.

b. To the extent practicable, proposed structures and other visually intrusive development shall be placed in locations least likely to block or interrupt scenic views as seen from traveled ways, water bodies, or public property.

[31] July 14, 2006 Prefiled Testimony of Terrence DeWan and Amy Segal, pp. 33-36.

By their very nature, wind-generating facilities in mountainous regions will be visible to a portion of the population who live, work, and recreate nearby. The BNWF turbines have been sited along the ridgelines and side slopes of Black Nubble to take advantage of the available wind resource. As noted in Table 6-4 Summary of Visual Impacts and in Chapter 5 Project Description, the access roads, collection lines, transmission lines, and other project components have been sited in areas that will have minimal visual impact on public viewpoints.

The BNWF will not *block* or *interrupt* [32] scenic views as seen from traveled ways, water bodies, or public property. The views that characterize the region will still be available and will still be regarded as highly scenic.

Traveled Ways. As noted in Table 6-4, the project will be visible from a few public highways (e.g., several places along Route 4/16 west of Rangeley, several places along Route 16 in Dallas and Coplin plantations). In most of these instances the wind turbines will be visible in the background viewing distance and will not block or interrupt the views. From most of these viewpoints the turbines will appear to be very small, if they are visible at all.

Water Bodies. As noted in Table 6-2, Lakes and Ponds within the Study Area, and Table 6-4, Summary of Visual Impacts, portions of the wind farm may be visible from a dozen waterbodies within the study area. The closest possible viewpoint will be from portions of Saddleback Lake, at a distance of 5.5 miles. From this vantage point, the view also includes the ski slopes at Saddleback Mountain. Where the turbines are visible from the waterbodies, they will mainly be seen against the sky and will not block or interrupt views of the surrounding landscape.

[32] Block: to obstruct, shut out from view or get in the way so as to hide from sight. Interrupt: to make a break in. From wordnet.princeton.edu/perl/webwn

Public Property. There are three significant pieces of public property (other than the roads and water bodies described above) that will have a view of the BNWF: the Bigelow Preserve, on the north side of Route 27; the Appalachian Trail between the Bigelow Range and Saddleback Mountain; and Mount Abraham. As noted above, extensive study went into the siting access roads and collection/transmission lines to minimize visibility from both the Appalachian Trail and the peaks of the Bigelow Range and Mt. Abraham. Table 6-4 summarizes the visual impact that the BNWF will have on these mountain peaks and the Appalachian Trail. In no instance will views from the trails be blocked; i.e., hikers will still be able to view the surrounding landscape. Views will be altered to a varying extent by the addition of the turbines at distances of 3 to 13 miles.

c. If a site includes a ridge elevated above surrounding areas, the design of the development shall preserve the natural character of the ridgeline.

The majority of the BNWF site is on ridgelines elevated above the surrounding areas. The natural character of the site has been considered by careful siting of access roads, the wind turbines, and ancillary facilities to avoid visible 'notches' in the tree cover or major alterations to the profile of the ridgeline. The natural character of the ridgeline will be preserved to the maximum extent possible.

As noted in Chapter 9, Mitigation Strategies, all elements of the project have been sited and designed to minimize their visual impact on the views from scenic resources. Road widths will be kept to the minimum required for the special equipment needed to install and maintain the wind turbines. The laydown areas will be the minimal size necessary to assemble the units and erect them on the bases. Laydown areas will be revegetated following installation. Electrical collection lines will be placed under the roads to minimize disruption to the scenic character of the site.

8.4 Conclusion

Although there will be visual impacts on scenic and recreational resources within the BNWF viewshed, those impacts have been minimized to the maximum extent possible. In no instances will the wind turbines or the transmission structures block views of scenic resources or from these resources.

BNWF will be visible from less than 5% of the 15-mile radius study area. Most of the community views will be at distances of greater than ten miles, which is beyond the recognition distance threshold that Dr. Palmer described in his testimony at the LURC public hearings held last August.[33] Views from scenic resources such as the Route 16 Scenic Byway and Rangeley Lake will be marginally affected, due to the distance from the project and the nature and intensity of the surrounding land use.

The communities surrounding Black Nubble are deeply tied to their natural resource base. Two prominent ski areas utilize the high peaks, steep terrain, cold winter climate, and rivers to create recreational areas; hunters, fishermen, hikers, snowmobilers and others visit the area to enjoy the abundant wildlife and trails; the woods provide employment opportunities, fuel for the Stratton energy plan, and raw materials for the mills; the Dead River has been dammed to create Flagstaff Lake; abundant gravel is mined in the broad valley below the Bigelow Range. The Black Nubble Wind Farm will provide another way that a renewable resource can be harvested in an economically and environmentally sustainable manner, broadening the areas' utilization of its natural resources.[34]

The proposed project has been planned and designed to minimize visual impacts to scenic resources within the study area. EEC has made adequate provisions for fitting the wind turbines, collection lines, transmission line, access roads, and ancillary facilities

[33] July 17, 2006 Prefiled Testimony of Dr. James Palmer, at p. 7. In his testimony, Dr. Palmer noted that the human eye would not be able to recognize turbine bases at distances greater than 8.5 miles.

harmoniously into the existing natural environment. Based upon this assessment, we conclude that there will be no unreasonable interference with existing scenic or aesthetic uses, nor will there be an undue adverse effect on the scenic character of the land within the viewshed of the wind farm.

[34] August 21, 2006 Rebuttal Testimony of Terrence DeWan and Amy Segal, p. 6.

9.0 MITIGATION STRATEGIES

Mitigation is defined as any action taken or not taken to avoid, minimize, rectify, reduce, eliminate, or compensate for actual or potential adverse environmental impact. [35] Because the wind farm site is in a visually sensitive area, mitigation of visual impacts has been of primary concern throughout its planning and design. The following section describes the various measures that have been taken in the site selection, planning, and design process, and will be taken during construction and site management to minimize visual impacts.

9.1 Wind Turbines

9.1.1 Site Selection and Planning

- The site selection process specified avoiding significant visual impacts on identified scenic resources to the maximum extent possible.
- Black Nubble was selected with the recognition that wind energy production can be highly compatible with commercial forest practices (cutting, road construction, operation of heavy machinery).
- This site was selected in part due to its proximity to existing transmission lines, roads, and the wind resource.
- The initial plans for the facility considered using 39 older 1.5 MW wind turbines, 33 Vestas V80s, or 30 Vestas V90s on two mountains. The smaller turbines would not only have involved using more turbines but producing significantly less energy as well. Using the V90 turbine design and eliminating Redington Mountain has further reduced the number of turbines to 18.
- The original plan for the wind farm included 30 turbines in two locations. The project has been scaled back to this application for Black Nubble. See 9.9 for a discussion of this action as a mitigation measure.

9.1.2 Design

- The Vestas turbine was selected in part for its aesthetic qualities: the tapered base, its uncluttered lines and aerodynamic forms, the shape of the airfoil blades. The clean design of the turbine is a good example of form following function.
- The color of the blades, tower, and nacelle will be white, which is preferred by the FAA. Colors other than white would have required that the turbines be lit with white strobe lights to increase their visibility. Black blades were considered for their ability to shed ice, but were eliminated after testing public sentiment in the hiker's survey, comparing their visual impacts in photosimulations, discussing the issue with Vestas, and observing black bladed turbines in other locations (e.g., Searsburg, Vermont).
- Vestas has made several modifications to the design of their blade system in recent years. The V90 blades have a thin profile that minimizes their appearance when seen from the side.
- The height of the towers and the size of the turbines will be consistent throughout the BNWF to create a sense of visual uniformity.
- Lighting will be the minimum required under Federal Aviation Administration regulations. Lighting will consist of sychronized red lights, slow off and slow on. In June, 2007 MMP worked with the FAA to further reduce the number of lit turbines on Black Nubble from nine to seven.

9.1.3 Construction

- The laydown area at the base of each turbine will be limited to the minimum size required to assemble the towers and blades.
- Following installation, the laydown areas will be revegetated to minimize contrasts in color and texture.

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[35] See definition of Mitigation in the Glossary, Appendix F.

- A crane specially suited to the terrain will be used to erect the turbines. This equipment will be moved to each turbine on 32' wide summit roads. After construction, the roadway will be reduced to 12' wide and the shoulders allowed to revegetate.
- The concrete bases for the towers will be buried to allow vegetation to become re-established at the foot of the turbine. This will minimize the amount of disturbed area and reduce contrast between the light-colored concrete and native vegetation.
- The design team will evaluate the location of stump disposal areas, borrow pits, and other features which would result in additional clearing in highly sensitive viewsheds.

9.2 Access Road Network

- The access road network will follow existing timber haul roads wherever possible to minimize the amount of new earthwork, cutting, culverting, and road construction.
- Current Soil Conservation Service Best Management Practices for road construction and erosion control will be followed.
- The Erosion and Sedimentation Control Report for the Roadways to Access Wind Towers on Black Nubble, DeLuca-Hoffman Associates, Inc., has been prepared to address specific issues related to mountainside construction. An underlying premise throughout this manual is the recognition that the roads need to be constructed with the utmost care to avoid erosion and sedimentation. By following these guidelines the contractor is expected to minimize the amount of denuded land that is exposed at any one time and greatly reduce visual contrasts.
- The Erosion and Sedimentation Control Report also stresses the need for effective fugitive dust control during road construction. Dust raised by large vehicles can be a significant source of visual pollution, especially to people at higher elevations looking down at the construction site.

- New access roads to the top of Black Nubble have been sited to minimize their visibility from public viewpoints and scenic resources, especially those viewpoints in the foreground and midground, i.e., the Appalachian Trail. Alternative road alignments were considered and discarded for their potential visibility from public viewpoints.
- Access roads have been designed to meet the technical requirements of the vehicles that will be used to haul the windfarm components to the construction site. Maximum grades of 14% have kept the road length to a minimum.
- Roads have been designed to allow the contractor the flexibility to make horizontal or vertical adjustments based upon field conditions. The design intent is to retain flexibility to allow the final layout to harmoniously blend with the existing topography.
- Switchback curves were sited in areas of relatively mild topography wherever possible to minimize the depth of cut and fill sections.
- Access roads above 2,700 feet are being carefully sited to avoid steep slopes and significant cuts and fills wherever possible to minimize contrasts in color, line, and texture.
- Access roads are being kept as narrow as possible (typically 12-16 feet travel surface with 2 to 4-foot shoulders) to minimize visual impacts. Summit roads are being designed as narrow as possible to safely accommodate the crane and transport equipment required to bring the components up to each turbine site.
- Rip-rap and/or gabions may be used in some areas to minimize the extent of clearing and excavation required on the more visible side slopes of roads. The design team will evaluate the use of such techniques for both their effectiveness and their potential for visual impact, since some slope treatments may present unacceptable levels of color and texture contrast.
- Following turbine installation, the travel way for both the access roads and summit roads will be reduced to a maximum width of 12’.
- Sections of the summit access roads in visually sensitive areas will be assessed after turbine installation. In addition to reducing the width of the travelway to

12', portions of the gravel surface may be removed and a planting berm may be installed on one side of the road.[36] As illustrated in Figure 6-4, the 18"-high berm will allow native vegetation to become established and screen the rock face or engineered wall treatment on the uphill side of the road. Other techniques, including the use of Permeon[37] to accelerate the natural weathering process in highly visible areas where there is blasted rock, exposed ledge, rip-rap, or concrete, may also be utilized.

- Roadway construction will use naturally occurring materials wherever possible to maintain consistency in color and texture with the surrounding landscape.
- The contractor will be required to have a number of tools at their disposal to deal with unusual situations (such as steep side slopes that might normally require extensive tree clearing and earth moving). These include the use of filter cloth, geotextile fabrics, erosion control mesh, and geogrids. [38] Figure 6-4, Representative Cross Section of the Summit Roads on the East Side of Black Nubble, shows some of the engineering and mitigation techniques that may be used to reduce the visibility of the summit roads.
- Seed mix will be tailored to the specific requirements of the site, using native materials wherever feasible to achieve a stable surface that closely resembles the color and texture of existing vegetation. See Appendix A of the Erosion and Sedimentation Control Report.

[36] The location of the planting berm will depend on grading, exposure, maintenance considerations, and other site-specific factors.
[37] Permeon is a sprayed-on material that has been used extensively by federal resource agencies that 'ages' exposed rock faces to replicate the effects of weathering and aging, thus minimizing contrasts in color. See www.permeon.com for additional information.
[38] The use of these materials is outlined in Redington Wind Farm: Basis of Design of the Roadways to Access Wind Towers, DeLuca-Hoffman Associates, Inc.

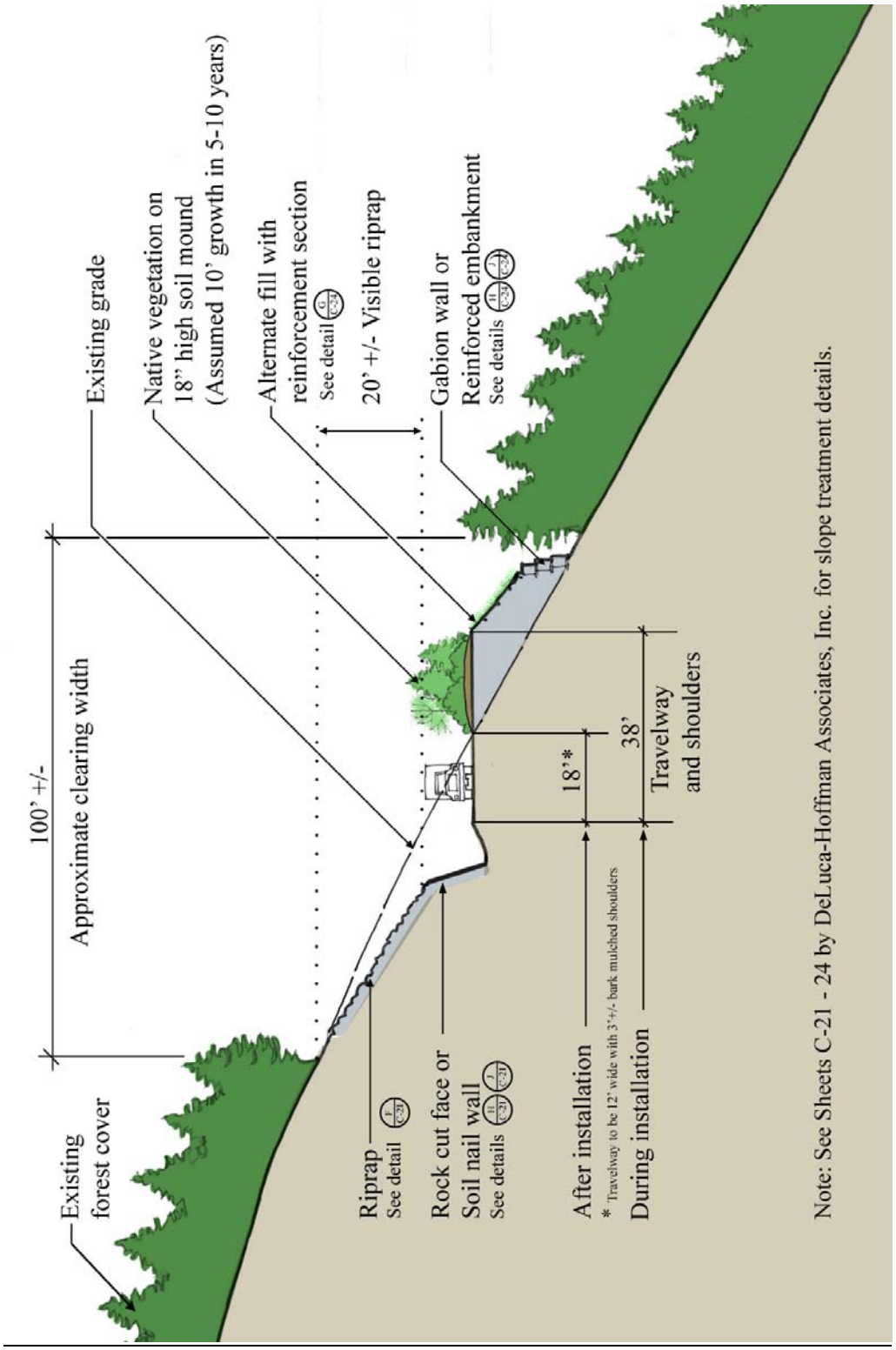

Figure 6-4: Representative Cross Section for Summit Roads on the East Side of Black Nubble

- Bark mulch and erosion control mix will be used to treat side slopes along the access roads. The dark color of these materials will minimize color contrast and provide a growing medium for the establishment of native vegetation. See the Erosion and Sedimentation Control Report for further information about the application of bark mulch and erosion control mix.

9.3 34.5 kV Collection Line

- Power and communication lines will be buried in a trench under the summit roadways to minimize clutter surrounding the turbines. Trenches will be revegetated following installation.
- The 34.5 kV lines leading from the turbines down the mountains have been sited to take advantage of topography and existing clear cuts to make them as unobtrusive as possible.

9.4 Substation

- The substation was sited well off Route 27 to allow a substantial buffer between the public and the facility.
- Existing vegetation, clearings, and landforms have been considered in siting the substation and maintenance facility.
- The proposed location concentrates impacts by locating the facilities in the vicinity of an existing gravel pit/staging area, and the Nash Stream Road.

9.5 115 kV Transmission Line

- The corridor selection process stressed avoidance of visual and other environmental impacts. Several early alignments were abandoned or modified due to their potential impacts on the Appalachian Trail and other scenic resources.

- The transmission line will be buried as it crosses Route 27 and the Appalachian trail to minimize impacts on the trail and the existing trailhead parking lot.
- Visually sensitive areas and viewpoints have been avoided to the maximum extent possible.
- Adjustments were made in the transmission corridor alignment to minimize visibility and take advantage of existing vegetation and landforms.
- Existing access roads will be used wherever possible for construction and maintenance.
- Buffers will be provided for screening at all river, stream, and road crossings.

9.6 Maintenance Facility

- The maintenance facility has been consolidated in a five-acre property in a wooded area generally out of public view. See Section 13, Property Maintenance, for a rendering of the building.

9.7 Management and Maintenance

- Following the installation of the facility, the existing and expanded road network will generally remain open for the public. This will give the public the opportunity to see the turbines at close range and to better understand how they transform the wind into electricity.
- Access will be restricted during weather conditions that produce severe icing to protect the public from ice being shed from the blades and nacelles of the turbines. The existing gate near Route 16 is usually locked by the abutting landowner(s) for 4-6 weeks in the spring to protect the roads during mud season.
- Maine Mountain Power will stress high quality maintenance once the facility is operational. It is very important that all turbines are in working order, and that any problems be corrected as soon as possible.

- The site will be monitored on a weekly basis and all trash and debris will be removed immediately.

9.8 Public Contact and Education

- MMP expects that there will be a considerable amount of public interest in the BNWF, due to the inherent nature of the facility, the public's concern for alternate energy sources, and the character of the project area. Experience in other locations in the northeast has shown that there will be additional visitorship to the area to observe the turbines. At this point, however, it would be impossible to predict the level of visitor interest. If warranted, MMP may develop an informational exhibit regarding the BNWF at a point within the project area. This will probably consist of interpretive panels (similar to those installed at Searsburg, VT and seen in Photo 6-P162 and P163) that describe the function and operation of the facility.

9.9 Black Nubble Only Alternative

9.9.1 Comparison

- Closest Point to the AT. In the original application, the turbines on Redington Ridge would have been one mile from the AT. With the BNWF, the closest point to the AT will be 3.1 miles. (However, at this closest point on the AT east of Poplar Ridge there will be no view of the wind farm.)
- Proximity to AT. In the original application, 17.0 miles of the AT would have been within four miles (midground viewing distance) of the turbines. With the BNWF, the AT will be within four miles of the turbines for 7.7 miles.
- Closest View from the AT. With the BNWF the closest point on the AT where there will be any view of the turbines is at Poplar Ridge, a distance of 3.2 miles. Along the ridge there are a series of five viewpoints, two of which will have

filtered views of Black Nubble. In the original application the closest view of the turbines would have been from the summit of Crocker Mountain at a distance of 1.5 miles.

- Midground Views. The original application had 0.21 miles of open views and 0.24 miles of filtered views. This would have included views from the summit of Crocker Mountain at a distance of 1.5 miles, the Sugarloaf Cirque (at a distance of 2.4 miles), and trail between Sugarloaf and Spaulding Mountains (at a distance of 3.0 miles). With the BNWF, there will be 0.1 miles of open view (from Saddleback Junior at a distance of 4.0 miles) and 0.1 miles of filtered views (from the side slopes of Poplar Ridge and Saddleback Junior).
- Proximity to Mt. Abraham. In the original application, the closest turbines would have been 4.1 miles from the summit of Mount Abraham. With the BNWF the closest turbines on Black Nubble will be 6.5 miles away.
- View Angles. The percentage of the view from panoramic summits that will include wind turbines has decreased significantly. The view angle from Saddleback has been reduced from 35º to 15º; the view angle from The Horn on Saddleback has been reduced from 43º to 18º; the view angle from Saddleback Junior has been reduced from 54º to 22º; and the view angle from Mt. Abraham has been reduced from 26º to 12º.
- Silhouetting. From many of the higher viewpoints the turbines on Black Nubble will be seen against a backdrop of other mountains rather than against the sky, making them less noticeable. In the original application, many of the turbines on Redington Range would have been appeared above the horizon, making them more visible.

9.9.2 Offset

- If Black Nubble Wind Farm is constructed, Redington Pond Range, the last undeveloped mountain above 4,000 feet in Maine, would remain in an undeveloped state. Redington acts as a visual buffer between Black Nubble and

Sugarloaf Mountain, blocking views from Sugarloaf Cirque and the trail between Sugarloaf Mountain and Spaulding Mountain.

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