April 21, 2010

To: Marcia Spencer-Famous, Maine Land Use Regulation Commission

Re: Pre-filed testimony for consolidated environmental groups on DP 4860,

Dear Marcia:

On behalf of Jenn Burns Gray, enclosed are the pre-filed testimonies for the consolidated group of the Appalachian Mountain Club, Maine Audubon, and the Natural Resources Council of Maine. Hard copies of all testimony, along with CD copies, is being mailed or delivered to the Commission and other parties, and electronic versions distributed to the email service list.

The consolidated intervenors are submitting pre-filed testimony of three witnesses, Susan Gallo, Cathy Johnson and David Publicover. (Note that no testimony is being filed by myself, even though I was listed as a potential witness.)

If you have any questions please don't hesitate to contact me.

Sincerely,

Dylan Voorhees
Natural Resources Council of Maine

STATE OF MAINE

LAND USE REGULATION COMMISSION

In the Matter of Development Permit, DP 4860

Kibby Expansion Wind Power Project

Pre-filed Testimony of Catherine B. Johnson, Natural Resources Council of Maine

Submitted on behalf of the Appalachian Mountain Club, Maine Audubon and the Natural Resources Council of Maine

April 21, 2010

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Introduction

I have been the North Woods Project Director at the Natural Resources Council of Maine (NRCM) for 20 years. During that time I have been involved in reviewing and commenting on dozens of development proposals in LURC jurisdiction. I have participated fully in two full revisions of LURC's Comprehensive Land Use Plan (1990-1997 and 2005 – 2010) and I have participated in many stakeholder committees. I have been appointed to many Management Plan Advisory Committees established by the Bureau of Parks and Lands and I have served in the past, and have recently rejoined, the Forest Legacy Committee. I have participated in numerous legislative efforts including revising LURC's laws, establishing an ecological reserve system for the state's public lands, and amending the Forest Practices Act to limit liquidation harvesting. I am an avid canoeist and hiker and have paddled most of the major rivers and many lakes in the jurisdiction and have hiked many of the mountains. All of these experiences have given me a deep understanding of recreational and scenic issues facing the jurisdiction.

Summary

NRCM is a strong supporter of both protecting the scenic and recreational resources of the state and developing renewable energy as one part of a strategy to limit pollution and climate change. We believe that the Maine Wind Energy Act (35-A MRSA § 3401) provides a balanced approach for achieving both of these goals.

After reviewing the proposed Kibby expansion on Sisk Mountain, we have concluded that the northern eight turbines can meet the legal criteria regarding the effect of the proposed project on scenic character and related existing recreational uses if certain conditions are included in the permit. While there would be some impact on scenic resources of statewide and national significance and existing uses of those resources, we do not believe that the impact would be unreasonable. We do, however, believe that conditions need to be included in the permit in order to mitigate these adverse impacts.

If a permit were granted for the northern eight turbines, this expansion project would produce over 60,000 megawatt-hours of renewable power each year, displacing fossil fuel burning and making a modest but meaningful contribution to the state's statutory goals for wind development. (This amount of power is similar to the amount produced annually by the Pejepscot hydropower dam on the Androscoggin River in Brunswick/Topsham, and relatively similar to the amount expected from the recently constructed Stetson II expansion wind power project.) It is widely recognized that unchecked climate change could negatively affect Maine's environment, economy and people, including in LURC jurisdiction. Although no one project or strategy will be sufficient to reduce Maine's contribution to climate change pollution, NRCM believes Maine must move forward with appropriately sited wind power.

We have concluded that the southern seven turbines (9 – 15) do not meet the legal criteria set forth in 12 M.R.S.A. §685-B(4)(C) and 35-A M.R.S.A. §3452 regarding the

effect of the proposed project on scenic character and related existing uses. Turbines 9 – 15 would be prominently visible from Chain of Ponds and the Arnold Trail, resources of state and national significance, and would change the scenic character from a landscape with minimal evidence of human activity to one with wind turbines that would be extensively visible by recreational paddlers and anglers on Chain of Ponds, and visitors along the Arnold Trail.

Statutory Criteria for Evaluating Scenic Impacts

12 M.R.S.A. §685-B (4)(C) sets forth the legal criteria for determining scenic impacts:

> 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…
>
> In making a determination under this paragraph, regarding an expedited wind energy development, as defined in Title 35-A, section 3451, subsection 4, the commission shall consider the development's effects on scenic character and existing uses related to scenic character in accordance with Title 35-A, section 3452.

35-A M.R.S.A. §3452 (1) further defines the standard for determining scenic impact as:

> …whether the development significantly compromises views from a scenic resource of state or national significance such that the development has an unreasonable adverse effect on the scenic character or existing uses related to scenic character of the scenic resource of state or national significance.

Significance of the Potentially Affected Scenic Areas

The areas of state or national significance that would be affected by the southern seven turbines include the following:[1]

1. **Chain of Ponds** – Chain of Ponds includes 5 connected ponds: Round, Natanic, Long, Bag and Lower Ponds. Chain of Ponds is rated Class 1A in the Wildlands Lake Assessment. Class 1A lakes are the highest rated lakes in the state - those of "statewide significance with two or more outstanding values." Chain of Ponds has outstanding scenic value "with very dramatic relief."[2] Chain of Ponds also has outstanding physical features, fisheries, and wildlife, and significant shore

[1] These resources all meet the criteria set forth in 35-A M.R.S.A. §3451(9).
[2] Parkin, D. et al. 1989. Maine's Finest Lakes: The Results of the Maine Lakes Study. Maine State Planning Office, Critical Areas Program, Augusta, ME.

character and cultural features. LURC has classified Chain of Ponds as a management class 2 lake that is accessible and undeveloped. Chain of Ponds has significant areas of shore in public ownership (see below) and is used by the public for fishing and paddling.

2. **Chain of Ponds Public Land Unit** – Chain of Ponds Public Land Unit includes 1,041 acres, including mostly the northern and eastern shores of Chain of Ponds. The Bureau of Parks and Lands Management Plan (BPL Management Plan) for this parcel begins: "This *highly scenic* 1,041 acre parcel in Chain of Ponds Township…"[emphasis provided.][3] The management plan continues, quoting the Portland Press Herald outdoor writer, Martin Perry: "There are few places in Maine with as rugged a landscape…Mountain summits and ridges surround the narrow ribbon of water and create a fjord-like setting." Use of the public land unit includes camping at primitive campsites and a commercial campground, canoeing, kayaking, and fishing. There is also a hiking trail skirting Round Pond. Management priorities for the unit include ensuring "the scenic and primitive nature of the surroundings." See Attachment A.

3. **Benedict Arnold Trail to Quebec Historic District –** The Arnold Trail is listed on the National Register of Historic Places. The characteristic that makes this section of the trail particularly noteworthy is its nearly pristine and unspoiled condition – a condition that evokes the wilderness experience that the soldiers faced in this region on their march to Quebec.

4. **Crosby Pond –** Crosby Pond is also rated Class 1A in the Wildlands Lakes Assessment because of its outstanding scenic and fisheries values. It also has significant wildlife values. LURC has also designated it a Management Class 2 lake that is accessible and undeveloped.

5. **Arnold Pond –** Arnold Pond is the third resource class 1A lake within 8 miles of the southern seven turbines. It has outstanding scenic and cultural values as well as significant fisheries values. Arnold Pond has been designated a Management Class 4 lake, that is high value, accessible, and developed.

6. **Kibby Stream –** The Maine Rivers Study designated Kibby Stream, a tributary of the Dead River, a Class A stream for its scenic and undeveloped character. The Rivers Study includes tributaries of Class A Rivers (the Dead River) when the tributary "a) possesses natural or recreation values consistent with those of the main river area; b) significantly enhances the overall value of the larger river segment's resources." In discussing the scenic value of the Dead River, the Maine Rivers Study notes: "The area above West Forks [which includes Kibby Stream] has a high diversity of views due to variations in landforms, topography and hydrologic features." The Maine Rivers Study further notes: "The lands

[3] Excerpts from Bureau of Parks and Lands Flagstaff Region Management Plan addressing Chain of Ponds, June 12, 2007. See attachment A.

Existing Character of Surrounding Area

As is clear from the descriptions of all the scenic resources of state and national significance in the region, the primary character of this region is its highly scenic undeveloped mountains and forests. The ponds, the stream, and the historic trail are all distinguished because of the very high scenic character of the surrounding area. Recreation in the area (e.g. camping, paddling and fishing) is primarily primitive in character, dependent on the natural scenic character of the surroundings.

In addition, 47 miles of Route 27, between Kingfield and Coburn Gore on the Canadian Border, are one of only 12 designated scenic byways in Maine. This scenic byway runs along the eastern shore of Chain of Ponds. The link from the Department of Transportation's website notes that the section of the byway along the Chain of Ponds includes rock formations "over 400 million years old, and they will provide you with a final taste of *outstanding scenery* and natural studies." [emphasis added.]

Other than Route 27 and adjacent logging roads and a few camps along Chain of Ponds, the only major man-made features in the area are the Kibby 1 wind turbines and their associated road system. Very few of the Kibby 1 turbines and none of the Kibby 1 roads are visible from the areas of state and national significance listed above, except Kibby Stream.

The fact that there is a road like Route 27 in the area does not necessarily mean that the scenic character of the region has already been degraded and needs no further protection. In fact, the existence of the Route 27 scenic byway emphasizes the high scenic quality of the landscape and heightens the scrutiny that should be given to any proposed degradation of scenic character. Maine residents and visitors visit this remote-feeling but accessible area specifically to enjoy the scenic views and to participate in recreational and cultural activities, the high quality experience of which is dependent on the highly scenic setting.

Nor does the fact that there are already turbines in the region lead to the conclusion that additional turbines would not have unreasonable adverse effects. If that were the case, any single wind project could lead to additional wind projects, marching across the landscape, without consideration of any new impacts created by such additional projects on scenic resources of state and national significance.

Expectations of Typical Viewer

The typical viewer of the turbines visible from Chain of Ponds would expect to see undeveloped mountains since that is the characteristic that would draw the viewer to the area, and which is highlighted in both the Wildlands Lakes Assessment and the BPL Management Plan. In fact, typical viewers likely would expect to see a generally natural

forest, given that, according to BPL's Management Plan, the public lands adjacent to the ponds, and others in the immediate region are so steep and hilly that they are not suitable for timber harvesting. Given the distance from major cities and towns, typical viewers would likely expect to see completely dark night skies.

Viewers certainly would expect to see cars and trucks, including logging trucks, passing by on Route 27 and on the logging roads, given that virtually all visitors arrive in the region by using Route 27. Given that there are no significant structures in the region, visitors would not expect to see major man-made structures.

Nature and scope of impacts on users and scenic resources of state and national significance[4]

In evaluating the impact of the project, it is important to think about both the effects of the proposed turbines and the value of the scenic resource and public uses being affected. Because wind turbines are inherently visible features given their size relative to other features on the landscape, it is largely the value of the affected resources and related uses that will distinguish the impacts of one set of wind turbine from another.

Evaluating the scenic impact of a project is not an easily quantifiable exercise. Professional assessments can provide an important perspective using generally accepted and relatively objective standards. However, evaluation of scenic quality and impacts inevitably involves a large degree of subjective judgment, and the perspective of laypersons should also be given strong consideration.

James F. Palmer, who prepared a visual impact analysis for LURC during the Plum Creek proceeding, put it thus:

> There are well developed professional procedures for evaluating the elements that are thought to determine scenic quality and to contribute to scenic impacts (e.g. Smardon et al. 1988, USDA Forest Service 1995). These procedures are grounded in professional experience, and have been accepted by the courts (Smardon and Karp, 1993). However the reliability of these procedures is not well-established through empirical evaluation. *What research exists suggests that the reliability of professional assessments is comparable to, but not higher than public assessments of scenic quality.* (Palmer and Hoffman 2001, Ribe et al. 2002).[5] [Emphasis provided.]

[4] 35-A M.R.S.A.§3(E) and (F) evaluation criteria read as follows: "E. The extent, nature and duration of potentially affected public uses of the scenic resource of state or national significance and the potential effect of the generating facilities' presence on the public's continued use and enjoyment of the scenic resource of state or national significance; and F. The scope and scale of the potential effect of views of the generating facilities on the scenic resource of state or national significance, including but not limited to issues related to the number and extent of turbines visible from the scenic resource of state or national significance, the distance from scenic resource of state or national significance and the effect of prominent features of the development on the landscape."

[5] Palmer, James F. et al, A Review of the Potential Visual Effects From Implementing the Proposed Concept Plan for Plum Creek's Lands in the Moosehead Lake Region, August 30, 2007, p. 10.

There are accepted criteria which help guide assessments. The Department of Environmental Protection[6] sets out three factors to consider in evaluating impact:

1) Landscape compatibility – whether the proposed activity differs significantly from its existing surroundings and context from which they are viewed;
2) Scale contrast – the size and scope of the proposed activity given its specific location within the viewshed; and
3) Spatial dominance – the degree to which an activity dominates the landscape composition.

There is no question that all of the proposed turbines differ significantly from the undeveloped forested ridgeline where they would be located and from the scenic ponds, scenic byway, class A stream and historical trail from which they would be viewed. They are a different color, shape, and form and they would tower above the forest canopy. In addition, the cut and fill areas along the summit road lying on the west side of the ridge (which do not appear in the visual simulations) would result in large areas of light-colored bedrock and boulders which would be in marked contrast to the dark-colored forest. This road would be far more prominent than existing narrower logging roads, which are much less visible and which are rarely if ever constructed on such steep high-elevation slopes.

However, the impacts of the turbines differs significantly in terms of how much the activity dominates the landscape composition, how different the scale contrast is and the resulting impact on public uses of the resources of state and national significance. As Vissering's Appendix 2 Viewshed Analysis Map Detail shows, as proposed, some number of turbines would be visible for about three miles of the length of the Chain of Ponds, including the southern third of Natannis Pond, all of Long Pond, and the western half of Bag Pond. This is approximately one third of the length of Chain of Ponds. However, when you consider only the northern eight turbines, they would be visible from only approximately one mile of the Chain of Ponds: the southern half of Long Pond and the western quarter of Bag Pond. Paddlers and anglers on the pond would see substantially fewer turbines – and none at all from more areas - if only the northern eight were built. [See Attachments B-1 and B-2, NRCM Revised Vissering Photosimulation from Viewpoint 5; and Attachments C-1 and C-2, NRCM Modified Vissering Appendix 2, Viewshed Analysis Map Detail: Chain of Ponds.]

The southern seven turbines are within approximately three miles of the Chain of Ponds, the Chain of Ponds public land unit, and the Arnold Trail. The viewscape as seen from the south end of Long Pond is framed on the northwest by Mount Pisgah and on the southeast by Sisk Mountain. The two peaks are connected by a long ridge, on which the turbines are proposed. [See Vissering's "Pan view from the southern end of Long Pond," Appendix 3, photo 11.] The viewer's eye is drawn upward from the pond by the two peaks. Turbines on the ridge between the two peaks would be squarely in front of the

[6] Chapter 315: Assessing and Mitigating Impacts to Existing Scenic and Aesthetic Uses. This rule legally applies only to assessing impacts subject to the Natural Resources Protection Act, 38 M.R.S.A. §480-D (1), but its general principles and approach may be helpful in analyzing impacts in this project.

viewer. With only low-lying forest between the viewer and the turbines, the turbines would be clearly and completely visible above the tree line.

The roads associated with the southern seven turbines would likely also have a significant visual impact, although the simulations do not include the impacts of the roads. The road for the seven southern turbines would be located on the west face of the ridge, facing the Chain of Ponds and Route 27. In some places, it appears that the road would cross slopes of up to 50%. In multiple places there would be cut or fill slopes up to and occasionally exceeding 70 vertical feet. These would be highly visible from the ponds. While the applicant indicates that parts of the roads would be revegetated, it is not feasible to revegetate bedrock exposures and large boulder fields.

As is evident from Vissering's simulation from Viewpoint 5, the turbines would be a prominant feature from Long Pond. (See Attachment B-1.) These ponds are primarily used for primitive, natural character-based recreation including paddling, wildlife watching, fishing and camping; they are a place where people go for a sense of solitude and to get away from the human built environment. This experience would be significantly compromised if the seven southern towers were looming directly in front of users. Users would no longer feel like they were in an accessible but remote-feeling area. Rather they would be reminded of the human built environment at all times as they linger to paddle, watch wildlife and fish within view of the turbines. In addition, while nighttime use of the ponds is certainly less common, paddling on a still cloudless night can be a spectacular experience – one that would be severely degraded by prominent flashing red lights. While the applicant did not prepare a visual simulation of the impacts of the lights on the turbines at night, we know from other lakes that even one light at a significant distance can measurably change the ambience of the experience.

Visitors who enjoy the public lands and waters at Chain of Ponds because of their "accessible remoteness" and their sense of naturalness would either have to tolerate this significant compromise of their recreational experience, or choose to go elsewhere.

Visitors are likely not the only thing that will choose to go elsewhere if the southern seven turbines are built. As the Bureau of Parks and Lands notes in their comment #11, wind power projects can have a significant impact on future land conservation projects whose goals are to protect scenic or recreational values in the region. Funds for conservation acquisitions and easements are extremely limited and competition for these funds is high. Factors often considered in choosing among potential projects whose goals are to protect scenic or recreational values are their proximity to existing public lands and the pristine nature of the region. Without the southern seven turbines, it is reasonable to expect that additional conservation purchases might occur in the region and provide further protection for scenic and recreational uses as well as for wildlife habitat because of the existence of the existing highly scenic public lands parcel and the historical significance of the region. However, the seven southern turbines would have a much greater impact on these resources and would degrade the existing natural character of the landscape. These impacts could well drive potential conservation funds to another part of the state.

The user experience of the Arnold Trail would also be significantly compromised. This particular stretch of the Arnold Trail is the area where the wilderness closed in on the troops and they experienced problems resulting from being in the wilderness. Because of the very few changes to the landscape in this area, visitors today can get a good sense of the wilderness that Arnold's men faced. If the experience from this stretch of the Trail is compromised, there is no place for visitors who wish to experience that sense of wilderness along the Arnold Trail to go, since the Trail is fixed on the face of the earth. Unlike campers and paddlers, there is no other place for these users to go.

We are also concerned about the potential impact of the turbines on Arnold Pond. Vissering's April 9, 2010 report leaves us unsure about what turbines would be visible from the pond and the degree of impact. We will await the results of Vissering's further simulations.

We believe that the northern eight turbines cause many fewer adverse impacts to the ponds, public lands and the Arnold Trail. The northern eight turbines are an additional mile further away and thus less dominant on the landscape. They would be visible from a much smaller area of the Chain of Ponds, and would be partially blocked by intervening forests and lower ridges. In addition, the prominent road to the southern seven turbines on the upper west side of the Sisk ridge would be eliminated. It appears from the plan maps that the road in the northern part of the project area would lie primarily on the ridgeline, and would be minimally visible or hidden from view from the Chain of Ponds region. While the northern part of the project would have some impacts on the scenic resources and related recreational uses, we believe those impacts would not significantly compromise the scenic resources or uses and do not rise to the level of "unreasonable adverse effect." If only the northern eight turbines were constructed, we believe there would be *no* visibility from Viewpoints 1, 2, 3 and 4 as identified in Vissering's photosimulations. The key areas of remaining visibility, along Long and Bag Ponds would resemble NRCM's modified photosimulation from Viewpoint 5 in Attachment B-2, which can be contrasted with Vissering's Photosimulation from Viewpoint 5, Attachment B-1.

Proposed Conditions on the Permit to Mitigate Adverse Impacts

We believe that the impacts of the southern seven turbines on scenic resources and related uses so significantly compromise those resources and uses that they cause an unreasonable adverse effect and no permit should be granted for those turbines.

However, the impacts of the northern eight turbines are different. While they would definitely impact the views and recreational uses of Kibby Stream, and some of these turbines would be visible from parts of Chain of Ponds and Arnold and Crosby Ponds, we believe that conditions could be included in a permit so that the impacts would not rise to the level that an amended application for the eight northern turbines should be denied. We believe that a permit for these eight northern turbines should require

conditions that would mitigate the adverse impacts that the turbines would cause on scenic resources of state and national significance and related uses.

Wind turbines, because of their size, will always be visible from somewhere. Because turbines need to be located where there are sufficient wind resources, based on current technology, they typically need to be placed on ridgelines, whether those are low, rolling hills or high-elevation ridges. Therefore, conditions on a permit, including mitigation, can be a valuable tool that may allow wind power development to proceed even in proximity to certain scenic resources of statewide significance.

The fact that turbines would be visible does not in itself lead us to conclude that mitigation must be provided. The state currently lacks a clear, detailed framework for determining when mitigation for scenic impacts should be required as a permit condition, and a standard methodology for establishing a mitigation level. Mitigation has been been required as a condition of a permit in previous cases (e.g. Moosehead Lake Concept Plan) even in the absence of any explicit statutory authorization. The lack of a clear mitigation framework for wind projects is not surprising, given the evolving nature of wind development in Maine. Developing such a framework is in Maine's long-term interest and we believe LURC has a key role in that effort. Even if Maine possessed such a framework, it likely would not be entirely formulaic given that the determination of whether or not a project creates an unreasonable adverse impact on scenic resources includes subjective judgments.

We believe there may very well be other circumstances where the impact of turbines on scenic resources, and related uses, of state or national significance within eight miles of the proposed project would be sufficiently minor that no mitigation would be necessary. To our knowledge, neither LURC nor DEP have permitted a wind power project to date with the same level of impacts to a suite of scenic resources as outstanding as those around Chain of Ponds.[7] In the case of the eight northern turbines in this application, we believe that conditions to mitigate the impacts are needed. Factors that lead us to conclude that mitigation is needed include:

1. The number of scenic resources of state and national significance that would be impacted: Chain of Ponds, Arnold Pond, Crosby Pond, the Chain of Ponds public lands unit, Kibby Stream and the Arnold Trail would all be impacted to some degree by the proposed turbines.
2. The relative value of the resources that would be impacted: Chain of Ponds, and Arnold and Crosby Ponds are not merely scenic resources of state significance. They are resources that have been identified as having "outstanding" scenic values. The public lands unit is described as "highly scenic." Even among scenic resources, these areas have been broadly recognized for their exceptionally high scenic value.

[7] Although they were not treated consistently by LURC and various third parties, both the Kibby 1 and Stetson wind projects included conservation payments and/or protections of mountain resources that had the effect of either protecting or improving scenic/recreational resources. Neither project had comparable scenic impacts to the current application.

3. The relatively high number and many types of uses that would be impacted: This is an area that has a relatively high level of use, given its distance from population centers. The combination of the scenic byway, the Arnold Trail, the multiple Class 1A ponds with outstanding scenic character and the public land unit in an accessible but undeveloped and relatively remote-feeling area makes this a very attractive destination. Visitor expectations of undeveloped mountains and shorelines are particularly high, given that that is the primary characteristic of the area. A wide variety of visitors to the area will be impacted by the turbines. The experiences of users of the public land unit, including paddlers and anglers on the ponds, historical buffs following the Arnold Trail, tourists exploring the scenic byway, and anglers looking for remote headwater streams would be changed by these turbines. Winter users, including snowmobilers and snowshoers, would also be impacted.
4. The scale of the turbines viewed at a distance of approximately four miles, when combined with the above considerations.

Given the value of the resources and the extent of impacts on the scenic resources and on existing uses related to the scenic character of the scenic resources of state and national significance, we believe that a permit for the northern eight turbines should include as a condition a requirement that the applicant provide appropriate mitigation.

We suggest that the appropriate conditions could include providing funds to protect other scenic resources that are either in the same immediate area, such as purchasing additional public lands along the shoreline of Chain of Ponds or improving the scenic character of existing public lands on Chain of Ponds, or purchasing the development rights on a scenic mountain ridge in the state. Pisgah Mountain or the southern ridge and peak of Sisk Mountain are two possibilities; there are certainly others. Absent a specific proposal for one of the above, we suggest that a fund in the amount of $100,000 dollars be made available to the Bureau of Public lands to be spent as they determine is most appropriate, consistent with these goals.[8]

Vissering suggests that no mitigation is required because there is no unreasonable or undue adverse impact. This is an incorrect analysis of the law. If there were an undue or unreasonable impact from these eight northern turbines, the application would need to be denied and mitigation would not be relevant. Mitigation is only relevant where the impacts do not rise to an undue or unreasonable adverse level.

Conclusion

Changes in the viewshed that would be caused by the construction of turbines 9 - 15 would significantly compromise the scenic character of the state significant Chain of Ponds and the nationally significant Arnold Trail causing an unreasonable adverse effect on the scenic character and related recreational uses of these areas. We urge LURC to deny a permit for these turbines.

[8] The figure $100,000 represents the approximate value of the land area on which the northern eight turbines sit: ½ mile x 1.1 mile, or approximately 350 acres, x $300/acre. This is one potential method for determining the appropriate amount of mitigation. Other methodologies may also be appropriate.

We believe that an amended application for turbines one through eight would meet the legal requirements and should be granted subject to a condition that requires mitigation for the adverse impacts on scenic resources of state or national significance.

Dated: April 21, 2010

VERIFICATION

_____

Signature of Witness: Catherine B. Johnson

April 21, 2010

Before me appeared Catherine B. Johnson, who being duly sworn, did testify that the foregoing testimony was true and correct to the best of her knowledge and belief.

State of Maine
Kennebec County

_____

NOTARY PUBLIC

ATTACHMENTS

A. Excerpts from Bureau of Parks and Lands Flagstaff Region Management Plan addressing Chain of Ponds, June 12, 2007.
B-1. NRCM revised Vissering Photosimulation from Viewpoint 5 showing northern eight turbines and southern seven turbines.
B-2. NRCM revised Vissering Photosimulation from Viewpoint 5 showing northern eight turbines only.
C-1. Vissering Appendix 2, Viewshed Analysis Map Detail: Chain of Ponds.
C-2. NRCM modified Vissering Appendix 2, Viewshed Analysis Map Detail: Chain of Ponds, showing approximate visibility of turbines if southern seven turbines are removed.

STATE OF MAINE
DEPARTMENT OF CONSERVATION
LAND USE REGULATION COMMISSION

IN THE MATTER OF

TRANSCANADA MAINE WIND DEVELOPMENT INC.	)	PRE-FILED TESTIMONY
	)	MAINE AUDUBON
KIBBY EXPANSION WIND POWER PROJECT, DP4860	)	SUSAN M. GALLO
	)	
KIBBY AND CHAIN OF PONDS TWPS. FRANKLIN COUNTY	)	

I. Introduction

If TransCanada's application for the Kibby Expansion Wind Power Project is approved as proposed, the project will cause undue adverse impacts to several high-priority resource values. It therefore fails to meet the criteria for approval set forth in 12 M.R.S.A. §685-B.4.C, 35-A MRSA §3452, and LURC Land Use Districts and Standards Chapter 10.24. Specifically, the construction of the southern seven turbines in the project area and their associated roads will cause undue adverse impacts to breeding Bicknell's thrush (*Catharus bicknelli*), a species endemic to the northeast and one of the highest conservation priorities for the region, and to a large block of a rare natural community type, and will also cause an unreasonable adverse impact to the character of scenic resources of both state and national significance.

This testimony is presented on behalf of the Consolidated Interveners (Appalachian Mountain Club (AMC), Maine Audubon, and Natural Resources Council of Maine (NRCM)) and will focus on the value of wildlife habitat in the project area (particularly for Bicknell's thrush). Maine Audubon has grave concerns about additional undue adverse impacts in the

project area, and will refer to and support testimony from Dr. David Publicover from AMC and Catherine Johnson from NRCM.

II. Biographical Info.

My name is Susan M. Gallo. I hold a Master's degree in Organismal Biology and Ecology from the University of Montana, and a Bachelor's of Science degree in Natural Resources from Cornell University. I have direct field experience working with amphibians, forest songbirds, seabirds, shorebirds and loons. Early in my wildlife career, I worked as a wildlife biologist for the state of Montana, Montana Audubon, and Plum Creek Timber Company, with a focus on forest breeding bird ecology, land management (ranching and logging), and conservation planning. Since coming to Maine Audubon as a Wildlife Biologist in 1998, I have worked on a variety of state-wide conservation issues, including coordinating state-wide surveys for amphibians, loons, and owls; coordinating Maine's limited Important Bird Areas Program; planning for Maine's Comprehensive Wildlife Conservation Plan; and participating in various stakeholder groups and task-forces for state government (e.g., Boat Access Task Force (DIFW, 2007), Migratory Songbird Working Group (DIFW, 2001), Surface Water Ambient Toxic Monitoring Program (DEP, 2006-present)). Through efforts to expand Maine's Important Bird Areas program to northern Maine in the last several years, I have become actively involved with issues pertaining to priority conservation birds and conservation planning for the northern forest region.

II. Support for the Northern Eight Turbines

Maine Audubon supports the development of wind power as a renewable energy source, and has supported wind power development in the past that was sited to avoid conflicts with high-priority wildlife and wildlife habitat. To that end, we supported the initial Kibby Wind Power project because it avoided prime habitat for Bicknell's thrush and Northern Bog lemming, eliminated turbines from high-elevation habitat, set aside development rights on 1,300 acres of higher-value Bicknell's thrush habitat, and provided $500,000 to off-site conservation of additional high-elevation habitat.

Consistent with our support of other wind power development projects in Maine, we support the construction of the eight turbines and their associated roads in the northern portion of this project area. Scenic impacts from this part of the project area meet the standards (see testimony of Catherine Johnson, NRCM) and no large blocks of unique natural community types have been identified[1] (see also testimony of Dr. David Publicover, AMC). This part of the project area is located outside of high-quality Bicknell's thrush habitat, so concern over both habitat loss and risk of collisions with turbines is minimal. If the application were amended to include development of only this portion of the project area, we would support the project.

III. Ecological Value of the Southern Project Area

The southern portion of the project area is ecologically different from the northern portion, and in contrast, provides higher-value habitat for wildlife. Although the applicant has attempted to address some of the concerns for wildlife and wildlife habitat by modifying turbine and road locations in the southern portion of the project area, these modifications have not resulted in elimination of undue adverse impacts to the resources in question. Therefore, the proposal for

[1] Pers. Comm., Sarah Demers at Maine Natural Areas Program, April 5, 2010.

wind turbine development in the southern portion of the project area still falls short of meeting the criteria of no undue adverse impacts, and should not be permitted.[2]

A. Bicknell's Thrush

Bicknell's thrush was documented above 3,200 feet in the southern project area by the applicant during the summer of 2009.[3] Bicknell's thrush is an extreme habitat specialist, restricted to balsam fir-dominated forests in the mountains of the northeastern United States and Canada, and preferring areas within larger forest patches that have long-term, on-going disturbance (damage from high winds, insects, disease, heavy ice, etc.) and dense re-growth of balsam fir in the understory.[4]

Bicknell's thrush habitat often overlaps with areas that have high wind resource values. A recent study overlaying a model of Bicknell's thrush habitat with areas of high wind resource values in the Northeast Highlands physiographic region of Vermont found that 94% of Bicknell's thrush habitat was in areas classified as having high wind power potential (Wind Power Class Four or higher).[5] However, only 7% of the landscape where wind power potential was high in this region overlapped with Bicknell's thrush habitat (See Exhibit A). In other words, most (93%) of the potential landscape with high wind power potential in the Northeastern Highlands of Vermont did *not* overlap with Bicknell's thrush habitat. Undue adverse impacts to

[2] M.R.S.A. §685-B4C. 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.
[3] Kibby Expansion Wind Power Project Application Volume II, page B.15-28.
[4] Rimmer, C.C., K.P McFarland, W.G. Ellison, and J.E. Goetz. 2001. Bicknell's thrush *(Catharus bicknelli)*. *In* The Birds of North America, No. 592 (A. Poole & F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
[5] McFarland, K.P., C.C. Rimmer, S.J.K. Frey, S.D. Faccio, B.B. Collins. 2008. Demography, ecology and conservation of Bicknell's thrush in Vermont, with a special focus on the Northeastern Highlands. Vermont Center for Ecostudies, Norwich, VT. Technical Report 08-03.

Bicknell's thrush habitat from wind power development in Maine are entirely avoidable if projects are sited outside of this limited habitat.

It is critical that wind power projects be sited to avoid high-quality Bicknell's thrush habitat, as recommended by researchers working extensively with Bicknell's thrush throughout the northeast. Dr. Chris Rimmer and colleagues at the Vermont Center for Ecostudies have made explicit recommendations in two recent papers for "avoiding trail construction and widening in areas where natural disturbance is most likely to maintain suitable habitat for Bicknell's Thrushes (e.g., west-facing slopes, ridgelines, fir waves, and areas adjacent to fir waves)." [6,7] Wind power development as sited in the current application do not follow these guidelines. Proper siting is essential to reduce impacts to Bicknell's thrush.

Although there is no conclusive evidence of range-wide population declines, regional declines and local extinctions have elevated concern for Bicknell's thrush populations.[8] For example, between 2001 and 2004, a statistically significant decline of 9% per year was recorded for 47 mountaintop survey routes in Vermont.[9] An analysis of surveys in New Hampshire between 1993 and 2003 indicated a range wide decline of 7%, the first evidence of a sustained decline in a major population of Bicknell's thrush.[10] There is no published data supporting an increase in Bicknell's thrush in the northeast region.

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[6] Rimmer, C.C., K.P. McFarland, J.D. Lambert, R.B. Renfrew. 2004. Evaluating the use of Vermont ski areas by Bicknell's Thrush: applications for Whiteface Mountain, New York. Vermont Institute of Natural Science, Woodstock, VT

[7] Rimmer, C.C., J.D. Lambert and K.P. McFarland. 2005. Bicknell's Thrush Conservation Strategy for the Green Mountain National Forest. VINS Technical Report 05-5. Vermont Institute of Natural Science, Woodstock, VT.

[8] See studies cited in Rimmer, C.C., J.D. Lambert, and K.P. McFarland. 2005. Bicknell's thrush *(Catharus bicknelli)* Conservation Strategy for the Green Mountain National Forest. Vermont Institute of Natural Science Technical Report 05-5, Woodstock, VT.

[9] Lambert, J.D., M. P. McFarland, C. C. Rimmer, S.D. Faccio and J.L. Atwood, 2005. A practical model of Bicknell's thrush distribution in the northeastern United States. Wilson Bulletin 117(1):1-11.

[10] J. D. Lambert, D.I. King, J.P.Buonaccorsi, and L.S. Prout, 2008. Decline of a New Hampshire Bicknell's thrush Population, 1993–2003. Northeastern Naturalist 15(4):607-618.

1. Bicknell's Thrush is a Conservation Priority on Multiple Spatial Scales

As shown in Exhibit B, "Generalized Distribution of Bicknell's thrush in the Northeastern United States," suitable Bicknell's habitat is severely limited throughout its range. Bicknell's thrush does not breed anywhere in the world outside of this northeastern region, and is one of the most rare, range-restricted breeding birds in the Northeast. Its rarity and the importance of conserving its habitat are widely recognized:

- *The International Union of Concerned Scientists* classifies Bicknell's as globally "vulnerable", a category for species facing a high risk of extinction in the wild.[11]

- *The U.S. Fish and Wildlife Service's* 2008 "Birds of Conservation Concern" includes the Bicknell's thrush at multiple geographic scales (local, regional and national) as a species that, without additional conservation actions, is likely to become a candidate for listing under the Endangered Species Act.[12]

- *National Audubon's* 2007 Watchlist placed Bicknell's thrush in their red category, for species that are declining rapidly and/or have very small populations or limited ranges, and face major conservation threats. These typically are species of global conservation concern.[13]

- *The Maine Department of Inland Fisheries and Wildlife*[14] classifies Bicknell's thrush as one of only 12 bird species of very high priority on their list of Species of Greatest Conservation Needs, indicating a high potential for state extirpation without management intervention and/or protection. The plan lists wind power turbines as a threat for the species, and identifies the following three relevant population and habitat objectives for Bicknell's thrush:
    1. Increase the population within the Atlantic Northern Forest Bird Conservation Region by 10%;
    2. Maintain existing range of breeding habitat; and
    3. Identify and secure habitat protection for core breeding areas in Maine.

- *The Partners in Flight* North American Landbird Conservation Plan lists the Bicknell's thrush as a species with multiple causes for concern across their entire range, with a

[11] BirdLife International (2009) Species factsheet: *Catharus bicknelli*. Downloaded from http://www.birdlife.org on 4/12/2010.
[12] U.S. Fish and Wildlife Service, 2008. Birds of Conservation Concern 2008. U.S. Dept. of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA.
[13] Butcher, G.S., D.K. Niven, A.O. Panjabi, D.N. Pashley, and K.V. Rosenberg. WatchList: The 2007 WatchList for United States Birds. American Birds 61:18-25.
[14] Maine Department of Inland Fisheries and Wildlife. 2005. Maine's comprehensive wildlife conservation strategy. Maine Department of Inland Fisheries and Wildlife, Augusta, Maine.

combination of small populations, narrow distributions, high threats, and declining population trends, and a species of highest continental concern and priority for conservation action at national and international scales.[15]

- *The Partners in Flight* Bird Conservation Plan for the Eastern Spruce-Hardwood Forest states that Bicknell's thrush is the species of greatest concern, and by association the conifer habitats of mountaintops…ranks first in regional priority (p. 16). It also lists the loss of boreal-mountaintop habitats that are critical for Bicknell's thrush as "perhaps the most immediate threat to important bird populations in the planning unit". The plan supports the conservation goal of protecting all sites that support Bicknell's thrush "large enough to be considered source populations for other sites" and as many additional high-elevation habitat patches with smaller populations as possible.[16]

- *The U.S. Fish and Wildlife Service* lists Bicknell's thrush as one of only 17 species in the highest priority conservation category in Bird Conservation Region 14 (Atlantic Northern Forest) because of concern for its population within the region, the high responsibility of the region for the population, and either high or moderate continental concern for the species. The plan also lists wind power as a threat to Bicknell's thrush in the region.[17]

Despite the lack of state or federal listing as an endangered or threatened species, the above references make it undeniable that Bicknell's thrush is a high conservation priority at multiple spatial scales and with agreement among major bird conservation organizations and state and federal agencies across the northeast and the nation.

2. Loss of Bicknell's Thrush Habitat

The applicant asserts that the project area offers limited habitat for Bicknell's thrush but provides insufficient information to support these claims. Potential "suitable" habitat was identified through the use of "field surveys and aerial photo interpretation".[18] The applicant did not identify which "field survey" data was used for this delineation (vegetation surveys or point counts), or what characteristics on aerial photos were used to identify the habitat. No further

[15] Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, A. M. Martell, A. O. Panjabi, D. N. Pashley, K. V. Rosenberg, C. M. Rustay, J. S. Wendt, T. C. Will. 2005. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY. Partners in Flight website. http://www.partnersinflight.org/cont_plan/.
[16] K.V. Rosenberg and T.P. Hodgman. 2000. Partners in Flight Landbird Conservation Plan: Physiographic Area 28: Eastern Spruce-Hardwood Forest
[17] Dettmers, R. 2006. A blueprint for the design and delivery of bird conservation in the Atlantic Northern forest. US. Fish and Wildlife Service/Atlantic Coast Joint Venture.
[18] Kibby Expansion Wind Power Project Application Volume II, page B.15-28

explanation of methods is given in the application. Therefore we have no way to assess the delineation of the "suitable" habitat block and cannot support the applicant's claim that this is the limit of potential suitable habitat within the project area.

a. "Suitable" vs. "Core" Habitat

An additional concern is the inappropriate division of potential Bicknell's thrush habitat into "suitable" vs. "core" habitat. "Core" habitat was delineated within suitable habitat based on spot-mapping methodology. Although we concur with the use of spot-mapping as a tool to gather more information about habitat use, there are many ways to interpret spot-mapping results. Given no methods for data analysis in the application, and the atypical and complex social system of Bicknell's thrush (e.g., mates of both sexes having multiple partners, males with overlapping home ranges), we cannot evaluate or concur with the delineation of "core" habitat.

Furthermore, the applicant has made a fundamental flaw by creating this type of delineation; it is inappropriate when assessing the impact of an industrial development on Bicknell's thrush habitat. What has been identified as "core" habitat in the summer of 2009 may or not be "core" habitat in 2010 or into the future. The temporal nature of Bicknell's thrush habitat is evident from multiple research perspectives. Analysis of high-elevation survey routes run by volunteers for the Vermont Center for Ecostudies' Mountain Bird Watch program show apparent extirpations and recolonizations over time.[19] In other words, Bicknell's thrush will "disappear" from a survey route one year, only to "reappear" one or several years later. An analysis of high-elevation point counts in the White Mountain National Forest illustrated similar patterns, with Bicknell's thrush present at point counts in suitable habitat typically in only one of

[19] see McFarland et al., 2008 for examples in the Northeastern Highlands of Vermont.

five survey years.[20] Given the dynamic nature of high-elevation forests, and the likelihood that a small-scale disturbance like wind throw or ice damage will dramatically change the nature of habitat quality for Bicknell's thrush in a fairly short time-frame[21], it makes the most sense, ecologically and from a long-term conservation perspective, to treat *all* suitable Bicknell's thrush habitat, whether used in 2009 or likely to be used in 2010 or beyond, as an equally valuable resource worthy of protection.

The applicant refers repeatedly to avoiding "core" Bicknell's thrush habitat when siting crane roads and turbine pads, while minimizing to the "maximum extent practicable" [22] all Bicknell's thrush habitat. We urge LURC to use the scientific reports we cite and agree that *all* Bicknell's thrush habitat has the potential to be "core" habitat in the future, and in fact, the dynamic nature of the system assures that "core" areas of habitat will move over time. Impacts to *all* Bicknell's thrush habitat must be avoided in order to maintain viable habitat over the long term, and meet the standard of no undue adverse impact to this important natural resource.

b. Edge Effects and Fragmentation

The habitat lost from a wind power development goes beyond the actual footprint of roads, collector corridors and turbines. Aside from the direct loss of habitat, the creation of multiple and extensive openings in the forest can degrade forest habitat, creating "edge effects" that can degrade habitat beyond the physical boundary of the edge in question. Openings in the forest can change the character of habitat for wildlife species by changing light penetration, temperature, moisture and microclimate along the edge. Roads create long, linear edges through forested habitat and can change habitat in multiple ways, by altering the physical and chemical

[20] S.R. Hale. 2006. Using satellite imagery to model distribution and abundance of Bicknell's thrush (*Catharus bicknelli)* in New Hampshire's White Mountains. Auk 123(4):1038-1051.
[21] Lambert et. al 2005
[22] e.g., Kibby Expansion Wind Power Project Application Volume II, B.13-9

environment, changing animal behavior and travel patterns, and acting as vectors for the spread of invasive species.[23] A recent review of avian studies of edge effects and predation confirm most studies of avian nest predation find edge effects up to but not more than 150 meters from the forest edge (approximately 492').[24] (Also see testimony of Dr. David Publicover, pages 9 and 10, for additional information on forest edge effects).

Predator-prey relationships may also be altered when a block of forest is fragmented by roads or other development like agriculture or logging. This may apply to "islands" of Bicknell's thrush on mountaintops surrounded by forest management activities that reduce habitat suitability at lower elevation. Red squirrels, a primary nest predator for Bicknell's thrush,[25] have been documented to be more abundant in isolated fragments of western boreal forests, possibly because interior forest predators like pine marten and barred owl are absent when forest fragments become too small.[26] This may have serious impacts on nesting songbirds in small patches of habitat, particularly for low-nesting species like Bicknell's thrush.

The Maine Natural Areas Program estimated that the applicant will be clearing 42 acres within the Fir-Heart-leaved Birch Sub-alpine natural community. To account for additional edge effects immediately adjacent to the cleared areas, MNAP added an additional 50' buffer around the cleared area, bringing the total area affected within this community type to 80 acres.[27] However, a 50' buffer is likely much too conservative in terms of the depth of impacts from edge effects, particularly for Bicknell's thrush. The area affected should be recalculated with at least a

[23] Extensive review in S.C. Trombulak and C. A. Frissell, 2000. Review of ecological effects of roads on terrestrial and aquatic communities. Conservation Biology 14(1):18-30.
[24] See review of studies in Laurence, W. F. 2000. Do edge effects occur over large spatial scales? Trends in Ecology & Evolution 15:134–135.
[25] Rimmer et al., 2001.
[26] E. Bayne and K.A. Hobson, 2002. Effects of red squirrel (Tamiasciurus hudsonicus) removal on survival of artificial songbird nests in boreal forest fragments. Am. Midl. Nat. 147:72–79
[27] Letter from Sarah Demers to Marcia Spencer Famous dated February 24, 2010, page 1.

100' buffer (see page 9 of David Publicover's AMC testimony). This will clearly yield a more substantial and undue adverse impact to this rare natural community.

The applicant has determined that only 12.4 acres of potential suitable Bicknell's thrush habitat (14%) would be impacted by the project.[28] Since there is no discussion of the impacts beyond the footprint of the project area in the application, we can only assume this calculation is limited to direct clearing of roads and turbine pads and fails to include the multiple impacts to habitat beyond the actual cleared area. We believe the applicant has failed to include these edge effect impacts into the calculations of area affected.

Finally, the crane roads built for this project will be 34 feet wide, with graded areas on either side reaching well over 200 feet in total width in several places throughout the project area.[29] These are not temporary logging roads, and are significantly different from any kind of road clearing that has been in this area before (see Exhibit C for an example of a wind power access road through forested habitat). We therefore strongly disagree with the applicant's assertion that "the proposed project will not create edges (and thereby edge effects) incongruous with those that are extant, being introduced, or are impending due to forestry practices in the region."[30] The size and width of the access roads created for this project will be unlike anything currently in project area, particularly in the P-MA zone above 2700' where roads are primarily temporary for forest management activities.

c. Winter Habitat

Although many conservation organizations believe that the loss of winter habitat pose the most immediate threat to Bicknell's thrush survival,[31] evidence of winter limitation to the

[28] Kibby Expansion Wind Power Project Application Volume II, B.15-32 and B.15-11.
[29] Kibby Wind Power Expansion Application, Attachment B.13-1, Permit Plan Set.
[30] Kibby Expansion Wind Power Project Application Volume II, B.15-16
[31] For summary of winter habitat issues, see VCE website: www.vtecostudies.org/hispbird/

population is lacking, and studies are needed to quantify the extent and use of remaining winter habitat.[32] While we agree that winter habitat loss and degradation is a major concern for Bicknell's thrush, we do not see it as justification for ignoring the conservation needs on the breeding grounds. As efforts to purchase and protect additional habitat (e.g., the Hispaniola Conservation Fund at VCE[33]) move forward, we hope to see improvements in winter habitat quantity and quality. When the time comes that wintering habitat is less of an issue for Bicknell's thrush, we must be sure that we have been vigilant in protecting *all* potential breeding habitat in the northeast to assure long-term survival of wildlife using higher-elevation mountaintop habitat.

3. Undetermined Impact to local Bicknell's Thrush Population

The applicant's failure to meet its burden of demonstrating no undue adverse impact on Bicknell's thrush is illustrated by the lack of supporting documentation. The lack of data pertaining to Bicknell's thrush surveys in the permit application is striking. Unlike the extensive and detailed data summaries included for spring and fall raptor surveys, spring and fall migration surveys, and bat surveys in the project area,[34] there is little more than a page summarizing and interpreting Bicknell's thrush survey results.[35] This contrast in both the quantity and the quality of data is alarming. For the other surveys mentioned above, raw data that allows third parties to confirm and concur with the applicant's conclusions was provided. Similarly, the original application for the initial Kibby Wind Power Development included extensive information on migratory bird survey results. The fact that this information was not provided for Bicknell's thrush in the current application is a grave concern. Despite multiple attempts requesting

[32] Lambert et al., 2008, page 614.
[33] For more information, see: http://www.vtecostudies.org/hispbird/fund.html
[34] Kibby Expansion Wind Power Project Application Volume I, Sections A.3.3, A.3.4, and A.3.5.
[35] Kibby Expansion Wind Power Project Application Volume II, Sections B.15.28-29, B.15-32.

additional information from the applicant, no detailed information has been shared, so the burden of proof for undue adverse impacts has not been met by the applicant.

Some examples of the type of information we feel is critical for confirming a finding of no undue adverse impact include how many times each point count was surveyed, where Bicknell's thrush were located during spot-mapping exercises, and how many Bicknell's thrush (and other species) were detected at each point count. The conclusion that LURC must draw from the applicant's failure to provide this information is that the applicant has failed to meet their burden of proof that there will be no undue adverse impacts to Bicknell's thrush. Indeed, the limited information that they have provided indicates that building a commercial wind power facility within the southern portion of this project area will in fact result in undue adverse impacts.

4. Risks of Collision to Bicknell's thrush

There is a significant risk of collision to Bicknell's thrush from the placement of turbines directly in known breeding habitat. Male Bicknell's thrushes conduct a mating flight, which most commonly occurs at dusk and consists of 10- to 15-second flights that are 25 to 75 meters above the ground, often in large circles greater than 100 meters in diameter. Birds tend to rise rapidly from perches before circling and dropping abruptly back after completing this "flight song."[36] This behavior puts these birds well within the rotor-swept zone, which extends from 35 to 125 meters above the ground, at a time of low visibility (dusk). With five of the seven southern turbines in or within 100 meters of potential Bicknell's thrush habitat, the applicant severely underestimates the potential for direct collisions and in fact, fails to mention this potential cause of mortality in the application.

[36] Rimmer et al., 2001

IV. Post-construction Issues

1. Bird and Bat Migration:

Birds and bats migrate through the project area, as documented by the applicant during the spring and fall of 2009.[37] A comparison with recent similar studies on forested ridgelines in the northeast as presented in the application is summarized in Exhibit D. Of note, the fall migration passage rate in the project area of 458 targets/km/hr was moderately high compared to other recent studies.[38] However, the altitude of passing targets for fall migration was substantially lower than in other similar studies, with 23% of targets flying below the rotor swept area. This translates to a very high rate of targets passing through the rotor swept area (>100 targets/km/hr) (See Exhibit D). Although these passage rates may not rise to the level of creating an undue adverse impact, the low altitude of flights over the project area is a concern in terms of the potential for direct mortality.

We encourage LURC to provide strong language if this project is approved requiring rigorous post-construction studies. Since the body of knowledge and the available technology around post-construction studies is rapidly evolving[39], we encourage the use of current, peer-reviewed guidelines for these studies as well as the employment of emerging technology (for example, guidelines outlined on pages 2474-2477 in Kunz. et al., 2007, attached in Exhibit E).[40] We also ask that the scope of post-construction studies be <u>determined</u> by DIFW, in consultation with the U.S. Fish and Wildlife Service, in order to assure third-party oversight of protocols,

[37] Kibby Wind Power Expansion application, Vol. 1, Attachment A.3-3
[38] Kibby Wind Power Expansion application, Vol. 1, Attachment A.3-3
[39] For example, thermal infrared cameras have monitored direct bat mortality at wind turbines in West Virginia, see Horn, J.W., E.B. Arnett and T. H. Kunz. 2008. Behavioral responses of bats to operating wind turbines. J Wildl Mgmt 72(1):123-132.
[40] T.H. Kunz, E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M. D. Strickland, & J. M. Szewczak. 2007. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats:A Guidance Document. J Wildl Mgmt 71(8): 2449–2486.

similar to the agreement reached for the original Kibby Wind Power project.[41] In the event that the post-construction studies find high mortality events for either breeding birds or migrating birds and bats, strong language in the permit for adaptive management of turbine operations is needed. For example, curtailing turbines during times of day and/or times of year that are likely to lead to high mortality events.

If the application is approved, we also encourage DIFW to investigate emerging RADAR technology for monitoring migration events. For example, the company DeTect, Inc. manufactures the MERLIN Avian Radar System which provides operational monitoring of migrating birds and bats, and has the potential to shut down turbines in the face of on-coming migration events.[42] If post-construction studies reveal issues for bird and bat mortality, this type of technology may provide needed mitigation to reduce the size and scope of mortality.

2. Golden Eagle Recovery:

Golden eagles have been extirpated from other northeastern states in recent decades, and the last confirmed golden eagle nest in Maine was in the vicinity of the project more than 20 years ago. However, interest in recovery efforts in the northeast is on-going though at the present time is not in any organized form.[43] Fueling this interest are the occasional observations of golden eagles that stay in Maine throughout the summer. One radio-tagged three-year old golden eagle was observed throughout the northwestern part of the state in 2009.[44] We raise this issue to highlight the need for on-going coordination with DIFW if this project is permitted, and

[41] From page four of the "Summary of Agreement Between Maine Audubon, Natural Resources Council of Maine and the Appalachian Mountain Club, and TransCanada" for ZP709, "Although the scope and extent of the post construction avian and bat studies have not been finalized, TransCanada has agreed that any such studies will include the following elements…c. Details of the scope will be determined by IF&W in consultation with USFWS and will include details related to searcher efficiency, scavenging rates, and carcass identification/storage/removal"

[42] http://www.detect-inc.com/avian.html

[43] Charlie Todd, MDIFW biologist, pers. comm., April 2010.

[44] Charlie Todd, MDIFW biologist, pers. comm., April 2010.

to keep in mind during post-construction studies that golden eagles may become a mitigation concern in the future.

IV. Conclusions

The applicant has failed to meet its burden of establishing no undue adverse impact to existing natural resources or scenic character. Despite the lack of adequate information provided in the application, it is clear that the southern portion of the project area comprises breeding Bicknell's thrush habitat. Such habitat is severely limited and Bicknell's thrush is one of the most rare, range-restricted breeding birds in the Northeast. Locating turbines and their accompanying roads within and adjacent to this habitat will cause conversion and direct loss of this habitat as well as direct mortality to singing males, therefore comprising a significant undue adverse impact. The applicant should amend its proposal to include only the northern eight turbines thereby avoiding undue impacts to important wildlife habitat.

VERIFICATION

Susan M Gallo

Signature of Witness: Susan M. Gallo

April 19, 2010

Before me appeared Susan M. Gallo, who, being duly sworn, did testify that the foregoing testimony was true and correct to the best of her knowledge and belief.

NOTARY PUBLIC

AARON C. SPLINT
Notary Public, Maine
My Commission Expires May 22, 2010

SUSAN M. GALLO

PRE-FILED TESTIMONY

DP 4860

EXHIBITS

EXHIBIT A. Wind power resources in the Northeastern Highlands of Vermont overlaid with Bicknell's thrush habitat model (Figure 3 from McFarland et al., 2008) Full text of article available at: http://www.vtecostudies.org/PDF/VCEBITHReport2008.pdf

EXHIBIT B. Range map of Bicknell's thrush in the northeast (from Lambert et al., 2005)

EXHIBIT C. Example of road corridor in the original Kibby Wind Power project (photo by Ken Kimball)

EXHIBIT D. Table summarized from Kibby Wind Power Expansion Application, Volume I, Attachment A.3-3, showing passage rates and altitudes recorded in recent migration studies on forested ridgelines in the northeast U.S.

EXHBIT E. Excerpt regarding pre- and post-construction guidelines, from Kunz et al., 2007. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats:A Guidance Document. J Wildl Mgmt 71(8): 2449–2486. Available for download at: http://www.humboldt.edu/~jms139/download/Kunz_etal_JWM_07.pdf.

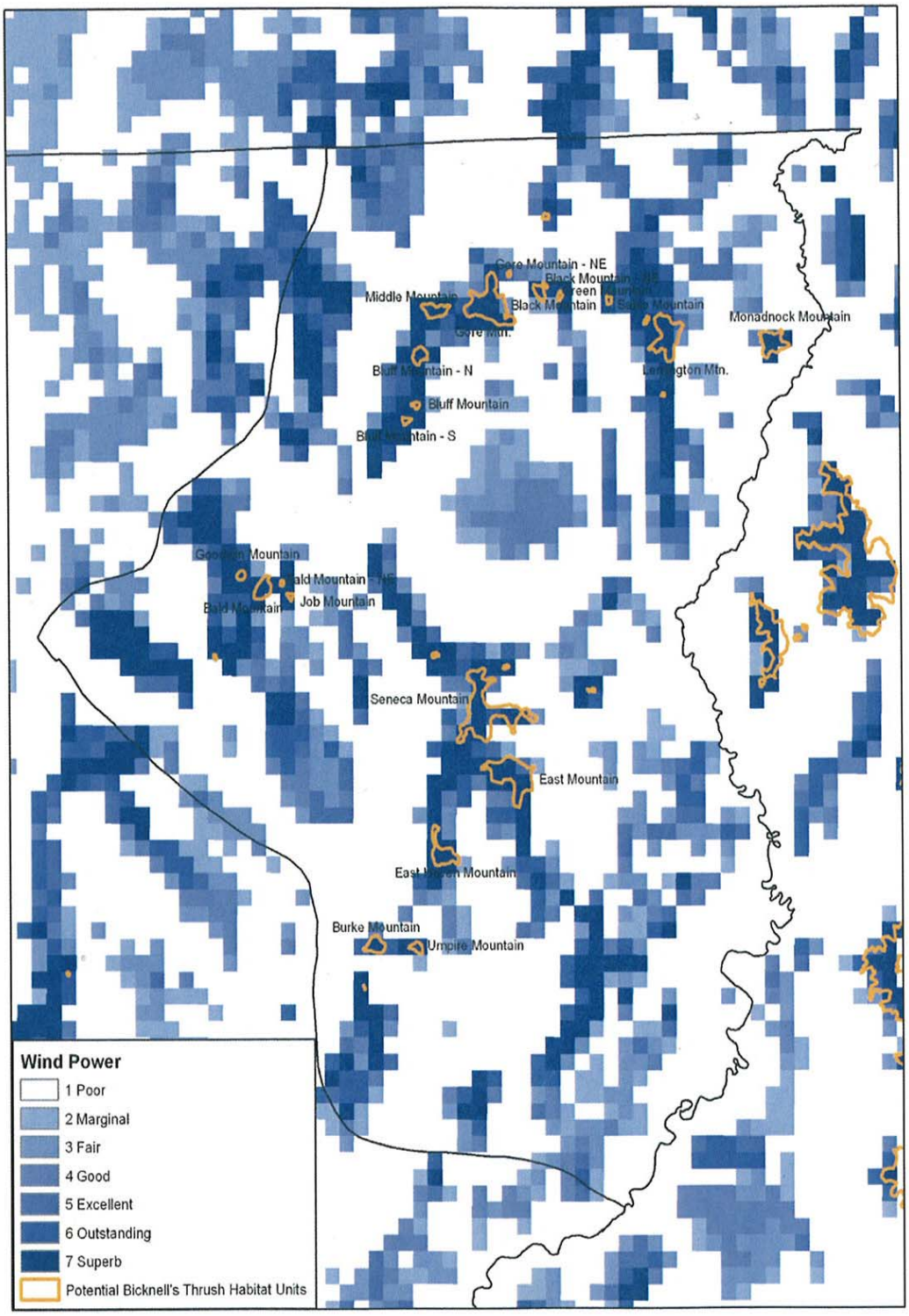

EXHIBIT A: Wind power estimates at 50m altitude in the Northeastern Highlands region, Vermont. Orange polygons indicate identified Bicknell's thrush high-elevation habitat units (Figure 3 in McFarland, K.P., C.C. Rimmer, S.J.K. Frey, S.D. Faccio, B.B. Collins. 2008. Demography, ecology and conservation of Bicknell's thrush in Vermont, with a special focus on the Northeastern Highlands. Vermont Center for Ecostudies, Norwich, VT. Technical Report 08-03)

EXHIBIT B

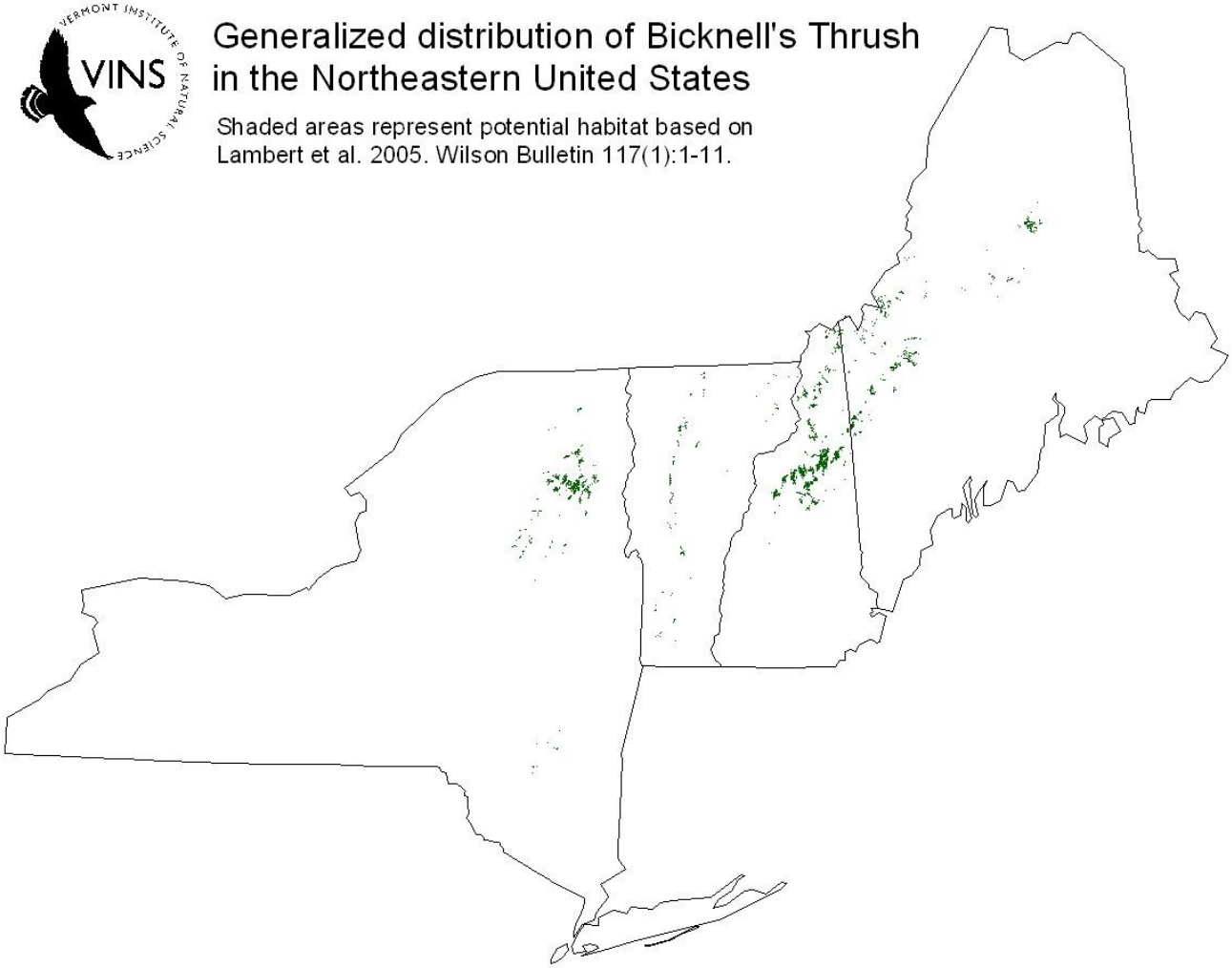
VERMONT INSTITUTE OF NATURAL SCIENCE
VINS
Generalized distribution of Bicknell's Thrush
in the Northeastern United States
Shaded areas represent potential habitat based on
Lambert et al. 2005. Wilson Bulletin 117(1):1-11.

EXHIBIT C. Example of road corridor in wind power development (photo by Ken Kimball). Note the width cleared extends far beyond the road itself.

EXHIBIT D. A sample of the most recent radar survey results conducted at proposed U.S. wind power facilities on forested ridgelines in the northeast U.S. From Kibby Wind Power Expansion Project Application, Attachment A.3-3, Appendix A, Table 5.

Site Name	Season	Year	# Survey Nights	Avg. Passage Rate (t/km/hr)	Average Flight Height (m)	%Targets Below Turbine Height	Avg. # of Targets in Rotor Swept Area (km/hr)
Laurel Mt., Barbour Co., WV	Spring	2007	20	277	533	3%	8
Laurel Mt., Barbour Co., WV	Fall	2007	20	321	533	6%	19
Georgia Mountain, VT	Fall	2008	21	326	371	7%	23
Kibby, Franklin Co., ME (Range 1)	Fall	2005	12	201	352	12%	24
Deerfield, Bennington Co., VT	Spring	2006	26	263	435	11%	29
Lincoln, Penobscot Co., ME	Spring	2008	20	247	316	13%	32
Kibby Expansion, DP4680	**Spring**	**2009**	**20**	**207**	**293**	**18%**	**37**
Mars Hill, Aroostook Co., ME	Fall	2005	18	512	424	8%	41
Kibby, Franklin Co., ME (Range 1)	Spring	2006	10	197	412	22%	43
Mars Hill, Aroostook Co., ME	Spring	2006	15	338	384	14%	47
Errol, Coos Co., NH	Spring	2007	30	342	332	14%	48
Lempster, Sullivan Co., NH	Fall	2006	32	620	387	8%	50
Franklin, Pendleton Co., NY	Spring	2005	21	457	492	11%	50
Allegany, Cattaraugus Co., NY	Spring	2008	30	268	316	19%	51
Errol, Coos Co., NH	Fall	2007	29	366	343	15%	55
Lincoln, Penobscot Co., ME	Fall	2007	22	368	343	15%	55
Roxbury, Oxford, ME	Fall	2007	20	420	365	14%	59
Stetson, Washington Co., ME	Fall	2006	12	476	378	13%	62
Allegany, Cattaraugus Co., NY	Fall	2007	46	451	382	14%	63
Kibby, Franklin Co., ME (Valley)	Spring	2006	6	456	368	14%	64
Kibby, Franklin Co., ME (Valley)	Fall	2005	5	452	391	16%	72
Dans Mountain, MD	Spring	2005	23	493	541	15%	74
Oakfield, Penobscot Co., ME	Fall	2008	20	501	309	18%	90
Kibby, Franklin Co., ME (Mountain)	Fall	2005	12	565	370	16%	90
Roxbury, Oxford, ME	Spring	2007	20	539	312	18%	97
Lempster, Sullivan Co., NH	Spring	2007	30	542	359	18%	98
Oakfield, Penobscot Co., ME	Spring	2008	20	498	276	21%	105
Kibby Expansion, DP4680	**Fall**	**2009**	**20**	**458**	**287**	**23%**	**105**
Kibby, Franklin Co., ME (Range 2)	Spring	2006	7	512	378	25%	128
New Creek, Grant City, WV	Fall	2007	20	811	360	17%	138

EXHIBIT E. Excerpt from Kunz et al. 2007, pages 2474-2477, relating to post-construction monitoring.

Assessing Impacts of Wind-energy Development on Nocturnally Active Birds and Bats: A Guidance Document. T.H. Kunz, E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M. D. Strickland, & J. M. Szewczak. 2007. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats:A Guidance Document. J Wildl Mgmt 71(8): 2449–2486.

CONDUCTING PRE- AND POSTCONSTRUCTION MONITORING

Many of the methods and metrics summarized above for monitoring nocturnally active birds and bats have been applied during pre- and postconstruction monitoring and research efforts. In this section, we describe basic approaches and protocols to perform pre- and postconstruction monitoring and research, discuss factors influencing and limiting protocol development and implementation, and offer considerations for future monitoring and research.

Preconstruction Studies

Preconstruction assessments at proposed wind-energy facilities generally are initiated from early project evaluations in consultation with state or Federal agencies with respect to wildlife, including potential direct impacts to bird and bat species, especially nocturnal migrants, and threatened and endangered species or species of special concern. Agencies generally request that data be used to characterize wildlife resources in the context of a proposed development, to evaluate the potential impacts from such development, and to the greatest extent possible, determine the location of turbines that will minimize risk to birds and bats. Although these objectives may provide useful information for designing a facility and siting specific turbines, or perhaps aiding in the decision to abandon a project altogether, each project may require a different sampling design, level of sampling intensity, and volume of data to be collected.

Multiple factors may influence preconstruction monitoring and confidence of the data collected as outlined in the original ‘‘Methods and Metrics’’ document (Anderson et al. 1999), as well as other works (e.g., Skalski 1994, MacKenzie et al. 2001, Morrison et al. 2001, Pollock 1991, Pollock et al. 2002). Designing a preconstrution study protocol should begin with clearly defined questions. Thus, a clear understanding of the relevant questions should dictate the sampling design and methods. An inappropriate protocol may result in low power to detect differences (Steidl et al.1997), failure to account for spatial and temporal variation (Hayes 1997), and pseudoreplication (Hurlbert 1984), all of which can lead to unreliable statistical and deductive inferences. Ultimately, when assessing risks to nocturnally active birds or bats at a proposed wind-energy site, failure to design an appropriate sampling protocol and account for the aforementioned factors may increase the likelihood of a Type II error (i.e., failing to reject a false null hypothesis and concluding no effect when, in fact, there is one).

A fundamental gap in our current knowledge of preconstruction assessment of risk is that no linkages exist between preconstruction assessments and postconstruction fatalities for nocturnal wildlife. Although intensive studies are underway (Arnett et al. 2006), it may be several years before methods described in this document can be used to predict fatalities with an acceptable level of precision, accuracy, and degree of confidence.

In the case of Federally endangered species, the course of action for decision-making is reasonably well-defined. For example, a developer who finds Indiana myotis (Myotis sodalis) during mist-net surveys on a project area may enter into voluntary negotiations with the United States Fish and Wildlife Service (USFWS) to receive an incidental take permit under the auspices of a Habitat Conservation Plan under Section 10 (a)(1)(B) of the Endangered Species Act or may chose to abandon the project due to high risk of taking additional endangered species (U.S. Fish and Wildlife Service 2003).

Currently, there is neither a framework nor empirically driven guidelines for agencies or developers to know what 39.7 (63.1 SD) bat calls per night gathered with acoustic detectors or a passage rate of 116.9 (68.6) targets/km/hour collected from radar actually mean compared to 119.1 (626.2) bat calls per night or 350.7 (677.1) targets/km/hour, except that the activity and variance is about 3 times higher in both cases. Thus, establishing linkages between preconstruction metrics and postconstruction fatality estimates is a vital next step toward being able to predict impacts and, thus, provide the context needed for decisionmaking. Until additional empirical data are gathered and a relationship between independent variables and the number of fatalities, establishing decision-making criteria will be far more challenging, controversial, and politically charged than improving the sampling designs and quality of information gathered. Considerable uncertainty and risk reside in existing decision-making frameworks, but to best utilize the information gathered during the preconstruction period, such frameworks are needed for stakeholders to agree upon and implement. Established quantitative criteria for decision-making should be based on the best available scientific information and subject to change as new information is gathered, following the fundamental principles of adaptive management (Holling 1978, Walters 1986).

Postconstruction Studies

Many of the methods and metrics described for preconstruction surveys may be used effectively during the postconstruction period, including visual, acoustic, radar, and capture methods. In addition, postconstruction studies require estimates of actual bird and bat fatalities.

Estimating presence and activity.— With few exceptions, postconstruction monitoring has centered on fatality searches. Five postconstruction studies have deployed ultrasonic detectors to record bat activity at operating wind facilities (Gruver 2002, Johnson et al. 2003, Fielder 2004, Jain 2005, Arnett et al. 2006). However, only one study in North America has used thermal imaging cameras to observe bat behavior and interactions with turbines (Horn et al. 2008). Efforts to deploy multiple tools (e.g., acoustic detectors, radar, and thermal imaging cameras) at proposed wind facilities, or those currently operating, are underway in an attempt to test various methods for evaluating preconstruction activity of birds and bats and establishing relationships between flight activity and fatalities (D. Redell, Wisconsin Department of Natural Resources, unpublished data; R. M. R. Barclay and E. Baerwald, University of Calgary, personal communication; A. Kelly, personal communication).

Postconstruction studies using multiple tools (e.g., acoustic detectors, radar, night-vision devices, and thermal infrared cameras) are needed to determine the context and relative exposure of nocturnal animals using the airspace in relation to observed fatalities. Numerous reports and environmental impact statements argue that fatalities of bats at wind-energy facilities are lower in the western United States and within agricultural regions, for example,

compared to forested ridge tops in the eastern United States. However, fatalities could be proportionally the same in relation to regional populations or simply the numbers of animals using the airspace at the time fatalities occur. Until this context is established, we suggest that comparisons and extrapolations among regions, especially when varying methods are employed, be viewed cautiously.

Fatality assessment.—Experimental designs and methods for conducting postconstruction fatality searches are well-established (Anderson et al. 1999, Morrison et al. 2001). Although the statistical properties for at least some common estimators have been evaluated and suggested to be unbiased or close to unbiased under the assumptions of the simulations (W. P. Erickson, WEST, Inc., unpublished data), important sources of field-sampling bias should be accounted for to correct estimates of fatalities. Important sources of bias include 1) fatalities that occur on a highly periodic basis, 2) carcass removal by scavengers, 3) searcher efficiency, 4) failure to account for the influence of site conditions (e.g., vegetation) in relation to carcass removal and searcher efficiency (Wobeser and Wobeser 1992, Philibert et al. 1993, Anderson et al. 1999, Morrison 2002), and 5) fatalities or injured bats that may land or move outside search plots.

Temporal distribution of fatalities.—Most estimators assume that fatalities are uniformly distributed, and at independent random times between search days. However, if the distribution of fatalities is highly clustered, then estimates may be biased, especially if carcass removal rates are high. Most estimators apply an average daily rate of carcass removal expected during the study. If most fatalities occur immediately after a search, they would have a longer time to be removed before the next search, resulting in higher scavenging rates than the average rate used in the estimates. This would lead to an underestimate of fatalities. On the other hand, if most fatalities occur before but close to the next search, the fatalities may be overestimated. Potential biases are minimized by ensuring that some searches are conducted most evenings during the survey period and that they are well-distributed throughout the area of interest (Fig. 21).

Scavenging rates.—The second source of bias in fatality estimation relates to assessing carcass removal rates by scavengers. All wind-energy facilities will be inhabited by a variety of potential avian (e.g., cervids [Corvidae], vultures [Ciconiidae]), mammalian (e.g., skunks [Mephitidae], raccoons [Procyon lotor], and coyotes [Canis latrans]), and insect (e.g., burying beetles and ants) scavengers, and searches, especially those conducted at less-frequent intervals, may result in highly biased estimates of fatality (Morrison 2002). Past experiments that have assessed carcass removal using small birds as surrogates for bats may not be representative of scavenging for bat carcasses. Two studies conducted by Erickson et al. (2003) and Johnson et al. (2003) used bat carcasses (estimated to be killed the previous night when found) and found similar or lower scavenging rates on bat carcasses compared to small bird carcasses. However, small sample sizes may have biased estimates and limited the scope of inference of these 2 studies. Fiedler (2004) and Fiedler et al. (2007) conducted 6 bias trials during the first phase of development at the Buffalo Mountain Energy Center in Tennessee and found no difference between bird and bat carcasses for searcher efficiency or scavenging time. Notwithstanding, Kerns et al. (2005), however, reported significantly lower scavenging rates on birds compared to both fresh and frozen bat carcasses at the Mountaineer Wind Energy Center in West Virginia. Scavenging should be expected to vary temporally (e.g., seasonally) and spatially from site to site and among both

macroscale habitats (e.g., forests vs. grasslands or agricultural landscapes) and microscale vegetation conditions at any given turbine (e.g., bare ground compared to short grass or agricultural stubble).

Searcher efficiency.—It is well-known that searcher efficiency or observer detection (i.e., the rates at which searchers detect carcasses) varies among individuals (Morrison et al. 2001). Searcher efficiency also can be biased by other factors including topography, vegetation, condition of carcasses (e.g., decomposed remains compared to fresh, intact carcasses), weather, and lighting conditions. Searcher efficiency and carcass scavenging should be expected to vary considerably within and among different vegetation cover conditions (Wobeser and Wobeser 1992, Philibert et al. 1993, Anderson et al. 1999, Morrison 2002, Arnett et al.2008). The use of trained dogs can increase the recovery rate of carcasses, especially in heavy vegetation cover, and offers promise for addressing many questions surrounding bat fatality at wind facilities (Arnett 2006), although dogs undoubtedly vary in their ability to detect carcasses.

Size of search plots.—Sizes of plots have varied among studies. Many recent studies used rectangular search plots with edges of plots a minimum distance from the turbine equal to the maximum tip height of the turbine. Observed spatial distributions of fatalities suggest that most, but not all, fatalities occur in this general area. However, topography, maturity of vegetation, size of carcass, wind direction, and other factors likely affect the distribution. This distribution can be used to approximate the number of fatalities missed (Kerns et al. 2005; Arnett et al. 2008; W. P. Erickson, personal communication). Most studies have shown a tighter distribution of bat fatalities around the turbine compared to birds (Kerns et al. 2005). Additional factors affecting the precision and accuracy of fatality estimates include search effort, including the number of turbines searched, intensity of searches within search plots, and the experience of observers (Anderson et al. 1999).

Search protocols.—Fatality search protocols have varied considerably among studies. Sampling methods and duration for 21 postconstruction studies conducted in North America are summarized by Arnett et al. (2008). Fatality searches usually are conducted on a systematic schedule of days (e.g., every 1 d, 3 d, 7 d, or 14 d) but rarely have daily searches been employed (Kerns et al. 2005). More intensive searches often are performed during the spring and autumn migratory periods, whereas summer breeding surveys sometimes are less frequent or not conducted at all. By contrast, when they are conducted, most spring and autumn postconstruction carcass searches at communication towers are performed nightly (Manville 2005).

Although there are multiple approaches to performing searches (e.g., line transects, circular plots), any protocol that is used must thoroughly quantify the aforementioned sampling biases to obtain reliable estimates. Most fatality studies to date have poorly accounted for searcher efficiency and removal by scavengers, especially for bats (NRC 2007, Arnett et al. 2008). Some studies adjusted fatality estimates based on a single trial for searcher efficiency and scavenger removal using small samples of bird and bat carcasses, and on >2 occasions these trials occurred outside of the migratory periods.

There is a clear need for rigorous implementation of search protocols that can yield reliable estimates of bird and bat fatalities. We recommend that all postconstruction monitoring be designed to address >2 common objectives. First, search protocols should be conducted so that estimates of fatalities can be compared across different landscapes and habitats both within and among regions. By standardizing

protocols for fatality searches, comparable estimates can be achieved and will be useful for understanding different levels of risk. Search intervals could vary from 3 days to 7 days, as long as standard search methods (we suggest line-transect sampling) are employed and sampling biases (e.g., search efficiency and scavenger removal) are adequately accounted for. The total area searched also should be accounted for and similar visibility classes need to be established (see Kerns et al. 2005).

Second, establishing patterns of fatalities in relation to weather variables, turbine characteristics (e.g., revolutions/min) and other environmental factors is fundamental to understanding wildlife fatality and developing solutions (Kunz et al. 2007). Thus, more intensive (nightly) postconstruction sampling should be conducted at sites where relatively high bat fatalities are expected for !33% of all turbines, to gather data required to meet this objective. Specific methods and suggestions for establishing and conducting sampling protocols are summarized in Kerns et al. (2005) and Arnett et al. (2008).

STATE OF MAINE
LAND USE REGULATION COMMISSION

TransCanada Maine Wind Development	)	PRE-FILED TESTIMONY OF
Development Permit DP4860	)	DR. DAVID PUBLICOVER
Kibby and Chain of Ponds Townships, Franklin County	)	APPALACHIAN MOUNTAIN CLUB

I. QUALIFICATIONS

My name is David Publicover. I am a Senior Staff Scientist with the Appalachian Mountain Club in Gorham, NH, where I have been employed since 1992. I have a B.S. in Forestry from the University of New Hampshire (1978), an M.S. in Botany from the University of Vermont (1986), and a D.F. in Forest Ecology from the Yale University School of Forestry and Environmental Studies (1992). My general responsibility is to provide scientific information and analyses to AMC and its partners in the areas of terrestrial ecology and natural resource conservation, sustainable forestry and land use, and land conservation planning.

For most of my tenure at AMC I have been involved with wind power development and siting issues. I have served as AMC's primary representative or expert witness during interventions in five previous commercial wind power development applications, including four before LURC (the Kenetech Boundary Mountains project in the mid-1990s and the more recent Kibby Mountain, Stetson Mountain, and Redington/Black Nubble projects) and one before New Hampshire Site Evaluation Committee. I have served on public policy working groups addressing wind power siting issues in Maine, New Hampshire and Massachusetts, most notably as an alternate member of the Governor's Task Force on Wind power Development in Maine (2007-08). I served as an invited member of panel discussions before the Commission on December 7, 2005 (related to the consideration of wind power in the revision of the Comprehensive Land Use Plan) and December 16, 2009 (related to the standards for considering petitions to expand the expedited wind power permitting area). I have developed a GIS-based analytical approach to assessing conflicts between potential ridgeline wind power development sites and recognized natural resource values. I have given presentations on AMC's approach to wind power at numerous conferences, including the American Wind Energy Association's 2006

national conference in Pittsburg, PA and the 2006 Maine Mountain Conference.

I participated in a field visit to the site in the company of TransCanada representatives on July 29, 2009. I have reviewed the entire application and read in detail the sections relevant to this testimony.

II. SUMMARY OF AMC'S POSITION AND TESTIMONY TO BE PRESENTED

The AMC opposes the project as currently configured. Specifically, we oppose the development of the southernmost seven turbines (turbines 9 through 15) and the associated access road. For reasons set forth below, we believe that this development would constitute an undue adverse impact on a rare natural community, rare wildlife species (Bicknell's thrush) habitat, and outstanding scenic resources, and thus fails to meet the criteria for approval set forth in 12 MRSA §685-B.4.C, 35-A MRSA §3452, and LURC Land Use Districts and Standards Chapter 10.24.

We do not oppose the construction of turbines 1 through 8. If the application were amended to include only those turbines we would support it. We believe that is an appropriate level of development for this ridgeline. It would allow the construction of an additional 24 MW of capacity that takes advantage of the existing infrastructure of the Kibby project, while eliminating significant impact to the rare natural community and Bicknell's thrush habitat and greatly reducing scenic impacts.

This testimony is presented on behalf of the Consolidated Intervenors (AMC, Maine Audubon, and Natural Resources Council of Maine). It will focus on the value of and impacts to the rare Fir-Heartleaved Birch Subalpine Forest natural vegetation community. The AMC also has strong concerns about the impacts to wildlife habitat (particularly Bicknell's thrush) and scenic resources (particularly Chain of Ponds). In these areas we refer to and support the testimony of Susan Gallo of Maine Audubon and Cathy Johnson of the Natural Resources Council of Maine.

III. THE FIR-HEARTLEAVED BIRCH SUBALPINE FOREST COMMUNITY

Extent and rarity. This community is ranked S3 by the Maine Natural Areas Program, defined

as "Rare in Maine (on the order of 20-100 occurrences), though not, to our knowledge, imminently imperiled." A list provided by MNAP (Attachment A) lists 18 currently documented occurrences in the state. Even given that there are most likely other undocumented occurrences, this community is at the low end of the number of occurrences for this ranking.

Comments on this application provided by MNAP[1] indicate that known occurrences of this community encompass about 40,000 acres, or just one-fifth of one percent of the state's land area. Three-quarters of this occurs in just three areas (Mount Katahdin and the Mahoosuc and Bigelow ranges). Outside of these three areas, the community occurs in small- to midsized patches ranging from 35 to 2400 acres that collectively occupy a tiny fraction of the state's land area. At 358 acres, the occurrence on Sisk Mountain is in the middle of the size range for documented occurrences outside of the three largest areas. At the lower end of the list the size drops off dramatically – the seven smallest documented occurrences are less than half the size of Sisk, and five are less than 100 acres. Sisk should not be considered a small or insignificant example of this community.

The size of a rare community occurrence is significant for two reasons. First, larger examples have greater resilience, and are more likely to persist in the face of both unusual events that adversely affect the community (such as a large disturbance) and climate change. Second, larger areas are likely to have greater internal diversity, and thus are likely to maintain at least parts of their area in the particular condition required by specific species. This is particularly important for communities (such as this one) where the structuring of habitat is mediated by regular disturbance. The on-going action of wind in this community creates a dynamic mosaic of recently-disturbed patches (favored by Bicknell's thrush) and more mature areas.

The Environmental Assessment included in the application states[2], "In western Maine however, it is relatively common, and is found on many of the ridges that are higher than 3,000 feet (915 m) in elevation." This statement is highly misleading. Within the western Maine mountains region[3], areas above 3000 feet in elevation make up just 1.4% of the region[4]. Areas above 3200 feet in elevation (which include the southern part of the proposed project) make up

[1] Letter from Sarah Demers to Marcia Spencer Famous dated February 24, 2010.
[2] Application Volume II, page B.15-5.
[3] Defined here as those portions of the Maine Central Mountains, Mahoosuc-Rangeley Lakes, White Mountains, Connecticut Lakes and Western Maine Foothills ecological subsections within the state, which collectively encompass all of Maine's major mountainous areas.
[4] As determined from USGS 30-meter resolution Digital Elevation Model data.

just 0.8% of the region. Thus *even within the western Maine mountains region*, areas where this community are likely to be found comprise just a small fraction of the landscape. This community cannot be considered "common" by any reasonable understanding of the word.

(As an analogy, imagine a family where a particular genetic mutation causes all members to have webbed feet. One could say that webbed feet were common within the family. However, such families are very rare, and clearly one would not conclude that webbed feet were common in the broader population.)

The Environmental Assessment also states, "The S3 ranking, therefore, is more of an indication of the relative rarity within Maine of the ecological conditions that foster the development of this community – namely high elevations and a cold climate." As presented this appears to diminish the rarity and significance of this community. However, this quote is essentially the definition of a rare community, which by their nature occupy parts of the landscape that are uncommon by virtue of features such as topography, elevation, climate, geology or hydrology.

To summarize:

- High elevation areas, and this community in particular, constitute a very small part of the landscape, even within the limited part of the state encompassing Maine's mountainous regions.
- The occurrence on Sisk Mountain is a good quality occurrence within the middle of the size range for occurrences outside of the state's largest mountain ranges (Katahdin, Mahoosucs and Bigelow), and should not be considered small or insignificant.

Ecological significance. This community occurrence was given an overall quality rank of B (Good) by MNAP. This ranking is based on three factors – condition, size and landscape context. It does not meet the criteria for an A (Exemplary) rank for size (minimum of 750 acres) or landscape context (because it is surrounded by managed forest rather than undisturbed land). However, it was given the highest ranking for condition ("the site being an undisturbed ridge line and the community composition being representative for the type"[5]). As a good quality, undisturbed and natural occurrence, Sisk should be considered a significant example of this rare community.

[5] Application Volume II, page B.15-21.

LURC's recently-revised Comprehensive Land Use Plan contains numerous references to the values and sensitivity of high mountain areas:

- "Mountain areas" are specifically listed among the "unique, high-value natural resources" included in the principal values of the jurisdiction (page 2). Throughout the document mountains are consistently listed as one of the specific resources that give the jurisdiction is special character.
- The goal and both policies pertaining to mountain resources emphasize the protection of their significant values (page 16):
    - Goal: "Conserve and protect the values of high-mountain areas from undue adverse impacts."
    - Policy 13: "Regulate high-mountain areas to preserve the natural equilibrium of vegetation, geology, slope, soil and climate, to reduce danger to public health and safety posed by unstable mountain areas, to protect water quality, and to preserve *scenic value, vegetative communities, unique wildlife communities* and low-impact recreational opportunities." [italics added] We note that the Sisk ridgeline possesses significant value for all three of the italicized resources.
    - Policy 14: "Protect high-mountain resources with particularly high natural resource values or sensitivity which are not appropriate for most development."
- The discussion of mountain resources (pages 222-223) clearly recognizes their value and sensitivity" "Mountains and the scenic, natural, recreational, economic and other values they possess are a limited resource in Maine. Mountain areas are increasingly popular sites for recreational facilities, vacation homes and wind power generation. Mountain development carries a significant risk of erosion due to steep slopes and the high erosion potential of many mountain soils. It also threatens to diminish the resources associated with mountain areas, including scenic qualities and vegetative communities."
- Specific issues related to wind power development in mountainous areas are clearly recognized (page 223): "Some of the jurisdiction's mountain areas have excellent wind energy resources. However, wind turbines and associated infrastructure have the potential to compromise the resources the P-MA Subdistrict is designed to protect. A number of wind power developments have been proposed in mountainous areas in the jurisdiction, raising the question of whether all mountain areas should be available for

this and comparable uses...*Given the finite number of high mountain areas and the value of their scenic, recreational and natural resources, it is unlikely that the Commission will consider all mountain areas in the jurisdiction suitable for wind power development or comparable uses.*" [italics added]

High-elevation subalpine forests are recognized as a distinct and significant habitat in state and regional conservation plans (primarily because they provide the essential habitat for Bicknell's thrush, the Northeast's rarest migratory songbird and a species of highest conservation concern in Maine's Comprehensive Wildlife Conservation Strategy[6]):

- Mountaintop Forest (forested areas above 3,000 feet in elevation) is listed as a distinct key habitat (separate from the broader Coniferous Forest habitat) in the Comprehensive Wildlife Conservation Strategy[7]. One of the conservation strategies for this task is to "Identify priority habitats for protection." One of the tasks listed under this strategy is to "Initiate efforts to 'officially' recognize Bicknell's Thrush and mountaintop habitat as a high conservation priority in public agency and private land-use planning efforts."
- Partners in Flight, a multi-party cooperative bird conservation effort[8], lists Mountaintop Stunted Conifer Woodland as one of five priority habitats in the Eastern Spruce-Hardwood physiographic region, and Bicknell's thrush as the primary priority species in this habitat[9]. The conservation goal for this habitat is to "Ensure the protection of all sites that support populations of Bicknell's Thrush 'large enough to be considered source populations for other sites,' and as many additional high-elevation habitat patches with smaller populations as possible."

Both the Maine Comprehensive Wildlife Conservation Strategy and the Partners in Flight Bird Conservation Plan for this region[10] list wind power development as a threat to this habitat.

Value for climate change adaptation. We recognize that human-accelerated climate change is an extremely important issue for society. There are three major policy considerations in dealing with climate change – energy efficiency, renewable energy development and adaptation. Replacing greenhouse gas emitting energy facilities with renewable energy sources, including

[6] Issues related to Bicknell's thrush will be discussed in detail in the testimony of Susan Gallo.
[7] See http://www.state.me.us/ifw/wildlife/groups_programs/comprehensive_strategy/table_contents.htm.
[8] See http://www.partnersinflight.org/description.cfm.
[9] See http://www.partnersinflight.org/bcps/pl_28sum.htm.
[10] Rosenberg, K.V. and T.P. Hodgman. 2000. Partners in Flight Landbird Conservation Plan: Region 28: Eastern Spruce-Hardwood Forest (Draft 1.0). American Bird Conservancy, The Plains, VA. (http://www.partnersinflight.org/bcps/plan/pl_28_10.pdf)

wind power, is an important tool. However, protecting habitats that historically have served as ecological refugia during periods of climatic variability is also an extremely important aspect to any comprehensive public policy solution to climate change, which must include consideration of adapting to the inevitable changes in climate that will occur.

A variety of sources indicate that Maine's coniferous forest is likely to decline significantly under the climatic warming projected by a variety of climate models. For example, Tang and Beckage (2010)[11] state:

> "Under all scenarios, boreal conifer forest is projected to contract to mountain ranges and to the region centred on the corner of northern New Hampshire and northwestern Maine by 2085… Boreal conifer forests are expected to lose on average 61% of their areal extent in New England by 2055 and 91% by 2085 across all scenarios… Our simulations indicate that the boreal conifer forest may still persist in New England in the late 21st century under some scenarios but its distribution will contract to the ranges of mountains."[12] (See Attachment B.)

Similar projections are made by the US Forest Service Climate Change Tree Atlas[13] (See Attachment C), whose projections are also included in Jacobsen et al. (2009)[14].

It makes sense that the higher elevations of the western mountains would serve as the last stronghold of spruce-fir forest in the state, as this is and is projected to remain the coldest part of the state. However, both paleoecological evidence and recent research provide additional evidence that high elevations are likely to retain this habitat even as a warmer climate leads to its decline at lower elevations.

Spear (1989)[15] studied high-elevation post-glacial vegetation in the White Mountains of

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[11] Tang, G. and B. Beckage. 2010. Projecting the distribution of forests in New England in response to climate change. Diversity and Distributions 16: 144-158.

[12] It is important to recognize the following caveat presented by the authors: "We caution, however, that BIOME4 is an equilibrium vegetation model that assumes that vegetation is in equilibrium with climate and does not consider successional changes or transient states as the vegetation composition shifts. The rate at which vegetation responds to climate change depends on the time (or lag) required for vegetation to reach a new equilibrium in response to climate change. Our projections should therefore be viewed as the potential distribution of these forest types in New England under a given climate condition. In addition, BIOME4 assumes that climate is a major factor in determining vegetation distribution over a broad spatial scale. However, other factors, such as seed dispersal, local-scale disturbances and human activities, can be important factors controlling vegetation distribution in a given area, influencing the time for vegetation to reach an equilibrium with climate or even inhibiting the landscape from attaining its potential forest state."

[13] Prasad, A. M., L. R. Iverson., S. Matthews., M. Peters. 2007-ongoing. A Climate Change Atlas for 134 Forest Tree Species of the Eastern United States [database]. http://www.nrs.fs.fed.us/atlas/tree, Northern Research Station, USDA Forest Service, Delaware, OH.

[14] Jacobson, G.L., I.J. Fernandez, P.A. Mayewski and C.V. Schmitt (editors). 2009. Maine's Climate Future: An Initial Assessment. University of Maine, Orono, ME.

[15] Spear, R.W. 1989. Late-Quaternary history of high-elevation vegetation in the White Mountains of New Hampshire. Ecological Monographs 59: 125-151.

New Hampshire from sediments that accumulated in bogs and lakes. Since the receding of the last glacier New England some 13,000 years ago, there have been major warming and cooling periods that resulted in changes to forest composition at lower elevations in northern New Hampshire. During a major warmer period between 9,000 and 5,000 years ago, spruce-fir forests at lower elevations were displaced by a mixed forest with species more closely resembling those of the mid-Atlantic region today. However, at higher elevations in northern New England the available record suggests that forests were remarkably stable compared to lower elevations and other factors like cloud immersion are as or more important than temperature. As stated by Spear (1989):

> "The ecotones between the subalpine spruce-fir and fir forest, and the fir forest and alpine meadow, have not changed altitude much over the last 10,000 years and do not appear to be sensitive to climate change…In contrast to the continual changes in the vast lowland forests surrounding the White Mountain peaks, the high elevations have been remarkably stable. Changes in the lowland forest have had virtually no impact on the subalpine fir forest and alpine meadow."

This pattern is supported by research into climatic changes in the White Mountains over the past 70 years. Seidel et al. (2010)[16] determined that over this time statistically significant changes in some climatic parameters were present at Pinkham Notch (elevation 2000') (though these changes were less pronounced than those found at lower elevations) but not at the summit of Mount Washington.

These results indicate that the subalpine forests in the western mountains of Maine (such as are found on Sisk Mountain) are likely to be retained on the landscape at a time when lower-elevation spruce-fir forests have been reduced or eliminated due to future climate warming. They thus will serve an important ecological and evolutionary role as refugia for species dependent on this forest type. The proposed development would seriously degrade the ability of this habitat to provide this critical ecological function in the future, and would be contrary to efforts to maintain the ability of Maine's forest ecosystems to adapt to future climate change[17].

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[16] Seidel, T.M., D.M. Weihrauch, K.D. Kimball, A.A.P. Pszenny, R. Soboleski, E. Crete and G. Murray. 2010. Evidence of climate change declines with elevation based on temperature and snow records from 1930s to 2006 on Mount Washington, New Hampshire, USA. Arctic, Antarctic and Alpine Research 41: 362-372.

[17] As an example, the presentation made by Alec Giffen to LURC on the "Great Maine Forest Initiative/Keeping Maine's Forests" on April 7, 2010 included as one aspect of the vision of this effort "Facilitat[ing] the adaptation of forest ecosystems to a changing climate."

IV. IMPACT OF PROPOSED DEVELOPMENT

The comments submitted by Maine Natural Areas Program indicate that approximately 42 acres of the Fir-Heartleaved Birch Subalpine Forest community would be eliminated to construct the project, and that indirect edge effects would increase the total affected area within this community to 80 acres. This represents about 22% of the total area of this community occurrence of 358 acres. For that portion of the community lying within the project area (i.e., within the expedited permitting area), over half of the community would be eliminated or indirectly impacted. There is no way that this level of impact can be considered minimal.

These direct impacts are not temporary impacts like clearing of trees, but represent a complete destruction of the community within the impact area (see Attachment D). The application notes that some part of this disturbed area (including crane assembly areas and the outer seven feet of the summit road travel surface) "will be covered with erosion control mulch and allowed to revegetate to native low shrubs and herbaceous cover". However, such "restoration" will in no way replace the native forest ecosystem. Future maintenance will require the areas to be re-cleared within 25-30 years. The loss of a significant portion of the community will be permanent.

We agree with MNAP that project impacts will extend beyond the actual project footprint. They state, "Expected impacts to the edge of the natural community include increased light and wind, and will likely change the habitat by removing moisture and damaging trees." However, we believe that their estimate of the indirect impact area (a 50' buffer around the project footprint) is too conservative. For example:

- Matlack and Litvaitis (1999)[18] stated,"Wind approaching the edge creates a jet of elevated wind speed which may extend 30-40 m [100-130 feet] into the forest."
- Noss (2001)[19] stated, "Changes in microclimate, increased blowdowns, and other impacts on vegetation may extend 2-3 tree-heights into a closed-canopy forest."
- The Maine Comprehensive Wildlife Conservation Strategy states (Appendix 12, page 25), "The effects of roads can extend over some distance from their centers, such that their 'effective widths' can be many times their actual widths."

[18] Matlack, G.R. and J.A. Litvaitis. 1999. Forest edges. Pp. 210-233 in Maintaining Biodiversity in Forest Ecosystems (M.L. Hunter, ed.). Cambridge University Press, New York, NY.
[19] Noss, R. 2001. Ecological Effects of Roads. Available at http://www.wildlandscpr.org/ecological-effects-roads.

Edge effects will be greatly increased by the configuration of the project. Long narrow openings (such as this project) have a much higher edge-to-area ratio than more compact openings of similar size. The road along the ridgeline (as wide as a two-lane highway) will create a continuous exposed edge well over a mile in length, located on the upper slope on the windward (west) side of the ridge. This edge will be perpendicular to and directly exposed to the strong prevailing winds, which is likely to lead to significantly increased blowdown along the length of the edge, potentially creating a propagating edge of disturbance up to the ridge crest. In addition, much of this edge has a west-southwesterly aspect, and will be directly exposed to strong afternoon sunlight. The project configuration thus represents a "worst-case scenario" for the propagation of the effects of wind, light and increased blowdown into the interior of the community.

These concerns were emphasized by the National Academy of Sciences in a study of the ecological effects of wind-energy projects[20], which concluded (page 91): "it is likely that wind-energy facilities will adversely alter ecosystems indirectly, especially through the following cumulative impacts:

1. Forest clearing resulting from road construction, transmission lines leading to the grid, and turbine placements represents perhaps the most significant potential change through habitat loss and fragmentation for forest-dependent species. This impact is particularly important in the Mid-Atlantic Highlands, because wind-energy projects there all have been constructed or proposed in forested areas[21].
2. Changes in forest structure and the creation of openings may alter microclimate and increase the amount of forest edge.
3. Plants and animals throughout the ecosystem respond differently to these changes, and particular attention should be paid to species listed under the ESA and *species of concern that are known to have narrow habitat requirements and whose niches are disproportionately altered*." (Italics added.)

Bicknell's thrush certainly qualifies as a species with narrow habitat requirements whose niche will be disproportionately altered.

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[20] National Academy of Sciences. 2007. Environmental Impacts of Wind-energy Projects. National Academy of Sciences National Research Council, Washington, DC.

[21] The committee drew on information from throughout the United States and abroad, but focused on terrestrial ridgelines in the Mid-Atlantic Highlands. However, these conclusions are equally applicable to other forested areas in the East.

In their comments, MNAP recommended that Turbine 11 be removed to reduce the fragmentation impact on the community[22]. However, we note that the southern part of the project (Turbines 12-15) will completely bisect this community in two locations, and thus has a greater fragmenting impact than Turbine 11.

Though considerably smaller, this project will have a much greater impact on significant natural resource values than the original Kibby project. The highest elevation turbine in the Kibby project (at the northern end of the Kibby range) was about 3210'. The northernmost turbines on Kibby Mountain, in closest proximity to the documented Fir-Heartleaved Birch Subalpine Forest community occurrence, were at an elevation of about 3000'. In contrast, turbines 9-14 on Sisk Mountain, located within this community, are at elevations above 3300', and thus sited in a portion of the landscape that is considerably less common.

The original Kibby project was designed to avoid significant impact to this community, which was a major factor in our decision to support it. In designing the original project, TransCanada's adopted a standard of "avoidance". As stated in the application for that project[23], "Note that as sensitive natural features have been identified through the course of project field efforts, the project design has been adjusted *to avoid impacts to such areas to the greatest extent possible*." To a large degree they were successful; comments from MNAP described the impact to the Fir-Heartleaved Birch Subalpine Forest community occurrence on Kibby Mountain as "minor". However, in this project TransCanada's standard was much weaker: "Note that as sensitive natural features have been identified through the course of project field efforts, the project design has been adjusted *to avoid and minimize impacts to such areas to the greatest extent possible given engineering and land constraints*."[24] The application also states that the design of roads placed special emphasis on "*minimizing to the maximum extent practicable* impact within the overall Bicknell's thrush and subalpine fir habitats."[25]

There is a considerable difference between "avoid to the greatest extent possible" and "minimize to the maximum extent practicable". Had TransCanada held itself to the same standard in this project that it used in the original Kibby project, turbines 9 through 15 would not

[22] In response comments dated April 8, 2010, TransCanada agreed to relocate Turbine 11 closer to the primary access road. While this relocation reduces fragmentation impacts to some degree and may slightly reduce the area to be impacted, the overall improvement in project design is minimal compared to the impacts that remain. This relocation does not change AMC's position on the project.
[23] Kibby Wind Power Project application, April 2007, Volume I, page 7-1.
[24] Application Volume II, page B.15-1.
[25] Application Volume I, page B.6-6

have been proposed. It appears that TransCanada's environmental standards do not represent a firm policy, but are adjusted after the fact to whatever level does not significantly interfere with project development.

It is AMC's position that the permanent destruction of, and indirect impacts to, a considerable portion of a significant occurrence of a rare natural community constitutes an unacceptable undue adverse impact, and is grounds for LURC to deny this application.

V. OTHER ISSUES

While we have stated our opposition to the project as presented, we present the following comments in relation to possible approval of the northern eight turbines:

Decommissioning. The decommissioning plan proposed by the Applicant[26] states that full funding will be put in place "no later than December 31 of year 15 of commercial operation." However, the Commission's decision on the original Kibby project required that full funding be put in place no later than the end of the *tenth* year of project operation[27]. We recommend that this project be held to the same standard as the original Kibby project.

Revegetation. We agree with the comments made by State Soil Scientist David Rocque[28] that seeding should not be used for soil stabilization or revegetation of high elevation areas because of the potential to introduce invasive non-native species and the development of vegetation that is not natural for the area. We recommend that a condition be included prohibiting the introduction of any material containing seed of non-native or off-site species to areas above 2700 feet in elevation, and that revegetation be accomplished by appropriate soil stabilization and natural regeneration with on-going monitoring to ensure its effectiveness.

[26] Application Exhibit A-7.
[27] Approved Final Development Plan Permit DP 4794, Condition 14.E.
[28] Memo to Marcia Spencer-Famous dated January 29, 2010, comments 11 through 13.

VI. SUMMARY

To summarize this testimony:

- The Fir-Heartleaved Birch Subalpine Forest is a rare natural community that occupies a tiny fraction of Maine's landscape and is a critical component of the state's biodiversity.
- The occurrence of this community on Sisk Mountain was rated as being of good quality by MNAP (based on condition, size and landscape context), but it was given the highest rating for its undisturbed natural condition. It is in the middle of the size range for occurrences outside of the three largest areas (Katahdin, Bigelow and Mahoosucs). It thus should be considered a significant example of the rare community.
- Subalpine forests are a distinct key habitat recognized in state and regional conservation plans, including the Maine Comprehensive Wildlife Conservation Strategy. They provide the essential habitat for Bicknell's thrush, the northeast's rarest migratory songbird.
- In the face of future climate change, spruce-fir forest in Maine is projected to decline significantly. High-elevation areas in western Maine are likely to be the one part of the state where these forests are retained, and thus they have an important role to play as refugia for species dependent on this habitat. Maintaining the ecological integrity of these areas is an important part of any strategy for adapting to future climate change.
- The proposed development would permanently destroy or indirectly impact about one-quarter of the extent of this community occurrence. Within the project area (i.e., within the expedited permitting zone), the development would directly or indirectly impact over half of the extent of this community.
- This level of impact on a rare natural feature constitutes an undue adverse environmental impact. The project thus fails to meet the criteria for approval set forth in 12 MRSA §685-B.4.C and LURC Land Use Districts and Standards Chapter 10.24.
- Based on the testimony of other witnesses for the Consolidated Intervenors (Susan Gallo and Cathy Johnson), we believe that the project will also have an undue adverse impact on Bicknell's thrush habitat and important scenic values.

- The undue adverse impacts to any of these three significant natural resources would be sufficient grounds for LURC to deny this application. In combination, they clearly indicate that the southern part of the project area (encompassing turbines 9 through 15) constitutes "high-mountain resources with particularly high natural resource values or sensitivity which are not appropriate for most development."

We urge the Commission to recommend to the Applicant that the application be amended to eliminate turbines 9 through 15. Such an amendment would result in minimal impact to the Fir-Heartleaved Birch Subalpine Forest Community[29] and Bicknell's thrush habitat and reduce scenic impacts considerably. Should the application be so amended we would support it. However, in the absence of such an amendment we urge the Commission to deny this application.

We thank you for the opportunity to present these comments.

Dated April 16, 2010

[29] We note that the access road to turbine 8 would still pass through the northern tip of this community. However, this impact would be limited to a small part of the fringe of the mapped community occurrence, and would meet our understanding of the term "minimal".

VERIFICATION

Signature of Witness: David A. Publicover

April 16, 2010

Before me appeared David A. Publicover, who, being duly sworn, did testify that the foregoing testimony was true and correct to the best of his knowledge and belief.

State of New Hampshire
Coos County

NOTARY PUBLIC

Kimberly S. Steward
Notary Public
My Commission Expires
April 15, 2014
State of New Hampshire

ATTACHMENTS

A. Maine Natural Areas Program list of documented occurrences of Fir-Heartleaved Birch Subalpine Forest community.

B. Maps of projected distribution of spruce-fir forest under projected future climate (from Tang and Beckage 2010).

C. Maps of projected distribution of red spruce and balsam fir under projected future climate (from US Forest Service Climate Change Tree Atlas).

D. Photographs of extent of disturbance from road and turbine construction at the Kibby Mountain project.

ATTACHMENT A

List of documented occurrences of Fir-Heartleaved Birch Subalpine Forest natural community in Maine (from Maine Natural Areas Program).

Subalpine Fir Forest records in Maine

Also known as Fir - heart-leaved birch subalpine forest

State Rank is S3

EO Rank	Survey Site	Counties	Last Observed	Acres	Hectares
A	MT KATAHDIN	Piscataquis	2004	18127	7336
A	Mahoosuc Range	Oxford	2008-09-18	8701	3521
A	The Bigelows - Little Bigelow, Cranberry Peak, Avery Peak, West Peak, The Horns	Franklin, Somerset	2005	3071	1243
A	REDINGTON POND RANGE	Franklin	2006-09-13	2400	971
B	BAKER MOUNTAIN TO LILY BAY MOUNTAIN	Piscataquis	2007	2289	926
B	BALDPATE MTN	Oxford	2005	1408	570
C	BARREN MOUNTAIN	Piscataquis	2007	890	360
B	BIG SPENCER MOUNTAIN	Piscataquis	2006-08-10	871	353
B	KIBBY MOUNTAIN	Franklin	2006-9-11	614	248
B	POPLAR RIDGE	Franklin	1996-09-18	365	148
B	**Sisk Mountain**	**Franklin**	**2009**	**358**	**145**
B	Black Nubble	Franklin	2007-07-25	316	128
B	CENTER MTN	Piscataquis	2007	172	70
E	Sugarloaf Mountain	Franklin	1996-08-21	152	62
B	Sabbathday Pond Area	Franklin	2008-06-18	97	39
C	MOUNT BLUE	Franklin	1999-12-03	52	21
E	WHITECAP MOUNTAIN	Piscataquis	1996-10-01	40	16
C	CHAIRBACK AREA COLUMBUS MOUNTAIN	Piscataquis	2007	36	15
C	BIG SQUAW MOUNTAIN	Piscataquis	2006	35	14

ATTACHMENT B

Maps of projected distribution of spruce-fir forest under projected future climate (from Tang and Beckage 2010). (These maps assume that vegetation is in equilibrium with projected future climate. However, there is likely to be a considerable lag time between changes in climate and the response of vegetation – see caveat from authors included as footnote 11.)

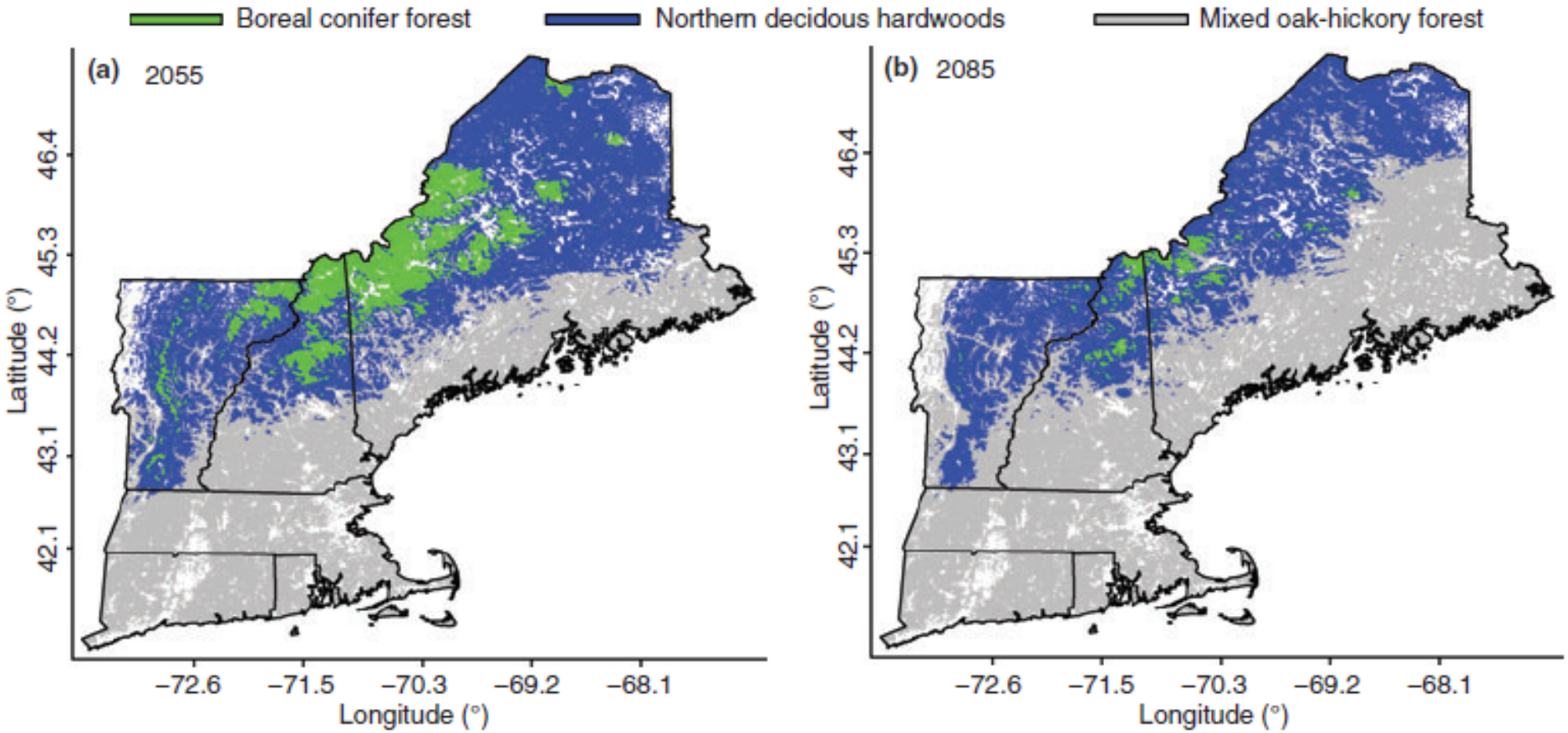


Figure 4 The distribution of mixed oak–hickory, northern deciduous hardwood and boreal conifer forests in two future periods 2041–70 (referred to as 2055) and 2071–99 (referred to as 2085) in New England. The vegetation type in each grid cell is based on the modal value of each grid cell across all nine climate changes scenarios.

ATTACHMENT C

Maps of projected suitable habitat for red spruce and balsam fir under projected future climate (from US Forest Service Climate Change Tree Atlas – see http://www.nrs.fs.fed.us/atlas/).

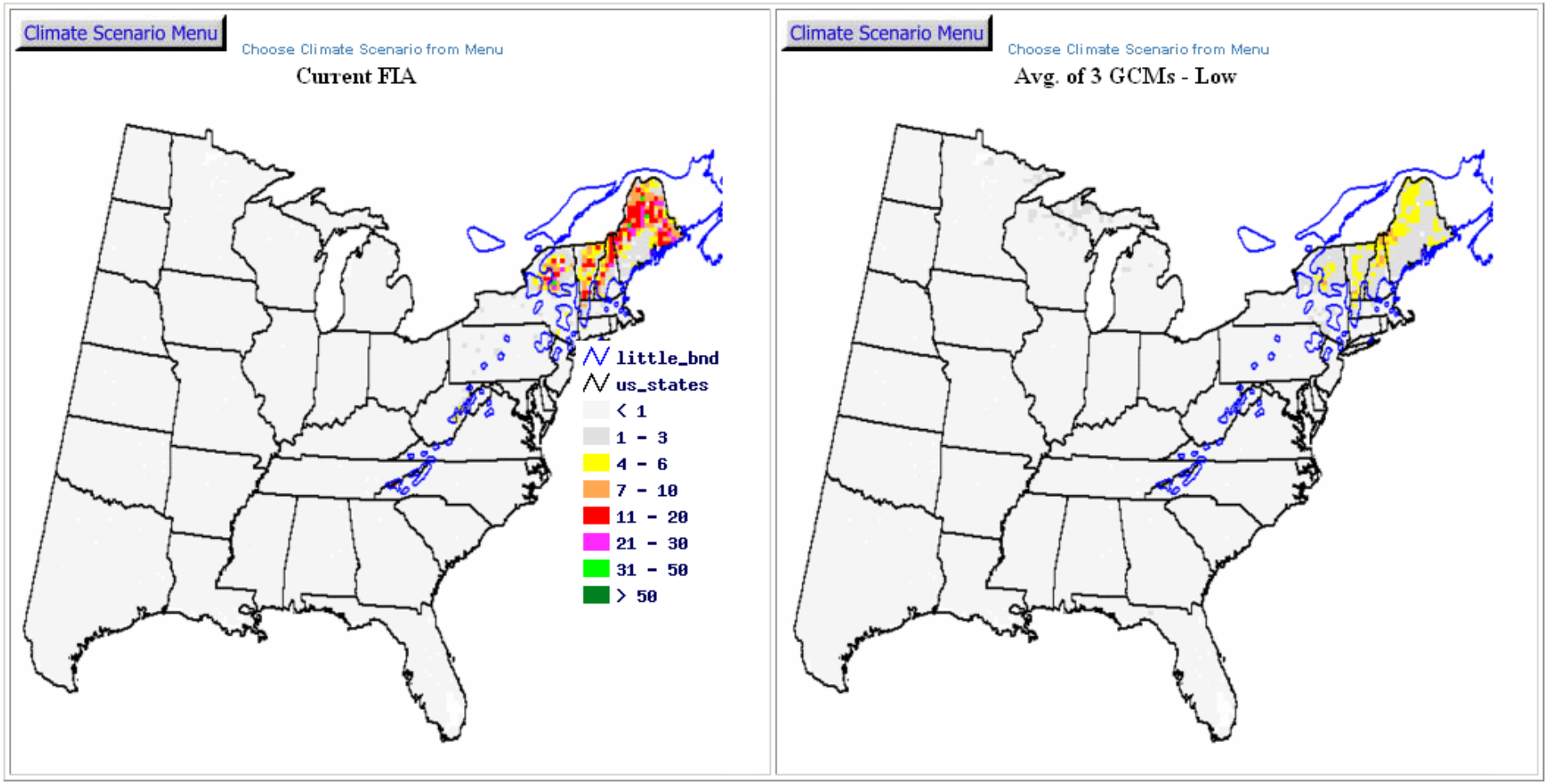
The left-hand map in each pair shows the current distribution of each species as determined from USFS Forest Inventory and Analysis data. The colors represent the calculated importance value of that species, with higher numbers representing greater dominance of that species at that location.

The right-hand map represents the suitable habitat for colonization by that species under the projected climate at the end of the 21st century. The projection is based on the average of three widely-used Global Circulation Models, and a "low emission" scenario for future CO2 levels (which assumes that there will be significant energy conservation and reduction of CO2 emission, leading to end-of-the-century CO2 levels of about 550 million parts per million – about double pre-industrial levels.)

As with Attachment B, these maps must be interpreted with caution. As stated on the Atlas web site, "With these models, we are predicting **potential suitable habitat** by year 2100. We are NOT predicting where the species will be at that time, as great lag times are involved in tree species migrations. It should also be borne in mind that the model does not account for future biotic interactions (competition, herbivory, mutualism etc.) or other human (land-use change, fire) or natural (ice, wind) disturbances - as these are extremely difficult to quantify accurately for future scenarios."

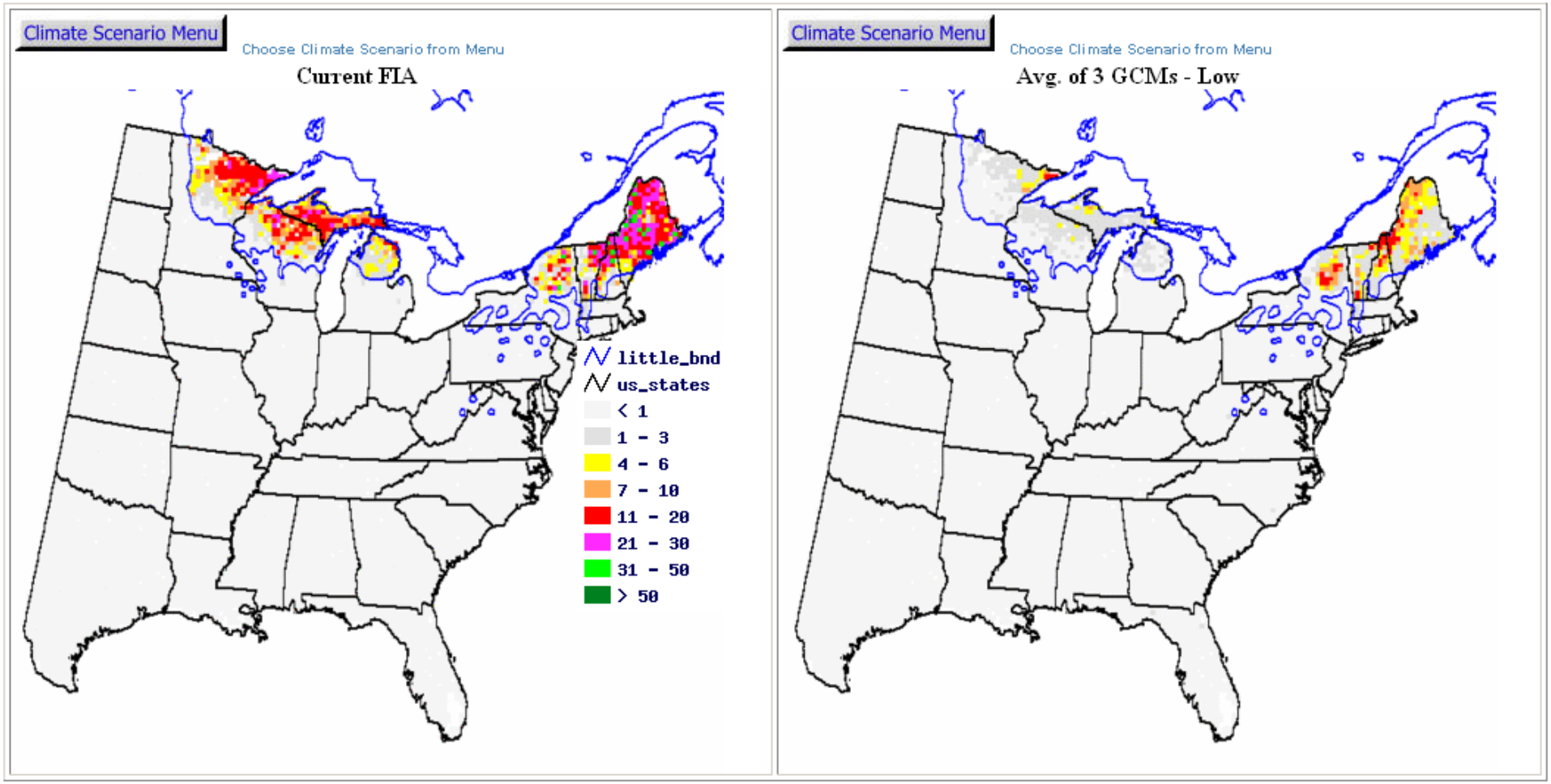
ATTACHMENT C (continued)

Red spruce



ATTACHMENT C (continued)

Balsam fir



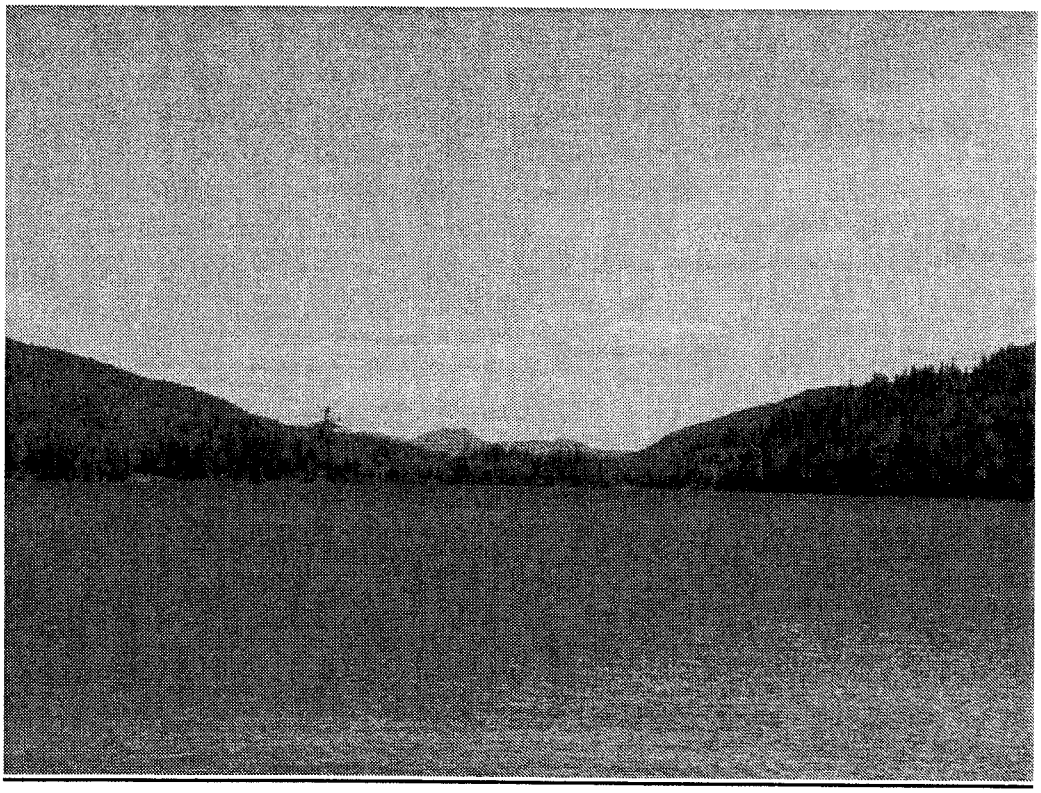
ATTACHMENT D – Photograhs of original Kibby project

ATTACHMENT D (continued)

ATTACHMENT D (continued)

Attachment A: Excerpts from Bureau of Parks and Lands Flagstaff Region Management Plan, addressing Chain of Ponds, June 12, 2007

Chain of Ponds



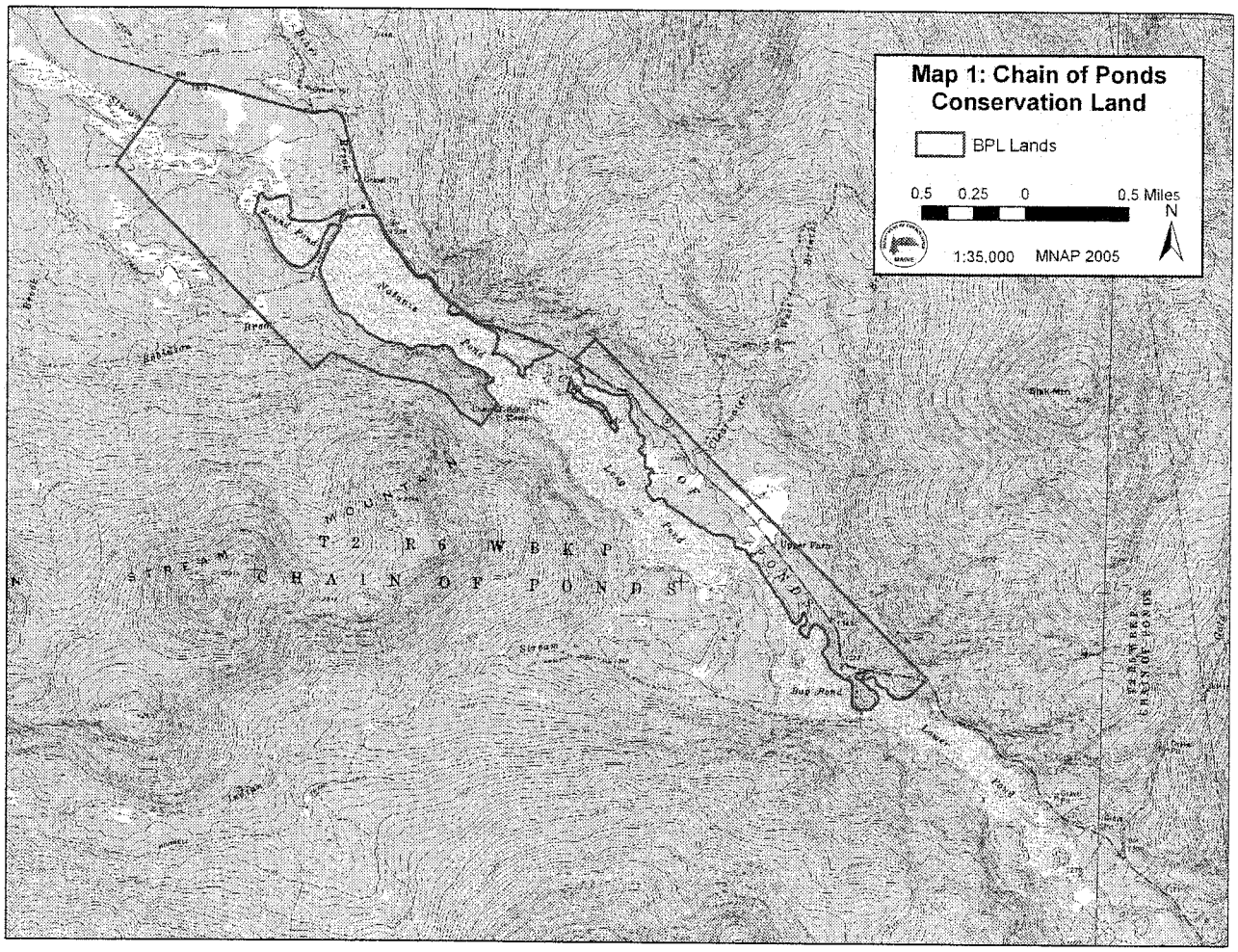
Character of the Land Base

This highly scenic 1,041-acre parcel in Chain of Ponds Township consists mostly of the eastern and northern shoreline of a chain of ponds including from northwest to southeast, Round, Natanis, Long, Bag, and Lower Ponds. The basins form numerous coves and small wetlands, which then empty into the North Branch of the Dead River south of the public reserved lands. A description of Chain of Ponds in the Portland Press Herald by an outdoors writer captures the beauty of this area: "There are few places in Maine with as rugged a landscape.. . Mountain summits and ridges surround the narrow ribbon of water and create a fjord-like setting. On the western edge of the ponds, gray blocks of granite plunge down into the clear waters. Fragrant cedars line many portions of the ponds." (Michael Perry, September 2, 2001).

Route 27, a designated scenic byway, runs along the eastern side of the Ponds. The road is an arterial route used by logging trucks, and to increase safety, DOT recently realigned and rebuilt the road. The rebuild included a scenic overlook that provides good views of the ponds and will be installing interpretive panels about the Arnold Trail.

At the North end of Natanis Pond the Bureau leases land to a commercial campground that predates the Bureau's acquisition of the property.

Inland Fisheries and Wildlife owns and maintains a dam at Lower Pond at the outlet which functions to maintain the trout and salmon fishery habitat within the chain. The dam was reconstructed in 1991. The ponds are known for their good fishing.



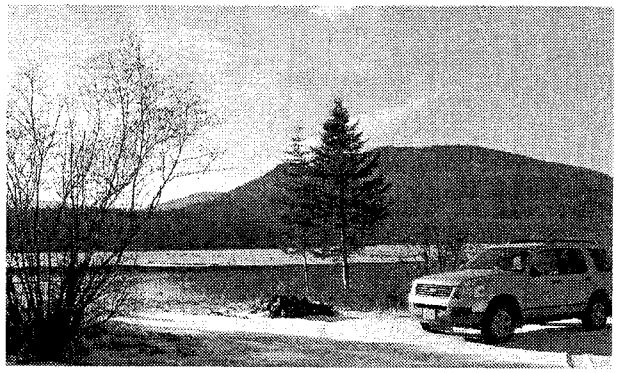
A small Mixed Graminoid – Shrub Marsh is found along the northwestern edge of the property. This is characterized by several graminoid species (including species of *Scirpus*, *Carex*, *Eleocharis*, *Glyceria*, and *Calamagrostis canadensis*). Black bulrush (*Scirpus atrovirens*) and inflated sedge (*Carex vesicaria*) are dominant. Old beaver dams are evident here (the marsh appears to be an abandoned impoundment), but no recent activity was noted. Species diversity is very high in this area.

The northern end of Round Pond is characterized by a Sweet Gale-Mixed Shrub Fen. This small open fen is dominated by sweet gale (*Myrica gale*) and speckled alder (*Alnus incana*). Meadowsweet (*Spiraea alba*) and star sedge (*Carex echinata*) are frequently encountered. Slender sedge (*Carex lasiocarpa*) and marsh-potentilla (*Comarum palustre*) are scattered throughout the community.

A Spruce-Larch Wooded Bog is found on the eastern edge of the fen at the northern edge of the pond. This is characterized by black spruce (*Picea mariana*) up to 30' and an understory of sheep laurel (*Kalmia angustifolia*), leatherleaf (*Chamaedaphne calyculata*), three-seeded sedge (*Carex trisperma*), and Labrador tea (*Rhododendron groenlandicum*) with hummocks of sphagnum.

working with the Public Lands Regional staff and MDOT to provide improved boat access. MDOT will upgrade the existing steep gravel launch on Lower Pond to an improved trailerable boat access facility. Boat access to Natanis Pond will also be improved in conjunction with other improvements to the commercial campground lease site, including a reconstructed bridge over the narrows between Round Pond and Natanis Pond, and a designated boat access parking area funded by MDOT. Carry-in access to the two middle ponds within the chain will be formalized and signage provided to identify their locations.

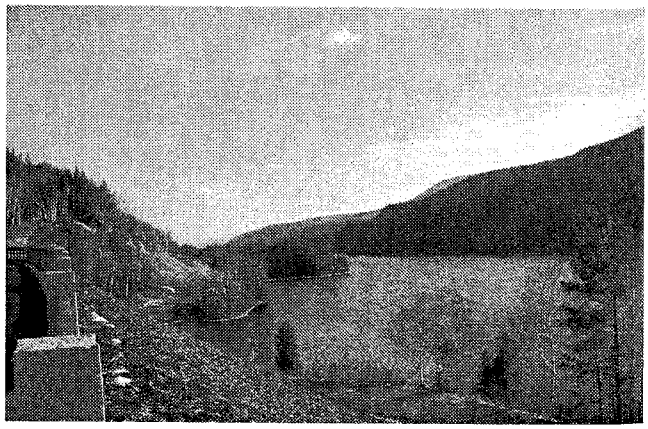
Primitive camping is available at several locations on the ponds. Two campsites with toilet facilities are found off the old road that connects Bag and Lower Ponds, near the informal boat launch site. There are three other sites within the Upper Farm area, where toilet facilities are also available. These sites, however, are in need of upgrading.



There has been discussion over the years of a motorized, international multi-use trail from Stratton to the U.S./Canadian customs gate in Coburn Gore. More recent efforts have been in combination with other efforts to establish an ATV trail system on private lands, that would include Natanis Point Wilderness Campground. A number of visitors come to the campground to take advantage of these ATV trail opportunities. At present, the international trail system has been designated, but is only authorized for snowmobile use at this time – mostly because landowner permission for use of ATV's on the Canadian side has not been secured. A spur from the ATV trail to the campground is maintained specifically for ATV's, and provides access from the campground to Stratton.

Through a cooperative agreement with the Arnold Expedition Historical Society, a footpath skirting Round Pond has been established on Bureau lands which retraces the route of the 1775 Arnold Expedition. The Arnold Expedition Historical Society is proposing to work with private landowners to extend the present footpath beyond Bureau lands, following the historic route as closely as possible to Arnold Pond. This trail will be named the "Height of Land Portage Trail."

Visual Considerations: Most of the land surrounding the ponds is steep and hilly with considerable slopes visible from the water. This does not impose special concerns relative to timber management, as most of the terrain is inoperable. RV's and other camping setups along the shoreline of Natanis Pond are easily seen from Route 27 and from the Pond, although the campground lessee has worked to make this less visible in recent years.



Chain of Ponds

February, 2007

Crosby Pond
Arnold Pond
Mud Pond
Lower Hathan Bog
Lost Pond
Otter Pond
27
Natanis Point Campground
Mount Pisgah
Natanis Pond
Massachusetts Bog
Chain of Ponds
Indian Stream Mountain
Massachusetts Gore
Sisk Mountain
Bag Pond Mountain
Delaware Gap
Alder Stream Twp
0 1 2 miles

All information depicted on this map is as accurate as available data allows. The property boundaries are an estimation. Base layers 1:24 K are from the State of Maine OGIS website. This is not a survey product. Map Created by G.Denis

LEGEND

Bureau of Parks and Lands

- Easement
- Reserved Lands
- Parks
- Ecoreserve Boundary
- New England Forestry Foundation Easement
- U.S. Fish and Wildlife Service
- Maine Audobon Society
- Penobscot Indian Nation Tribal Land
- Primitive Campsite
- Bigelow Lodge
- Commercial Campground
- Sugarloaf Ski and Touring Center
- Sugarloaf/USA
- Gate
- Boat Launch Hand Carry
- Trailhead
- Dam
- Tower
- DUA
- Boat Launch Trailerable
- Border Checkpoint
- Historic Arnold Trail
- ATV Trails
- Snowmobile Trails
- D O T Maintained Highway
- County or Town Roads (OGIS)
- Scenic Highway
- 100 ft. Contour Interval (OGIS)

N

Timber Resources

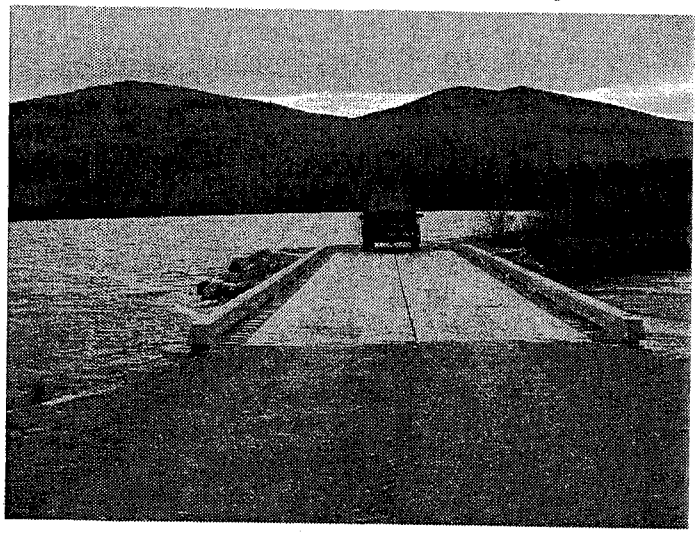
The terrain throughout the property is mostly steep, with timber management greatly constrained both by slope and proximity to water, public highway, and recreational use. Only about 240 acres, less than 25% of the forest area, is considered manageable (regulated, in forestry terms) and is located in two separate areas. The first is a strip in the Upper Farm area east of Route 27, with some located behind the fields, and another accessed by a gravel road that runs through the property. This parcel contains mainly well-stocked northern hardwoods, uncut for the past 30+ years, but with an extensive harvest history before that. The second area lies behind and west of Natanis Point Wilderness Campground, on either side of Horseshoe Stream and associated wetlands. This land is not quite as steep as the first parcel and is mainly mixedwood, northern hardwood/spruce-fir, with a similar cutting history. Any timber management would be geared towards wildlife and retaining the existing forest types in most cases.

Administrative Concerns

Leases and Agreements: Natanis Point Wilderness Campground has a 7-acre commercial lease with the Bureau, which includes approximately 1,500' of frontage along the northwestern shoreline of Natanis Pond. The current lease is a continuation of an agreement begun with the Brown Company prior to state ownership in 1978.

There are five residential camplot leases on the property, all of which were in place prior to acquisition of the property in 1978. A one-acre lease is located south of the Upper Farm area along the east side of Route 27, and has road access; three other one-acre leases are located along the eastern shoreline between Long and Bag ponds, and have road access; a fifth lease includes a one half-acre lot on Long Pond, and is water accessible only. These leases have been established on a five-year renewable basis, are for residential and seasonal use only, and contain conditions that limit improvements to both structures and lots.

Public Use and Management Roads, Gates, and Road Controls: The campground area contains the only public access road into the northern end of the property, although visitors are required to check-in prior to its use. The bridge over the outlet between Round and Natanis Pond was reconstructed in the 1990's, and replaced in 2005 with assistance from the Department of Transportation. The bridge replacement is part of a two-phase project that will include replacing the old boat launching facility on Route 27 with a new one within the campground.



Fire Control: Plan in progress.

Historic and Cultural Resources

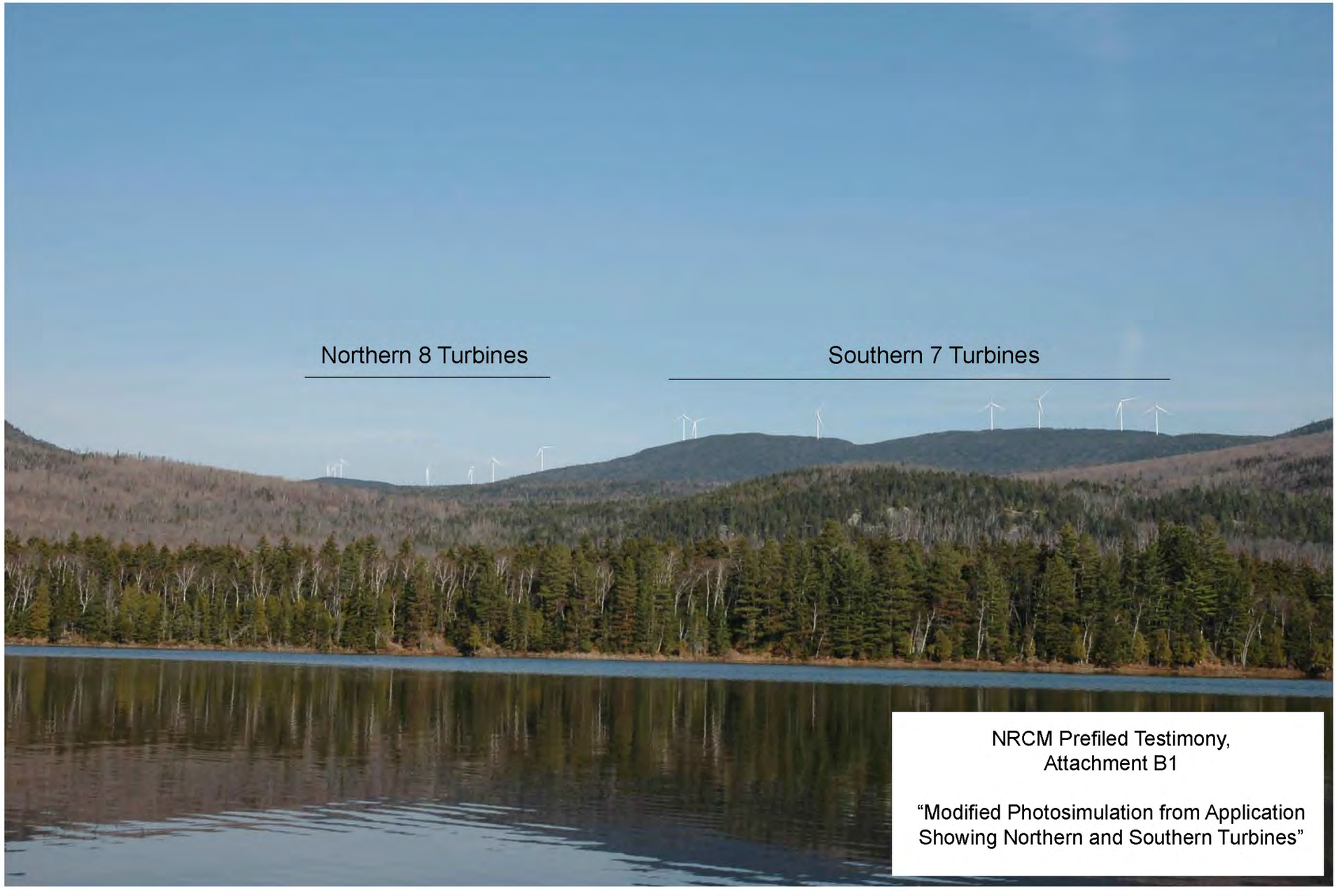
Native American Prehistory: The history of the Flagstaff Plan area dates back to its earliest use by Native Americans following the retreat of the glacier about 10,000 years ago.

Arnold Trail Historic District: In 1775 Washington dispatched Benedict Arnold and an army of 1100 soldiers up the Kennebec River to Quebec to launch a surprise attack in an attempt to overthrow British rule in Canada – in the hopes of turning the tide of the Revolutionary War. Arnold lead his colonial militia along an ancient Indian route from the Kennebec River, along the Dead River and into Canada, enduring tremendous hardships along the way, particularly on the northward trek from Bigelow Mountain to the Canadian border. The historic trail followed the watercourse along what is known as the Great Carrying Place, roughly over what is now the Appalachian Trail. The route continued along the Dead River in what is now Flagstaff Lake, then along the North Branch of the Dead River into the Chain of Ponds. The route continued northward along Horseshoe Stream. When the expedition reached Canada, the watercourse became obscured, and Arnold's army became separated. Many turned back at this point, many others died of starvation and exposure. A small contingent ultimately made it to Quebec, where the expedition came to an end when the attack on the British proved unsuccessful.

The Maine Historic Preservation Commission has filed an application to have the Trail included in the American Battlefield Protection Program, which would provide additional protections along the corridor. The Arnold Expedition Historical Society and the Kennebec-Chaudiere International Corridor have also worked on developing interpretive resources along the trail.

Lumbering in the Flagstaff Region: About thirty years after the Arnold expedition, a lumbering venture established a settlement on the Dead River, named Flagstaff after the flagpole allegedly erected by the Arnold expedition. In 1835 the Dead River Company was granted by the legislature (Private and Special Acts of Maine 1835 pp 858-859) "the right to clear the Dead River of obstructions.... And may for that purpose break jambs [sic] blast and split rocks, remove logs, gravel beds . . . and may erect, build and keep in repair guide booms and side dams." In 1843 the legislature authorized a dam on the Dead River, and on July 15, 1844 its construction was noticed in the Portland Advertiser (Wood, 1971). According to the sixth U.S. Census, in 1840, the area had numerous sawmills, though in the Dead River drainage only one town had sawmills-with two in Eustis; while in the Sandy and Carrabassett drainages there were many more - two in Kingfield, one in Lexington Twp, three in Madrid, two in Philips, one in Salem Twp, one in Freeman Twp, three in New Portland, four in Weld, three in Avon, three in Strong, six in Farmington, three in Industry, and ten others west and south of Farmington in Franklin County (Wood, 1971).

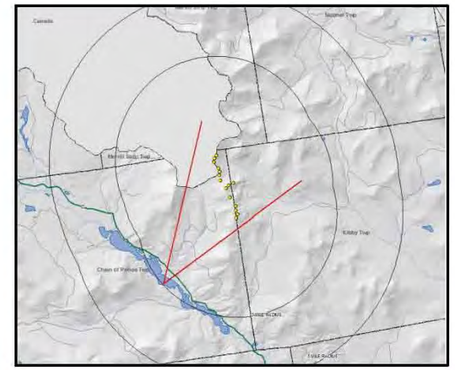
Large scale lumbering in the upper reaches of the Sandy and Carrabassett Rivers began later than in the Dead River drainage.



NRCM Prefiled Testimony,
Attachment B1

"Modified Photosimulation from Application Showing Northern and Southern Turbines"

VIEWPOINT LOCATION MAP



EXISTING CONDITIONS

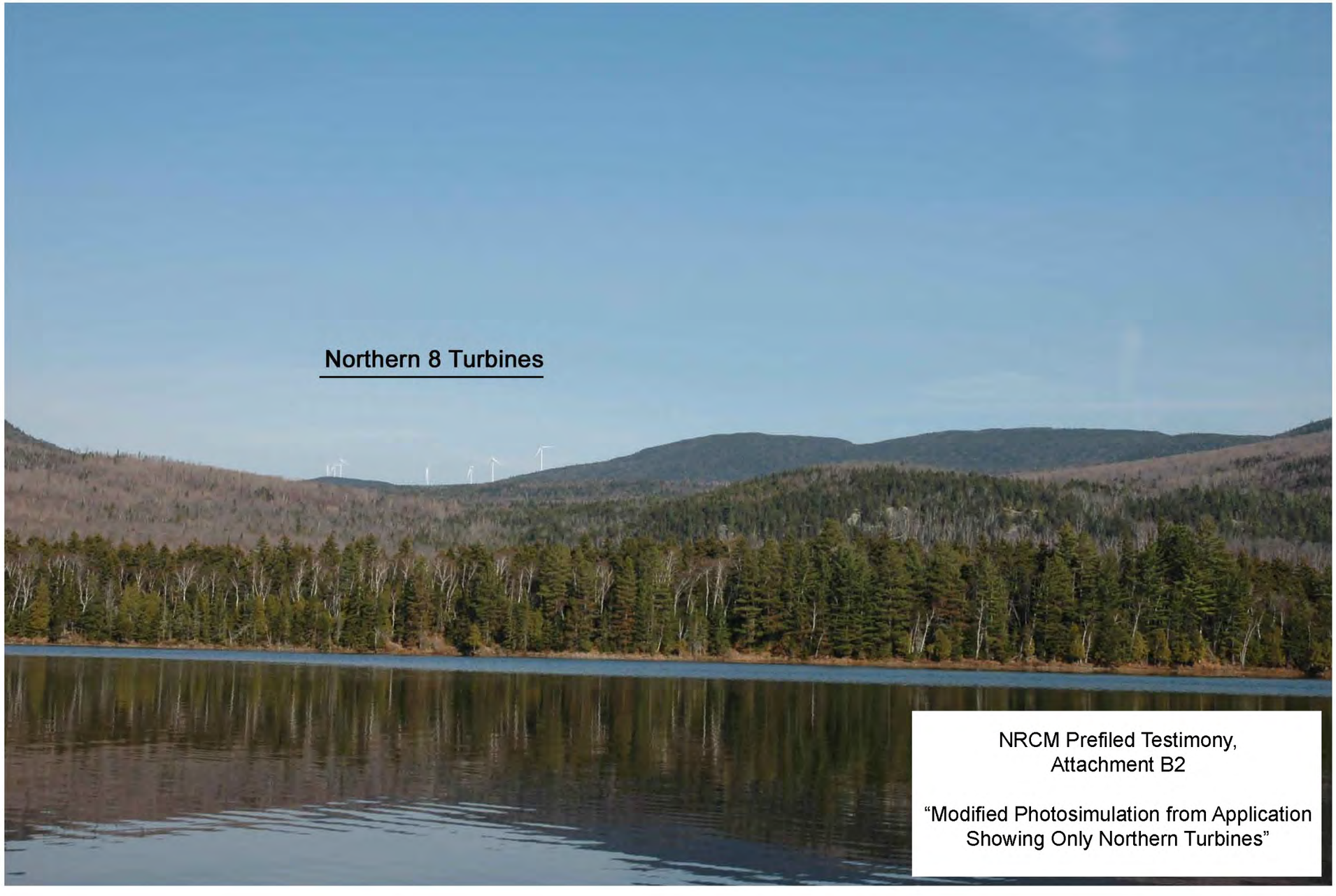
TECHNICAL INFORMATION

Turbine Model	Vestas V90 3 MW
Hub Height	80 meters
Rotor Diameter	90 meters
Viewpoint Coordinates	369271.3 E
In UTM 19	5021474.5 N
Viewpoint Location	Long Pond, SE
Viewer Elevation	1274 ft msl
Distance to Closet Turbine	3.0 miles
Distance to Furthest Turbine	4.25 miles
Number of Visible Turbines	14
Camera Model	Nikon D70
Lens Setting	50 mm (equivalents)
Date/Time	11.09.09/11:46 am

KIBBY EXPANSION WIND POWER PROJECT

Photosimulations Prepared for TransCanada
by Jean Vissering and TRC (Modified by NRCM)

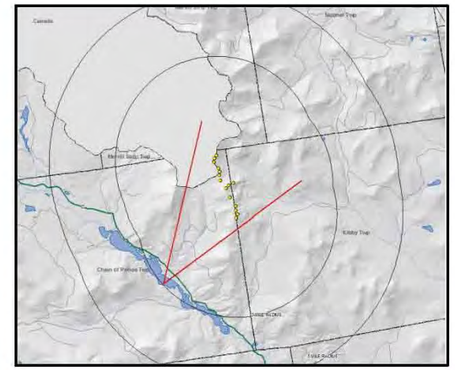
VIEWPOINT 5



NRCM Prefiled Testimony,
Attachment B2

"Modified Photosimulation from Application Showing Only Northern Turbines"

VIEWPOINT LOCATION MAP



EXISTING CONDITIONS

TECHNICAL INFORMATION

Turbine Model	Vestas V90 3 MW
Hub Height	80 meters
Rotor Diameter	90 meters
Viewpoint Coordinates	369271.3 E
In UTM 19	5021474.5 N
Viewpoint Location	Long Pond, SE
Viewer Elevation	1274 ft msl
Distance to Closet Turbine	3.0 miles
Distance to Furthest Turbine	4.25 miles
Number of Visible Turbines	14
Camera Model	Nikon D70
Lens Setting	50 mm (equivalents)
Date/Time	11.09.09/11:46 am

KIBBY EXPANSION WIND POWER PROJECT

Photosimulations Prepared for TransCanada
by Jean Vissering and TRC (Modified by NRCM)

VIEWPOINT 5

Notes:
1. Based on Vestas V90 with height to tip of blades: 125 meter (410 feet).
2. Based on USGS digital elevation model with 10 meter resolution.
3. Viewshed Analysis Software: ESRI ArcGIS 9.3.
4. Potential visibility indicated only in open areas: water, roadways, fields and wetlands.
5. Assumed 40 foot tree height in forested areas (includes evergreen forest, deciduous forest, mixed forest, woody wetlands).
6. Potential visibility is based on line of sight and may include all or only a small part of turbine. It does not reflect the effects of distance, haze, or atmospheric conditions on visibility.

T-1
T-2
T-3
T-4
T-5
T-6
T-7
T-8
T-9
T-10
T-11
T-12
T-13
T-14
T-15

3 MILES
5 MILES

VP 1
VP 2
VP 3
VP 4
VP 5
VP 6

T2 R6 WELS
T2 R7 WELS
T2 R6 WBKP
CHAIN OF PONDS
T1 R6 WBKP
KIBBY
MOUNTAIN
STREAM
CHAIN OF PONDS

PROPOSED TURBINE
VIEWPOINT LOCATION
NUMBER OF TURBINES POTENTIALLY VISIBLE
VALUE
1 - 3
3 - 6
6 - 9
9 - 12
12 - 15
0 1,250 2,500 Feet

NRCM Prefiled Testimony,
Attachment C1

"Vissering Appendix 2
Viewshed Analysis Map Detail:
Chain of Ponds"

KIBBY EXPANSION WIND POWER PROJECT

APPENDIX 2
VIEWSHED ANALYSIS MAP DETAIL: CHAIN OF PONDS

Prepared for TransCanada by Jean Vissering and TRC

Notes:
1. Based on Vestas V90 with height to tip of blades: 125 meter (410 feet).
2. Based on USGS digital elevation model with 10 meter resolution.
3. Viewshed Analysis Software: ESRI ArcGIS 9.3.
4. Potential visibility indicated only in open areas: water, roadways, fields and wetlands.
5. Assumed 40 foot tree height in forested areas (includes evergreen forest, deciduous forest, mixed forest, woody wetlands).
6. Potential visibility is based on line of sight and may include all or only a small part of turbine. It does not reflect the effects of distance, haze, or atmospheric conditions on visibility.

T-1
T-2
T-3
T-4
T-5
T-6
T-7
T-8

NRCM Prefiled Testimony,
Attachment C2

"Modification of Appendix 2
Viewshed Analysis Map Detail:
Chain of Ponds, Showing
Approximate Visibility of
Nothern Turbines"

3 MILES
5 MILES

VP 1
VP 2
VP 3
VP 4
VP 5
VP 6

PROPOSED TURBINE
VIEWPOINT LOCATION
NUMBER OF TURBINES POTENTIALLY VISIBLE
VALUE
1 - 3
3 - 6
6 - 9
9 - 12
12 - 15

0 1,250 2,500 Feet

KIBBY EXPANSION WIND POWER PROJECT

APPENDIX 2
VIEWSHED ANALYSIS MAP DETAIL: CHAIN OF PONDS

Prepared for TransCanada by Jean Vissering and TRC
(Modified by NRCM)