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.)

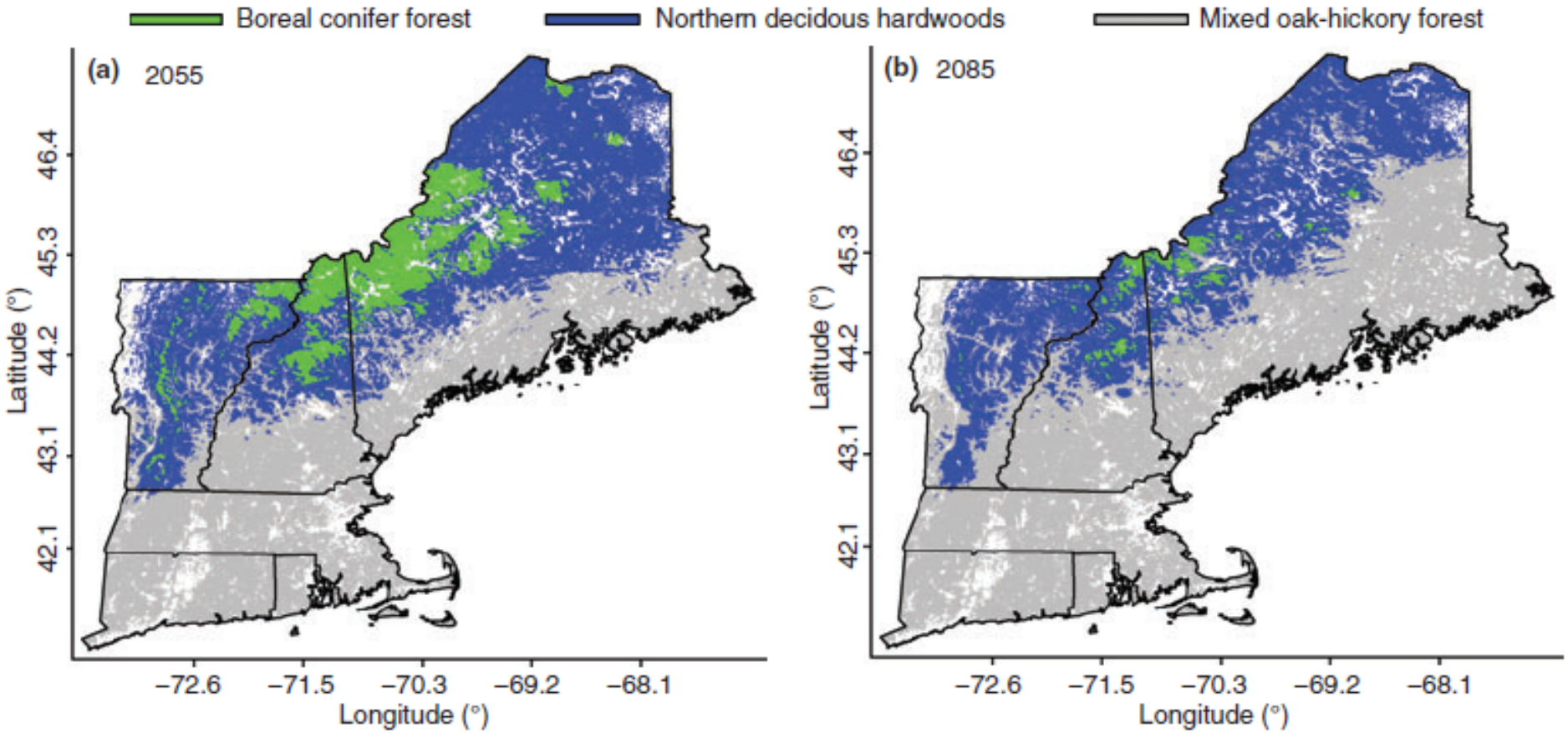


Figure 4 The distribution of mixed oak–hickory, northern deciduous hardwood and boreal conifer forests in two future periods 2041–70 (referred to as 2055) and 2071–99 (referred to as 2085) in New England. The vegetation type in each grid cell is based on the modal value of each grid cell across all nine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

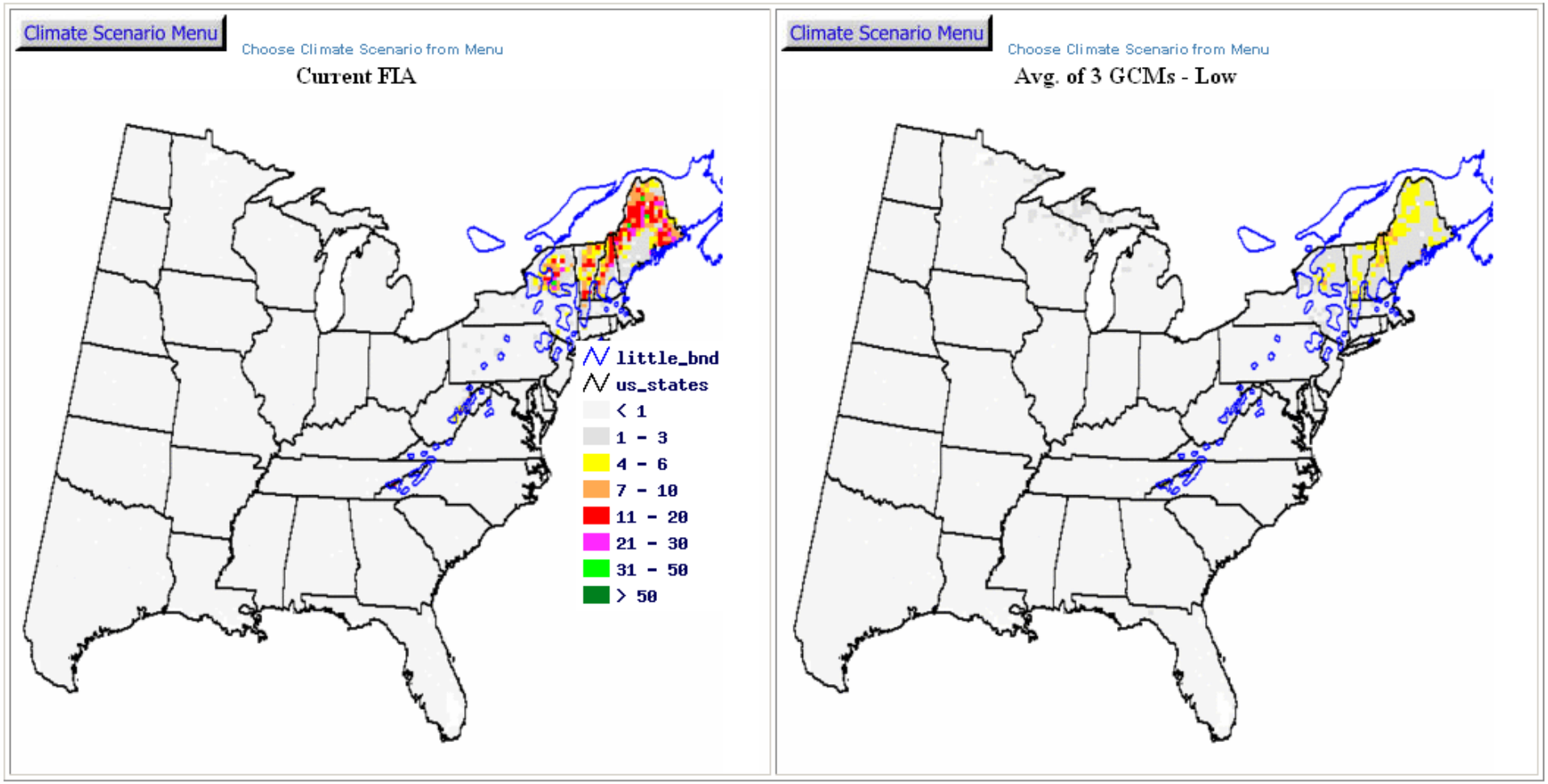
The left-hand map in each pair shows the current distribution of each species as determined from USFS Forest Inventory and Analysis data. The colors represent the calculated importance value of that species, with higher numbers representing greater dominance of that species at that location.

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."

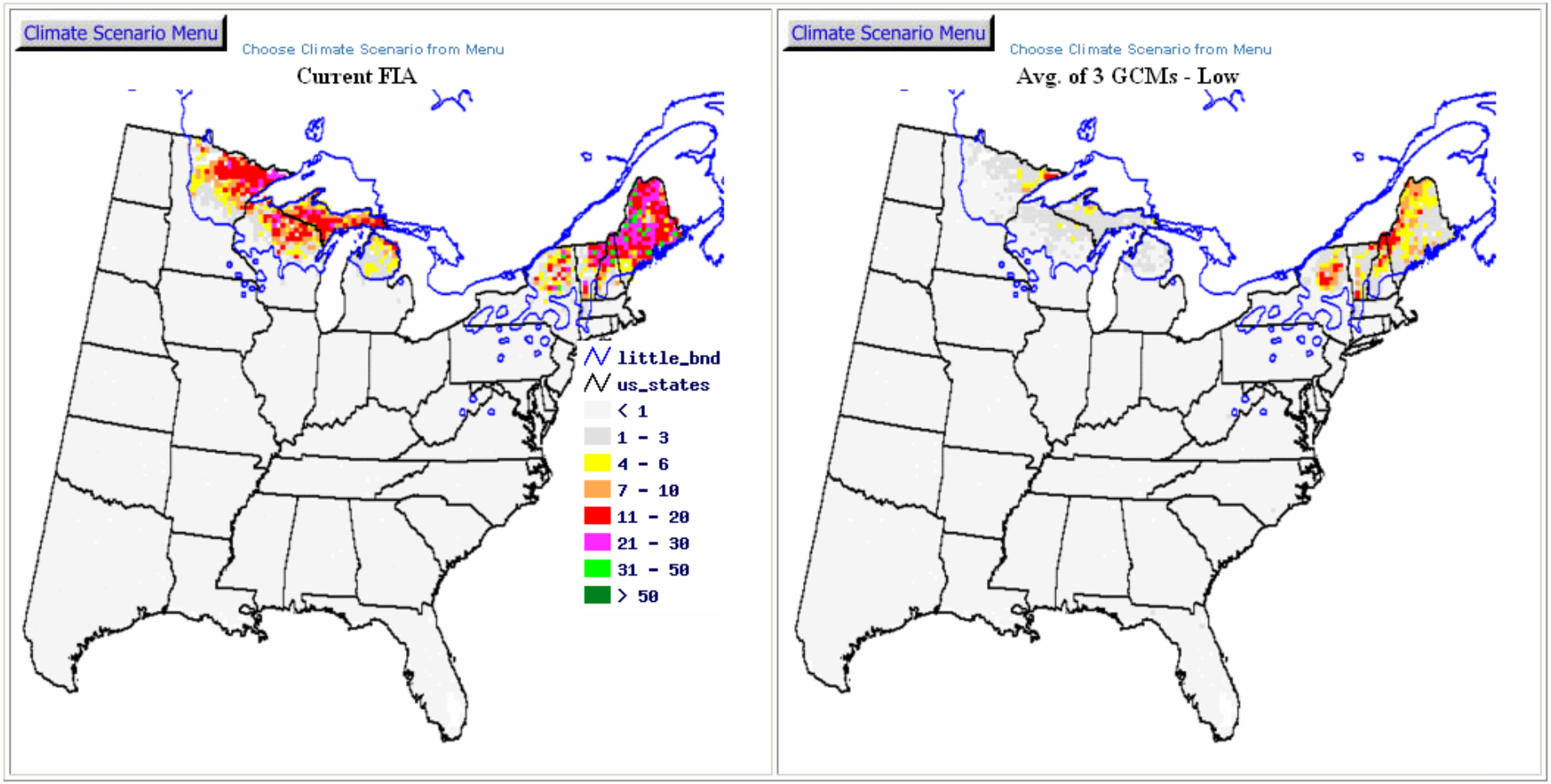
ATTACHMENT C (continued)

Red spruce



ATTACHMENT C (continued)

Balsam fir



ATTACHMENT D – Photograhs of original Kibby project

ATTACHMENT D (continued)

ATTACHMENT D (continued)