

**STATE OF VERMONT**  
**PUBLIC SERVICE BOARD**

Joint Petition of Green Mountain Power )  
Corporation, Vermont Electric Cooperative, Inc. )  
and Vermont Electric Power Company, Inc. for a ) Docket No. \_\_\_\_\_  
Certificate of Public Good pursuant to 30 V.S.A. § )  
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 )

**PREFILED TESTIMONY OF**  
**ADAM J. GRAVEL**  
**ON BEHALF OF GREEN MOUNTAIN POWER CORPORATION**

**May 21, 2010**

**Summary of Testimony**

Mr. Gravel sponsors his analysis of potential impacts of the Kingdom Community Wind Project on local and migrating birds and bats. Based on the results of the assessments conducted at the Project and publicly-available information on post construction impacts at other operational wind projects, it is expected that no undue adverse impacts to birds and bats will result from the Project.

**PREFILED TESTIMONY OF ADAM J. GRAVEL**  
**ON BEHALF OF**  
**GREEN MOUNTAIN POWER CORPORATION**

1   **1.    Q.    Please state your name, current position, employer and business address.**

2           **A.**    My name is Adam Gravel. I am a project manager and wildlife biologist with  
3 Stantec Consulting. I am a certified wildlife biologist through The Wildlife Society, the only  
4 nationally recognized certification program for wildlife biologists in the United States. My  
5 business address is Stantec Consulting, 30 Park Drive, Topsham, ME 04086.

6

7   **2.    Q.    Please state briefly your educational background and business experience.**

8           **A.**    I earned my Bachelor of Science degree in 2003 from the University of New  
9 Hampshire. I was hired by Woodlot Alternatives, Inc. (now Stantec) in 2004 as a Project  
10 Technician and radar ornithologist and was promoted to Project Manager and Wildlife Biologist  
11 in 2006.

12

13 I have conducted and coordinated environmental studies as a part of state permitting  
14 requirements for more than 70 wind projects from Maine to Virginia.<sup>1</sup> Such studies typically  
15 include: daytime raptor migration, nighttime radar migration, acoustic bat detector, and breeding  
16 bird studies designed to assess potential direct impacts from proposed wind energy projects. I

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<sup>1</sup> See Appendix A Tables 5-6 and Tables 10-11 in **Exh. Pet.-AJG-2** for lists of publicly available raptor and acoustic bat survey data, respectively. See Appendix A Table 8 in **Exh. Pet.-AJG-1** for a list of publicly available radar survey data. Surveys conducted by Stantec are identified. Due to confidentiality agreements, I can only provide information for those surveys which are publicly available.

1 have also assessed or directed assessments for the potential indirect (non-collision related)  
2 impacts of projects on wildlife, including habitat impacts and fragmentation effects, impacts to  
3 rare species, and impacts to common, local wildlife communities. Examples of these types of  
4 studies include wildlife habitat assessments for the Sheffield Wind Project, VT and Lempster  
5 Wind Project, NH, and natural community mapping, winter tracking, and rare plant surveys at  
6 the Granite Reliable Wind Project in Coos County, NH.

7

8 My experience in Vermont includes managing and conducting assessments at several proposed  
9 and permitted wind facilities, including radar, acoustic, and habitat studies at Sheffield Wind  
10 Project, VT, Deerfield Wind Project, VT, and Georgia Mountain Community Wind Project, VT.  
11 I have consulted with State and Federal agencies to identify and discuss potential areas of  
12 concern at proposed projects and I have developed field surveys to address those concerns.

13

14 **3. Q. Have you ever testified before the Public Service Board?**

15 **A.** Yes. I provided testimony in Docket No. 7508 (Georgia Mountain Wind Project).

16

17 **4. Q. Please describe your analysis and conclusions.**

18 **A.** Stantec conducted the following surveys at the Kingdom Community Wind  
19 (KCW) Project: (1) a spring 2009 raptor survey, (2) a fall 2008 and a spring 2009 radar survey,  
20 (3) a summer 2009 breeding bird survey which included a Bicknell's thrush playback survey, (4)  
21 a 2009 acoustic bat survey, and (5) a small-footed bat day-roost habitat assessment. Detailed  
22 descriptions of methods and results for each survey are available in our report *Bird and Bat Pre-*

1 *Construction Surveys for Kingdom Community Wind Project in Lowell, Vermont*, a copy of  
2 which is attached as **Exh. Pet.-AJG-1**.

3  
4 Vermont has draft guidelines published April 20, 2006 that are available for pre-construction  
5 bird and bat surveys for proposed wind projects in the State. Stantec reviewed these guidelines  
6 when developing work plans for each survey. In addition, Stantec developed a specific bat  
7 acoustic survey work plan in collaboration with Vermont Agency of Natural Resources (VANR)  
8 biologist Scott Darling, which was approved by him on April 10, 2009. Specific breeding bird  
9 survey and Bicknell's thrush playback survey work plans were reviewed and approved by  
10 VANR biologists John Austin and Everett Marshall on May 29, 2009.

11  
12 Following completion of the 2008 and 2009 bird and bat surveys, Stantec prepared a bird and bat  
13 risk assessment for the Project. Currently, there are no pre-construction technologies or methods  
14 that allow us to accurately quantify post-construction bird or bat mortality rates. However, a risk  
15 assessment framework allowed us to systematically examine on-site and regional data in order to  
16 predict risk with an assessed degree of confidence of direct and indirect impacts to species  
17 groups. The risk assessment followed what is known as a "weight-of-evidence" approach, which  
18 simultaneously evaluates multiple, diverse survey methods and considers the strengths and  
19 weaknesses of each. Level of risk for each group evaluated was predicted by taking into account  
20 its presence or abundance in the Project area, the likelihood of exposure to wind turbines, and  
21 patterns of impacts to the particular groups as documented at existing regional wind power  
22 facilities. The analysis also presented confidence levels in individual lines of evidence used to

1 determine levels of risk. A detailed description of the methods and results of this analysis can be  
 2 found in our report *Bird and Bat Risk Assessment: A Weight-of-Evidence Approach to Assessing*  
 3 *Risk to Birds and Bats at the Proposed Kingdom Community Wind Project, Lowell, Vermont*, a  
 4 copy of which is attached as **Exh. Pet.-AJG-2**.

5  
 6 Impacts to birds and bats have been documented at all operational wind facilities in the country.  
 7 Impacts vary by species group, and by project location (see Appendix A, Tables 7 and 9 in  
 8 **Exh. Pet.-AJG-2**):

Table 1. Range of bird and bat mortality rates at operational wind facilities.		
Region	Range of Mortality (birds/turbine/year)	Range of Mortality (bats/turbine/year)
New England	0.44 – 2.65	0.17 – 4.4
Northeast (NY, PA)	0.74 – 9.48	0.7 – 25
Mid-Atlantic (WV)	2.41 – 3.81	7.76 – 47.53
Midwest	0.33 – 4.45	1.16 – 63.9

9  
 10 Therefore, we predict there to be risk of impact to birds and bats at KCW because impacts have  
 11 been observed at every project. Since the magnitude of impact varies widely between and within  
 12 regions, pre-construction studies are conducted in an attempt to place bird and bat presence and  
 13 activity at a site into context with regional presence and activity, and into context with results of  
 14 both pre-construction and post-construction study results at regional proposed and operational  
 15 facilities.

16  
 17 Raptors

18 On-site field surveys to document raptor migration activity in the Project area occurred during

1 the 2009 spring migration season. The Risk Assessment indicated that there is a potential risk of  
2 direct and indirect impacts to raptors, since the on-site survey documented raptors migrating  
3 through the Project area, and the Project will result in forest clearing. However, the magnitude  
4 of impact is expected to be low, since (1) a low passage rate was observed, in comparison to  
5 regional surveys, (2) no breeding raptors were observed during any on-site survey, (3) post-  
6 construction studies and other literature on raptor collision mortality in the U.S. (outside of  
7 California) have documented low raptor collision rates and high rates of turbine avoidance  
8 behavior, and (4) post-construction studies and other literature on indirect impacts indicate that  
9 raptors often continue to use the area surrounding wind facilities once they are built.

10

11 In conclusion, results from the on-site survey and the risk assessment indicate that a risk of  
12 impact exists, but the magnitude of impact is expected to be low. Based on the analyses, I do not  
13 expect the Project to have an undue adverse impact on raptors.

14

#### 15 Nocturnally Migrating Songbirds

16 Stantec conducted on-site radar surveys to document nocturnal migrants during the fall of 2008  
17 and the spring of 2009. For complete details of the methods and results of radar surveys, refer to  
18 **Exh. Pet.-AJG-1**. Currently, there is no reliable way to distinguish birds from bats during radar  
19 data analysis, so results refer only to “targets.” However, given that the number of potential bird  
20 species migrating across the Project area far outweighs the nine species of bats known to occur in  
21 Vermont, it is likely that the pool of observed targets is composed of a higher percentage of birds  
22 than bats. Therefore, the results of on-site radar surveys are discussed in the context of

1 nocturnally migrating songbirds in the survey report, and are used to address risk to nocturnally  
2 migrating songbirds in the Risk Assessment.

3

4 The Risk Assessment indicated that there is a potential risk of direct impacts to nocturnally  
5 migrating songbirds, since on-site radar surveys documented targets moving through the Project  
6 area in the fall and spring seasons, and literature review indicates that impacts occur at wind  
7 facilities. However, the magnitude of impacts is expected to be low, since (1) on-site radar  
8 survey passage rates were low compared to regional survey results, (2) the vast majority of  
9 targets observed during on-site surveys were flying at consistently high altitudes above the  
10 proposed turbine height, and (3) literature review indicates that impacts appear to be low since  
11 the number of individuals that have collided with turbines is very small relative to the large  
12 number of individuals moving through the landscape, and as compared to regional population  
13 size.

14

15 In conclusion, results from the on-site survey and the risk assessment indicate that a risk of  
16 impact exists, but the magnitude of impact is expected to be low. Based on the analyses, I do not  
17 expect the Project to have an undue adverse impact on nocturnally migrating songbirds.

18

### 19 Breeding Birds

20 Two rounds of on-site breeding bird surveys occurred during June 2009. Following standard  
21 sampling, playback surveys were conducted at each sample point to survey for Bicknell's thrush.

22 For complete details of the methods and results of breeding bird surveys, refer to **Exh. Pet.-**

1 **AJG- 1.** The Risk Assessment indicated that there is a potential risk of direct and indirect  
2 impacts to breeding birds, since on-site surveys documented abundances and species  
3 composition of breeding birds typical of this region of Vermont and habitats associated with it,  
4 collision mortality has been documented at existing facilities, and habitat conversion is expected  
5 to cause shifts in species distribution and abundance. However, the magnitude of impacts to  
6 breeding birds is expected to be low, since (1) literature review indicates that birds are less prone  
7 to collision mortality during the breeding season than during migration, (2) there is a history of  
8 forest disturbance in the area due to timber harvest, and (3) many of the common species in the  
9 Project area are edge-associated species which are expected to become habituated to the presence  
10 of turbines. No Bicknell's thrush were observed in the Project area during breeding bird surveys.  
11 In addition, no federally or state listed threatened or endangered species were observed in the  
12 Project area during breeding bird surveys.

13

14 In conclusion, results from the on-site survey and the risk assessment indicate that a risk of  
15 impact exists, but the magnitude of impact is expected to be low. Based on the analyses, I do not  
16 expect the Project is to have an undue adverse impact on breeding birds.

17

#### 18 Bats

19 Stantec conducted on-site acoustic surveys to document bat activity between April 15 and  
20 October 15, 2009. The Risk Assessment indicated that there is a potential risk of direct impacts  
21 to bats, and the magnitude of impact is expected to be moderate. On-site acoustic surveys  
22 documented typical species composition of bats, with silver-haired bats, a long-distance migrant,

1 well-represented by acoustic detectors recording at or above tree canopy height. Overall acoustic  
2 activity rates above tree canopy were low compared to other Vermont studies). Results from  
3 post-construction surveys at regional facilities indicate that collision mortality occurs at wind  
4 facilities in the Northeast; bats are most vulnerable to collision mortality during the fall  
5 migration period; and long-distance migratory bat species (silver-haired bat, red bat, hoary bat)  
6 have comprised the majority of fatalities, although there is variability in rates of mortality and  
7 species composition at different sites. (Table 1 above; Appendix A Table 9 in Risk Assessment  
8 **Exh. Pet.-AJG-2**). Therefore, I expect patterns of collision mortality at the Project to be most  
9 similar to patterns at operational projects in New England,<sup>2</sup> where topography and habitat are  
10 most similar to the Project, and where low levels of bat mortality have been documented.  
11 The Risk Assessment also indicated that there is a potential for indirect impacts to bats, since  
12 removal of tree roosting habitat during construction is likely not outweighed by the creation of  
13 additional foraging habitat associated with turbine pad clearings and increased forest edge.  
14 However, the magnitude of indirect impacts is expected to be low, given the large forest blocks  
15 surrounding the Project area and the disturbed nature of some habitats within the Project area as  
16 a result of current timber harvest. Further, no potential day-roosts for small-footed bats were  
17 identified during a habitat assessment for this state-threatened species. Since small-footed bat  
18 mortality has not been documented at existing wind facilities to-date, and no potential day-roost  
19 habitat near the Project area was identified, it is expected that there will be no undue adverse  
20 impact to the species.

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<sup>2</sup> Operational wind projects in New England with publicly available post construction data include; Mars Hill, ME, Stetson Wind Project, ME, and spring results at the Lempster Wind Project, NH.

1 In conclusion, results from on-site surveys and the risk assessment indicate that a risk of impact  
2 exists, but the magnitude of impact is expected to be low to moderate. Based on the analyses, I  
3 do not expect the Project to have an undue adverse impact on bats.

4

5 Conclusions

6 I expect the impacts to birds and bats at the Kingdom Community Wind Project to be similar to  
7 those at other projects located in areas of similar habitat and topography. Existing facilities in  
8 New England, where topography and habitat are most similar to the Project area, have  
9 documented low levels of nocturnally migrating songbird and bat mortality relative to facilities  
10 outside of New England. I expect patterns of mortality to be similar to those expected at  
11 Sheffield and Deerfield, since results of on-site surveys at the Project area are similar to results  
12 from surveys conducted at these wind facilities. Based on my analyses, I do not expect the  
13 Project to have an undue adverse impact on raptors, nocturnally migrating songbirds, breeding  
14 birds or bats.

15

16 **5. Q. Does this conclude your testimony?**

17 **A.** Yes.

18