THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
SITE EVALUATION COMMITTEE

DOCKET NO. 2008-__

APPLICATION OF GRANITE RELIABLE POWER, LLC
FOR CERTIFICATE OF SITE AND FACILITY
FOR GRANITE RELIABLE POWER WINDPARK
IN COOS COUNTY

TESTIMONY OF ADAM J. GRAVEL AND STEVEN K. PELLETIER ON BEHALF OF GRANITE RELIABLE POWER, LLC

July 2008

Qualifications – Adam Gravel

Q. Please state your name and business address.

A. Adam Gravel. 30 Park Drive, Topsham, Maine, 04086.

Q. Who is your current employer and what position do you hold?

A. I am employed as a Project Manager and Wildlife Biologist by Stantec Consulting ("Stantec"), formerly Woodlot Alternatives, Inc. ("Woodlot"). I am responsible for coordinating and conducting wildlife use and impact assessment projects, specifically large scale avian and bat studies associated with wind projects.

Q. What are your background and qualifications?

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

I have conducted and coordinated environmental studies as part of state permitting requirements for more than 60 development projects from Maine to Virginia. Such studies principally include: daytime raptor migration, nighttime radar migration, and acoustic bat detector studies designed to assess potential direct impacts from the proposed wind energy projects. I have also assessed the potential indirect impacts (non-collision related) of projects on wildlife, including habitat impacts and fragmentation effects, impacts to rare species, and impacts to common, local wildlife communities.

My experience in New Hampshire includes managing and conducting several nocturnal radar and acoustic bat surveys, diurnal raptor migration and breeding bird surveys, rare plant and natural community surveys, and winter tracking surveys for state listed species. I have also consulted with state and federal agencies to identify and discuss potential resources of concern at proposed projects in order to develop field surveys to address concerns for wildlife or plants.

Qualifications – Steven Pelletier

Q. Please state your name and business address.

A. Steven Pelletier. 30 Park Drive, Topsham, Maine, 04086.

Q. Who is your current employer and what position do you hold?

A. I am employed as a Principal and Senior Scientist by Stantec Consulting (Stantec), formerly Woodlot Alternatives, Inc. (Woodlot). On October 1, 2007, Woodlot Alternatives, Inc. was acquired by Stantec Consulting Services, Inc.

Q. What are your background and qualifications?

A. I am a certified wildlife biologist, professional wetland scientist, and licensed/certified forester with over 25 years of professional experience. I hold an A.S.

degree in Forest Management Technology (1978) and a B.S. in Wildlife Management and Forestry (1980), both from the University of Maine at Orono. I have authored and co-authored a variety of ecological papers, including *Biodiversity in the Forests of Maine: Guidelines for Land Management*, published by the University of Maine Cooperative Extension.

I am an active member of the Society of Wetland Scientists, Society of American Foresters, Forest Guild, and The Wildlife Society, and am co-founder and a past President of the Maine Association of Wetland Scientists.

I initially began conducting ecological resource assessments for wind developments in the early 1990s. To date, Woodlot/Stantec has conducted over 120 seasons of wildlife surveys involving over 60 proposed wind projects located throughout the northeast and mid-Atlantic coastal states. These projects have been situated in a variety of landscape settings, including high linear ridgelines, individual mountain tops, the Great Lakes plain, and rolling agricultural landscapes.

The ecological resource assessments we conduct at wind developments typically include standard wetland, wildlife, botanical, and rare species surveys, but frequently also include resident and migration surveys for birds and bats involving a variety of alternative survey methods and tools.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to summarize the surveys and assessments that the Granite Reliable Power Project ("GRP Project") in Coos County, New

Hampshire has undertaken to date, and to highlight the conclusions drawn from the natural resource investigations conducted in the Project area.

Q. Are you familiar with and have you been to the Project site that is the subject of this Application?

A. Yes, we are familiar with the Project. Stantec, acting as a Project consultant, conducted a number of ecological surveys and participated in the assessments of avian, mammal, and plant communities associated with the GRP Project. The ecological surveys were conducted as part of state and federal permitting processes and included investigations of the access and ridgeline areas proposed for development. These natural resources investigations occurred over the past two years and involved several Stantec biologists and ecologists, including both of us providing this testimony. The results of the studies have allowed the Project developer to plan the Project layout to avoid and minimize impacts to wildlife and the natural environment to the maximum extent practicable.

Avian and Bat Impact

Q. Have you assessed the potential impact this Project will have on avian species?

A. Yes. We have conducted a variety of avian surveys to address potential impacts the proposed Project might have on resident and migrating songbirds, breeding birds, and migrating raptors.

Q. Please describe and summarize the results of these surveys.

A. These studies include a fall 2006 nocturnal radar survey, spring and fall 2007 nocturnal radar surveys, and a fall 2007 raptor survey.

In addition to natural resource investigations conducted by Stantec, New Hampshire Audubon was contracted by GRP to conduct a breeding bird survey in the Project area during the spring of 2007. Stantec was subsequently retained to review New Hampshire Audubon's breeding bird reports and is therefore familiar with the findings of that study.

Further efforts were made to share radar data collected by Stantec at the GRP site with another proposed Project, the North Country Wind Project ("NCWP"), approximately four miles north of the GRP Project area. At both sites radar units operated simultaneously on most nights during the fall 2006 and spring 2007 seasons, allowing a unique opportunity for comparisons of migration activity between sites in close proximity to each other and with similar elevation and habitat. The data from both sites combined further help document avian activity and movements within the local region. The full reports mentioned above and summarized below are provided with the New Hampshire Site Evaluation Committee Application as Appendices 19 through 24.

BIRDS

Nocturnal Avian Migration Surveys

Three seasons of radar surveys were conducted within the Project area over a year and a half period. Surveys were conducted in two locations within the Project area. These locations include (1) a lower elevation site approximately 2.5 miles across the valley, east of Mount Kelsey and Owlhead Mountain, and (2) on the summit of Owlhead

Mountain. Additional information on the regional magnitude and movement patterns was obtained from information shared with the NCWP. The results of the three seasons of radar surveys conducted at GRP are provided in Table 1 of Attachment A which is submitted with this prefiled testimony. Attachment A, Table 2 provides a comparison of radar survey results for the two projects.

Attachment A, Table 1 suggests that the flight characteristics of nocturnally migrating birds are generally consistent between seasons and years and in line with results of other publicly available studies to date in the northeast. Targets were observed flying in a southwesterly direction during the fall migration season and northeasterly direction during the spring. Some variation in mean nightly flight heights, passage rates, and flight direction was observed over the course of the three survey periods. This is not unexpected and largely due to the result of changes in nightly and seasonal weather patterns, although there is also likely some influence due to the elevation difference of the radar location between 2006 and 2007. Although variation occurred within the individual nights of a given season, the seasonal mean passage rates, flight heights, and the percentage of birds flying below 125 meters (the anticipated height of the proposed wind turbines with blades) were similar between seasons at the Project site.

Radar data from the NCWP which is described in detail in Appendix 22 of the New Hampshire Site Evaluation Committee Application also documented similar flight characteristics as the GRP Project. See Attachment A, Table 2. The results from studies conducted at the two sites are consistent in terms of season mean flight heights, which were within approximately 40 to 100 m (131’ to 328’) of one another. This consistency suggests that topographic features in this region of New Hampshire are not impeding or

concentrating nocturnal migrants and that the majority of migrants fly in a broad-front type of migration pattern.

As explained in the fall 2006 report and in the spring and fall 2007 radar survey reports contained in Appendix 19 – Appendix 21 of the New Hampshire Site Evaluation Committee Application, site-specific conditions of the radar location can influence the results of any radar study and any comparisons between sites. Nevertheless, when compared to data collected during other studies at different wind energy project sites across the northeast, the results of the radar surveys conducted at the GRP site fall within the range of other studies. See Attachment A, Table 3.

In general, migrants were not observed to be concentrated in any part of the Project area, and on most nights there were not a significant number of targets flying below the height of the proposed turbines. With respect to the height of migration activity, season mean flight heights of nocturnal migrants were consistently observed above the maximum height of proposed turbines (125 meters). For the fall 2006 season, the overall mean flight height was 455 m (1493'); it was 332 m (1089') in spring 2007, and 343 m (1125') in fall 2007. During the same time periods, the mean percent of targets flying below the maximum turbine height was 1 percent, 14 percent, and 15 percent respectively. Flight heights of nocturnal migrants during the fall of 2006 were higher than those documented during the spring and fall 2007 surveys, and were consistently above the maximum height of the proposed turbines. This is most likely due to the difference in elevation between the radar location in the fall 2006 and spring and fall 2007. The elevation of the fall 2006 radar survey location was lower than the

Owlhead Mountain site that was used during the spring and fall 2007 radar surveys. Figures 1, 2, and 3 portray the vertical distribution of targets for each season.

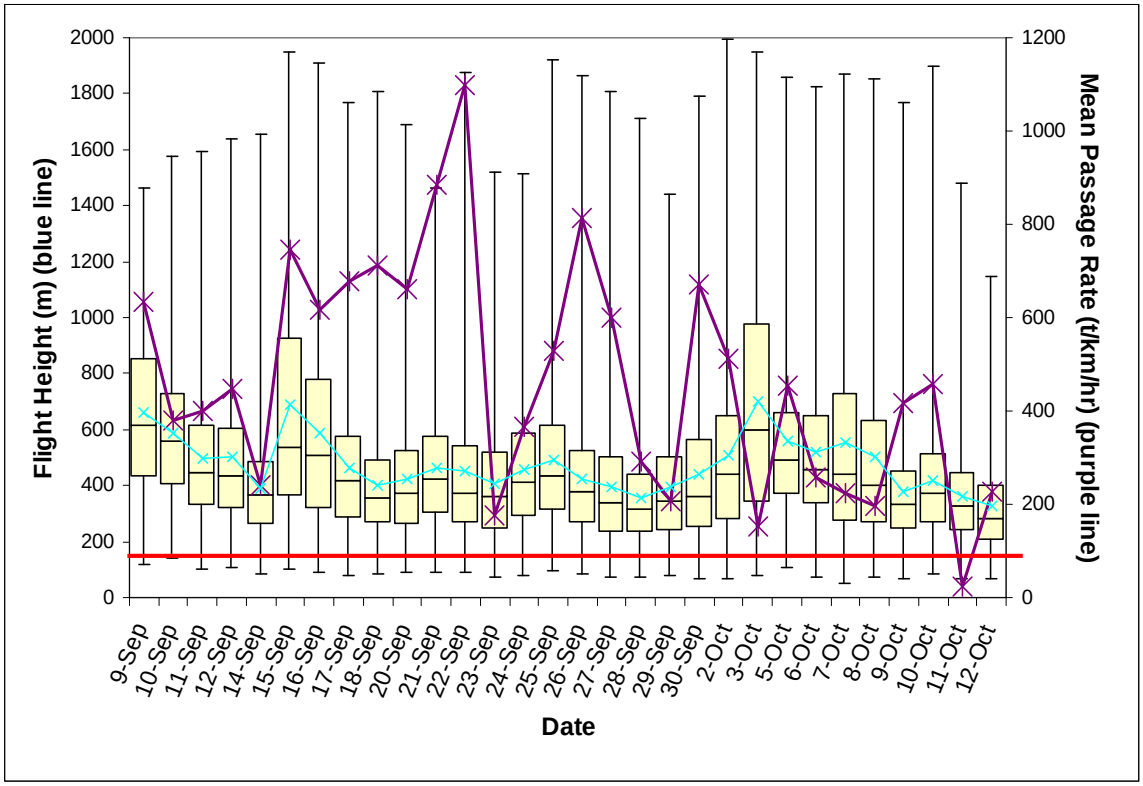

Figure 1. Vertical distribution of targets during Fall 2006 radar surveys. Boxes are bounded by the 25th and 75th percentiles, with the interior line representing the median value. Error bars represent minima and maxima. The horizontal/stationary red line represents the maximum turbine height.

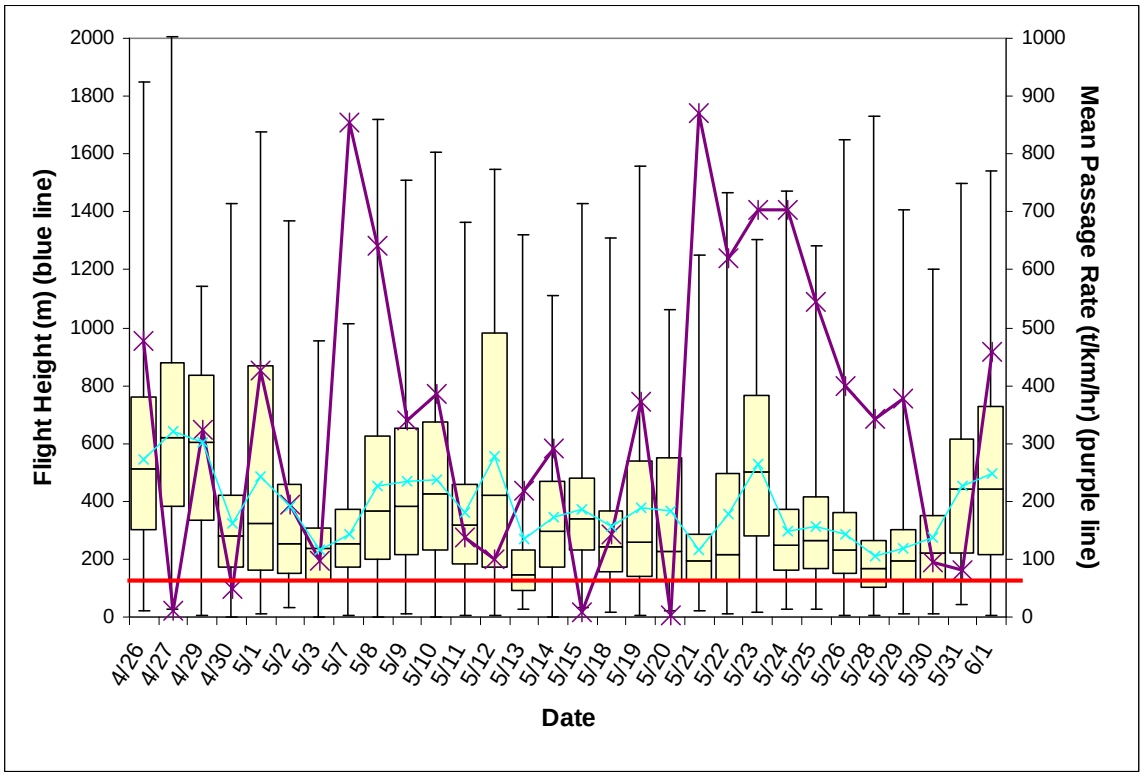

Figure 2. Vertical distribution of targets during Spring 2007 radar surveys. Boxes are bounded by the 25th and 75th percentiles, with the interior line representing the median value. Error bars represent minima and maxima. The horizontal/stationary red line represents the maximum turbine height.

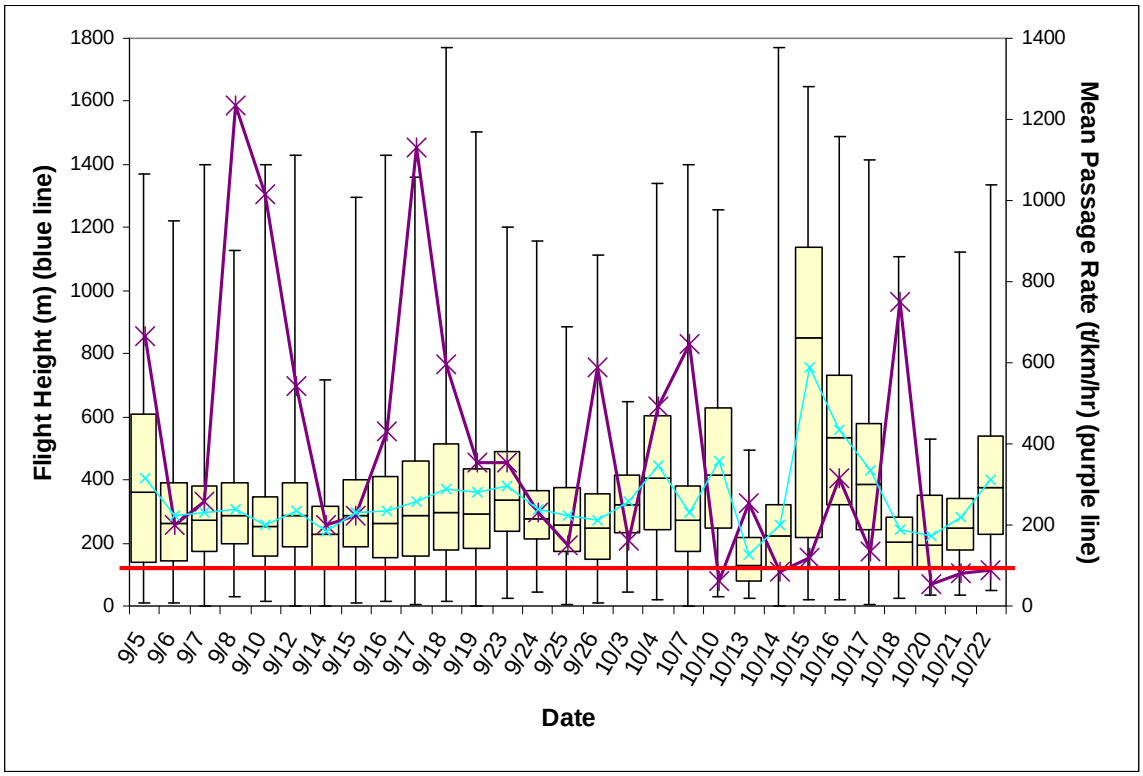

Figure 3. Vertical distribution of targets during Fall 2007 radar surveys. Boxes are bounded by the 25th and 75th percentiles, with the interior line representing the median value. Error bars represent minima and maxima. The horizontal/stationary red line represents the maximum turbine height.

The additional third season survey allows a year-to-year comparison of nocturnal migration activity. Of the two migration periods, fall is typically the larger migration season with the greater number of migrants. Additionally, the two radar survey locations presented site conditions that allowed for good views of targets flying in the airspace 360 degrees around them.

In addition to the comprehensive coverage of the Project area, radar data was also available from the NCWP during the fall of 2006 and spring of 2007 which provided simultaneous radar coverage on most nights of each season. Data collected from both of these sites allowed for a better assessment of nocturnal migration activity at a landscape level rather than at just the site level. Comparisons of the documented results from the

NCWP showed trends similar to those at the GRP site. In fact, on nights of simultaneous operations at the two sites, flight heights, passage rates, and flight directions were consistently similar. The results of the radar surveys are representative of avian migration activity through the area and suggest a relatively high elevation (i.e. relative to turbine height), broad front migration pattern that poses a limited risk of avian-turbine collisions. Therefore, we do not believe that the proposed Project will have an unreasonable adverse effect upon nocturnally migrating birds.

Q. Based on the surveys discussed above, or upon any other information, do you have an opinion regarding potential post-construction bird mortality at the Project site?

A. Yes. It has been shown that some bird mortality exists at modern wind facilities. Certain weather conditions and events could cause some bird species to collide with the turbines. However, recent mortality information found during post-construction surveys at developed wind projects has shown that mortality is generally not numerically significant, depending on the location (Arnett *et al*. 2007[1]).

Based on publicly available results of post-construction mortality surveys, we expect that bird mortality will occur at the GRP Project. However, as explained above, bird mortality has been low and does not appear to be significantly affecting bird populations. Additionally, as described above, the results of the three seasons of radar studies show that this Project site is within the range of other radar studies conducted in the northeast and that flight heights are consistently greater than the proposed turbine height. The data collected at the NCWP shows that migrating birds are not changing altitude between the NCWP and the GRP project which is four miles north of the project

site, further suggesting that topographic features are not influencing the height or direction at which migrants fly.

RAPTORS

Q. Please describe any raptor surveys conducted for this Project.

A. Stantec/Woodlot conducted one season of hawk migration surveys on Owlhead Mountain during the fall of 2007. A total of 11 days of hawk surveys were conducted from September 5 to October 16, 2007, the time period in which most species of raptors in the northeast migrate south. Surveys followed standard protocols developed by the Hawk Migration Association of North America (HMANA) and are described in detail starting on page 30 of the fall 2007 migration report attached as Appendix 21of the NHSEC Application. It is important to note that this survey was not a census of the migrating population of raptors through the area, but rather a survey designed to cover days of peak migration conditions throughout the time period in which most raptor species in the northeast migrate south. Observations from the Project area were compared to data from nine local and regional HMANA hawk watch sites available on the HMANA web site and in yearly reports. These HMANA watch sites included data from Pennsylvania to Maine. For purposes of accuracy and consistency, only hawk watch counts for the same period (i.e. from September 5 to October 16, 2007), were used for comparison. Relative to the observation rates from September 5 to October 16 at other hawk watch sites in the region, including the HMANA hawk watch site closest to the Project area (i.e. Pack Monadnock Mountain in Peterborough, New Hampshire), raptor passage rates at the Project site were among the lowest in the northeast. See Attachment A, Table 4.

A total of nine species were observed flying through the survey area, with an overall passage rate of 0.63 raptors/observation-hour. A total of 44 individual birds were observed. Approximately 74 percent of observations were of red-tailed hawks, which are probably the most common raptor species in the northeast. The flight heights of raptors in the Project area indicate that 55 percent of the observations occurred below 125 m, the height of most modern wind turbines. However, birds were often observed outside of the proposed turbine string locations. Additionally, 20 percent of observations were thought to be residents to the area. Differences between species were also observed and could be due to typical flight height preferences, species behavior, or to limitations in the distance that different species are visible. The greater occurrence of migrants at low altitudes may increase the potential for migrating raptors to come into close contact with the proposed wind turbines. Regardless, the overall risk of raptor/turbine collision – outside of the 1970's Altamont Project in California – has been consistently demonstrated to be extremely low, with a recent study finding of 0.03 raptors per turbine per year (or expressed differently, 0.04 raptors/MW/YR, Arnett et al. 2007[1]).

Q. Based on the surveys discussed above, or upon any other information, do you have an opinion regarding potential post-construction raptor mortality at the Project site?

A. Yes. Based upon the information presented above and in the chart below, it is anticipated that post-construction mortality rate for raptors will be low.

Raptor mortality found during post construction mortality surveys at wind farms in the U.S.

Location	study	Number of fatalities and	Reference[1]

	period	species	
Buffalo Ridge, MN	1994-1995	0	Osborn et al. 2000
Buffalo Ridge, MN	1996-1999	1 red-tailed hawk	Johnson et al. 2002
Searsburg, VT	1997	0	Kerlinger 2002
Foote Creek Rim, WY	1998-2002	1 Northern harrier, 3 American kestrel, 1 short-eared owl	Young et al. 2003
Vansycle, OR	1999	0	Erickson et al. 2000
Somerset County, PA	2000	0	Kerlinger 2006
Nine Canyon, WA	2002-2003	1 American kestrel, 1 short-eared owl	Erickson et al. 2003
Klondike, OR	2002-2003	0	Johnson et al. 2003
Mountaineer, WV	2003	1 red-tailed hawk, 2 turkey vultures	Kerns and Kerlinger 2004
Mountaineer, WV	2004	1 sharp-shinned hawk, 1 turkey vulture	Arnett et al. 2005
Myersdale, PA	2004	0	Arnett et al. 2005
Top of Iowa, Iowa	2004	1 red-tailed hawk	Koford et al. 2005
Buffalo Mountain, TN	2005	0	Fiedler et al. 2007
Maple Ridge, NY	2006	1 American kestrel	Jain et al. 2007

Direct observations of raptors at other developed wind projects in the northeast documented that most raptors are aware of the turbines and avoid them. Our own direct experience conducting similar surveys at an existing facility in southern Vermont supports this observation. Over the course of two seasons, raptors were repeatedly observed soaring near turbines and lifting up over the spinning turbine blades. These observations made it evident that the birds were aware of the presence and movement of the turbine blades. Considering their daytime habits and the very limited movement of migrating raptors during inclement weather, potential interactions between raptors and wind turbines can be expected to be low. We also anticipate that additional raptor surveys at the Project area would not yield substantive changes in the overall conclusions to date.

While the original concern about avian collisions at wind energy developments arose from observations of possibly biologically significant high mortality rates of hawks and eagles at the Altamont Pass and Solano County Wind Resource Areas in California in the 1990s, raptor mortality at newer facilities has since proved to be very low. The high rates of mortality can be attributed to the following principal factors: high raptor density, high prey density, high turbine density, short lattice towers, and early generation turbines with fast spinning blades that are not easily detected by migrating raptors.

The GRP wind Project will utilize modern technologies and site selection considerations that substantially reduce risk of mortality presented by older wind projects that documented greater mortality events in California. Raptor density at the Project site is low, particularly during the migration period. Surveys at the site suggest no significant migration of raptors through the Project area, although small numbers of raptors were observed. This is likely due to a lack of landscape features (i.e., long linear ridgelines, valleys, and coast lines) that could concentrate migration activity at the Project area. Rather, the surrounding landscape consists of a series of interrupted ridges and individual peaks that migrating raptors use as stepping stones as they pass through the area.

The anticipated mortality at the GRP wind Project is expected to be similar to, or lower than, the mortality observed at other wind power developments. Raptor fatalities are expected to be uncommon. This is due to their day-time habits, which allow raptors to be aware of and avoid the turbines. Turbine density in the Project area will be very low. Most importantly, wind turbines will consist of tall tubular towers and slow moving blades. Consequently, we believe that the GRP Project is no different from other modern

facilities that have resulted in no or little impact to raptors and that the risk of raptors colliding with the proposed turbines is low.

BREEDING BIRDS

Q. Please describe any breeding avian surveys conducted for the Project.

A. As previously noted, the New Hampshire Audubon conducted two breeding bird surveys within the GRP site during the spring 2007. The first survey was conducted using the original Project layout that excluded the Dixville Peak area. During this survey, investigations were conducted on Mount Kelsey, Owlhead Mountain, Fishbrook Ridge and along all proposed access roads and power collection lines. Despite the absence of breeding bird data from Dixville Peak for GRP, information was available from NH Audubon which had previously conducted a breeding bird survey for Wagner Forest Management in that area, specifically targeting Bicknell's thrush (*Catharus bicknelli*; and habitat for that species) in 2005 and 2007. The data collected during that survey were re-analyzed in the same format as the survey conducted for GRP when Dixville Peak became part of the Project layout in 2007. The detailed reports for these studies are attached to the NHSEC Application as Appendices 23 and 24. Combined, both studies incorporate all areas of the Project's layout including the ridgelines proposed for wind turbines, new access road locations, and the proposed power collection lines right of way. Breeding bird surveys were conducted during the initial planning stages of the GRP Project design to help minimize potential impacts to sensitive species and were designed to detect species of conservation concern including state-listed endangered, threatened, or special concern species.

Both breeding bird surveys consisted of 10 minute point counts in which the observer would identify by sight or sound the bird species, their behavior, and their distance away from the observer. In addition to the point count method, which is the accepted methodology for this type of breeding bird survey, broadcast surveys were also conducted at points that contained habitat for state listed, endangered, threatened, and special concern species, particularly Bicknell's thrush, a state species of special concern, and American three-toed woodpecker (*Picoides dorsalis*), a state- threatened species. The survey for areas south of Dixville Peak was conducted from May 31 to July 4, 2007 and the Dixville Peak survey was conducted on June 25, 2005 and June 23, 2007. All field surveys were conducted on days with favorable conditions to hear bird vocalizations and occurred in all of the major habitat types found within the proposed Project layout.

Overall, a total of 60 species were detected at 219 10 minute point-count locations that covered all areas of the Project site south of Dixville Peak. See Appendix 23 of the NHSEC Application. A total of 1,967 detections of 60 species were recorded during the surveys at the proposed turbine strings. Five additional species were recorded in between point locations along the turbine strings for a total of 65 different species detected. During the surveys along the proposed transmission strings, a total of 449 individuals of 47 species were detected. Five additional species were also observed between points within the area of the proposed power collection line. Most of the bird species detected during the surveys were those common to this region of New Hampshire. The most abundant and widespread species detected were white-throated sparrow (*Zonotrichia albicollis*), Swainson's thrush (*Catharus ustulatus*), slate-colored junco (*Junco hyemalis*), yellow-rumped warbler (*Dendroica coronata*), and winter wren

(*Troglodytes troglodytes*). No confirmed observations of state- listed threatened or endangered species were detected. There were unconfirmed detections of the state-threatened three-toed woodpecker along the ridgeline of Mount Kelsey. These observations were not confirmed due to the possible presence of a similar species in the area, the black-backed woodpecker (*Picoides arcticus*), which utilizes similar habitats (high elevation spruce/fir with standing snags) and emits similar vocalizations as the three-toed woodpecker.

The breeding bird surveys did, however, document the presence of two state-listed species of special concern. Bicknell's thrush and Rusty blackbird were both observed within areas of the proposed wind turbine strings. Bicknell's thrush prefers dense stunted spruce/fir forests near tree line at higher elevations and was observed on Mount Kelsey, Fishbrook Ridge, and Whitcomb Mountain. Rusty blackbird prefers spruce/fir or spruce-fir-northern hardwood forest stands on the edges of streams, ponds, bogs, fens, and beaver flowages in NH and were observed in two locations on the south end of Fishbrook Ridge and the northwestern area of the Phillips Brook Tract.

For the Dixville Peak surveys, a total of 12 species were detected during point count surveys in 2005 and 2007, for a combined total over the two different years of 16 species detected (see Appendix 24 of the NHSEC Application). Overall, a total of 80 individuals were detected during the surveys in 2005 and 50 individuals during the 2007 surveys. At the Dixville Peak area, 8 points were surveyed in 2005 and 11 points were surveyed in 2007. Most of the bird species detected during the surveys were those common to this region of New Hampshire having similar habitat to Dixville Peak. The most abundant and widespread species detected at Dixville Peak were white-throated

sparrow (*Zonotrichia albicollis*), Swainson's thrush (*Catharus ustulatus*), and blackpoll warbler (*Dendroica striata*). Yellow–bellied flycatcher (*Empidonax flaviventris*), winter wren (*Troglodytes troglodytes),* Nashville warblers (*Vermivora ruficapilla*), yellow-rumped warbler (*Dendroica coronata*), and slate-colored junco (*Junco hyemalis)* were also detected at more than half the points surveyed during both years. Only one state-listed special concern species, Bicknell's thrush was detected. Three detections of this species occurred during 2005. No Bicknell's thrush was observed during the 2007 survey.

Neither survey documented unusually high species diversity or large numbers of birds. While development of the Project would result in habitat loss and clearing along the ridgeline of the mountain, these types of impacts currently exist throughout the Project area in the form of timber clearing and open corridors for existing transmission lines and roads. Development of the Project is therefore not expected to cause dramatic shifts in the abundance, diversity, or distribution of the breeding bird population. Indirect impacts to breeding birds are expected to vary based on the habitat needs of individual species; those associated with forest interior habitats will be affected more, and those associated with edge or disturbed habitats will be less affected. To date little is known about habitat impacts to breeding birds from the development of wind projects because very few post construction studies have been conducted to address these impacts. We anticipate some impacts to ridgeline breeding habitats due to the limited amount of disturbance that have occurred in the past. However, the numbers of species that specifically utilize the summit habitats were documented to be low.

Q. Based upon the breeding avian surveys described above, or upon any other information, do you have an opinion regarding potential post-construction breeding bird mortality at the Project site?

A. Yes. Although collision mortality has been documented for breeding birds at existing facilities, birds seem to be less prone to collision during the breeding season than during the spring and fall migration. Likelihood of collision is presumably related to a combination of overall abundance and species-specific flight behaviors. Results of on-site surveys suggest that the Project area does not support large numbers of any rare bird species, and that while a small number of breeding birds will likely collide with turbines, the magnitude of these impacts is expected to be minor, and population level impacts for any single species are not anticipated as a result of the Project.

BATS

Q. Have you assessed the potential impact this Project will have on bat species?

A. Yes. Stantec conducted a full year (spring, summer, and fall 2007) of acoustic bat detector surveys for the Project. The full details of the methods and results of these studies are located in Appendices 20 and 21 of the NHSEC application. These surveys took place from April 26 to October 30, 2007 and encompassed the entire time period within the year that bats are active, including the spring migration, summer residence, and fall migration periods. Nine species of bats may occur in New Hampshire, based upon their normal geographic range. These include little brown bat (*Myotis lucifugus*), northern long-eared bat (*M. septentrionalis*), Indiana bat (*M. Sodalis*), eastern small-footed bat (*M. leibii*), silver-haired bat (*Lasionycteris noctivagans*), eastern

pipistrelle (*Pipistrellus subflavous*), big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), and hoary bat (*Lasiurus cinereus*). Of these species, the eastern small-footed bat is listed as state- endangered and the Indiana bat is federally- listed as endangered. Indiana bats are not suspected to occur in New Hampshire especially as far north as the GRP Project. In order to document the presence of all species in New Hampshire, "Anabat II ®" Acoustic bat echolocation detectors were used during the surveys because they are capable of detecting all frequency ranges of bat species present in New Hampshire. These detectors are also capable of deployment for long periods of time unattended, as well as deployment at different heights, especially those near the rotor zone of the proposed turbines, and within different habitats.

Four detectors were placed in the on–site meteorological measurement towers (2 detectors in each of the two towers) at heights of approximately 50 m (164') and 20 m (66'). Potential call files recorded from the on-site bat detectors were identified based on visual comparison of call sequences with reference libraries, including known calls recorded by Stantec during mist netting surveys in 2006 in New York and Pennsylvania, reference calls from 2002 to 2005 provided by Chris Corben, developer of the Anabat system, and calls recorded by Lynn Robbins a nationally-recognized bat expert, and a professor in the Department of Biology at Southwest Missouri State University.

Spring call volumes ranged from 0.2 to 0.3 calls per detector/night, with an overall call volume of 0.3 calls per detector/night. See Attachment A, Table 5. Call volumes in April and early May were generally low, likely the result of consistently low nightly temperatures during this time (below 45 degrees). In fact, no bat calls were recorded at any detector prior to May 1. As temperatures increased throughout the

season, bat activity also increased. Fall call volumes ranged from 0.4 to 0.7 calls per detector/night, with an overall call volume of 0.6 calls per detector/night. Call volumes were highest in July and August and became non-existent in October when nightly temperatures dropped significantly.

For both the spring and fall, species composition of recorded calls slightly differed between the high and low detectors, with "low frequency" species such as big brown bats, silver-haired bats, and hoary bats more commonly detected at the higher elevation detectors, and "high frequency" species in the *Myotis* genus most commonly detected near the ground. This trend, although typical of Anabat surveys conducted in the northeast, was generally less obvious at this site due to the overall low number of calls recorded. Overall, fall acoustic surveys documented greater levels of bat activity than spring surveys with the majority of recorded call sequences from the *Myotis* genus. Interestingly, almost 60 percent of all calls recorded during the spring, summer, and fall periods were from the detectors in the Trio Ponds met tower, which is now not part of the proposed Project layout.

No endangered or threatened species were detected during these surveys. Except for the state-endangered small-footed bat, the GRP Project area is located outside of the known range of threatened or endangered bat species. However, no small-footed bats were documented during the acoustic surveys. Generally speaking, preferred habitat for the small-footed bat, such as abandoned mines or mine tunnels for winter hibernacula and rocky crevices, cliffs, and talus slopes for maternity colonies, was absent from the Project site (DeGraaf and Yamasaki 2000[2]). Additionally, the overall call volume of detections

of the *Myotis* species, which includes the small-footed bat, were low throughout the surveyed year.

Bat activity documented at the Project site is comparable to those of other similar studies conducted to date on forested ridgelines in the northeast by Stantec and are at the low end of the range of those studies. See Attachment A, Table 6. The results of the spring, summer, and fall 2007 acoustic bat surveys conducted at the Project provided information on the timing and level of bat activity within the Project site. Overall, peak bat activity within the Project occurred in late summer and early fall; however, the total number of calls detected within each survey was low compared to other publicly available acoustic bat surveys conducted for wind projects in the northeast. The greatest number of calls recorded on any given night was 13 by the Owlhead low detector. Additionally, detections of migratory bat species (i.e., silver-haired bat, red bat, and hoary bat) were low or non-existent at the Project. Based on the information collected on site and on that found at other wind facilities, we do not anticipate the GRP Project will have an unreasonable adverse effect on bats.

Q. Based upon the surveys described above, or upon any other information, do you have an opinion regarding post-construction bat mortality at the Project site?

A. Yes. Recent research has shown that large numbers of bats have been killed by colliding with wind turbines at some wind power facilities, especially central Appalachian states. At this time, researchers have limited understanding of the specific factors influencing rates of bat collision mortality. However, recent evidence regarding the seasonal timing of fatalities documented at existing wind facilities and other

structures suggests that migrating bat species suffer the highest risk, particularly during the beginning of fall migration in late summer and early fall, yet risk during the summer feeding and pup-rearing period is generally low.

As documented at other constructed wind facilities, bat collision mortality may occur at the GRP Project. However, due to the low call volume observed and the species detected, this type of mortality is expected to be lower than that documented at other facilities.

OTHER WILDLIFE

Q. Have you assessed the potential impact this Project will have on other wildlife, particularly threatened and endangered species?

A. Yes. Stantec conducted a winter track survey to document the presence or absence of the state- endangered American Marten (*Martes Americana*) and state-endangered and federally threatened Canada Lynx (*Lynx Canadensis*). See Appendix 25 of NHSEC Application. This study was based on concerns expressed by state and federal agencies and designed through consultation with New Hampshire Fish and Game Department staff.

The winter track surveys were conducted on February 21 – 23, March 12 – 13, and March 19-20, 2007. Paired transects were established on five ridgelines within the Project site in habitats characteristic of the entire Project. A high and low elevation transect was established on each ridge to allow a comparison of elevation differences and to assess marten use along the ridge tops (where the majority of the disturbance occurs) relative to the side slopes (where little disturbance will occur from the Project). In

addition to the transect surveys, area searches were conducted for both species as observers traveled through the Project site to each transect location.

Tracks of 9 distinct species were observed during the three survey periods. The most frequent tracks observed were of marten (94 track observations), due to the nature of the targeted (marten) survey effort. The next most common track observed was moose (89 track observations), grouse (88 track observations), and fisher (66 track observations). Although lynx tracks have been documented in this region of New Hampshire, no observations of lynx tracks were documented during the three survey periods.

In addition to the winter track surveys for marten and lynx, a natural community characterization was also conducted to determine the amount of high elevation habitat that would be impacted from the proposed Project relative to the total amount of available high elevation habitat. See Appendix 16 of the NHSEC Application. This characterization was recommended during discussions with state and federal agency staff regarding impacts to marten habitat but also provided additional value to the assessment of potential impacts to other species that may require high elevation spruce/fir habitat.

The natural community characterization was conducted during March 2008. Prior to conducting field surveys, relevant existing natural resource data and high resolution aerial photographs were reviewed. This data review and landscape analysis was used to target field surveys within the different natural communities and wildlife habitats present at the Project site. During the field survey, the natural communities and habitats identified through the landscape analysis as being within the Project footprint were visited. Utilizing high resolution digital aerial photographs provided by GRP, the

boundaries of the natural communities present within the proposed impact areas of the Project were sketched onto field maps and subsequently digitized using Geographic Information System ("GIS") software following the field survey. Overall, approximately 2% of the available high elevation habitat within the Project site will be impacted by the Project. The majority of impact to high elevation habitat will occur on Dixville Peak and Mount Kelsey. This impact is, however, relatively limited and accounts for only approximately 58 acres of 3,540 acres (or 1.5 %) of available habitat present above 2700 feet for these two ridges.

Total Acres of Impact to Natural Communities Above 2700' at GRP's Proposed Wind Park

Location	Impact Acres	Total Acres above 2700'	% Of Land Area above 2700'
Dixville Peak	25	1873	1%
Mt. Kelsey	29	1667	2%
Owlhead Mtn	3	49	6%
Fish Brook Ridge	2	158	1%
Total	**58**	**3,747**	**2%**

The proposed GRP Project will likely influence some local marten movement due to habitat impacts on the ridgelines. However, as shown in the winter track survey, marten occurrence between the high elevation and low elevation transects was similar. In addition, the amount of impact to these areas is relatively small compared to the total habitat available. Consequently, no adverse effects resulting from the Project to the local marten population is anticipated.

Q. In your opinion will this Project have an unreasonable adverse effect on the natural environment, more particularly avian species, bat species and other wildlife communities?

A. No, we do not believe the GRP Project will have an unreasonable adverse effect on bird, bat, and other wildlife communities for the reasons described above.

The Project is sited on privately-owned land and is maintained by industrial and commercial forest management companies that allow various degrees of public access. Some roads are maintained year-round to support ongoing forestry activities while others are seasonal, where access is allowed during the non “mud seasons”. As a result of forestry activities, a network of primary and secondary logging roads and skid trails exists. Forest harvesting has resulted in a generally younger mix of age classes with stands of both regenerating hardwood and softwood species. The higher elevations (above 2700 feet or 823 m) are dominated by relatively undisturbed red spruce and balsam fir habitat.

Habitat conditions within this region are constantly changing as a result of the widespread industrial forest management practices. Wildlife species that reside at the Project site have generally adapted to an environment with frequent disturbances and changing conditions and accustomed to management activities and vehicle traffic.

Plant Life Impact

Q. Have you studied the effect this Project will have on plant life?

A. Yes. We have conducted several surveys to address potential impacts to rare plant species and natural communities. These studies include a spring/summer 2007 rare plant survey (Appendix 15 of NHSEC Application), a spring 2008 natural community characterization (Appendix 16 of NHSEC Application), and a spring 2008 rare plant survey (Appendix 17 of NHSEC Application). These surveys were designed and conducted through consultations with state and federal agencies in order to help design the Project layout to minimize potential impacts to rare, threatened, or endangered plant species and communities.

Q. Have you studied the impact this Project will have on rare plants?

A. Yes. As mentioned above, Stantec conducted a rare plant survey during spring/summer 2007 and spring 2008. In addition to identifying if rare plant species were present on site, a spring 2008 natural community characterization was also conducted to determine if any rare natural communities are present within the Project site, and more specifically within the Project's footprint.

Q. Please explain what your studies entailed.

A. The two rare plant surveys mentioned above were conducted through consultation with the New Hampshire Natural Heritage Bureau ("NHNHB"). The natural community characterization was conducted as recommended by New Hampshire Fish and Game Department ("NHFGD") and United States Fish and Wildlife Service ("USFWS"). Prior to conducting any field surveys, an information review and landscape analysis was conducted to identify target areas for field surveys. In addition to this

analysis, information from NHNHB was obtained for rare plant species that occur or were known to occur within the Project site. Following the natural community characterization in March 2008 and utilizing information gained during that study, further consultation with NHNHB occurred prior to the spring 2008 rare plant surveys to determine more specific areas within the Project site to target. For complete details on the methods used during these studies see Appendices 15 through 17 of NHSEC Application.

Q. Please explain the results of your study.

A. Due to past and current forestry activities, cover and habitat conditions within the Project site are constantly changing, reducing the possibility for the existence of rare plant species and communities to reside there. Neither of the plant surveys mentioned above documented any rare plant species or communities within the proposed layout of the GRP Project. One rare plant species, mountain sweet cicely (*Osmorhiza occidentalis*), was observed during the spring/summer 2007 surveys in the general vicinity of the Project, but approximately 2 miles from the nearest ridgeline proposed for wind turbines. The plant species and natural communities present within the Project site are typical to this region of New Hampshire. The majority of the land within this area of New Hampshire has been affected by industrial forestry practices.

Q. In your opinion will this Project have an unreasonable adverse effect on the natural environment, particularly plant life?

A. No. Due to the fact that no rare plant species were found within the Project site over the course of any of the surveys described above and in light of the

ongoing industrial forestry practices within the Project site, we do not believe that the Project will adversely affect any rare plant species or natural communities.

Q. Are there any other comments you would like to make at this time?

A. No

Q. Does this conclude your prefiled testimony?

A. Yes.

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Attachment A

Table 1. Summary of the season mean radar survey results for three migration seasons - Granite Reliable Wind Project				
Season	**Passage Rate (t/km/hr) with range**	**Flight height (m) with range**	**Flight Direction**	**% Below 125 m**
Fall 2006 *	469 (2 to 1098)	455 (310 to 638)	223°	1%
Spring 2007	342 (2 to 870)	332 (81 to 583)	76°	14%
Fall 2007	366 (54 to 1234)	343 (179 to 636)	223°	15%
* The fall 2006 survey was not conducted from the summit of Owlhead Mountain due to limited access during this time period. For this season it was located approximately 800' lower in elevation likely resulting in higher flight heights and a lower % below 125 m.				

Table 2. Summary of two seasons of radar survey results at the proposed Granite Reliable Power Wind Project and the North Country Wind Project - Coos County, New Hampshire								
	Passage Rate (t/km/hr) with range		**Flight height (m) with range**		**Flight Direction**		**% Below Turbine height**	
Season	**GRP**	**NCWP**	**GRP**	**NCWP**	**GRP**	**NCWP**	**GRP (125 m)**	**NCWP (120 m)**
Fall 2006	469 (2 to 1098)	505 (153 to 906)	455 (310 to 638)	361 (225 to 495)	223°	208°	1%	8%
Spring 2007	342 (2 to 870)	187 (24 to 387)	332 (81 to 583)	290 (145 to 515)	76°	92	14%	12%

Table 3. Summary of available avian radar survey results

Project Site	Number of Survey Nights	Number of Survey Hours	Landscape	Average Passage Rate (t/km/hr)	Range in Nightly Passage Rates	Average Flight Direction	Average Flight Height (m)	(Turbine Ht) % Targets Below Turbine Height	Citation
Fall 1998									
Harrisburg, NY	35	n/a	Great Lakes plain/ADK foothills	122	n/a	181	182	45	Cooper and Mabee 2000
Wethersfield, Wyoming Cty, NY	35	n/a	Agricultural plateau	168	n/a	179	154	57	Cooper and Mabee 2000
Spring 2003									
Westfield Chautauqua Cty, NY	30	150	Great Lakes Shore	395	15-1702	29	528	(125 m) 4%	Cooper *et al.*2004a
Fall 2003									
Westfield Chautauqua Cty, NY	30	180	Great Lakes shore	238	10-905	199	532	(125 m) 4 %	Cooper *et al.* 2004c
Mt. Storm, Grant Cty, WV	45	270	Forested ridge	241	8-852	184	410	n/a	Cooper *et al.* 2004b
Fall 2004									
Franklin, Pendleton Cty, WV	34	349	Forested ridge	229	18-643	175	583	(125 m) 8%	Woodlot 2005a
Prattsburgh, Steuben Cty, NY	30	315	Agricultural plateau	193	12-474	188	516	(125 m) 3%	Woodlot 2005b
Prattsburgh, Steuben Cty, NY	45	292.5	Agricultural plateau	200	18-863	177	365	(125 m) 9.2%	Mabee *et al.* 2005a
Martindale, Lancaster, Cty, PA	n/a	n/a	Reclaimed minelands	187	n/a	188	436	(n/a) 8%	Young 2006
Casselman, Somerset Cty, PA	n/a	n/a	Reclaimed minelands	174	n/a	219	448	(n/a) 7%	Young 2006
Deerfield, Bennington Cty, VT (Existing Facility)	28	300	Forested ridge	175	7-519	194	438	(100 m) <1%	Woodlot 2005c
Deerfield, Bennington Cty, VT (Western Expansion)	14	159	Forested ridge	193	8-1121	223	624	(100 m) 5%	Woodlot 2005c
Deerfield, Bennington Cty, VT (Valley Site)	13	136	Forested ridge	150	58-404	214	503	(100 m) < 1%	Woodlot 2005c
Deerfield, Bennington Cty, VT (3 sites combined)	28	595	Forested ridge	178	7-1121	212	611	(100 m) 3%	Woodlot 2005c
Sheffield, Caledonia Cty, VT	18	176	Forested ridge	114	19-320	200	566	(125 m) 1%	Woodlot 2006a
Spring 2005									
Churubusco, Clinton Cty, NY	39	310	Great Lakes plain/ADK foothills	254	3-728	40	422	(120 m) 11%	Woodlot 2005d
Ellenberg, Clinton Cty, NY	n/a	n/a	Great Lakes plain/ADK foothills	110	n/a	30	338	(n/a) 20%	Mabee *et al.* 2006a
Dairy Hills, Clinton Cty, NY	n/a	n/a	Great Lakes shore	117	n/a	14	397	(n/a) 15%	ED&R 2006a
Clayton, Jefferson Cty, NY	36	303	Agricultural plateau	450	71-1769	30	443	(150 m) 14%	Woodlot 2005e
Sheldon, Wyoming Cty, NY	38	272	Agricultural plateau	112	6-558	25	418	(120 m) 6%	Woodlot 2006b
Prattsburgh, Steuben Cty, NY	20	183	Agricultural plateau	277	70-621	22	370	(125 m) 16%	Woodlot 2005f
Prattsburgh, Steuben Cty, NY	30	270	Agricultural plateau	170	3-844	18	319	(125 m) 18%	Mabee *et al.* 2005a
Cohocton, Steuben Cty, NY	3	29	Agricultural plateau	371	133-773	28	609	(125 m) 12%	ED&R 2006b
Munnsville, Madison Cty, NY	41	388	Agricultural plateau	160	6-1065	31	291	(118 m) 25%	Woodlot 2005g
Fairfield, Herkimer Cty, NY	40	369	Agricultural plateau/ADK foothills	509	80-1175	44	419	(125 m) 20%	Woodlot 2005h
Jordanville, Herkimer Cty, NY	40	364	Agricultural plateau	409	26-1410	40	371	(125 m) 21%	Woodlot 2005i
Sheffield, Caledonia Cty, VT	20	179	Forested ridge	208	11-439	40	522	(125 m) 6%	Woodlot 2006a
Deerfield, Bennington Cty, VT	20	183	Forested ridge	404	74-973	69	523	(125 m) 4%	Woodlot 2005j
Franklin, Pendleton Cty, WV	23	204	Forested ridge	457	34-240	53	492	(125 m) 11%	Woodlot 2005k

(*continued*)

Table 3. Summary of available avian radar survey results (*continued*)

Project Site	Number of Survey Nights	Number of Survey Hours	Landscape	Average Passage Rate (t/km/hr)	Range in Nightly Passage Rates	Average Flight Direction	Average Flight Height (m)	(Turbine Ht) % Targets Below Turbine Height	Citation
Fall 2005									
Churubusco, Clinton Cty, NY	38	414	Great Lakes plain/ADK foothills	152	9-429	193	438	(120 m) 5%	Woodlot 2005l
Ellenberg, Clinton Cty, NY	n/a	n/a	Great Lakes plain/ADK foothills	197	n/a	162	333	(n/a) 12%	Mabee *et al.* 2006a
Dairy Hills, Clinton Cty, NY	n/a	n/a	Agricultural plateau	94	n/a	180	466	(n/a) 10%	Young et al. 2006
Flat Rock, Lewis Cty, NY	n/a	n/a	Great Lakes plain/ADK foothills	158	n/a	184	415	(n/a) 8%	ED&R 2006a
Clayton, Jefferson Cty, NY	37	385	Agricultural plateau	418	83-877	168	475	(150 m) 10%	Woodlot 2005m
Bliss, Wyoming Cty, NY	8	n/a	Agricultural plateau	440	52-1392	n/a	411	(125 m) 13%	Young 2006
Perry, Wyoming Cty, NY	n/a	n/a	Agricultural plateau	64	n/a	180	466	(125 m) 10%	Young 2006
Sheldon, Wyoming Cty, NY	36	347	Agricultural plateau	197	43-529	213	422	(120 m) 3%	Woodlot 2005n
Howard, Steuben Cty, NY	39	405	Agricultural plateau	481	18-1434	185	491	(125 m) 5%	Woodlot 2005o
Fairfield, Herkimer Cty, NY	38	423	Agricultural plateau	691	116-1351	198	516	(125 m) 4%	Woodlot 2005p
Jordanville, Herkimer Cty, NY	38	404	Agricultural plateau	380	26-1019	208	440	(125 m) 6%	Woodlot 2005q
Munnsville, Madison Cty, NY	31	292	Agricultural plateau	732	15-1671	223	644	(118 m) 2%	Woodlot 2005r
Deerfield, Bennington Cty, VT	32	324	Forested ridge	559	3-1736	221	395	(100 m) 13%	Woodlot 2005s
Kibby, Franklin Cty, ME (Mountain)	12	115	Forested ridge	565	109-1107	167	370	(125 m) 16%	Woodlot 2006d
Kibby, Franklin Cty, ME (Range 1)	12	101	Forested ridge	201	12-783	196	352	(125 m) 12%	Woodlot 2006d
Kibby, Franklin Cty, ME (Valley Site)	5	13	Forested valley	452	52-995	193	391	(125 m) 16%	Woodlot 2006d
Mars Hill, Aroostook Cty, ME	18	117	Forested ridge	512	60-1092	228	424	(120 m) 8%	Woodlot 2005t
Spring 2006									
Chateaugay, Franklin Cty, NY	35	300	Agricultural plateau	360	54-892	48	409	(120 m) 18%	Woodlot 2006e
Wethersfield, Wyoming Cty, NY	44	n/a	Agricultural plateau	324	41-907	12	355	(125 m) 19%	Mabee et al. 2006b
Centerville, Allegany Cty, NY	42	n/a	Agricultural plateau	290	25-1140	22	351	(125 m) 16%	Mabee et al. 2006b
Howard, Steuben Cty, NY	42	440	Agricultural plateau	440	35-2270	27	426	(125 m) 13%	Woodlot 2006f
Deerfield, Bennington Cty, VT	26	236	Forested ridge	263	5-934	58	435	(100 m) 11%	Woodlot 2006g
Kibby, Franklin Cty, ME (Mountain)	6	33	Forested ridge	456	88-1500	67	368	(120 m) 14%	Woodlot 2006h
Kibby, Franklin Cty, ME (Range 1)	10	80	Forested ridge	197	6-471	50	412	(120 m) 22%	Woodlot 2006h
Kibby, Franklin Cty, ME (Range 2)	7	57	Forested ridge	512	18-757	86	378	(120 m) 25%	Woodlot 2006h
Kibby, Franklin Cty, ME (Valley Site)	2	14	Forested valley	443	45-1242	61	334	(120 m) n/a	Woodlot 2006h
Mars Hill, Aroostook Cty, ME	15	85	Forested ridge	338	76-674	58	384	(120 m) 14%	Woodlot 2006i
Fall 2006									
Chateaugay, Franklin Cty, NY	35	327	Agricultural plateau	643	38-1373	212	431	(120 m) 8%	Woodlot 2006j
Wethersfield, Wyoming Cty, NY	56	n/a	Agricultural plateau	256	31-701	208	344	(125 m) 11%	Mabee et al. 2006c
Centerville, Allegany Cty, NY	57	n/a	Agricultural plateau	259	12-877	208	350	(125 m) 12%	Mabee et al. 2006c
Lempster, Sullivan Cty, NH	32	290	Forested ridge	620	133-1609	206	387	(125 m) 8%	Woodlot 2007a
Stetson, Penobscot Cty, ME	12	77	Forested ridge	476	131-1192	227	378	(125 m) 13%	Woodlot 2007b

Table 4. Summary of Regional Fall 2007 (September 5 - October 16) Migration Surveys*				
Site Number**	**Location**	**Observation Hours**	**TOTAL**	**BIRDS/ HOUR**
1	**Waggoner's Gap, PA**	395	16028	40.55
2	**Putney Mountain, VT**	252	4982	19.77
3	**Kittatinny Mountain, NJ**	125	1174	9.41
4	**Barre Falls, MA**	148	5239	35.46
5	**Blueberry Hill, MA**	246	6338	25.74
6	**Cadillac Mountain, ME**	173	3149	18.20
7	**Franklin Mountain, NY**	181	2146	11.86
8	**Hawk Mountain, PA**	437	14050	32.17
9	**Pack Monadnock, NH**	284	9879	34.75
10	***Coos County, NH***	67.65	42	0.65
* Data obtained from HMANA website.				
** See map below for site location.				

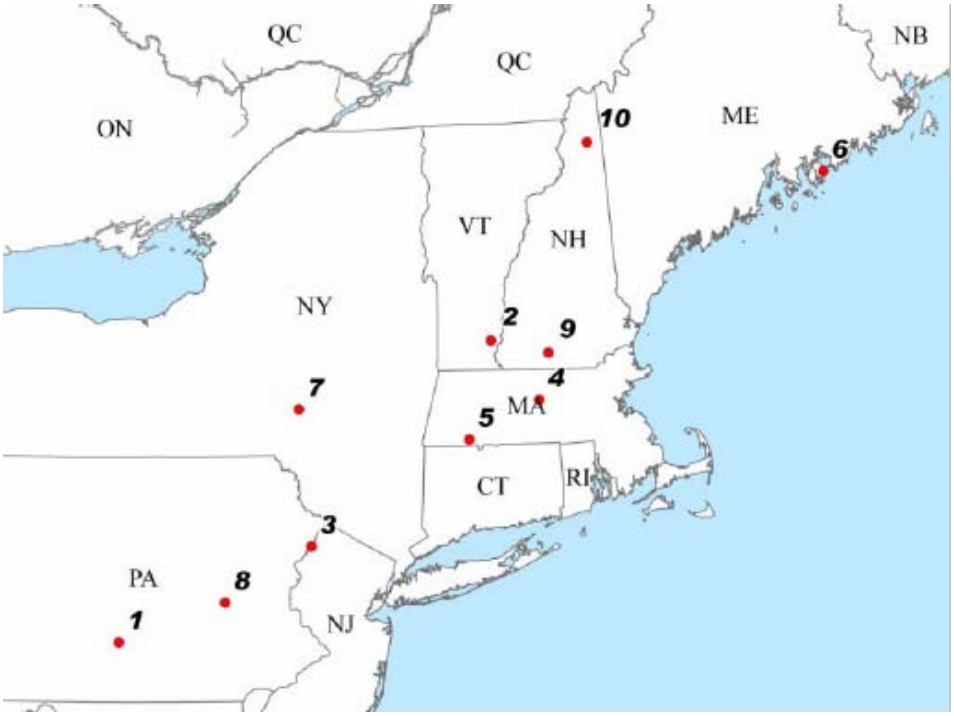

Table 5. Summary of bat detector field survey effort and results

Location	Dates	# Detector-Nights*	# Recorded sequences	Detection Rate **	Maximum # calls recorded ***
Spring 2007					
Owl Head High	4/26-6/1	37	8	0.2	5
Owl Head Low	4/30-6/1	19	5	0.3	2
Trio Pond's High	4/28-6/1	35	8	0.2	3
Trio Pond's Low	4/28-6/1	35	12	0.3	2
Overall Spring Results		***126***	***33***	***0.3***	--
Summer/Fall 2007					
Owl Head High	6/1-8/24, 8/28-9/26, 10/5-10/8, 10/18-10/22	124	50	0.4	10
Owl Head Low	6/1-8/8, 8/29-9/11, 9/24-9/27, 10/4, 10/18-10/22	93	63	0.7	13
Trio Pond's High	6/1-8/2, 8/16, 8/29-9/26, 10/8-10/30	116	80	0.7	7
Trio Pond's Low	6/1-8/28, 9/5-9/26, 10/8-10/30	134	98	0.7	9
Overall Summer/Fall Results		***467***	***291***	***0.6***	--
Overall Year Results		***593***	***324***	***0.6***	

* Detector-night is a sampling unit during which a single detector is deployed overnight. On nights when two detectors are deployed, the sampling effort equals two detector-nights, etc.

** Number of bat passes recorded per detector-night.

*** Maximum number of bat passes recorded from any **single** detector for a 12-hour sampling period.

Table 6. Summary of available bat detector survey results

Project Site	Landscape	Calls Per Detector Night	Citation
Fall 2004			
Prattsburgh, Steuben County, NY	Agricultural plateau	2.22	Woodlot 2005b
Cohocton, Steuben County, NY	Agricultural plateau	2.00	Woodlot 2005b
Sheffield, Caledonia County, VT	Forested ridge	1.76	Woodlot 2006a
Franklin, Pendleton County, WV	Forested ridge	9.24	Woodlot 2005a
Spring 2005			
Churubusco, Clinton County, NY	Great Lakes plain/ADK foothills	0.26	Woodlot 2005d
Clayton, Jefferson County, NY	Agricultural plateau	0.90	Woodlot 2005e
Sheldon, Wyoming County, NY	Agricultural plateau	0.17	Woodlot 2006b
Prattsburgh, Steuben County, NY	Agricultural plateau	0.28	Woodlot 2005f
Cohocton, Steuben County, NY	Agricultural plateau	0.72	Woodlot 2006c
Munnsville, Madison County, NY	Agricultural plateau	0.27	Woodlot 2005g
Jordanville, Herkimer County, NY	Agricultural plateau	0.50	Woodlot 2005i
Sheffield, Caledonia County, VT	Forested ridge	0.17	Woodlot 2006c
Deerfield, Bennington County, VT	Forested ridge	0.07	Woodlot 2005j
Franklin, Pendleton County, WV	Forested ridge	0.50	Woodlot 2005k
Fall 2005			
Churubusco, Clinton County, NY	Great Lakes plain/ADK foothills	5.56	Woodlot 2005l
Clayton, Jefferson County, NY	Agricultural plateau	4.70	Woodlot 2005m
Sheldon, Wyoming County, NY	Agricultural plateau	34.92	Woodlot 2005n
Howard, Steuben County, NY	Agricultural plateau	31.06	Woodlot 2006o
Cohocton, Steuben County, NY	Agricultural plateau	1.57	Woodlot 2006c
Fairfield, Herkimer County, NY	Agricultural plateau	1.70	Woodlot 2005p
Jordanville, Herkimer County, NY	Agricultural plateau	4.79	Woodlot 2005q
Munnsville, Madison County, NY	Agricultural plateau	2.32	Woodlot 2005r
Sheffield, Caledonia County, VT	Forested ridge	1.18	Woodlot 2006a
Deerfield, Bennington County, VT	Forested ridge	0.52	Woodlot 2005s
Redington, Franklin County, ME	Forested ridge	4.20	Woodlot 2005u
Mars Hill, Aroostook County, ME	Forested ridge	0.83	Woodlot 2005t
Spring 2006			
Chateaugay, Franklin County, NY	Agricultural plateau	2.00	Woodlot 2006e
Brandon, Franklin County, NY	Agricultural plateau	13.00	Woodlot 2006e
Wethersfield, Wyoming County, NY	Agricultural plateau	1.50	Woodlot 2006k
Centerville, Allegany County, NY	Agricultural plateau	2.10	Woodlot 2006k
Howard, Steuben County, NY	Agricultural plateau	0.40	Woodlot 2006f
Sheffield, Caledonia County, VT	Forested ridge	7.90	Woodlot 2006a
Deerfield, Bennington County, VT	Forested ridge	0.10	Woodlot 2006g
Kibby, Franklin County, ME	Forested ridge	0.30	Woodlot 2006h
Fall 2006			
Chateaugay, Clinton County, NY	Agricultural plateau	5.10	Woodlot 2006j
Brandon, Franklin County, NY	Agricultural plateau	13.10	Woodlot 2006j
Wethersfield, Wyoming County, NY	Agricultural plateau	0.30	Woodlot 2006l
Centerville, Allegany County, NY	Agricultural plateau	0.06	Woodlot 2006l
Sheffield, Caledonia County, VT	Forested ridge	1.10	Woodlot 2006a
Lempster, Sullivan County, NH	Forested ridge	3.47	Woodlot 2007a
Kibby, Franklin County, ME	Forested ridge	0.20	Woodlot 2006m
Stetson, Penobscot County, ME	Forested ridge	2.60	Woodlot 2007b

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