STATE OF VERMONT
PUBLIC SERVICE BOARD

Petition of Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., and Vermont Electric Power Company, Inc., for a certificate of public good, pursuant to 30 V.S.A. Section 248, to construct up to a 63 MW wind electric generation facility and associated facilities on Lowell Mountain in Lowell, Vermont, and the installation or upgrade of Approximately 16.9 miles of transmission line and Associated substations in Lowell, Westfield and Jay, Vermont	)	Docket No. 7628

PROPOSED FINDINGS OF FACT AND CONCLUSIONS

OF LAW OF THE VERMONT AGENCY OF NATURAL RESOURCES

I. INTRODUCTION

Green Mountain Power Corporation, Vermont Electric Cooperative, Inc., and Vermont Electric Power Company, Inc., have petitioned the Vermont Public Service Board for a Certificate of Public Good to construct and operate the Kingdom Community Wind Project, a 63 MW wind electric generation facility and associated facilities, on Lowell Mountain in the town of Lowell, Vermont, and to install approximately 16.9 miles of transmission line and associated substations in the Towns of Lowell, Westfield, and Jay, Vermont. This Proposal for Findings of Fact, Conclusions of Law and Order sets forth the findings and recommendations of the Vermont Agency of Natural Resources (Agency or ANR) with respect to criteria relating to natural resources in accordance with 30 V.S.A. § 248(b)(5).

Findings

Project site

1. The Wind Project will be located along the Lowell Mountain Ridgeline. The property where the project is proposed is steep, remote and dominated largely by mid-succession and mature forest cover. Austin pf at 18.

2. The property is unique in the region because the Lowell ridgeline is a single linear feature within a broader landscape of the northern Green Mountains region with an abundance of lowland agricultural lands. Austin direct pf at 18.

3. The Lowell ridgeline is largely dominated by forest cover, in varying stages of succession and it is the broad forest cover that provides interior forest habitat for many species of wildlife in the region. Austin direct pf at 18

4. The VFWD has mapped unfragmented forest habitat blocks throughout Vermont as a way of better understanding the extent of fragmentation in the various regions of the state. Austin direct pf at 21.

5. "Habitat blocks" are defined as areas of contiguous natural habitat that are bounded by fragmenting features. Sorenson direct pf at 18.

6. Information from this effort for the Lowell ridgeline makes clear that the ridgeline itself is an area of contiguous, largely unfragmented forested habitat surrounded by areas that are highly fragmented by agriculture, roads and development. Austin direct pf at 21.

7. The Lowell Mountain Block is approximately 29,680 acres and is the 12th largest habitat block in the Northern Green Mountains biophysical region. Sorenson direct pf at 19.

8. There is no pre-existing development in the vicinity of the ridgeline of the project and forest management activities have not resulted in any significant changes to the character of the forested habitats. Austin direct pf at 18.
9. Remote ridgelines currently provide the core habitat blocks that remains in the state and there are many areas of Vermont that are highly fragmented. Austin direct pf at 21.

Project description

10. The project involves the construction and operation of a twenty-one (21) wind turbine generation facility and the construction of approximately 16.9 miles of transmission lines and associated infrastructure in Lowell Vermont. Pughe pf. at 5-8.
11. The project will be located on land currently owned by the Wileman family/Moose Mountain Forestry, LLC. GMP has executed lease agreements with the Wileman family authorizing GMP to operate the Kingdom Community Wind Farm on the Wileman property. Tr. 2/3/2011 (Pughe); ANR-Cross-Exhibit 8.
12. The project will involve the construction of a 2.5 mile access road and a 4 mile crane path road along the ridge of the Lowell Mountain. Sorenson pf at 20.
13. These roads, associated drainage structures, and the 21 turbine pads will result in construction of infrastructure and site clearing on approximately 149.9 acres. Sorenson pf at 20; Nelson updated pf. rebuttal at 12.
14. The total area needed to construct the project is 169.8 acres. Jewkes 1-26-11 update to prefiled rebuttal at 5.
15. Approximately 2.5 acres of earth will be disturbed to install the overhead collector line. Jewkes 1-26-11 update to prefiled rebuttal at 5.

16. To construct the crane path road, the contours of the mountain and ridge will be flattened which will require side slopes considerably wide enough to cut down to existing grade. Tr. 2/3/11 at 196 (Jewkes)

17. Disturbance widths for the 250 foot diameter turbine pads measured between 300 to 420 feet. Burke direct pf at 11.

18. In areas where the turbine pad abuts the crane path road, the amount of clearing required for the project would exceed 450 feet. Tr. 2/3/11 at 198-99 (Jewkes).

19. Disturbance widths associated with the crane path along the ridgeline is approximately 260 feet, including the clearing associated with Wet Pond I, adjacent to turbine 6. Burke direct pf at 11.

20. In areas where the crane path road will not abut a turbine pad, the maximum width of the crane path, without stormwater features, is approximately 190 feet. ANR-Cross Exh. 6.

21. The addition of the erosion control zone and stormwater features will expand the amount of clearing needed to construct the project. Tr. 2/3/11, at 203 (Jewkes)

22. The erosion control zone will require the additional cutting, without grubbing, of trees on 10 feet on each side of the road. Tr. 2/3/11 at 203 (Jewkes).

23. The maximum width of the access road, excluding the stormwater features, is approximately 152 feet. ANR-Cross-Exhibit 5.

24. The addition of stormwater features along the access road will expand the width of clearing needed to construct the project.

25. The width of the clearing required at the area where the access road meets the crane path road ranges from 320 to approximately 520 feet. In areas where the turbine pad abuts the

crane path road, the amount of clearing required for the project would exceed 450 feet. Tr. 2/3/11 at 200-02 (Jewkes).

26. The widest area of disturbance is approximately 530 feet. Burke direct pf at 10.

27. Once the project is operational, with the exception of the 10 foot erosion control zone on each side of the crane and access roads, the clearing required to construct the project will remain throughout the life of the project. Tr. 2/3/11 at 204-05 (Jewkes).

Aesthetics, Historic Sites, Air and Water Purity, the Natural Environment, and the Public Health and Safety

30 V.S.A. § 248(b)(5)

28. Absent the proposed mitigation outlined below and set out in GMP-ANR-1, the proposed Project will have undue adverse effects on the natural environment, with due consideration given to the criteria specified in 10 V.S.A. §§ 1424(a)(d) and 6086(a)(1) through (8) and (9)(K).

Water and Air Pollution
[10 V.S.A. § 6086(a)(1)]

29. The Project will not "result in undue air pollution." The wind turbines will not generate any air pollutants. Accordingly, operation of the Project will not require an air pollution control permit from ANR.

Headwaters

[10 V.S.A. § 6086(a)(1)(A)]

30. The wind farm component of the Project is located in an area that meets one or more of the headwaters criteria. Nelson Direct pf. at 10, 19-20.

31. The wetlands along the ridgeline act as functional headwaters, and are a critical transition between groundwater and surface water. Headwater wetlands moderate water temperature and contribute organic matter to the stream, both of which are critical to stream biota. Morrison pf. surrebuttal, at 3

32. Within portions of the wind farm component, there are areas of steep slopes and the drainage areas of several of the delineated features are less than 20 square miles. Nelson Direct pf. at 10, lines 14-15.

33. The turbine location stations, along with portions of the access road, are located above 1,500 feet elevation. Nelson Direct pf. at 10, lines 16-17.

34. An objective of the Project design is to maintain natural drainage patterns and topography to the extent practical. Nelson Direct pf. at 10, lines 21-23.

35. Earth disturbance will occur in close proximity to receiving waters that are situated above 2,500 feet in elevation. Nelson Direct pf. at 11, lines 14-15.

36. These receiving waters consist of stream segments and wetlands that are designated as Class A Waters. Nelson Direct pf. at 11, lines 16-21.

37. Impacts that occur at the beginning of a stream can affect water quality and aquatic biota downstream. Morrison pf. surrebuttal, at 3

38. The cumulative effects of these impacts should be offset by appropriate mitigation. Morrison pf. surrebuttal, at 3

39. The project will need to obtain a state wetlands permit and an Army Corps of Engineers 404 permit. As part of the 404 permit process, the Agency of Natural Resources conducts a 401 certification review. Tr. 2/24/2011, at 152 (Morrison)

40. As part of the 401 certification review process, the Agency will evaluate the project for compliance with the Vermont Water Quality Standards. Tr. 2/24/2011, at 152 (Morrison)

41. Any mitigation for the project should include a mechanism for conserving higher elevation wetlands. Morrison surrebuttal at 4.

42. The permitting process and review for the federal and state wetlands permits will address the need for mitigation for impacts to headwaters. Tr. 2/24/2011, at 152.

Discussion

The wind farm component of the project is located on lands that meet the headwaters criteria of 10 V.S.A. § 6086(a)(1)(A). The Project will need to comply with the Vermont Water Quality Standards. To ensure that the project complies with the Vermont Water Quality Standards, the Board should include a specific condition requiring that Petitioner obtain the 401 water quality certification and state and federal wetland permits before it commences construction.

Wetlands
[10 V.S.A. § 6086(a)(1)(G)]

43. Both the wind farm and transmission components of the Project contain Class II and Class III wetlands. Exh. Pet.-JAN-9, VWR Re-Classification Summary Spreadsheets for WIND FARM and TRANSMISSION Components, September 28, 2010.

44. ANR concurs with the classification of the Project wetlands as they are identified in the Re-Classification Summary Spreadsheets included in Exh. Pet.-JAN-9. Morrison Direct pf. at 5.

45. The Project will result in direct (0.267 acres), temporary (0.110 acres) and secondary (0.156 acres) impacts to wetlands on the wind farm component. Nelson Rebuttal pf. at 3, lines 9-13 (Revised).

46. The Project will result in direct (0.002 acres), temporary (1.73 acres) and secondary (0.83 acres) impacts to wetlands on the transmission component. Nelson Rebuttal pf. at 9, lines 2-6 (Revised).

47. In addition, there will be permanent (0.655 acres) and temporary (0.198 acres) impacts to Class II wetland buffers on the wind farm component. Exh. Pet.-JAN-2 Appendix 1 (Second Supplemental).

48. Impacts to wetlands and their buffers are associated with access roads, tree clearing, overhead transmission lines and stormwater treatment. Morrison Direct pf. at 7.

49. Functions and values of wetlands located on the wind farm component include groundwater discharge, groundwater recharge, flood storage, water quality benefits, and wildlife habitat. Morrison Direct pf. at 3-4.

50. Functions and values of wetlands located on the transmission component vary depending on the size and location of the wetland. Morrison Direct pf. at 4.

51. A number of wetlands located along the ridgeline on the wind farm component act as functional headwaters and are a critical transition between groundwater and surface water. Morrison Surrebuttal pf. at 3, lines 12-13.

52. The ridgeline wetlands moderate water temperature and contribute organic matter to streams, both of which are critical to stream biota. Morrison Surrebuttal pf. at 3, lines 13-15

53. Impacts that occur at the beginning of a stream can affect water quality and aquatic biota downstream. Morrison Surrebuttal pf. at 3, lines15-16.

54. The Project will result in direct impacts to about 9,892 square feet of the functional headwater wetlands along the ridgeline. Morrison Surrebuttal pf. at 3, lines 16-17.

55. Indirect impacts to the functions and values of these functional headwater wetlands will also be caused by activities such as clearing and grading occurring in close proximity to these wetlands. Morrison Surrebuttal at 3, lines 17-19.

56. Mitigation that was proposed by Petitioner prior to filing its Federal wetlands permit application under Section 404 of the Clean Water Act and seeking a Section 401 water quality certification was not adequate to address the impacts to the ridgeline wetlands. Morrison Surrebuttal pf. at 2, lines 20-22; Morrison Tr. at 151, lines 13-25 and 152, lines 1-2.

57. With regard to the higher elevation wetlands acting as functional headwaters, appropriate mitigation could include conservation of higher elevation wetlands with similar functions and values. Morrison surrebuttal pf. at 2, line 23; 3, lines 1-2; and 4, lines 15-16.

58. The Petitioner will need to obtain a Vermont state wetlands permit along with a Federal Section 404 permit and a Section 401 water quality certification. Morrison Direct pf. at 9; Morrison Tr. at 152, lines 7-14.
59. Both the state and federal permits will require mitigation due to the amount and extent of the impacts to wetlands and their functions. Morrison Direct pf. at 9; Morrison Tr. at 152, lines 15-18.
60. A ratio of 15:1 (mitigation: impact acres) is required when preservation is utilized as mitigation. Morrison Direct pf. at 9.
61. The Stipulation between the Petitioner and ANR (Exh. GMP-ANR-1) does not specifically address mitigation for wetland impacts.
62. Mitigation will be addressed as part of the wetlands permitting process. Tr. 2/24/2011 at 154, lines 22-25; 155, lines 1-7; 152, lines 15-18 (Morrison)

Discussion

The Project will result in direct, temporary and secondary impacts to wetlands and their buffers. These impacts are associated with access roads, tree clearing, overhead transmission lines and stormwater treatment. The Petitioner will need to obtain a Vermont state wetlands permit along with a Federal Section 404 permit and a Section 401 water quality certification for the Project. Both the state and federal permits will require mitigation due to the amount and extent of the impacts to wetlands and their functions. The Stipulation entered into by the Petitioner and ANR (Exh. GMP-ANR-1) does not specifically address mitigation for wetland impacts because the parties envisioned that mitigation will be addressed through the wetlands permitting process. In order to avoid undue adverse impacts to wetlands, if the Board were to issue a Certificate of

Public Good it should include as a condition that Petitioner obtain state and federal wetlands permits and a Section 401 water quality certification prior to construction of the Project.

Waste Disposal

[10 V.S.A. § 6086(a)(1)(B)

Findings

63. The Project will need to obtain a wastewater permit from the Vermont Department of Environmental Conservation. Pughe pf. rebuttal at 12.

Discussion

Any CPG issued for the Project should include as a condition that Petitioner obtain the requisite permit from ANR/DEC before it commences construction.

Soil Erosion

[10 V.S.A. § 6086(a)(4)]

64. The Project will require both a NPDES construction stormwater discharge permit and an operational permit. Burke Tr. at 161, lines 16-20.
65. Petitioner has applied for an individual NPDES discharge permit. Nelson Direct pf. at 11, lines 7-11.
66. A construction stormwater discharge permit is terminated upon completion of the project and final stabilization of disturbed areas. Burke direct pf at 4.
67. The construction phase of the Project is considered a high risk project by the Vermont DEC Stormwater Management Program. Burke Tr. at 172, lines 11-12.
68. The Individual Discharge Permit for the Project will require an Erosion Prevention and Sediment Control Plan and include additional oversight requirements and safeguards to

address the higher risks presented by the Project. Burke Tr. at 185, line 14-25; 186, lines 1-21.

69. Stormwater runoff from an impervious surface must be treated in accordance with standards set forth in the Vermont Stormwater Management Manual, which specifies five unified treatment criteria. Burke direct pf at 4.

70. The operational phase stormwater permit will address the management of runoff from impervious surfaces after construction is complete. Burke Tr. at 176, lines 23-25; 177, lines 1-2.

71. Petitioner has applied for an individual operational state stormwater discharge permit. Burke pf direct at 5.

72. The Vermont Stormwater Management Rule defines impervious surface as "man made surfaces, including but not limited to, paved and unpaved roads, parking areas, roofs, driveways and walkways, from which precipitation runs off rather than infiltrates." Burke direct pf. at 6, lines 12-15.

73. The crane path and access road, once constructed, will be impervious surfaces. Burke Tr. at 164, lines 12-24.

74. In addition to other requirements, the operational stormwater permit will require the Petitioner to inspect the stormwater infrastructure and submit a report to the state stormwater management program annually. Burke Tr. 168, lines 15-21

75. The stormwater features need to remain as long as the impervious surface that they are treating remains in place. Tr. 2/3/2011, at 205 (Jewkes).

76. The deep-ripping/scarification of the crane path and portions of the access road as described in the Stipulation entered into by the Petitioner and ANR (Exh. GMP-ANR-1) would necessitate the development of erosion prevention and sediment control plan and issuance of a construction phase stormwater permit at the time of decommissioning. Burke Tr. at 178, lines 11-24; 179, lines 1-4.

Individual stormwater permits

77. Individual permits provide greater oversight and protection against the potential risk of impacts to water quality. For example, an individual permit provides an established set of required conditions to which a designer must certify compliance. An individual permit requires a site specific erosion prevention sediment control plan that is subject to review by the Agency stormwater management program. The Agency can develop conditions specific to the project. Tr. 2/24/2011, at 186 (Burke)
78. Individual permits allow for greater public participation and require a thirty day notice period for public comments, rather than 10 for the general permit, and offer an opportunity for a hearing on the Project. Tr. 2/24/2011, at 188-89 (Burke)
79. For an individual construction NPDES permit, the Agency stormwater management program also requires the additional oversight of an erosion prevention sediment control specialist, which is an additional consultant that would be visiting the site to ensure that the on-site plan coordinators that are also responsible for implementing the plan that they are in fact following the plan. Tr. 2/24/2011, at 186 (Burke)
80. The Erosion Prevention Sediment Control Specialist reports directly to ANR with site specific reports, and photographs. For this project the reporting will occur on a weekly basis. Tr. 2/24/2011, at 186 (Burke)

81. An additional requirement of individual construction permits includes a preconstruction conference in which ANR stormwater management staff meet with the permittee, the plan coordinators, specialists, and other relevant personnel prior to construction to review the project, EPSC plans and to review expectations and project schedule to ensure the plan is going to be followed. Tr. 2/24/2011, at 186 (Burke)

82. This project will incorporate additional protective measures during the construction phase. Each earthwork crew that on site will have its own dedicated on-site plan coordinator specifically responsible for inspecting, maintaining, and ensuring that the erosion and prevention plan sediment control plan is being followed. Tr. 2/24/2011, at 188-89 (Burke)

83. An additional layer of oversight includes an erosion control crew that will work throughout the project to supplement erosion control and ensure compliance with the EPSC Plan. Tr. 2/24/2011, at 188 (Burke).

84. The impervious surfaces proposed by the applicants for coverage under the operational state stormwater discharge permit totals 27 acres. Burke direct pf at 6.

85. The 27 acres of impervious surface proposed as part of the project includes an access road, crane pads, turbine foundations, and the maintenance building rooftop and associated parking areas. Burke direct pf at 9.

86. An operational stormwater discharge permit is required and should remain in effect for as long as the impervious surface remains on the project to ensure treatment of stormwater runoff from impervious surfaces indefinitely. Burke direct pf at 12.

Discussion

Petitioner has applied for a NPDES Individual Discharge Permit. The Individual Discharge Permit for the Project will require an Erosion Prevention and Sediment Control Plan and include additional oversight requirements and safeguards to protect water quality. The Board should include a requirement in the CPG for the Project that the Petitioner obtain a NPDES Individual Stormwater Discharge Permit prior to construction of the Project.

The project will require an Individual Operational State Stormwater Permit from the Vermont DEC Stormwater Management Program as a result of the creation of impervious surfaces associated with the Project. The operational stormwater permit will require proper design and construction of stormwater treatment and control practices in order to minimize the impacts of stormwater runoff from impervious surfaces to receiving waters. The Board should include a requirement in the CPG for the Project that the Petitioner obtain an Operational Stormwater Permit prior to operation of the Project.

The deep-ripping/scarification of the crane path and portions of the access road as described in the Stipulation entered into by the Petitioner and ANR (Exh. GMP-ANR-1) would necessitate the development of an erosion prevention and sediment control plan and issuance of a construction phase stormwater permit at the time of decommissioning in order to protect receiving waters.

Rare and Irreplaceable Natural Areas

[10 V.S.A. § 6086(a)(8)]

87. Absent the mitigation outlined below and prescribed by GMP-ANR 1, the Project will have an undue adverse effect on rare and irreplaceable natural areas.

Natural Community ASSESSMENT METHODOLOGY

88. Natural communities are interacting assemblages of plants and animals, their physical environment, and the natural processes that affect the organisms and the environment. These assemblages of plants, animals, and other organisms found in natural communities repeat wherever certain environmental conditions (such as soil, hydrology, and climate) are found. Whereas a natural community refers to an actual occurrence on the ground, a natural community type is a composite description summarizing the characteristics of all known examples of that type. Sorenson pf direct at 5.

89. The VFWD developed a classification of more than 80 natural community types. Sorenson direct pf at 5

90. A State Rarity Rank system is used by the VFWD based on the known number of occurrences of a natural community type, the total area occupied by that type, and the quality or condition of most occurrences:

> **S1:** very rare in the state, generally fewer than five high quality occurrences;
> **S2:** rare in the state, occurring at a small number of sites or occupying a small total area in the state;
> **S3:** high quality examples are uncommon in the state, but not rare; the community is restricted in distribution for reasons of climate, geology, soils, or other physical factors, or many examples have been severely altered;
> **S4:** Widespread in the state, but the number of high quality examples is low or the total acreage occupied by the community type is relatively small;
> **S5:** common and widespread in the state, with high quality example more common.

91. Almost all examples of rare natural community types are considered state-significant, whereas only the very best examples of common (S5) community types are considered state-significant. Sorenson direct pf at 6.

92. Examples of state-significant natural communities are tracked by the VFWD in the database managed by the Natural Heritage Information Project. Sorenson direct pf at 6.

THE West Farnham hill Serpentine Outcrop

93. An example of the very rare (S1) Serpentine Outcrop is located in the proposed transmission corridor just east of Route 100 in Lowell. Sorenson pf at 10.

94. The Serpentine Outcrop is an area of exposed serpentine bedrock. Sorenson direct pf at 10.

95. The Serpentine Outcrop at West Farman Hill should be considered a rare and irreplaceable natural area (RINA) by the Public Service Board under 10 V.S.A. s 6086(a)(8). Sorenson direct pf at 12; Nelson pf. rebuttal at 16.

96. The West Farman Hill serpentine outcrop natural community is primarily under the influence of natural processes, such as the chemical characteristics of serpentine bedrock and drought associated with exposed bedrock that limits plant development overtime. Sorenson direct pf at 13

97. The West Farman Hill serpentine outcrop natural community is dominated by native species (including two rare species). Sorenson direct pf at 12.

98. There are only eight known examples of Serpentine Outcrop known in Vermont. Sorenson direct pf at 13.

99. Typical plant nutrients are very low in abundance on soils derived from serpentine bedrock. Sorenson direct pf at 11.

100. Rare species found in the natural community on the West Farman Hill serpentine outcrop include Large Leaf Sandwort (*Moehringia macrophylla)* and Green Mountain Maidenhair fern (*Adiantum viridimontanum)*, which is a species classified as Rare (S2), is globally uncommon and is a Vermont state threatened species: Sorenson direct pf at 11

101. The Serpentine Outcrop community is irreplaceable because it is the result of mountain building events from millions of years of ago, and its exposure is due to glacial scouring and deposition beginning about 20,000 years ago. Sorenson direct pf at 13.

Mitigating Impacts from Transmission Lines and Utility poles

102. Proposed utility poles for the transmission line appear within a few feet of the Green Mountain maidenhair fern individual plants and clusters. Sorenson surrebuttal at 4.

103. Given the proximity of the new poles to the state-threatened plant and the area of construction disturbance around the new pole, impacts to the Green Mountain maidenhair fern are likely. Sorenson surrebuttal at 4.

104. Petitioner has proposed a vegetation management plan, PET-JAN-13. The Plan should be supplemented to include the recommendations of ANR witness Eric Sorenson, and incorporated as a condition of any Certificate of Public Good issued for the project. GMP-ANR-1; Sorenson pf. surrebuttal at 3.

105. Large-leaved sandwort is a highly characteristic species of the Serpentine Outcrop community and protecting this plant is important to avoiding any undue adverse effect. Sorenson surrebuttal at 3.

106. Petitioner shall map the location of this species in the vicinity of any construction work for the Project to avoid or minimize impacts and for determining if transplanting or

seed collection is necessary, based on construction impacts affecting greater than 25 percent of the rare plant population. Sorenson surrebuttal at 3

107. The five step plan to protect RTE species and manage invasive species adopted for the National Grid G33 transmission line, referring to Docket 7500, pages 19 and 20, 29, should be incorporated into the plan for the Project. Sorenson surrebuttal at 3

108. New poles should be located further from the state-threatened plants in order to avoid direct impacts. Otherwise, an Endangered Species Taking Permit will have to be obtained from ANR. Sorenson pf. surrebuttal at 4.

109. The management plan for the Serpentine Outcrop should be modified to include the following:

a. Monitoring for a minimum of three years for invasive species. Any species on the state Quarantine or Watch Lists will be removed by hand or per conditions below.
b. Prior to any routine vegetation management occurring in this area a qualified botanist will flag and delineate the Green Mountain maidenhair fern and large-leaved sandwort or alternatively the area containing them.
c. Mechanical clearing would be done during the dormant season.
d. There will be no foliar herbicide application within this area
e. Cut stump application of herbicide may occur if farther than one meter from any individual of the Green Mountain maidenhair fern or large-leaved sandwort.

Sorenson pf surrebuttal, at 5.

110. All the identified threatened plants within the impact area should be located, flagged, and fenced prior to any construction related activity, including tree clearing. Sorenson direct pf at 16.

Discussion

The West Farman Hill Serpentine outcrop is a rare and irreplaceable natural area. The serpentine outcrop is primarily under the influence of natural processes, such as the chemical characteristics of serpentine bedrock and drought associated with exposed bedrock that limits

plant development overtime. The West Farman Hill serpentine outcrop natural community is dominated by native species. The serpentine outcrop is rare and irreplaceable because there are only eight known examples of Serpentine Outcrop known in Vermont. Another factor contributing to the rarity of this natural area is the presence of two rare species, one state-threatened in Vermont. Serpentine bedrock is exposed in very limited areas in Vermont, primarily Lowell and Belvidere. The movement of serpentine bedrock to near the earth's surface is the result of mountain building events millions of years ago and the exposure of these areas is the result of glacial scouring and deposition resulting from the last glacial retreat, which began about 20,000 years ago. Because of this, the Serpentine Outcrop community is irreplaceable. Accordingly, the site qualifies as a rare and irreplaceable natural area.[1]

To mitigate for potential undue adverse impacts to the West Farman Hill Serpentine Outcrop, the Petitioner must develop and implement the vegetation management plan prescribed in GMP-ANR-1.

State Significant Natural Communities

111. State significant natural communities occur on the Project area in the form of Montane Spruce-Fir Forest and Montane Yellow Birch-Red Spruce Forest. Sorenson direct pf at 10.

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[1] See generally *In re McCullough Crushing, Inc.*, Application #5W0842-3, Findings of Fact and Conclusions of Law and Order, at 16 (Dec. 8, 2009) citing *Re: Leo and Theresa Gauthier*, #4C0842-EB, Findings of Fact, Conclusions of Law, and Order at 11-13 (June 26, 1991); *Re: Barre Granite Quarries, LLC and William and Margaret Dyott*, Findings of Fact, Conclusions of Law, and Order at 83-85 (December 8, 2000); *Re Josiah E. Lupton, Quiet River Campground*, Land Use Permit #3W0819 (Revised)-EB, Findings of Fact, Conclusions of Law, and Order at 28 -29 (May 18, 2001). *See also Re John Larkin*, 4C0626-6C, Findings of Fact, Conclusions of law and Order (Jan. 11, 2001).

A. Montane Spruce-Fir Forest

112. Montane Spruce-Fir Forest is dominated by red spruce (*Picea rubens)* and balsam fir (*Abies balsemea),* and has heart-leaved paper birch (*Betula papyrifera* var. *cordifolia).* Sorenson direct pf at 7-8

113. Montane Spruce-Fir Forest is an uncommon (S3) natural community type in Vermont. Sorenson direct pf at 7.

114. Montane Spruce-Fir Forest occurs on mountain summits and ridgelines, typically at elevation over 2,500 feet in the northern portion of Vermont. Sorenson direct pf at 7.

115. The total amount of Montane Spruce-Fir Forest on the Lowell Mountain ridgeline is approximately 94 acres. Sorenson direct pf at 9.

B. Montane Yellow Birch-Red Spruce Forest

116. Montane Yellow Birch-Red Spruce Forest is also an uncommon (S3) natural community in Vermont. It typically occurs on mountain slopes at elevations (2,000 feet to 2,500 15 feet) below Montane Spruce-Fir Forest. Dominant trees are red spruce and yellow birch (*Betula alleghaniensis*). The slightly warmer site conditions and deeper soils in this natural community type mean that there is usually a higher diversity of herbaceous species than is found in Montane Spruce-Fir Forest. Sorenson pf. direct at 9.

117. The total area of Montane Yellow Birch-Red Spruce Forest mapped on the slopes of the Lowell Mountain is 977 acres. Sorenson direct pf at 10.

118. The Montane Yellow Birch-Red Spruce forest is a moderate sized example of this type and is in good condition. Tr. 2/24/2011, at 190 (Sorenson).

119. Project Impacts

120. The proposed construction and clearing for the project will result in the destruction or loss of approximately 25.699 acres of Montane Spruce-Fir Forest. Tr. 2/3/2011 at 207 (Jewkes); Sorenson pf at 20.

121. The proposed construction and clearing for the Project will degrade the Montane Spruce-Fir Forest to the degree that it will no longer be considered state-significant. Sorenson direct pf at 14.

122. The degradation of that natural community indicates a significant adverse effect on the natural environment. Sorenson direct pf at 14.

123. About 81 acres of Montane Yellow Birch-Red Spruce Forest will be lost due to Project. Sorenson direct pf at 20; Tr. 2/3/2011, at 207 (Jewkes).

Fragmenting Effects of the Project

124. The adverse effects of the Project result from the substantial and permanent habitat fragmentation associated with construction of access roads, ridgeline crane roads, turbine pads, construction staging areas, stormwater management structures, collector lines, and the associated forest clearing. Sorenson direct pf at 19-20.

125. The Project will result in alterations in the ecological processes that influence the formation and maintenance of the portions of these two natural communities that are near the construction areas, including natural disturbance by wind, colluvial action on the steep mountain slopes, and wildlife species composition. In addition, the ecological integrity of the natural communities is threatened by the introduction of non-native, invasive species in association with the construction and clearing activity. Sorenson direct pf at 19-20.

126. The scale of the proposed project is large in the relative context of the remote forested landscape where it is proposed. Austin direct pf at 8

127. Fragmentation means dividing land with naturally occurring vegetation and ecological processes into smaller and smaller areas as a result of roads, land clearing, development, or other land uses that remove vegetation and create physical barriers between previously connected natural vegetation. Sorenson direct pf at 18.

128. The term fragmentation is a widely used term in the scientific fields of ecology and biology, particularly with respect to forest, habitat and wildlife conservation. Austin direct pf at 20.

129. Fragmentation alters interior forest wildlife habitat, impairs movement of some wildlife species, changes natural ecological processes such as surface water drainage and susceptibility of trees to blowdown by high wind events, and increases the likelihood of introduction of non-native, invasive plant species. Sorenson direct pf at 18.

130. Further fragmentation of important large habitat blocks such as the Lowell ridgeline is not beneficial for wildlife. Austin direct pf at 21.

131. The conservation and maintenance of large areas of undeveloped, unfragmented habitat blocks is needed to continue to support all of Vermont's wildlife resources. Austin direct pf at 21.

132. Habitat fragmentation can affect the types and abundance of species that inhabit an area. Austin pf surrebuttal at 22.

133. There are species, such as some forest interior songbirds or black bear that require large areas of remote, contiguous habitat to meet their life requisites. Austin direct pf at 22-23.

a. Site Clearing

134. This project involves extensive, wide, permanent roads, concrete pads, and large turbines, as well as the permanent on-going presence of people to maintain and operate the facility. Austin surrebuttal at 14.

135. The fragmentation of the 29,680 acre habitat block that includes the Lowell Mountains and the Project will be caused by construction of about 2.5 miles of access road from Route 100 to the Lowell Mountain ridgeline and about 4.0 miles of ridgeline crane roads. Sorenson direct pf at 20.

136. Unlike the existing Class 4 roads on the Lowell Mountain Block that are located off the ridgeline, the proposed new 4.0 miles of crane road will be directly along the ridgeline as this is where the wind resource is located. Sorenson direct pf at 21

137. The Project roads and turbine pads will result in permanent forest canopy gaps along their entire lengths, unlike the Class 4 roads on the Lowell Mountain Block that have mostly closed forest canopies. Sorenson direct pf at 22

138. The fragmentation created by this project will not be a benefit to wildlife in this area. Austin direct pf at 21.

139. Habitat fragmentation, both with respect to forest interior breeding birds, as well for wildlife generally, will be significant based on the scope and design of the proposed project. Austin direct pf at 22.

140. There will be significant and profound fragmentation effects from a Project of this scale in nature, in an unfragmented forested environment like Lowell Mountain. Tr. 2/7/2011, at 177-78 (Austin)

b. *Introduction of Invasive Species*

141. The scale of proposed road construction and clearing will increase the risk for introducing non-native, invasive species into the natural communities on the Lowell Mountains. Sorenson direct pf at 25.

142. Non-native, invasive species are aggressive colonizers of bare soils that have been exposed by construction or erosion, especially if there is also abundant sunlight from canopy removal. Sorenson direct pf at 25.

143. Invasive species, including honeysuckles (*Lonicera* spp.), buckthorns (*Rhamnus* spp.), and barberries (*Berberis* spp.), once established on forest edges can quickly spread into the interior of forests (especially those that are heavily managed or that have exposed soils associated with erosion or recreation trails) and reduce the quality of wildlife habitat, interfere with natural forest regeneration, and reduce the ecological integrity of the natural communities. Sorenson direct pf at 25.

144. Some invasive plant species, such as those mentioned above, are spread by birds, especially bird species associated with forest edge habitat. Sorenson direct pf at 25.

145. The common reed (*Phragmites australis*), and other invasive plant species are commonly spread to new sites in contaminated fill material trucked in for road construction or carried on construction machinery. Sorenson direct pf at 25.

c. Timber Harvest activities are not comparable to the Project impacts

146. The effects of the Project are nothing like those presented by a timber harvest activities. Tr. 2/27/11 at 178.

147. John Austin has reviewed timber harvest activities in Vermont for nearly twenty years. In all those years and the thousands of timber harvest activities that I've either overseen or reviewed he has never seen anything on the order of the clearing for this Project. The Project will fragment this area of forest interior habitat. Tr. 2/7/2011 at 178.

148. Altered forest conditions associated with logging operations are completely different from the 149.9 acres of permanent clearing and construction associated with the Project. Sorenson direct pf at 24

149. The effects on forested habitats from timber harvest activities can mimic natural disturbance events, or create openings that revegetate quickly and tend to be relatively small in scale are not comparable to the expansive network of roads and turbine pads associated with the proposed wind energy project. Austin direct pf. at 18.

150. Although the forest on the Project and others in the Lowell Mountain Block have been harvested for timber over the past two centuries, each logging operation results in relatively temporary effects on forest conditions and forest interior conditions are expected to return to all areas that are logged in this area. Sorenson direct pf at 23 – 24.

<u>Absent adequate mitigation the fragmenting effects of the Project are adverse and undue</u>

151. The Agency evaluates the extent of natural resource impacts from a project at three scales: the species scale, Natural community scale, and landscape scale. Sorenson direct pf at 4

152. For this Project, the primary concerns at the species scale of review are rare plant and animal species, birds, bats, bear and deer. Sorenson direct pf at 4.

153. The Primary concern of the Project on the landscape scale is the integrity of large, relatively unfragmented blocks of forest and habitat, the ecological processes that influence the natural communities within these large forest blocks, and interior forest wildlife habitat. Sorenson direct pf at 4.

154. This project will result in the construction of 6.5 miles of 65 to 205 foot wide, mostly rock- blasted road and turbine pads in mature Montane forests along a ridgeline in one of the larger blocks of unfragmented habitat in the region. Sorenson rebuttal pf. at 6.

155. The linear nature of the proposed disturbance (4.0 miles of ridgeline crane road) exacerbates the degree of habitat fragmentation. Sorenson pf at 24

156. The linear orientation of the impacts and their location along the Lowell Mountain ridgeline will maximize the fragmenting effects of the clearing on the state significant natural communities and on this large and currently unfragmented habitat block. Sorenson pf at 20 – 21.

157. Fragmentation is one of the major issues we have affecting the environment in Vermont. Tr. 2/24/2011, at 196 (Sorenson)

158. At the completion of construction for this Project there will not merely be a change in vegetation type, but instead there will be a complete conversion from mature Montane forests to industrial wind farm. Sorenson rebuttal pf. at 8.

159. The downslope movement of soils and nutrients is a natural process on upper mountain slopes. However, the proposed Project will result in removal of the thin layer of soil and all vegetation along four miles of the Lowell Mountain ridgeline. Sorenson rebuttal pf. at 9.

160. In these areas, colluvial action will be completely stopped as there will be no soils and no vegetation to generate new soils. Sorenson rebuttal pf. at 9

161. Habitat fragmentation and loss are commonly viewed by the professional conservation science community as some of the greatest threats to wildlife and the conservation of biological diversity, along with climate change and invasive species. Sorenson rebuttal pf. at 6.

162. Absent the mitigation agreed to by ANR and Petitioner, the Project will result in an undue adverse effect on state significant natural communities and the natural environment caused by the fragmenting effects of the Project. GMP-ANR-1 at 2.

163. Absent appropriate mitigation, these areas will largely remain as rock sideslopes or packed rock fragments for the roads and turbine pads for the life of the project. Sorenson rebuttal pf. at 8.

Mitigation for Effects of Habitat Fragmentation

164. There is much uncertainty as to what mitigation steps will actually reduce the adverse impacts from this project to the level that they are not undue. Sorenson direct pf at 28.

165. Petitioner has taken steps to reduce the adverse effects of fragmentation by using existing logging roads and trails to some extent. Sorenson direct pf at 27.

166. Petitioner has revised its original proposal to automatically clear a 150 foot wide strip of forest in preparation for access road and crane road construction. Sorenson direct pf at 27

167. There should be a separate invasive species monitoring and control plan for post construction and for decommissioning. Sorenson pf at 29.

168. Although re- establishment of Montane Spruce-Fir Forest is unlikely due to the level of site disturbance, appropriate grading, establishment of organic material, and planting or seeding of native vegetation is feasible. Sorenson pf at 29.

169. The Villeneuve 110-acre parcel along the Long Trail in Lowell appears to have some important ecological values, but conservation of this parcel provides little or no mitigation for the fragmentation occurring in the Lowell Mountains resulting from the Project. Sorenson surrebuttal at 17.

170. Through the surrebuttal testimony of Eric Sorenson, VANR recommended six mitigation measures to offset the undue adverse effects of the project, or to render the effects adverse, but not undue. Sorenson pf surrebuttal at 12-13; Tr. 2/24/2011, at 204-05 (Sorenson)

171. The stipulation reached between GMP and ANR addressed and incorporated elements of each of the six mitigation measures recommended by ANR. Tr. 2/24/2011, at 205.

172. The Stipulation GMP-ANR-1 incorporates the ANR recommendation for a specific vegetation management plan for the Serpentine Outcrop. Tr. 2/24/2011, at 206.

173. The second recommendation outlined that the proposed mitigation lands adjacent to the Project on landowner's parcel should be permanent conservation easements to offset the permanent nature of the Project impacts. Sorenson pf surrebuttal at 2-13.

174. GMP-ANR-1 prescribes that three of the easement parcels, shall be permanent and one parcel shall be for the life of the project, through decommissioning, plus twenty-five years. GMP-ANR-1.

175. The third recommendation requests a permanent easement should be established to conserve the high elevation forests and the disturbed area on the ridgeline of the site. This easement should provide for restoration of the construction site after decommissioning and guarantee no future 3 development along the ridgeline. Sorenson pf rebuttal at 13

176. GMP-ANR-1 requires that the ridgeline located on landowner Wileman's property shall be subject to a permanent conservation easement. Those portions of the project area that are not within the Wileman property and covered by a permanent easement will receive additional and more stringent or aggressive restoration work and recontouring to restore the area to a ridgeline or mountain summit conditions. Tr. 2/24/2011 at 209.

177. In its fourth recommendation, ANR requested additional conservation easements to secure the connectivity of the Lowell Mountain Habitat block. Sorenson pf rebuttal at 13.

178. GMP-ANR-1 requires GMP to secure "conservation easements of adequate size and location, as approved by ANR, to be held in perpetuity, to provide wildlife habitat connectivity to address fragmentation. GMP must consult with and obtain the approval of ANR for any parcel it seeks to secure to satisfy this requirement. ANR shall determine the adequacy of any parcel sought to be conserved to satisfy this requirement." GMP-ANR-1

179. The fifth recommendation from ANR is for a revised decommissioning plan with details on a site restoration plan to reestablish natural communities and to place the post Project ridgeline on a path for the reestablishment of native vegetation. Tr. 2/24/2011, at 210-11 (Sorenson)

180. ANR-GMP-1 requires GMP to amend its decommissioning plan, PET-CP-6, to include a site restoration plan approved by ANR. At a minimum, the restoration plan shall include:

a. Deep-ripping /scarification of the crane path and the portion of the access road that lies within the Parcel 4 easement area and turbine pads, as shown on Exhibit A to break up these compacted surfaces and contouring of the surfaces to establish a substrate with micro-topography that will be more conducive to colonization by vegetation

b. Establishment of organic material on this recontoured substrate;
c. Once the roadway surface is no longer impervious upon completion of obligations in Sections 4.1 and 4.2 above, ANR and GMP agree to work in good faith and cooperate to develop a plan for the removal of or revegetation over the stormwater management features for the crane path
d. ANR and GMP agree to work in good faith to develop a plan for the planting of vegetation in the prepared substrate that shall be reviewed and approved by ANR

or any future environmental agency before submitting to the Board or its successor, and shall provide that the determination of appropriate vegetation shall be made at the time of decommissioning;

e. ANR and GMP agree to work in good faith to develop a plan to be approved by ANR for monitoring and management of the ridgeline restoration area for success for 5 years.

f. ANR and GMP agree to work in good faith to develop a plan to be approved by ANR for monitoring and management of non-native invasive species for up to ten years post restoration.

g. GMP must submit its site restoration plan, non-native species monitoring plan, and restoration monitoring and management plan to ANR for its review and approval before submitting these plans to the Board or its successor authority. GMP-ANR-1.

181. Except for the details of specific post-project plantings, the requirements of the site restoration plan must be completed by Project operation. GMP-ANR-1.

182. The final recommendation of ANR was for a ten year non-native species monitoring plan. Sorenson pf. surrebuttal at 13.

183. GMP-ANR-1 requires post construction invasive species monitoring at the wind project site and at the serpentine outcrop for a period up to ten years. GMP-ANR-1.

184. In addition to responding to the specific recommendations of ANR, GMP-ANR-1 also requires GMP to revegetate the road sideslopes following final grading. GMP-ANR-1.

185. Although the Project will still result in an adverse effect to the natural

environment, with the requirements of the terms and conditions of GMP-ANR-1, the adverse effect will not be undue. Tr. 2/24/2011 at 210 (Sorenson).

Creation of Forest Edge Does Not Mitigate Fragmentation

186. The creation of edge by the Project in this forest interior does not serve as mitigation for impacts from the Project. Sorenson direct pf at 24

187. Creating habitat diversity is accomplished through the development of habitat management and conservation plans, not as a byproduct of commercial development. Austin direct pf at 21.

188. Use of fragmentation as mitigation for the fragmenting effects of a project completely undermines the VFWD and Vermont Wildlife Action Plan goals of protecting unfragmented habitat. Sorenson direct pf at 26

Discussion

Based on the testimony and evidence presented in this matter and the findings above, the project will result in an undue adverse impact to the natural environment on Lowell Mountain and the rare and irreplaceable natural community unless the mitigation prescribed in GMP-ANR-1 and requested above is implemented. See 30 V.S.A. § 248(b) (5).

Under Section 248(b)(5), the Public Service Board cannot issue a Certificate of Public Good unless it finds that the project will not result in an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment and public health and safety. The statute incorporates many of the Act 250 criteria by reference, including necessary wildlife habitat and endangered species under 10 V.S.A. § 6086(a) (8) (A). As the Board announced in *East Haven*, the Board's inquiry, however, is not constrained by the Act 250 criteria.

> Although in Section 248(b) (5) the General Assembly has provided the Board with guidance as to what specific environmental impacts to examine in reviewing a proposed project, it did not limit the scope of the Board's review to only the incorporated Act 250 criteria.1 The statute specifically provides that the Board must find that a proposed project will not have an "undue adverse effect on . . . the natural environment." A project such as this has the potential of multiple and substantial impacts on wildlife. To consider fully whether those impacts constitute an "undue adverse effect on . . . the natural environment," this review should not be constrained to only the effects on "endangered species" and "necessary wildlife habitat" as those are considered under Act 250.[2]

In its most recent review of a proposed wind project, the Board concluded that unmitigated significant and permanent impacts to natural communities can result in an undue adverse impact on the natural environment. In the Georgia Mountain Community Wind docket, the Board found that the impacts to the natural communities must be mitigated "in order to avoid an undue adverse impact on the natural environment." [3]

The fragmenting effects of the project will be significant and permanent. The project will result in the clearing of approximately 149.9 acres of forested habitat on Lowell Mountain. Almost 26 acres of Montane Spruce Fir Forest will be permanently lost as a result of the Project. Approximately 81 acres of Montane Yellow Birch-Red Spruce will be destroyed. The mitigation prescribed in GMP-ANR-1 is required to offset the fragmenting effects of the Project.

The mitigation prescribed in GMP-ANR-1 is adequate to offset the undue adverse effect on the natural environment caused by the fragmenting effect of the Project.

[2] Docket 6911, Order of 7/17/06 at 66.
[3] Docket 6508, Order of 6/11/2010, at 68.

Necessary Wildlife Habitat and Endangered Species
[10 V.S.A. § 6086(a)(8)(A)]

189. With the proposed mitigation prescribed in GMP-ANR-1, the Project will not have an undue adverse effect on wildlife. This finding is supported by the Findings below.

Deer

190. The project will not present undue adverse impacts to deer winter habitat. Austin direct pf at 8

191. Five areas of deer winter habitat were identified in the vicinity of the access road and power lines for the proposed project. Austin direct pf at 8

192. The power line corridor has been planned to avoid impacting four (4) areas of the deer winter habitat. Austin direct pf at 8

Moose

193. The project will result in undue adverse impacts to moose winter habitat. Austin direct pf. at 9

194. The project has been designed to avoid an area of softwood cover that was identified as winter habitat for moose. Austin direct pf. at 9

195. This area is at least 400 feet from the lower portion of the access road for the project. Austin direct pf. at 9

Black Bears

196. Absent the mitigation outlined below and agreed to by Petitioners and ANR, the project will result in an undue adverse impact to black bear. This finding is supported by the findings below. GMP-ANR-1

197. Wetlands and concentrated bear scarred beech stands are necessary habitat for black bear. Austin direct pf. at 9; ANR-JMA-2 at 3; PET-JAW 2

198. The project site contains large areas of concentrated bear scarred beech habitat in addition to an array of forested wetlands and a beaver-influenced wetland complex that

appear to provide spring and summer feeding and thermal refugia habitat for black bears. Austin direct pf. at 9-10. See exhibit PET-JAW-4

199. Petitioner's consultant Mr. Wallin provided mapping that quantifies the necessary wildlife habitats of bear scarred beech and wetlands on the proposed project site and surrounding area. Pet- JAW-4

200. The mapping in JAW-4 quantifies the direct and indirect impact areas to bear BSB habitat associated with the proposed project. Austin surrebuttal at 2. See Pet-JAW-4

201. Direct impacts to bear habitat involve the physical loss of habitat with the construction of the project. Tr. 2/7/2011, at 158.

202. The term "indirect impact" is used to describe the potential for the construction and operation of a project to displace or disturb wildlife from using necessary or important habitat. Austin direct pf. at 12

203. 146 acres of concentrated bear-scarred beech habitat (BSB) were delineated within the area of both direct impacts from the project as well as within the ¼ mile area of potential indirect influence from the project. Austin direct pf. at 10.

204. The project will result in direct and indirect impacts to bear habitat. Tr. 2/7/2011, at 158 (Austin).

205. The project will result in the elimination of approximately 20.7 acres of bear scarred beech habitat. Austin pf rebuttal at 2-3; Tr. 2/7/2011, at 158.

206. Indirect impacts to bears occurs through the disturbance or displacement associated with mostly human-related activities that can affect bears access to and use of certain habitats. Tr. 2/7/2011, at 158 (Austin)

207. In this case, indirect impacts will occur as a result of the disturbance or displacement of bears from the concentrated bear scarred beech feeding habitat as a result of activities of both constructing the project and operating and maintaining the project. Tr. 2/7/2011, at 158 (Austin); Austin surrebuttal at 8.

208. Bears are creatures that require remote forested habitat with a variety of food resources in order to survive. Tr. 2/7/2011, at 157-58 (Austin).

209. Approximately 125 acres of bear scarred beech habitat is located within ¼ of the proposed project. Tr. 2/7/2001, at 21 (Wallin).

210. In reviewing project impacts to bear habitat, the Agency of Natural Resources, Department of Fish and Wildlife applies the Bear Mitigation Guidelines to provide a framework for the Department scientists to be fair and consistent in their assessment of impacts, their interpretation of information from a project's consulting biologists on impacts from a project, and to fairly and consistently develop recommendations or solutions to mitigate those impacts. Tr. 2/7/2011, at 159-60 (Austin)

211. In its evaluation of projects under Act 250 and Section 248 review, the VFWD applies a ¼ mile zone of influence from a proposed project to significant black bear habitat based on mitigation guidelines. Austin surrebuttal at 12.

212. The VFWD's mitigation guidelines rely on a ¼ mile buffer zone to ensure the functional values of concentrated BSB habitat. Austin surrebuttal at 12.

213. The ¼ mile figure is a function of existing research that examined the influence of human activity and development in proximity to black bears and important habitats. Austin surrebuttal at 12.

214. The Bear Guidelines provide that a project development should not occur within the habitat buffer zone. ANR-JMA-2 at 6.

215. In designing a project, a developer should first attempt to avoid an impact to bear scarred beech habitat. Tr. 2/24/2011, at 26 (Wallin); ANR-JMA-2

216. If a developer cannot avoid an impact to bear scarred beech habitat, a developer should attempt to minimize the impact to bear scarred beech habitat. Tr. 2/24/2011, at 26 (Wallin); ANR-JMA-2

217. If a project developer cannot minimize the impacts of the project, the developer should mitigate the impacts for bear-scarred beech habitat. Tr. 2/24/2011, at 26 (Wallin); ANR-JMA-2

Mitigation

218. For impacts to bear scarred beech habitat from the project, the Agency recommended habitat compensation for unavoidable impacts at a ratio of 4:1; that is four acres of comparable BSB habitat conserved for each acre impacted. Austin pf. surrebuttal at 13.

219. Any conservation easement would need to be managed to maintain and enhance the American beech component of the forested habitat. Austin pf. surrebuttal at 14.

220. Prior to reaching agreement with ANR regarding the mitigation for the project, Petitioner had proposed to conserve 180 acres of habitat on the Wileman property in

perpetuity and approximately 400 acres of habitat for the life of the project. Wallin pf. rebuttal at 4.

221. The mitigation proposal was intended to mitigate for the direct impact of 20.7 acres of bear scarred beech and indirect impact of an additional 125 acres. Wallin pf. rebuttal, at 4.

222. As part of its stipulation with the VANR Petitioner has agreed to preserve three parcels on the landowner's property on Lowell Mountain as mitigation for impacts to black bear habitat.

223. Parcel 1 consists of approximately 292 acres as shown on Exhibit A of GMP-ANR-Exh.1. Parcel 1 shall be subject to a conservation easement of limited term until twenty five (25) years after completion of Project decommissioning. GMP-ANR Exh.1

224. Parcel 2 is a 110.3 acres parcel that shall be subject to a permanent conservation easement. GMP-ANR Exh. 1.

225. Parcels 1 and 2 shall be subject to an approved forestry and wildlife habitat management plan, to be established in coordination with GMP, ANR, and Landowner, that is consistent with the purposes and conditions set forth in the conservation easement, and that is consistent with Landowner's forest management objectives for the site, while ensuring the proper stewardship and enhancement of the bear habitat features on Parcel 1. The forestry and wildlife habitat management plan may be implemented by amending the Landowner's use value appraisal plan. The forestry and wildlife habitat management plan shall be reviewed and approved by ANR and submitted to the Board for final approval prior to construction of the Project. The Landowner shall have the right to log the property provided such use is consistent with the forestry and wildlife habitat management plan and the conservation easements described herein. Landowner will avoid logging operations during the fall feeding period

(September through and including November) and spring feeding season (April through and including May).

226. The parcels shall be subject to the other restrictions and conditions contained in GMP-ANR-1.

227. Any development other than development allowed pursuant to the ANR approved forestry and wildlife management plan is prohibited for the term of the conservation easement. GMP-ANR-1.

228. The requirements established for Parcels 1 and 2 shall be accomplished prior to commencement of construction activities for the Project. GMP-ANR-1.

229. Parcel 3 is a 178.1 acre parcel that shall be subject to a permanent conservation easement prohibiting both development and commercial logging of timber on Parcel 3, but allowing timber management to be done at the discretion of ANR. GMP-ANR-1 at 2.3.2

230. Parcel 3 shall be managed in accordance with Army Corps of Engineers and ANR recommendations. GMP-ANR-1 GMP-ANR-1

231. The requirements established for Parcel 3 shall be accomplished prior to commencement of construction activities for the Project.

232. Parcel 3 shall be subject to the terms and conditions contained in ANR-GMR-1.

233. The requirements for all three parcels must be accomplished prior to commencement of construction for the Project. GMP-ANR-1.

<u>The Villeneuve parcel</u>

234. The Villeneuve parcel is an area which has already been conserved by the Green Mountain Club. If the project were approved, Petitioner would compensate the Green Mountain Club for its costs in conserving the Villeneuve parcel. Transcript 2/3/11 (testimony of Charlie Pughe page 118)

235. Mr. Wallin has not visited the Villeneuve parcel. He did not conduct a comprehensive review of the project site for bear scarred beech because when the site was reviewed it did not have the densities to warrant such a review. Tr. 2/7/11, at 85.

236. An associate of Mr. Wallin's visited the site and his observations are contained in Pet-JAW-7.

237. Only five percent of the mature hardwood trees are beech trees. Beech comprises a relatively small amount of trees on the project site. Tr. 2/7/11, at 82-83.

238. Only a few bear scarred beech were found on the Villeneuve parcel. Pet-JAW-7.

239. The wetlands on site are not sufficiently large to qualify as necessary wildlife habitat. ANR-JMA-2 at 11; Tr. 2/7/11, at 50 (Wallin).

240. The VFWD does not believe the Villeneuve parcel is suitable habitat for mitigation of impacts to concentrated BSB habitat because it does not have BSB habitat characteristics. Austin surrebuttal at 14-15.

241. Mitigation for specific habitat conditions impacted should be compensated with habitat of the same kind that is of similar quality. Austin surrebuttal at 15.

Discussion

The project will result in the taking or removal of approximately 20.7 acres of bears scarred beech trees. Bear scarred beech trees are necessary wildlife habitat for black bear. Bears will be displaced from an additional 125 acres of bear scarred beech habitat within ¼ mile of the Project. Absent the mitigation prescribed in GMP-ANR-1, the project would result in an undue adverse impact to black bear habitat.

Petitioner's initial mitigation plan was considered inadequate by VANR because it failed to preserve habitat of comparable value in perpetuity to mitigate for both the direct and indirect impacts of the project. Petitioner has worked cooperatively with VANR to develop a mitigation proposal that increases the habitat that will be preserved in perpetuity and extends the duration or period of the conservation of limited term.

The proposed mitigation will conserve in perpetuity approximately 288 acres and preserve for the life of the project, through commissioning, and another twenty five years an additional 292 acres of bear scarred beech habitat. With the mitigation in place, the project will not result in an undue adverse impact to black bear scarred beech habitat.

The Board should incorporate the Stipulation into any Certificate of Public Good ("CPG") issued for the Project and include any conditions required in this Stipulation as specific conditions in the CPG. The Board should also incorporate into the CPG any requirements of the execution and enforcement of any easements, plans or other required habitat mitigation and restoration.

Bats

242. With the Pat Post-Construction monitoring program set forth in Attachment A of ANR-SD-2, the Project will not result in an undue adverse impact to bat populations. This finding is supported by the findings below.

a. Surveys of Bat Fatalities Around Wind Turbines

243. Concerns about potential effects of the Project are derived from findings revealed in 2003 that ridge top wind facilities in the East result in the highest bat collision mortality levels among wind facilities in the nation. Darling direct pf at 6.

244. The Mountaineer Wind Project in West Virginia is a 44 turbine facility. The Mountaineer Wind Project had a total facility estimate of 2092 dead bats during a 2003 survey, about 47.5 dead bats per turbine. Darling direct pf at 6 citing Kerns and Kerlinger 2004.

245. The Mountaineer Wind Project findings might be underestimates as mortality searches were only made once per week. Darling direct pf at 6.

246. Similar, although not identical, bat fatality surveys conducted at other operating utility-scale wind facilities have shown comparable fatality rates in Alberta (22 bats/turbine) (Baerwald, pers. comm.), New York (25 bats/turbine – daily searches)(Jain et al. 2007), Tennessee (64 bats/turbine) (Fiedler et al. 2007), and even Germany (12 – 21 bats/turbine)(Brinkman et al. 2006). Furthermore, as turbine and rotor heights have increased to over 400 feet in recent years, there is evidence that the taller turbines may actually be killing a greater number of bats (Barclay et al. 2007). These findings have only heightened bat biologist concerns about the levels of bat mortality experienced at utility-scale wind energy facilities. Darling direct pf at 6.

247. As turbine and rotor heights have increased to over 400 feet, there is evidence that taller turbines kill a greater number of bats. Darling direct pf at 6, citing Barclay et al. 2007.

Operational Adjustments as Mitigation to Alleviate Bat Fatalities

248. In response to the concern of VDFW that potential bat fatalities may reach levels resulting in undue adverse impacts on bat populations, Petitioner and ANR entered into discussions regarding post –construction monitoring for the project. Darling direct pf at 7.

249. The Petitioner expressed interest and willingness to investigate mitigation alternatives to reduce bat fatalities to levels below which the Department considers undue adverse impacts. Darling direct pf at 7-8.

250. Petitioner and the Agency entered into a Memorandum of Understanding regarding bird and bat fatalities. Darling direct pf at 8, referring to ANR-SD-2.

251. VDFW believes the MOU stipulations will result in the adequate reduction of bat fatalities through the systematic set of operational adjustments enabling Petitioner and the Agency to establish the most effective and efficient long-term means of reducing bat fatalities. Darling direct pf at 8.

252. From June 1 to September 30 of the initial year of operations, the project will implement a research oriented study design that will identify the appropriate rotor cut-in speeds to satisfy bat fatality thresholds outlined in the MOU. Darling direct pf at 8.

253. Research on operational adjustments in Germany, Alberta, Canada, and Pennsylvania has shown positive results in reducing bat fatalities. Darling direct pf at 9.

254. The Germany and Alberta, Canada operational adjustments resulted in about a 50% reduction in bat fatalities. Darling direct pf at 9.

255. In a two year study at the Casselman Wind Project in Pennsylvania, a fully operation group of wind turbines killed 5.4 times as many bats than two other groups of turbines together that each operated at lower cut-in wind speeds. Darling direct pf at 9.

256. The MOU between the Petition and the Agency applies the methodology from the Casselman Wind Project. Darling direct pf at 10.

257. Operation adjustment efforts are an effective mitigation tool to reduce wind facility impacts to bat populations. Darling direct pf at 10.

Operational Adjustment Effects on Energy Production

258. Operational adjustments would likely have a minimal impact on energy production. Darling direct pf at 10.

259. The MOU between Petitioner and the Agency provides for collaborative evaluation of the effects of the operational adjustments on energy production. Darling direct pf at 11.

260. Many utility-scale wind facilities begin to generate electricity when wind speeds exceed 3.5 or 4 meters/second. Darling direct pf at 10

261. Costs may vary based on the unique circumstances of each site and the market conditions. Darling direct pf at 10.

262. In Alberta, the cost of the one month study period of operational adjustments from 4.0 meters/second to 5.5 meters/second was $3000 Canadian. Darling pf at 10, citing Barclay 2008. Darling direct pf at 10.

263. The results from the 2008 Pennsylvania trials generated estimates of 0.3% loss in energy production per year at 5.0 meters/second, and 1% loss in energy production per year at 6.5 meters/second. Darling direct pf at 11.

264. Even less impact on energy production can be achieved over time as operational adjustments adapt to lowering fatality rates by considering weather conditions, time of the year, hours in the night, etc. Darling direct pf at 11.

Discussion

The Project will result in an undue adverse impact on bats absent adequate mitigation. The Board has determined in previous wind cases that operational adjustments to shut down turbines during conditions when bat fatalities are more likely to occur is required to mitigate the impacts to bats. [4]

As demonstrated by other wind projects implementing operational adjustments, such adaptive measures will have minimal impact on energy production or the cost of energy. The Agency and the Petitioner have worked together to develop a protocol for implementing operational adjustments to minimize impacts to bats. The MOU between Petitioner and the Agency provides for collaborative evaluation of the effects of the operational adjustments on energy production.

With the implementation of the post construction monitoring program contained in Attachment A of ANR-SD-2, the Project will not result in an undue adverse impact to bat populations. The Board should adopt and incorporate the terms and conditions of ANR-SD-2 in any Board Order and associated Certificate of Public Good authorizing construction of the Project.

Birds

265. The impact of wind turbines on birds can be categorized in several ways. Impacts can be realized as fatalities from collisions, changes in behavior, and changes in ecology of the site that result in changes in behavior or reproductive success, or population stability. ANR-Cross-Exhibit 21 (Kerlinger Report) at 72.

[4] See Docket No. 7508, Order of 6/11/2010, at 75; Docket No. 7250, Order of 7/17/09, at 9.

a. Collision Studies

266. The Vermont Fish and Wildlife Department is currently engaged in a long-term study with the U.S. Fish and Wildlife Service and the University of Illinois to study the intricacies of bird migration in relation to Vermont's mountainous topography and associated wind patterns. Austin direct pf at 3.

267. The research is conducted specifically to provide guidance and insight on how best to site and operate wind energy projects in Vermont. Austin direct pf at 3

268. The VFWD does not believe that the data regarding nocturnal bird migration is indicative of a high potential collision risk, especially since there is still no way to accurately correlate radar data with collision risk at this time. Austin direct pf. at 16.

269. This information should be used as a means of comparing post construction bird mortality data to pre-construction migration data. Austin direct pf. at 16.

270. The VFWD recommends that the standard conditions for lighting of structures at wind energy facilities be applied to this project. Austin direct pf at 16.

I. Mitigation of Impacts from Potential Collision Effect on Bird Populations

271. The Petitioner and the VFWD have worked collaboratively to develop a post construction monitoring plan for birds. Austin direct pf at 17.

272. This plan has been crafted with the input of Scott Darling to coordinate the bird and bat fatality monitoring. Exh. ANR-SD-2. Austin pf at 17.

273. With the implementation of the stipulated agreement and protocol described in ANR-SD-2 any adverse impacts of the project resulting from bird collisions can be mitigated so as not to be unduly adverse. Austin pf at 17.

a. Effect on Birds from Habitat Fragmentation

274. Information on the breeding bird communities of the area around the project site regarding is contained in the Stantec Report, *Bird and Bat Risk Assessment: A Weight-of-Evidence Approach to Assessing Risk to Birds and Bats at the Proposed Kingdom Community Wind Project, Lowell*, Vermont (February 26, 2010), Exh. PET-AJG-2 ("Stantec Report"). Austin direct pf at 18.

275. The report states that there were no state or federally threatened or endangered birds on or near the project site. Austin direct pf at 18-19.

276. There was no evidence of Bicknell's thrush discovered in the higher elevation spruce fir forests of the project site. Austin direct pf at 19.

277. The Stantec Report identified Seven (7) birds listed in Vermont's Wildlife Action Plan as species of greatest conservation need ("SGCN"). Austin direct pf at 19.

278. Species of greatest conservation need are those species that are either rare, have declining populations, or are sensitive to habitat loss or disturbance. Austin direct pf at 19

279. These species include Canada warbler which is a species of concern due to declining population trends Austin direct pf at 19.

280. This species was observed by ANR staff on a site visit in September 2010 on the 8 project site. Austin direct pf at 19.

281. The existing forest habitat is important to forest dependent bird species. Austin pf at 19.

282. Forest interior nesting songbirds, including those identified in the breeding bird survey for the project are habitat specialists that require large patches of unfragmented forest habitats to nest and reproduce successfully. Austin direct pf at 22.

Project Impacts

283. The proposed Project infrastructure and clearing is expected to decrease the capacity of the Lowell Mountain habitat block to support area-sensitive wildlife species and especially nesting of forest-interior bird species. Sorenson direct pf at 22

284. The project will result in changes to forest interior breeding bird communities associated with the changes to the landscape and habitat conditions. Austin direct pf at 19.

285. There will be a shift in breeding bird communities that involve reduced numbers of some area sensitive bird species such as wood thrush to species that tolerate or require edge habitat such as blue jays. Austin direct pf at 19.

286. The project is likely to result in a shift in breeding bird species away from those that are forest interior species and toward more forest edge species. Sorenson direct pf at 23

287. Results from the Searsburg surveys (Kerlinger) illustrate changes in the composition of the bird community in the area of the project with a trend toward more species that associate with edge habitat and a decline from species associated with interior forest. Austin pf at 23.

288. The Searsburg survey appears to be the only study available to address this important issue concerning wind energy development in the northeastern United States. Austin pf at 23.

289. Some of the biological effects of fragmentation on forest dependent birds include increased rates of nest predation and parasitism; disturbances associated with increased encounters with humans, and changes in vegetation composition through the introduction of invasive species (habitat degradation). Austin direct pf at 23.

290. Fragmentation from the project is primarily in the Montane Spruce-Fir Forest where Canada warbler are found in high frequency Sorenson direct pf at 24 referring to Stantec, Bird and Bat Pre-Construction Survey, January 2010, PET-AG-1, page 36.

Mitigation for effects of Habitat Fragmentation

291. To mitigate the fragmenting effects of the Project, Petitioner has coordinated with ANR in the development of a stipulation that requires the conservation of parcels of land in the Lowell Mountain habitat block and the development of site restoration, vegetation management, and an amended decommissioning plan. The terms and conditions of the parcels are contained in GMP-ANR-1.

Discussion

The Project will result in an undue adverse impact on birds absent adequate mitigation. With the implementation of the stipulated agreement and protocol described in ANR-SD-2 any adverse impacts of the project resulting from bird collisions can be mitigated so as not to be unduly adverse. With the implementation of the required terms and conditions prescribed in GMP-ANR-1 and the recommendations above, the project will not result in an undue adverse impact to birds.

The Agency recommends that the Board incorporate the terms and conditions of ANR-SD-2, and GMP-ANR into any Certificate of Public Good issued for the Project.

Public Investments
[10 V.S.A. § 6086(a)(9)(K)]

292. The Wild Branch Wildlife Management Area is a remote, forested area, consisting of a variety of upland types that provides a broad array of food resources for wildlife. The habitat and the setting allows the public opportunities to hunt, fish, trap, bird watch, and undertake other land-based activities in a remote, quiet, wild setting. Buck pf. direct at 5

293. The Wild Branch WMA was purchased by the Vermont Department of Fish and Wildlife in 1967, and is a 410 acre parcel of upland forest habitat that lies in the remote northeast corner of the town of Eden. It abuts the Town of Craftsbury's western boundary and extends westward to the summit of the Lowell Range. Wild Branch lies approximately one mile south of the border with the Town of Lowell. It is surrounded by large tracts of forestland with an occasional hunting camp. The WMA is bisected by the Wild Branch of the Lamoille River as well as a Class 4 town road that is not plowed during the winter. Buck pf. direct at 5

294. There are no major fragmenting features on or near the WMA, including highways, transmission lines, or other major anthropogenic features. Buck pf. direct at 5

295. Over past the 40+ years, the Department has been managed the WMA by Department biologists for wildlife habitat, including releasing apple trees, maintaining

open meadows, protecting riparian corridors, as well as habitat-related timber harvests. Between planning, maintenance, and other management-related activities, the Department has expended tens of thousands of public dollars. Buck pf. direct at 6

296. The users of the WMA arrive at the property by vehicle because it is a long distance from developed locations. Once on site, users park their vehicles and proceed on foot. Buck surrebuttal at 2.

297. Wildlife enthusiasts prefer to move on foot. Buck surrebuttal at 2.

298. Traveling by foot will take wildlife enthusiasts to multiple vantage points where the presence of industrial turbines will alter their remote outdoor experience. Buck surrebuttal at 3.

299. The southernmost tower for the project is located within one mile of the Wild Branch Management Area. Buck pf. at 6.

300. Erection of an OCAS tower at the south end of the project will move the project closer to the Wild Branch Management Area. Tr. 2/3/2011, at 46 (Pughe).

301. People using the north-east quadrant of the Wild Branch WMA will experience the "greatest brunt" of the development. Buck surrebuttal at 3.

302. Remoteness is an important quality in the hunting, fishing and viewing experience in Vermont. Buck surrebuttal at 3.

Decommissioning

303. In response to the concerns of the parties regarding its proposed decommissioning plan Petitioner has agreed to amend its proposed decommissioning plan to address the long term fragmenting effects of the project. GMP-ANR-1

304. Petitioner will amend the decommissioning plan to incorporate the elements outlined in GMP-ANR-1.

Discussion

The Board should incorporate the terms and conditions of GMP-ANR-1 into any Certificate of Public Good issued for the Project and require GMP to amend its decommissioning plan.

CONCLUSION

With the mitigation measures and terms and conditions outlined in GMP-ANR-1, and the other recommendations of ANR, the Project will not result in an undue adverse impact to the natural environment. Accordingly, ANR respectfully recommends that the Board impose as conditions of the certificate of public good the ANR recommendations contained in GMP-ANR-1 and the findings above.

Respectfully submitted this 21st day of March, 2010 at Waterbury, Vermont.

State of Vermont
Agency of Natural Resources

BY: _____

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