

**BREEDING BIRD SURVEY II**  
**FOR THE ROARING BROOK WIND POWER PROJECT,**  
**LEWIS COUNTY, NEW YORK**

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Prepared for:

Iberdrola Renewables

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**Breeding Bird Survey II for the Roaring Brook Wind Power Project,**

**Lewis County, New York - 2008.**

**Executive Summary**

To determine the type and number of birds that nest at the Roaring Brook Wind Power Project (hereafter, the "Project") site in Lewis County, New York, a breeding bird study was conducted in June 2008. That study was done as a follow-up to a 2007 breeding bird study at the project. The 2008 study was conducted because the original site plan had been changed in late 2007 to include new areas. The idea for conducting breeding bird studies at the Project was introduced in the avian risk assessment which suggested that there could possibly be suitable habitat on site for New York State endangered, threatened, and, or species of concern, as well as forest interior nesting birds. The Project is located within a New York State Important Bird Area that is designated as an interior forest nesting bird site. Two objectives of the study were: (i) to determine the status of federal or New York State listed species, species of special concern, and forest interior birds that may be nesting on site and if they were present, determine the locations of those nesting areas; and (ii) to identify the approximate numbers of individuals/territories, and distribution of all bird species within the proposed turbine areas.

A total of 39 point counts was established within the Project site, corresponding approximately to proposed turbine locations. The point counts were situated in forests along low ridges that transverse the Project site. The points were generally spaced by at least 250 m. Point counts were conducted on four days (June 19-22, 2008). Two complete surveys were conducted at each point. Each point count location was surveyed daily for 5 minutes during which time birds seen or heard were recorded. Also recorded were the distance and compass direction of each bird from the point count location, as well as whether a bird was heard vocalizing or seen.

A total of 1,666 individuals of 54 species was detected at the 39 point counts. Most of these species are likely to nest within the Project boundary, although a few (Ring-billed Gull, Great Blue Heron, etc.) are not likely to nest on site. The assemblage of species nesting on the Roaring Brook site is a moderately diverse array of species that use forest, forest edge, and brush. Songbirds accounted for 75.9% of species, with few raptors (one Red-tailed Hawk and two Turkey Vultures), four woodpecker species, three water bird species (no waterfowl, two shorebirds), two game bird species, and two other types of species (Yellow-billed and Black-billed Cuckoo).

No Federally-Listed or New York State endangered or threatened species were observed during the study, nor are these species likely to nest at the site. Habitat on site is not suitable for nesting by any of these species. With respect to New York State species of special concern, none were observed on site. However, one Green List species (American Bird Conservancy) and one Yellow Watchlist (National Audubon and American Bird Conservancy) were observed. These species are believed to be declining. The Green List species was Wilson's Snipe, for

which a single individual was observed. This species may nest in the more open wetlands on or adjacent to the site. The Yellow WatchList species was Wood Thrush, which was observed 21 times at 17 point counts. Both of these species are believed to be declining, although their populations are in the millions in North America. Wilson's Snipe is legally hunted in New York State.

Ten species accounted for 54.1% of all species observed with five (Red-eyed Vireo, White-throated Sparrow, Mourning Warbler, Dark-eyed Junco, and Veery) accounting for 32.4% of all species. These birds are songbirds that nest mostly in brush and forest edge. Several species of forest interior nesting birds were observed, strongly suggesting the basic forest interior community is still somewhat intact, despite heavy logging and road building on site. The presence of forest edge and brush, including Brown-headed Cowbird, American Goldfinch, American Robin, Gray Catbird, Common Grackle, Common Yellowthroat, Chestnut-sided Warbler, Red-winged Blackbird, Song Sparrow and some other edge species, demonstrate that the forest has been fragmented significantly. However, the abundances of these species are relatively small in relation to overall species composition on site. These patterns demonstrate that fragmentation, though it is occurring, has not eliminated the overall forest character of the site.

The results of the 2008 study are nearly identical to those from the 2007 study with respect to number (55 species in 2007; 54 species in 2008) and type of species. In addition, the most abundant species in 2008 included most of those that were most abundant in 2007. This strongly suggests that the change in site plan to include new areas has not resulted in a change in the avian community. Similarly, the site plan change does not result in a change in risk to birds at the Project.

No impacts to New York or Federally-Listed endangered, threatened, or species of concern are anticipated. Biologically significant collision fatalities of nesting birds at the Roaring Brook project are not likely. Some habitat will be fragmented and this will have some impact to forest interior nesting birds. This impact is a result of clearing forest for turbines. However, current logging and other land-use practices on site will continue to fragment the forest and potentially change the composition of species nesting on site. These existing activities may reduce the suitability of the site for interior forest nesting birds. Disturbance and displacement from project operations, turbines, and roads may result in impacts to some nesting species although the extent of these impacts is not entirely understood. Some species, especially forest edge and farmland nesting birds are likely to benefit and they should habituate. Impacts to forest interior nesting species cannot be predicted accurately because the ultimate disposition and management of the forests on site is not known at this time. Some impacts from clearing turbine sites and roads, as well as the presence of turbines are likely, although some species will habituate to the latter impact.

Based on the findings of the breeding bird study and impacts known from other wind power project sites, the following recommendations are made.

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- To reduce habitat disturbance and impacts, disturbed areas and habitat surrounding the turbines, meteorology towers, roads, and other infrastructure should be restored following construction.
- Forest management objectives that permit and enhance forest regeneration around the turbines and elsewhere on site should be implemented. These measures would result in forest management that would focus on long term benefits to forest interior nesting bird species and minimizing forest fragmentation. Such measures would also incorporate sustainable timber harvest management techniques.

## Introduction

Wind power is expanding rapidly in the United States, including upstate New York. Although wind power has generally proven to be a clean and renewable electricity source in North America and Europe, impacts to birds have been noted. These impacts largely have not been biologically significant. That is, the impacts have not caused declines in regional or global populations of bird species. Because large numbers of raptor fatalities have been reported from sites such as the 5,400 turbine Altamont Wind Resource Area in California and large numbers of night migrating songbirds have been killed at tall, guyed communication towers, some environmental organizations, animal rights groups, and wildlife agencies now ask that extensive research be conducted at wind plants prior to construction in an attempt to estimate the magnitude and types of birds that may be impacted at prospective wind plants.

Post-construction studies conducted in the United States at wind turbines have focused mostly on fatalities caused by birds colliding with wind turbines. In Europe the focus has been slightly different. Although fatality studies are done, more emphasis is placed on determining the degree of disturbance and displacement of birds that nest, forage, or otherwise use a particular site. Of the habitat disturbance and displacement studies conducted at wind plants in the United States, most have assessed the impacts of wind power development on grassland birds after projects have been developed, including birds that nest in farm fields, grazing land, and other open habitats (reviewed in Kerlinger 2007). Few studies have addressed displacement and disturbance impacts of wind turbines on forest nesting species.

To determine the magnitude and significance of potential impacts to birds at the proposed Roaring Brook Wind Power Project (hereafter the "Project") in Lewis County, New York, a Phase I Avian Risk Assessment was conducted in 2007 (Kerlinger and Guarnaccia 2007). That risk assessment suggested collision impacts to birds would not likely be biologically significant, although Kerlinger and Guarnaccia suggested a nesting bird study be conducted to determine the species and numbers of birds present at the Project site. Likewise, the New York State Department of Environmental Conservation frequently recommends nesting bird studies for wind power projects. The rationale for the nesting bird study was mostly to inventory the forest, forest edge, and farmland/grassland nesting species that are present within the Project boundary during the nesting season, including those that are listed by New York State as endangered or threatened or species of special concern, as well as other rare species.

A nesting bird study was conducted at the Project site during June 2007 (Kerlinger 2007). The results of that study provided a comprehensive list and other details about the nesting species at the Project site. In addition, the numbers and location of listed species, species of concern, and American Bird Conservancy (ABC) Green List species were provided.

In late 2007 and early 2008, the locations of ten of the original 39 turbines slated for Roaring Brook were changed. Whereas 10 turbines from the original design are no longer being proposed, ten new turbine locations are proposed for areas adjacent to the original study area. Although those areas were covered by the Phase I Avian Risk Assessment, the 2007 breeding

bird study did not specifically address nesting birds at these ten new turbine locations. Therefore, a second year of preconstruction breeding bird study was conducted in June 2008. The new study examined the 39 turbine locations that are now planned for the Project. The methods used for 2008 were identical to those used in 2007.

The results of the two years of nesting bird study, particularly those found in the second year, may serve to determine which species may be impacted by the Project and could serve as baseline data to determine whether nesting species are displaced after construction of the facility. Thus, the information can be used to better assess risk at the Roaring Brook site and to evaluate impacts following construction of turbines.

Objectives of the present study are as follows:

- Determine the presence of federal or New York State endangered or threatened species and New York State species of concern that nest on site; Audubon WatchList species; and ABC Green List species.
- Collect data on abundance and location of common and rare nesting birds at the site for determining the degree and magnitude of disturbance impacts, if any that result from construction of the Project.

## Methods

To provide quantitative information on the species of birds that nest within and immediately adjacent to the Project site (Figure 1) point count locations were established to sample nesting birds (Figure 2). The locations of the sampling points/point counts correspond to the approximate locations where turbines would likely be located. The habitat at most point counts is forested or forest edge, although there are dirt roads that have been constructed throughout the project area. Forests are mostly secondary deciduous, although there are some small patches of conifers (Kerlinger and Guarnaccia 2007).

A total of 39 point count locations were established on the site. The point turbine arrays were in “strings” extending roughly from northwest to southeast including two to 10 turbines. Point count locations were spaced so that none were within about 250 m of each other (Table 1, Figure 1 and 2). Most species could easily be heard at distances out to 150 m or more, so this study includes corridors along turbine rows that are about 300 m in width and about 300 or more m longer than the turbine row (150 m on each end of a row). The point counts are generally distributed throughout the site (Figure 2).

The order in which the point counts were conducted was changed from day to day to reduce the potential for biasing the data set with respect to time of day sampling was done. In some places, point counts were along or near dirt roads, similar to the U.S.G.S. Breeding Bird

Survey protocol, whereas in others, the observer (Dave Tetlow<sup>1</sup>) walked for hundreds of meters to the point count locations. The same observer conducted both the 2007 and 2008 surveys.

Point count survey research was conducted on four days (June 19-22, 2008) during the peak nesting season for birds in this portion of New York State (Andrle and Carroll 1988). After the point counts were conducted on each day and while driving and walking between point count locations, searches were undertaken for rare, threatened and endangered birds. Thus, additional hours were spent on these dates in an effort to find New York State listed species and species of special concern. All 39 point counts were surveyed two times. Each survey required observations on two consecutive mornings.

The point count surveys and observations commenced at dawn, when there was enough light to see birds and after they commenced singing. The earliest observations were made at 05:00 hours EDT (Eastern Daylight Time; 04:00 Eastern Standard Time) and the latest observations were made at slightly after noon. (EDT). Observations that were conducted after 1100 hours EDT, were done only when weather was cool and, or overcast and rainy. No observations were done at midday under clear and hot conditions when birds are less likely to sing. The latest observations were ended was 1223 EDT (1123 EST). Observations were made on the four dates listed above were done in weather that was conducive to observing and hearing birds (Table 2; no heavy rain or strong wind). A total of 5 minutes was spent at each point count location on each of the two rounds of surveys. During that time the observer listened and looked for birds. This amount of time is two minutes longer (66%) than called for by the protocols used by the U.S.G.S. Breeding Bird Survey. Additional time was taken to record data on some occasions at point count locations.

While walking or driving from point count to point count location, an effort was made to detect endangered, threatened, and species of special concern. In addition to information regarding species identification, the direction (eight cardinal compass directions) and distance (in m) of each bird observed (heard or seen) was recorded. Additional notes were made, if interesting behaviors or other information was observed. Data were recorded on the data sheet provided in Appendix I.

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<sup>1</sup> The field technician, Dave Tetlow, is an experienced field technician who has for more than two decades observed and listened to forest and grassland birds in the United States, especially upstate New York. He is very knowledgeable regarding the songs and plumages of species that are likely to be encountered in fields and forests at Roaring Brook. Tetlow has been an atlaser and block buster on both the New York and Pennsylvania breeding bird atlas projects. The former was for the NYS DEC, the latter for the Pennsylvania Game Commission. Tetlow conducted the 2007 field research at Roaring Brook.

## Results and Discussion

A moderately diverse assemblage of mostly forest species was found during the point counts during the June 2008 nesting bird surveys at the Project site (Tables 3). A total of 1,666 individuals of 54 species were observed. It is likely that all but a very few of these species nest on or immediately adjacent to the Project site. Three species that probably do not nest on site include Eastern Kingbird and Killdeer, which are grassland nesters, and Great Blue Heron, which is a colonial nester and a colony would likely have been observed. A small number of other species may also nest within or immediately adjacent to the proposed turbine area, but were not detected during the point count surveys.

Species composition was dominated by songbirds (41 species, 75.9%), which accounted for approximately three-quarters (42 of the 54; 77.8%) species observed. Of these species there were 11 species of warblers, two vireos, three thrushes, two sparrows, four flycatchers, and assorted other songbird species. There also were 2 species of raptors (Red-tailed Hawk and Turkey Vulture), four woodpecker species, two game bird species, three water bird (one gull and two shorebird) species (no ducks or geese), and two other species (Black-billed and Yellow-billed Cuckoo; Table 3).

Five of the 54 species observed at point count locations (Table 4) accounted for 540 of 1,666 (32.4%) individuals observed and another five species (Table 4) accounted for an additional 21.7% (361 individuals). Together the ten most common species (10 of 54; 18.5%) accounted for 54.1% (901 individuals) of all birds observed on point counts.

Of the ten most often observed species, all can be characterized as being forest or forest-edge nesting birds. Some, such as American Robin and some others, often nest at forest edges or in early second growth/brushy forest. For the most part, the birds observed are suggestive of a heavily forested site and a site that has been fragmented to varying degrees. Species suggestive of fragmentation or a forest in which there are brushy openings, cutovers, and even small open fields include American Robin, American Goldfinch, Brown-headed Cowbird, Common Grackle, Common Yellowthroat, Chestnut-sided Warbler, Red-winged Blackbird, Swamp Sparrow, Northern Flicker, Tree Swallow, and Wild Turkey.

It is important to note that the presence of some forest edge and brush species, along with water birds is a result of wetland areas that lie between the ridges on which turbines would be constructed. These wetlands are often beaver flows that include brushy edges, very small areas of open water (beaver ponds and streams), and areas of emergent vegetation. The Ring-billed Gulls do not nest on site, but may have been foraging in a nearby pond or wetland. Species such as Swamp Sparrow, Wilson's Snipe, Great Blue Heron, and some others likely nest and, or forage in these wet, less wooded areas, or similar sites farther from the turbine arrays. Thus, these naturally occurring open areas, along with the forestry practices being used on the Project site, both contribute to potential fragmentation of the larger forests in this area.

With respect to forest interior nesting species, several were found on site. These include Black-and-white Warbler, Black-throated Blue Warbler, Black-throated Green Warbler, Least Flycatcher, Ovenbird, Rose-breasted Grosbeak, Scarlet Tanager, Veery, Winter Wren, Wood



Thrush, and some others. These species are particularly susceptible to impacts from forest fragmentation. Many were relatively common and generally distributed throughout the site.

Another sign that the forests on site are still viable and not significantly fragmented is obvious from the numbers of edge and farm field species observed vs. the numbers of forest nesting birds. For example, species such as American Goldfinch, Brown-headed Cowbird, Common Grackle, Red-winged Blackbird, Gray Catbird, Tree Swallow, Swamp Sparrow, and some others each accounted for less than or equal to only about 1-2% of the overall total of birds observed. They were also seen at few sites, instead of spread widely throughout the study area. This may be a function of the forestry practices during the past decade. Because small trees have grown rapidly after cutting, fragmentation has not had a chance to decimate the forest nesting bird community. There are also more mature forests on adjacent properties from which forest interior nesting birds may be attempting to colonize the Project site, despite the lesser quality forest on much of the site.

There were no Federally-Listed or New York State endangered or threatened species observed during the study. With respect to New York State species of special concern, none were observed at any of the point count locations. However, Wilson's Snipe, a species that is on the ABC Green List was seen (Table 5) on one occasion. This species may nest in the smaller wetlands near turbines. According to the American Bird Conservancy (ABC), this species is moderately abundant with declines in the population or high threats to its population. It is ironic that the New York State Department of Environmental Conservation allows this species to be hunted legally. The North American population of this species hovers at about 2 million individuals (Donaldson et al. 2000). Also called Common Snipe, the daily bag limit per hunter in New York State is eight birds, while the possession limit is 16 birds. Apparently, harvests of this magnitude are not considered biologically significant, even though thousands of these birds are shot in the eastern United States annually.

Wood Thrush, an Audubon WatchList species was observed at several point counts. Categorized as a Yellow WatchList species, Wood Thrushes are declining, although they apparently have a North American population that numbers on the order of about 14 million birds in North America (Rich et al. 2004).

#### Comparison of 2007 and 2008 Breeding Bird Study Results

There were only minimal differences between the results of the 2007 and 2008 breeding bird studies. For example, the overall numbers of individuals observed in 2008 differed by about 95 individuals or about 5-6%. The numbers of species differed by only a single bird. The species composition was also quite similar with 7 species being among the ten most abundant species in both years. In 2007 Chestnut-sided Warbler, American Redstart, and Northern Flicker were among the ten most abundant species, but were replaced by American Robin, Black-throated Green Warbler, and Scarlet Tanager in 2008. There were some differences in the overall list of species and abundance of those species, although the differences were minor. In other words, the avian community at the 39 point count locations observed in 2008 was very similar in composition and abundance as was found in 2007.

## **Assessment of Impacts to Nesting Birds**

Because the findings of the 2008 study were very similar to or identical to findings from 2007, conclusions regarding risk are virtually the same. Assessment of risk based on the 2008, and to a lesser degree 2007 breeding bird study findings are presented below.

### Risk of Mortality or Injury Due to Collisions

Collisions with turbines involving the species that nest in the forest and forest edge, like those observed at the Project site, are likely to be minimal. Fatalities at wind power facilities rarely involve forest or edge nesting species during the nesting season (Erickson et al. 2001, Kerns and Kerlinger 2003, Kerlinger 2001, 2002a, Kerlinger 2002b; Jain et al. 2007, 2008, Nicholson 2002, Fiedler et. al 2007). Most of the species that nest in forest, forest edge, and brush at the Project site rarely fly above the treetops during the nesting season. These species would, therefore, not likely be at rotor height (approximately 125-400 feet [~40-122m] above the ground). Most of these species spend their time below or only a few feet above the forest canopy during the nesting season. The time these birds may fly above the treetops at rotor swept height is during dispersal in later summer and during migration.

There are some exceptions. Small numbers of Turkey Vultures were killed at the Mountaineer site during the first year of operations (Kerns and Kerlinger 2004), and they have been killed in small numbers at other wind power sites. The Mountaineer site is located on a mountain ridge in West Virginia. Other species that are more aerial during the nesting season include Tree Swallows and Red-tailed Hawk, which occurred in very low numbers at the Project site. At other wind power sites, swallows are common, but few have been killed. Only a single Red-tailed Hawk was observed, so it is unlikely that many of these birds nest at the Project site. Furthermore, the habitat on site is not terribly suitable for foraging by Red-tailed Hawks.

With respect to virtually all warblers, thrushes, vireos, wrens, and most other forest nesting songbirds, as well as cuckoos and game birds, risk is likely to be minimal and certainly not biologically significant. At the nearby Maple Ridge wind power project, mortality during the nesting season has been minimal. It is important to mention that site because it is adjacent to the Project site and many of the same species nest in the smaller forests near those wind turbines. Thus, collision risk during the nesting season to forest nesting and other species nesting at the Roaring Brook site is likely to be minimal.

### Risk of Habitat Disturbance and Displacement of Nesting Birds

Studies conducted at other wind power sites have demonstrated that species from different habitats appear to react in different ways to the presence of tall structures, including wind turbines. Grassland and open country birds in particular have been reported to be disturbed and displaced to varying degrees by wind turbines. A study of several nesting songbird species in Minnesota, on Conservation Reserve Program grasslands showed that some species avoided the area within 100 or more meters of turbines (Leddy et al. 1999). In Wyoming, Mountain Plovers would generally not nest within 200 m of turbines (Johnson et al. 2000). At the Ponnequin Wind Energy Facility in Colorado, Horned Larks foraged directly beneath turbines

and that species, along with Western Meadowlarks foraged near the bases of turbines in the Altamont of California. Some grassland birds in the Altamont Pass Wind Resource Area also perched on lattice turbine towers (Curry & Kerlinger, LLC observations) strongly suggesting these birds were not greatly disturbed by these structures. However, at the adjacent Maple Ridge project, grassland nesting birds did not seem to be displaced to a great degree and, if displacement actually occurred, it would only have been on the order of 50-100 m from each turbine (Kerlinger and Dowdell 2008).

Forest nesting birds have not been studied well in North America. A short-term study at the Searsburg, Vermont site many miles to the east of the Roaring Brook site attempted to examine displacement and disturbance impacts. At that mixed, mountaintop conifer-hardwood forest site, disturbance from habitat modification and turbine presence was found to be minimal, although a few species were reported to avoid the clearings where the turbines were located. One year after construction Blackpolls, White-throated Sparrows, Dark-eyed Juncos and some other species sang at short distances from turbines, at the edges of the turbine clearings. However, a few other species, most notably Swainson's Thrush, appeared to retreat deeper into the forest, away from the turbine areas. Whether they moved away from the clearing or the turbine is not known. This confounding variable cannot be controlled for in post construction studies. The Searsburg site was not studied long enough or intensely enough to provide clear answers to the question of displacement, although the fact that several species occupied the forest within 20-30 m of the turbines during the post construction surveys strongly suggests that some species do habituate rapidly to the presence of wind turbines and clearings in the forest.

In a follow-up study in 2003, 6 years after construction at the Searsburg site, Kerlinger and Dowdell (2003) found that the same species were still present close to the turbine sites. These included Blackpoll, White-throated Sparrow, Dark-eyed Junco, Magnolia Warbler, and others. Swainson's Thrush, which was found to retreat in the year after construction, was found singing within 40 m of an operating turbine. These birds are typical of many upstate forests (Andrle and Carroll 1988, Levine 1988) and some are found on the Project site. It appears that most species nesting in this type of forest are not displaced to any great degree and habituate to turbines. This suggests that forest restoration, like that done at Searsburg would minimize the potential for fragmentation impacts as well as displacement impacts.

A long-term study at that site or other forested wind power sites would provide insight as to degree of displacement and speed of habituation of these species. Such a study would also provide insight as to which species habituate and which are displaced permanently, if any. Because forest nesting birds have a canopy over their heads, it is conceivable that tall structures like wind turbines do not cause undue adverse disturbance and do not displace birds great distances. It is also obvious that habituation, at least to some extent, does occur.

The Searsburg site also did not demonstrate major fragmentation impacts (Kerlinger 2002, Kerlinger and Dowdell 2003) including invasion/colonization by Brown-headed Cowbirds and American Crows. However, some edge species, which are indicators of fragmentation, were more numerous in the year after the forest was partially cleared for turbines and roads. In the follow-up study in 2003, there did not appear to be an increase in edge species and species that colonize fragmented forests. At Searsburg, a condition of the original permits was to have a

forest management plan in which the forest was permitted and encouraged to regrow, thereby reducing potential fragmentation impacts to forest nesting birds.

The construction of turbines at the Roaring Brook site is likely to disturb and displace some interior forest and other nesting species, especially if it occurs during the nesting season. During the actual construction process, during which earth is moved and heavy equipment is present, along with large numbers of workers, birds are likely to be displaced from territories within about 100 meters of construction activity. This disturbance will vary by species, but should be limited mostly to the period of construction that lasts a few months. The degree of disturbance will also be lessened if infrastructure is constructed in the latter part or after the nesting season. These impacts will probably be ephemeral in that after construction equipment and workers leave the site, and habitats are encouraged to regrow, the birds that may be displaced by construction activity are likely to return to some or most of the areas previously inhabited during the nesting season.

Clearing for roads and turbines and the presence of tall turbines after actual construction will likely cause some disturbance to and displacement of nesting birds. Forest nesting birds and birds of forest edge are not likely to be disturbed to the degree that open country, grassland nesters have been shown to be disturbed at some sites. The reason for minimal impacts is detailed above. In situations in the Midwest, grassland species do not appear to respond favorably, at least in the short term, to tall structures that break the skyline (Leddy et al. 1999). In Europe, waterfowl feeding in open fields have experienced displacements up to 50-100 m from turbines (Larsen and Madsen 2000). As was stated previously, the degree of impact is likely to vary among species with some ignoring turbines and others leaving the area within a few hundred meters of turbines. However, habituation may occur over the course of several years, but the rate and degree of habituation if it occurs is unknown.

The key to preserving the forest bird community of the Project site in the long-term is related to the future health of the vegetative components of the forests at Roaring Brook. Without some sort of long-term forest management objectives, the forest interior and other forest community bird species will not be maintained at Roaring Brook whether turbines are constructed or not.

**Note.** The long-term viability of interior forest nesting bird populations in New York State, including the Project is in jeopardy. Large, mature contiguous forests that are suitable for interior forest nesting birds are currently being eroded as these habitats are replaced by housing, camps, roads, and non-sustainable forestry practices. The Project could provide a vehicle for preserving or maintaining a large, privately owned forest in the long term, thereby insuring that the ultimate disposition of these lands benefits threatened wildlife.

## **Recommendations**

The following recommendations are made to reduce disturbance to and displacement of grassland nesting species resulting from wind turbine construction at the Roaring Brook site.

- To reduce habitat disturbance and impacts, disturbed areas and habitat surrounding the turbines, meteorology towers, roads, and other infrastructure should be restored following construction.
- Forest management objectives that permit and enhance forest regeneration around the turbines and elsewhere on site should be implemented. These measures would result in forest management that would focus on long term benefits to forest interior nesting bird species and minimizing forest fragmentation. Such measures would also incorporate sustainable timber harvest management techniques.

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**Table 1.** GPS locations (UTM83\_X and Y) for point counts at the Roaring Brook Wind Power Project, Lewis County, New York.

<b>Turbine, String and Point Count Numbers</b>	<b>UTM83_X</b>	<b>UTM83_Y</b>
1	449112	4842586
2	449337	4842353
3	449552	4842045
3A	449496	4841919
4	449818	4741711
5	450070	4841444
6	450321	4841162
7	450576	4840913
8	450935	4840651
9	451100	4840151
10	451758	4840494
10A	451749	4840455
11	448778	4841323
12A	449074	4841058
13	449382	4840737
14	449728	4840252
15	450013	4839899
16	450446	4839706
17A	450924	4839430
18	451316	4839165
19	451559	4838743
20	451807	4838228
21	452307	4838744
22	452484	4838459
23	452659	4838250
24A	453239	4838795
25	448993	4840092
26	449263	4839632
27	449202	4838795
28	449411	4838481
29	449571	4838141
30	449693	4837855
31	449808	4837568
32	449930	4837270
33	450694	4837470
34	450852	4837239
35	450982	4836942
36	451106	4836668
37	451109	4838072
38	451241	4837826
39	451370	4837585



## Roaring Brook Wind Breeding Birds - 2008

**Table 2.** Summary of dates, times, and weather conditions (temperature, wind direction and speed, and percent cloud cover) for the 2008 breeding bird point counts conducted at Roaring Brook, New York. Weather conditions are temperature in degrees Celsius, wind speed (kilometers per hour), and precipitation (if it occurred).

<b>Date</b>	<b>Time Start-End (EST)</b>	<b>Weather Conditions</b>
June 19, 2008	0500-1103	11-12° C; 14-16 kph; light rain - mist
June 20, 2008	0500-1215	12-14° C; 3-10 kph; light rain - no rain
June 21, 2008	0500-1105	12-20° C; 6-10 kph; no precipitation
June 22, 2008	0500-1223	15-19° C; 6-8 kph; light rain – no rain

Roaring Brook Wind Breeding Birds - 2008

**Table 3.** List of species observed at the Roaring Brook Wind Power Project site, Lewis County, New York, during breeding bird study on four days in June 2008.

Species	6/19/2008	6/20/2008	6/21/2008	6/22/2008	Total Individuals/ Percentage	Total Point Counts/ Percentage
American Crow	4	13	14	9	40 / 2.4%	24 / 61.5%
American Goldfinch	2	2	9	3	16 / 1.0%	9 / 23.1%
American Redstart	13	7	13	11	44 / 2.6%	32 / 82.1%
American Robin	21	12	15	20	68 / 4.1%	34 / 87.2%
Black-billed Cuckoo	0	0	1	0	1 / 0.0%	1 / 2.6%
Black-capped Chickadee	13	11	8	13	45 / 2.7%	24 / 61.5%
Brown-headed Cowbird	1	0	0	0	1 / 0.1%	1 / 2.6%
Blue-headed Vireo	2	3	3	3	11 / 0.7%	8 / 20.5%
Blue Jay	6	9	15	8	38 / 2.3%	23 / 59.0%
Black-throated Blue Warbler	4	8	3	9	24 / 1.4%	19 / 48.7%
Black-throated Green Warbler	17	15	17	20	69 / 4.1%	39 / 100.0%
Black and White Warbler	3	8	7	11	29 / 1.8%	24 / 61.5%
Cedar Waxwing	5	8	14	10	37 / 2.2%	16 / 48.7%
Common Grackle	9	3	9	10	31 / 1.9%	13 / 33.3%
Common Raven	0	3	1	1	5 / 0.3%	3 / 7.7%
Common Yellowthroat	13	13	18	12	56 / 3.4%	35 / 89.7%
Chestnut-sided Warbler	3	5	2	3	13 / 0.8%	10 / 25.6%
Dark-eyed Junco	27	22	19	18	86 / 5.2%	36 / 92.3%
Downy Woodpecker	5	4	1	5	15 / 0.9%	10 / 25.6%
Eastern Kingbird	1	0	1	0	2 / 0.0%	2 / 5.1%
Eastern Towhee	2	4	4	1	11 / 0.7%	10 / 25.6%
Eastern Wood-Pewee	0	3	3	3	9 / 0.5%	9 / 23.1%
Great Blue Heron	2	2	1	2	7 / 0.4%	7 / 17.9%
Great-crested Flycatcher	1	10	6	7	24 / 1.4%	21 / 53.8%
Gray Catbird	2	0	2	1	5 / 0.3%	5 / 12.8%
House Wren	5	8	7	6	26 / 1.6%	21 / 53.8%
Killdeer	0	0	1	1	2 / 0.1%	2 / 5.1%
Least Flycatcher	2	6	6	6	20 / 1.2%	17 / 43.6%
Magnolia Warbler	4	2	1	3	10 / 0.6%	9 / 23.1%
Mourning Warbler	25	22	26	20	93 / 5.6%	38 / 97.4%
Northern Flicker	1	18	14	20	53 / 3.2%	30 / 76.9%
Ovenbird	24	22	20	12	78 / 4.7%	35 / 89.7%
Pileated Woodpecker	7	2	3	3	15 / 1.0%	14 / 35.9%
Purple Finch	14	11	13	11	49 / 2.9%	33 / 84.6%
Rose-breasted Grosbeak	6	4	6	0	16 / 1.0%	11 / 28.2%
Red-eyed Vireo	36	37	36	33	142 / 8.5%	39 / 100.0%
Red-tailed Hawk	0	0	0	1	1 / 0.0%	1 / 2.6%

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Species	6/19/2008	6/20/2008	6/21/2008	6/22/2008	Total Individuals/ Percentage	Total Point Counts/ Percentage
Red-winged Blackbird	4	0	10	5	19 / 1.1%	9 / 23.1%
Ring-billed Gull	0	0	4	0	4 / 0.2%	2 / 5.1%
Ruffed Grouse	1	0	0	0	1 / 0.1%	1 / 2.6%
Scarlet Tanager	15	17	20	14	66 / 4.0%	37 / 94.9%
Swamp Sparrow	3	2	0	2	7 / 0.4%	7 / 17.9%
Tree Swallow	8	3	7	2	20 / 1.2%	7 / 17.9%
Turkey Vulture	0	0	1	2	3 / 0.2%	2 / 5.1%
Veery	25	15	19	21	80 / 4.8%	38 / 97.4%
Wilson's Snipe	1	0	0	0	1 / 0.1%	1 / 2.6%
Wild Turkey	4	2	2	2	10 / 0.6%	8 / 20.5%
Winter Wren	6	5	3	4	18 / 1.1%	13 / 33.3%
Wood Thrush	6	5	4	6	21 / 1.3%	17 / 43.6%
White-throated Sparrow	40	29	33	37	139 / 8.3%	38 / 97.4%
Yellow-bellied Sapsucker	10	15	14	11	80 / 4.8%	33 / 84.6%
Yellow-billed Cuckoo	1	1	0	0	2 / 0.1%	2 / 5.1%
Yellow Warbler	5	6	3	2	16 / 1.0%	11 / 28.2%
Yellow-rumped Warbler	0	7	1	8	16 / 1.0%	11 / 28.2%
<b>Total</b>	<b>410</b>	<b>404</b>	<b>440</b>	<b>412</b>	<b>1666</b>	

**Table 4.** Ten most common species observed during the 2008 breeding bird study at the Roaring Brook Wind Power Project, Lewis County, New York. Species are ranked in descending order of abundance.

Species	Number Observed	Percentage of Total Birds Observed
1-Red-eyed Vireo	142	8.5%
2-White-throated Sparrow	139	8.3%
3-Mourning Warbler	93	5.6%
4-Dark-eyed Junco	86	5.2%
5-Veery	80	4.8%
<i>Subtotal</i>	<i>540</i>	<i>32.4%</i>
6-Yellow-bellied Sapsucker	80	4.8%
7-Ovenbird	78	4.7%
8-Black-throated Green Warbler	69	4.1%
9-American Robin	68	4.1%
10-Scarlet Tanager	66	4.0%
<i>Subtotal</i>	<i>361</i>	<i>21.7%</i>
<b>Total</b>	<b>901</b>	<b>54.1%</b>

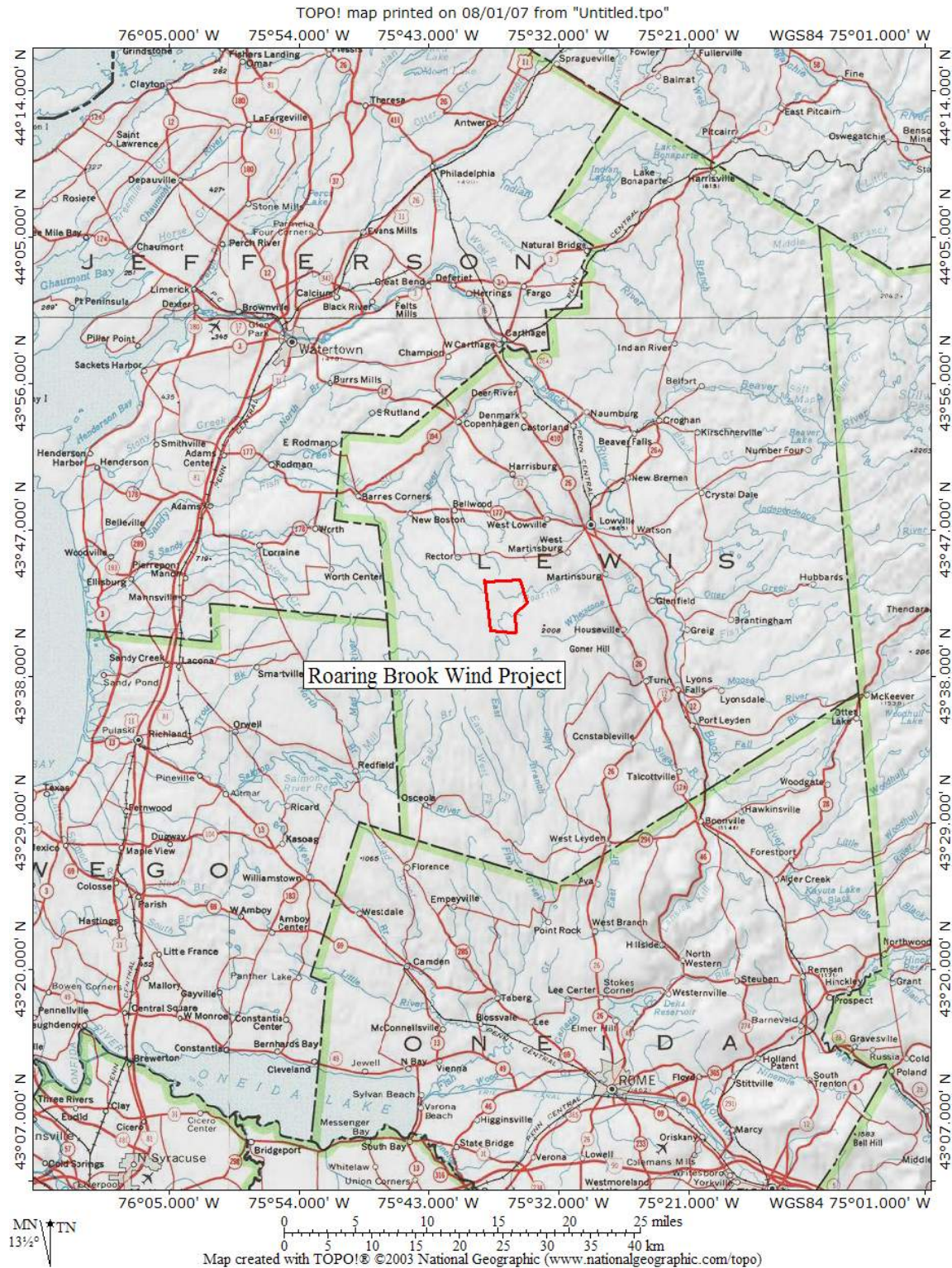
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**Table 5.** List of endangered, threatened, special concern, and American Bird Conservancy Green Listed Species observed during June 2008 breeding bird study at the Roaring Brook Wind Power Project site, Lewis County, New York. NYS-T = New York State Threatened; MADT = American Bird Conservancy Green List – Moderately Abundant with Declines or High Threats, RDLP = Restricted Distribution and Low Population. Population data from Canadian Shorebird Conservation Plan, Donaldson et al. 2000; U. S. Shorebird Conservation Plan 2001; and Rich et al. 2004.

<b>Species</b>	<b>Status</b>	<b>Number Seen/ # Point Counts</b>	<b>North American Population</b>
Wilson’s Snipe	Green List - MADT	1 / 1	2 million*
Wood Thrush	GL - MADT	21 / 17	14 million

\*New York State Hunting Harvest Limit is 8 per person per day, 16 in possession per person.

Figure 1. Location of the Roaring Brook Wind Power Project, Lewis County, New York.



**Figure 2.** Map showing breeding bird study area and the Roaring Brook Wind Power Project boundary, Lewis County, New York. Locations of point counts were on higher topography (see gps coordinates in Table 1 for location of point counts).

