

**PHASE I AVIAN RISK ASSESSMENT FOR THE
FLAT ROCK WIND POWER PROJECT,
LEWIS COUNTY, NEW YORK**

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Executive Summary

The Flat Rock Wind Power Project, totaling about 99± megawatts involving about 66 turbines (tubular tower height to be about ~262 feet [80 m], rotor length ~116 feet [35.25 m]) has been proposed for a site west of West Lowville, Lewis County, NY (about 1,600-1,950 feet [492-600 m] ASL). Towers will be lighted according to FAA recommendations.

Turbines and construction will be almost entirely in farmland (dairy grazing, corn, and hay), with some activity in small woodlots. Habitat surrounding the project site consists of farms, small patches of early to mid-succession deciduous woodlots, and low density residential. Extensive forest does not occur within a mile of where turbines will be erected. Small, isolated wetlands occur in several places within the project footprint and wetlands will be crossed in places. Small wetlands will be crossed in places. The site cannot be considered sensitive or rare habitat, nor is such habitat located within the project area or immediately adjacent to the project.

This report details a Phase I Avian Risk Assessment for wind power development. It includes a literature review, interviews with local and regional experts (agency staff, environmental organizations, and local birders), and site visits by an avian expert on July 22 and 23, 2000. Together, these sources of information provide an indication of the type and number of birds that are known or suspected to use a project site and the area surrounding that site. This information is then used to determine the degree of risk to birds, if any, from wind power development at a particular site. In addition, the concerns of regulators and environmental organizations are determined and incorporated into the risk assessment. Notes on rare, threatened, and endangered bats are included as an appendix to this report.

Nothing in the literature or from interviews with experts suggested that the site is an important nesting or foraging area for federally threatened or endangered birds, or birds proposed for listing (letter from U. S. Fish & Wildlife Service). A letter from the New York Natural Heritage Program (New York State Department of Environmental Conservation) reported that two listed species (Loggerhead Shrike – NYS endangered [record from 1888] and Clay-colored Sparrow – NYS “Protected” [record from 1985]) from the southeastern corner of the project site. Those species were not found during the site visit and the area they might occupy is actually not within the area where turbines will be placed. Several Northern Harriers, a NYS threatened species, were observed during the site visits and some locations within the project area looked suitable for nesting of this species. There are no known hawk migration pathways or lookouts on or within many miles of the project site. Songbirds and other species are likely to migrate over the project site, mostly at altitudes well above the turbines. The site is not known to be a significant wintering site for birds, so relatively few birds are likely to use the site between mid-November and mid-March. In addition, there was no evidence that the project site or lands

adjacent to the site would attract significant concentrations of migrating or wintering waterfowl, shorebirds, songbirds, hawks, or other species. Site visits revealed no evidence of federally endangered or threatened species or state endangered species presence or use of the site and the habitat did not appear to be suitable for such endangered species.

A review of the available literature, site visits, and interviews with agency and environmental organization staff, as well as bird experts in the area revealed that the proposed project site is home to common nesting species, with the exception of Northern Harrier. It is probable that this species, listed as threatened in New York, nests within or adjacent to the project boundaries. Other species that are likely to nest on the project site or immediately adjacent to it include common species of brush and forest edge and, perhaps, a small number of grassland nesting birds. Common raptors that may frequent the site and nest nearby are primarily Red-tailed Hawk and American Kestrel.

Based on what is known about risks to birds at wind power plants in North America and Europe, and what was learned from the literature search, site visits, and interviews, there is no indication that the Flat Rock Wind Power Project will result in significant adverse impact to birds. From this Phase I Avian Risk Assessment there is also no indication that further study is needed prior to construction of the project, although it is recommended that wetlands areas are delineated and provided with large buffers, and that meteorology towers be constructed without guy wires.

Introduction

A wind power project has been proposed for a site near Lowville in Lewis County, New York (Figure 1). The facility, to be called the Flat Rock Wind Power Project, will consist of about 66 turbines (tower height 262 feet [80 m], rotor length ~ 116 feet [35.25 m]) and will provide about 99 megawatts of power to the grid. Turbines will be placed on tubular towers and lighted according to Federal Aviation Administration regulations. This project would supply electricity for about 32,000 homes. The site is now used for agriculture, specifically dairy farming, although small patches of forest, hedgerows, and isolated wetlands are within the project area. Ownership of the land is private, although sizeable tracts of state forest occur to the southwest.

Because birds have been impacted at a few wind power sites in the United States and Europe, concern about impacts has been raised as an issue at most proposed wind power facilities. The impacts on birds have included fatalities resulting from collisions with operating turbines and habitat modification as a result of construction on a particular site. Although the range of impacts is great, at virtually all modern wind power facilities impacts have been minor and not significant.

An example of a significant adverse impact of wind power on birds is the Altamont Pass Wind Resource Area of California (AWRA), where raptors are known to collide with revolving turbine rotors (Howell and DiDonato 1991, Orloff and Flannery 1992, 1996). The Altamont seems to be an anomaly because, to date, no other site has been found to impact large numbers of raptors or other birds. At the other end of the spectrum from the Altamont are wind power sites in Searsburg, Vermont (Kerlinger 2000); Somerset County, Pennsylvania (Kerlinger and Curry unpublished report 2001); Ponnequin, Colorado (Kerlinger and Curry unpublished report); Buffalo Ridge, Minnesota (Strickland in press); San Geronio and Tehachapi Mountains, California (Anderson et al. 2000); and several other locations where few birds were found to be at risk. Reports from Europe have also recorded few fatalities, with a few exceptions. Winkelman (1994) documented fatalities of shorebirds and songbirds at a coastal site in the Netherlands. From what we now know, avian fatalities at wind power facilities are related to specific site location, turbine characteristics, and, or species attributes according to Anderson (1998) of the California Energy Commission. Most importantly, wind power facilities have not been shown to impact avian populations and have not impacted federally listed species.

This report is a Phase I Avian Risk Assessment contracted by Atlantic Renewable Energy Corporation. The purpose of a Phase I Assessment is to determine potential risk to birds at the proposed wind power site. Thus, the Phase I Assessment is designed to guide developers, regulators, environmentalists, and other stakeholders through the process of determining the degree of risk at a particular site and how impacts or potential impacts, if any are perceived, need to be studied in more detail. The initial assessment includes: (i) a site visit, (ii) a literature search, and (iii) interviews with avian experts, environmentalists, and regulators.

The site visit was made by a trained avian ecologist (Paul Kerlinger) who has extensive experience in wind power development. The site and surrounding area are walked and toured by automobile. During the visit, habitat and topography are examined and the avifauna present is observed. The site visit is not meant to be a quantitative survey or inventory of birds on the site and surrounding area. Instead, the purpose of the site visit is to gain an understanding of the habitat and topographic features so that a list of species that might be present may be assembled and the potential for risk to those birds evaluated.

The literature search includes examination of pertinent materials including Audubon Christmas Bird Counts, hawk migration literature/newsletters, New York Breeding Bird Atlas, USGS Breeding Bird Surveys, Important Bird Areas projects, New York Natural Heritage Program databases, U.S. Fish & Wildlife Service database, and other sources of information on birds that might nest, migrate through, forage on, winter on, or concentrate at the site.

Interviews consist of a series of questions (Appendix I) asked of regulators (U.S. Fish and Wildlife Service and state nongame/game biologists), avian experts (university professors, amateur and professional ornithologists who observe hawk migration, nesting songbirds, waterfowl, etc.), and environmentalists (local Audubon chapters, state Audubon, bird clubs, Hawk Migration Association of North America, Partners in Flight, American Bird Conservancy, Important Bird Areas programs, The Nature Conservancy, New York State Federation of Bird Clubs, etc.). Information from these diverse sources are then integrated into a report like the one that follows, summarizing what is present at a site, potential risk of wind turbine construction at the site, a comparison of risk at the site with other sites where risk has been determined empirically, and suggestions for further studies, if indicated.

In addition to the avian risk assessment, this report includes information on sensitive habitats, wetlands, and endangered and threatened species other than birds.

Topographic/Physiographic and Habitat Description of Lewis County and the Flat Rock Wind Project Site

Information regarding topography, physiography, and habitat of the site was first gathered using a 1:24,000 USGS topographic map, and later from ground truthing via a site visit (described below). In addition, several texts were examined to determine the type of habitat known to be present in the general vicinity of the proposed wind plant and, therefore, the bird communities and species that are likely to be present (Andrle and Carroll 1988).

Lewis County is, mostly, in the Tug Hill Plateau, adjacent to the Black River Valley ecological zone. Most of the county is an undulating plateau characterized by gently rolling hills ranging to more than 2,000 feet (615 m) ASL, with most of the county being between 1,000 and 2,000 feet (307-615 m) ASL. There are no steep mountains and few deep valleys in the county. From the west, the plateau rises gradually and on the east it drops off gradually, with some steep hills.

The historically dominant habitat of Lewis and surrounding counties was a mix of hardwood (beech/maple, elm, white ash) and conifer (hemlock, red spruce, and white pine) forest. The spruce is located mostly at the highest elevations and is, today, mostly in small stands. Today, the area varies, with some parts being more than 90% forested and others less than 30% forested (from Remote Sensing Laboratory, New York State Forest Cover Map, Department of Geography, University at Albany). Agriculture and forestry are the main land-uses in the county, with farming focusing on dairy, corn, alfalfa, hay, and fallow fields.

The Flat Rock wind power project site is on high, gently rolling plateau about 2 miles (3.2 km) west of the Village of Lowville (43^o 47.42' N, 75^o 35.82' W; Figure 1). The project site overlooks the Black River Valley to the northeast and east. The site ranges in elevation between about 1,600 and 1,950 feet (492-600 m) ASL. It is at the eastern escarpment of the Tug Hill Plateau. The ground on which the turbines will be situated is devoid of steep slopes. Numerous small streams have headwaters on the farms at the project site, all of which drain into the Black River, to the east. There appear to be numerous isolated wetlands (usually < 1 acre) on and immediately adjacent to the site.

The project site and surrounding lands are transected by Route 177 (east to west) and many smaller roads that are both paved and unpaved. There are farms, residential homes, and some commercial properties scattered along the roads within the project area. Population density in the area is low. Most of the land is a mixture of farmland and forest. The latter include patches of hardwood forest/woodlots, treed hedgerows, old-field succession, wetlands, and tree farms making the area a mosaic of habitats.

The habitat that normally would occupy the project area, if it did not have a history of disturbance, would be mixed northern hardwood and conifer forest. The natural successional forest in the area is deciduous hardwood (maple, beech) at the lower elevations, with some coniferous trees (spruce, white pine, and hemlock), mostly in higher locations. The forest has been cleared repeatedly, such that all forests are now second growth with little being older than

40± years. Forest canopies seldom exceed about 40-50 feet (12-15 m). The dominant land use within the project site is farming, specifically dairy grazing, hay, and corn.

For ease of description and to provide greater detail, the site is divided into four sections (Figure 1): North, North-Middle, South-Middle, and South. The North corresponds to that portion of the site that is north Route 177. The North-Middle portion lies between Route 177 and Gardner Road. The area between Gardner and Rector Roads is designated South-Middle, and south of Rector Road is denoted as South.

Site Visit to Flat Rock Wind Power Project, near Lowville, Lewis County: Birds and Habitat

The Flat Rock project site was visited on July 22 and 23, 2000, during which habitat and birdlife were examined. In addition to walking and driving around the project site during the 2000 site visit, the area for one-half mile (~1 km) surrounding the site was toured by automobile. Roads transect the area so that virtually all habitat where turbines will be situated was visible without walking the entire area. During the visit, an effort was made to observe the bird life and habitat on and adjacent to the site, and determine what birds or ornithological phenomena might be present on site or nearby. The weather during the site visit was fair with moderate wind and mild temperatures (60-75°F), permitting excellent views of the habitat and birds on and adjacent to the project site.

Habitat information was gathered by examining the vegetation, topography, and hydrology. The vegetation on-site included mostly farm-type cover, with trees/hedge rows and small woodlots between the fields. Birds present during the site visit were a mixture of nesting species and individuals dispersing after the nesting season. The following sections include detailed descriptions of each of the four areas examined.

North. The area along the east and west sides of Porter Road between Route 177 and O'Brien Road is a mosaic dominated by agricultural fields. The fields are mostly hay, although there is some grazing (fenced in areas) adjacent to where turbines will be placed, and a small field of soybeans. Most of the hay had been mowed recently. The forests are limited to small patches of second growth hardwood with some spruce mixed in. Red spruce stands are small and limited to the centers of these wooded areas. The forest patches were away from the roads and consisted mostly of sugar maple, white ash, black cherry, and some other species. Hedge-rows separated some fields and consisted of sugar maple, white ash, black cherry, and American elm. There were a few wet areas/meadows that qualify as wetlands. These hosted red-osier dogwood, alder, and small stands of cattails. A stream crosses Porter Road in mid-site. The banks of this stream, which are steep and forested, would not be likely to be included in the footprint of the project.

There were no residences within the area in which turbines will be situated. A meteorology tower, in disrepair, was present in the middle of this area to the east of Porter Road. Roads are mostly gravel, including Lawrence Road, Yansey Road, and Nelsy Road. To the west along Lawrence Road there are farm fields, although a very narrow hedge of trees (American elm, sugar maple, and black cherry) lines the road. Farther west there is a second meteorology

tower, to the north of the road. A forest edge parallels the road to the north. This forest is primarily hardwood with a few spruces mixed in. The farm fields are mostly hay and are bordered by small woodlots. A wet area is located about one-half mile to the west of Porter Road to the north of Lawrence Road (red-osier dogwood, arrowwood viburnum, and other wetland plants). The land quickly rises away from this low spot to farm fields that surround it.

Birds present on site were: Ring-billed Gull – 12+, Wild Turkey – 1, Mourning Dove – 2, Turkey Vulture – 2, Northern Harrier – (NYS threatened species) 1 subadult male, Red-tailed Hawk – 1, American Kestrel – (near site) 1, Barn Swallow – 10+, Tree Swallow – 2, Cliff Swallow – 1, American Robin – 4, Savannah Sparrow - 30-50, Song Sparrow – 2, and American Goldfinch – dozens. Eastern Meadowlark was seen about one-half mile off-site. At the north end where fields had not been mowed, there were large flocks of Bobolinks (perhaps 100 total), along with numbers of Savannah Sparrows; a Vesper Sparrow (NYS species of special concern) perched on a fence post, American Crow – 2, Eastern Kingbird – 2, American Robin – 4, Red-winged Blackbird – 20+, Savannah Sparrow – 12+, and American Goldfinch – 6.

North-Middle. This portion of the project site lies between Route 177 and Gardner Road, between Eagle Factory Road and Beetle Road. Most of this portion of the project site is farmed, although there is a diagonal strip of forest, perhaps 200 feet (61 m) wide, that cuts through this site at the lower elevations. This forest is primarily northern hardwood (sugar maple, aspen, fire cherry, isolated spruce and larch, red-osier dogwood, maple-leafed viburnum), with alders and willows along a narrow creek bed. Farm fields dominate the area and are along Route 177, Beetle, and Line Roads. The patches of forest are off the road, some on the highest ground. The predominant crop is hay, although small patches of alfalfa were also evident. Several fields were plowed and there were others that were fallow and undergoing succession. On these there were a few small trees coming up.

Birds present in the North-Middle tract were: Ring-billed Gull – 4, Turkey Vulture – 1, Barn Swallow – 6, Common Grackle – 2, Song Sparrow – 3, Savannah Sparrow – 8, Red-winged Blackbird – 4+, and American Goldfinch – 4. An American Kestrel was on the electric wire on Line Road. Dozens of European Starlings were on the fields, along with smaller numbers of Common Grackles.

South-Middle. This section of the project site extends between Gardner and Rector Roads, mostly along both sides of Borkowski Road. At the south end of Borkowski Road, there are hay fields that abut Rector Road. There are at least two dwellings on the north side of Rector Road. Going north a few hundred yards, the road enters a brushy, broken wooded area. There are low spots and some wetlands that contain alder, willow, and red-osier dogwood, with other wetland plants in the wetter places. These are interspersed with hay fields. The wooded areas get larger farther south and the road dips into a steep valley through which a stream flows. The sides of this valley are heavily wooded with black cherry, sugar maple, and American elm. A few yellow birch, witch hazel, and alder occur in the lower lying areas. A small tree farm of alien pine was observed off the road. To the west there is more forest than to the east of the road. North of the stream there are hay fields mixed with forested patches. Near Gardner Road there are larger, more open hay fields.

Birds present were mostly those found in brushy fields and forest edge including: Northern Harrier (adult female) - 1, Red-tailed Hawk - 1, Ruffed Grouse - 6, Mourning Dove - 4, Ruby-throated Hummingbird - 1, American Crow - 2, Cedar Waxwing - 4, Veery - 1, Eastern Kingbird - 2, Eastern Phoebe - 1, American Robin - 8, Red-eyed Vireo - 2, Yellow Warbler - 2, Chestnut-sided Warbler - 1, American Redstart - 3, Nashville Warbler - 1, Common Yellowthroat - 2, Song Sparrow - 6, Savannah Sparrow - 4, and American Goldfinch - 8. Ring-billed Gulls (maybe 8-10) were foraging in the cut hayfields. Other birds seen away from the forested edge were Barn Swallows - 15+, Tree Swallow - 3, Cliff Swallow - 1, American Crow - 2, Eastern Kingbird - 2, and Cedar Waxwing - 5.

South. This portion of the site is south of Rector Road from a few hundred yards east of Swernicki Road to Centerville Lane. Some of the site extends several hundred yards south of Flat Rock Road. This portion of the project site is characterized by a large amount of land that is not currently in agriculture. The eastern (along Swernicki Road) and southern (Rector Road) portions are primarily active farmland, mostly consisting of hay, with some corn and alfalfa (at least 3 fields). Hedgerows amongst these fields are larger and the center of this section of the project site is heavily wooded. The forests in the eastern portion of this section are mostly hardwood. Most of the turbines will be placed on agricultural lands. There are two houses along Swernicki Road (one a farm) and at least two along Flat Rock Road within the project area.

The western portion of this section, along Flat Rock Road, appears to be abandoned farmland and forest, with some agriculture. Several hayfields were noted, along with plowed fields. There was, at least, one abandoned farm building on this road. The old fields are undergoing succession and small trees are taking over fields. Alders are abundant, as are aspen, ash, and there is at least one small tree plantation. A decent sized wetland is located a hundred yards north of Flat Rock Road just east of the junction with Centerville Lane and there is a lake to the southwest of this intersection on which there were a number of jet-skis. Adjacent to the lake were several four-wheel, off-road vehicles parked.

Along Rector Road are several houses on the north side within the project area. The land is farmed heavily, mostly for hay, which was being cut during the site visit.

The forest at the center of this tract is the largest woodlot within the project area. It is mostly hardwood, with several acres of red spruce. It seems to be almost contiguous with the larger forested area to the southwest of the project site. Roads separate these forests. This forest is mostly second growth hardwood nearly 40 feet (13 m) in height, although succession has recently reclaimed portions of abandoned farms.

A store/bar and club of some sort (off-road vehicles) is located at the southwest corner of the project site on Flat Rock Road (off-site). What looks like a small factory is located at the corner of Rector and Swernicki Roads. There are two radio towers (lighted) in this portion of the project site. A meteorology tower was located about 200 yards north of Flat Rock Road.

Birds seen during the site visit included: Killdeer - 2, Turkey Vulture - 1, Northern Harrier (adult female) - 1, Red-tailed Hawk - 2, Ring-billed Gull - 30, Mourning Dove - 4, Rock Dove - 50, Northern Flicker - 2, American Crow - 3, American Robin - 40+, Barn Swallow -

25, Tree Swallow - 20, Cedar Waxwing – 10+, European Starling – 25, Eastern Kingbird – 5, Alder Flycatcher – 1, Yellow Warbler – 2, Song Sparrow – 10, Savannah Sparrow – 8, Swamp Sparrow – 2, Purple Finch – 1, Red-winged Blackbird – 20+, Indigo Bunting – 1, Rose-breasted Grosbeak – 1, American Goldfinch – 12+. A single Belted Kingfisher was observed at a pond in a yard on Rector Road and there were 9 Wild Turkeys on Rector Road, just to the east of the site and several more were on the western edge of the site.

Summary. The large amount of cropland (with concordant farm practices) and small forest patches within the project area makes it suitable for common birds. It is marginally suitable to a few New York State species of special concern and threatened species. Species that nest on site are primarily species of forest edge and brush, as well as grassland. Forests on-site are too small to support uncommon Neotropical migrant species of songbirds or sensitive interior forest nesting birds. Grassland habitats (hayfields and old fields) are cut during the nesting season, so birds that attempt to nest will usually be unsuccessful. Northern Harriers were seen on-site and could nest in the project area or adjacent to it, especially along the edges of the small wetlands or in successional fields (abandoned farm fields). Farm fields would not be suitable for these species for nesting because of mowing, but these fields are suitable for foraging by harriers. Other raptors in the area surrounding the project site were American Kestrels and Red-tailed Hawks, but their numbers were not great. The only sensitive habitat within this project area is the wetlands that are interspersed on-site, and the lower lying stream corridors that are forested to varying degrees. These habitats are where birds like Northern Harrier nest may nest.

Lewis County and Flat Rock Wind Power Project Site - Avian Overview (Literature Review, Interviews, Habitat Assessment)

Nesting Birds

New York State has a list of endangered and threatened species, as well as a list of species of special concern (Table 1). This list includes species that are extirpated, extinct, and rare. Extirpated and extinct species are not considered herein. Species of concern are similar to those listed in the National Audubon WatchList for the state.

Several data sets and information sources were used to determine the presence of listed species, species of special concern, and others as nesting birds in Lewis County and at the Flat Rock project site: USGS Breeding Bird Surveys (BBS), New York State Breeding Bird Atlas (BBA), New York Natural Heritage Program, New York State Important Bird Area program, New York State Federation of Bird Club members, and various ornithologists or knowledgeable birders. Also, habitat examined during site visits was used to determine what the habitat was suitable for in terms of listed and other species. Detection of any listed species or species of concern from these information sources would signal that these species might be found on or near the proposed wind power site.

A letter from the United States Fish and Wildlife Service reported no records of endangered or threatened species, or species proposed for listing at the project site (Appendix II). A letter from the New York State Natural Heritage Program (New York State Department of

Environmental Conservation) reported Loggerhead Shrike (NYS endangered) being nearby, but records were about two decades old (map in Appendix II). With respect to Loggerhead Shrike (NYS endangered) the habitat might be suitable. The record for the shrike was from 1888 and was not within the project footprint or was at the very edge of the project. The area shown by the Heritage Program map for Loggerhead Shrike is almost entirely to the east of where the turbines will be located, although one or two turbines may be located within the circle. The species was not observed and is not likely to be found on the project site because it has virtually disappeared from the state. Interviews with various birders who know the area did not reveal any documentation of shrikes in the area. The record for Clay-colored Sparrow was also from the margin of the project footprint and was from 1985. Habitat may be suitable in some places, but the species in New York State is at the very edge of its breeding range. It is not on the list of species of special concern for the state, probably because it is virtually an extralimital species in New York State.

Two Breeding Bird Survey routes (Table 2) were used to evaluate risk to nesting birds at the Flat Rock project site and in the Lewis County area. The Breeding Bird Survey is sponsored by the United States Geological Survey and is conducted each year. A BBS is a 24.5 mile (39.4 km) long road survey of nesting birds. Fifty, three minute stops are made at 0.5 mile (0.8 km) intervals during which all birds seen or heard within 0.25 miles (0.4 km) are recorded. The survey is repeated several times each spring during the nesting season.

The two BBS counts used (Number Four and Highmarket) were close BBS counts to the project site. Both are located in Lewis County. A ten-year period including 1990-1999 was examined for the sites, with each having 8 years of surveys. The Number Four BBS is immediately adjacent to the west of the project site (within 1 mile) and the Highmarket BBS is also within 1 mile of the project site. Numbers of species found, as well as presence of endangered and threatened species are summarized for the two BBSs in Table 2.

No federally endangered or threatened species or New York State endangered species were located on either of the BBS routes during the 10 years of surveys examined. Two New York State threatened species, Northern Harrier and Upland Sandpiper, were found in a small number of years (Table 2). Northern Harrier may nest on or adjacent to the site according to the BBS dataset. Only two Upland Sandpipers were found on the Number Four and the Highmarket site combined, in only one of eight years of surveys at each site.

Five species of special concern were found on the Highmarket BBS, but none were found on the Number Four BBS (Table 2). Most of the species of special concern were found in small numbers and in a small number of years. American Bittern, present in one year, is an obligate wetland (large marsh) nester and would not likely be found on the Flat Rock site because the wetlands are too small and do not contain the appropriate vegetation. Cooper's Hawks, found in only one year, will nest adjacent to farm fields and it could be present near the project site. They hunt forest edges and some open fields, usually where there are hedgerows and forest edge nearby. Horned Larks, were found in several years. They nest in agricultural fields, especially if they are left fallow or have very short grass that is not mowed. Farming practices, including cutting of hay, destroys nests and kills young of this and other grassland species. Cerulean Warbler, found in two of eight years, will not nest on the site because there is no riparian habitat

with tall trees. Grasshopper Sparrow was found in one year and could nest in some of the hayfields on-site. As with the Horned Lark, cutting of hay often destroys nests of this species.

The BBS revealed that most of the species found in the general area of the project site are common songbird nesters of small woodlands, edges, fields, and grasslands. Few waterfowl and other waterbirds will be nesting on or adjacent to the study area. The raptor species most likely to use the site or nest nearby are Red-tailed Hawk, American Kestrel, and, to a lesser extent, Northern Harrier.

The BBA project surveyed virtually all "blocks" within Lewis County. Such complete coverage provides a high level of confidence as to what species nest in the county. The Atlas was conducted over a period of six years (1980 – 1985). A total of 5,323 (of 5,335) blocks were surveyed statewide or 99.8 percent of the state (Andrle and Carroll 1988).

The BBA revealed that the vast majority of bird species that nest in Lewis County near the project site are common species that inhabit forest, edge, brush, and grassland. The block(s) that included the Flat Rock project site and areas immediately surrounding the site were inhabited by a subset of the birds found in the larger area of Lewis County that is not characterized by large, contiguous forest.

No federally endangered or threatened species or New York state endangered species were found or suspected to be nesting in BBA blocks on or near the project site (Table 1). Several species that are listed by New York State as threatened and species of special concern were known or suspected to be nesting in BBA blocks on or near the project site (Table 1). Four New York threatened species were found in atlas blocks within five miles of the project site. Least Bittern, rated as probably nesting, might be found near the project site, although marshes within the project area are not large enough for this species. Northern Harrier was confirmed nesting on or near the project site. The footprint of the project is unlikely to impact nesting sites for this and the previous species. The other two threatened species, Upland Sandpiper and Henslow's Sparrow, were both rated as possibly nesting and are birds of grasslands. They might nest in hayfields on the project site, although cutting of hay would likely destroy their nests.

Twelve species listed as species of special concern were confirmed or suspected to be nesting at or within five miles of the project site according to the BBA (Table 1). Of these species several have habitat requirements that are not present on the site. These include American Bittern (large marshes), Cerulean Warbler (riparian forest), Red-shouldered Hawk (swamp forest or wet woods), and Red-headed Woodpecker (parkland – forest with grass beneath canopy). The remaining species, Sharp-shinned Hawk, Cooper's Hawk, Common Nighthawk, Whip-poor Will, Horned Lark, Sedge Wren, Vesper Sparrow, and Grasshopper Sparrow may be found on or near the site. Sharp-shinned Hawk may nest in some spruce forest patches, which are outside of the project footprint. Cooper's Hawks may nest along the forest edge or in patches of woodland near the site. Common Nighthawk and Whip-poor Will may nest near the site, although it is more likely that these species are going to be found at lower elevations in the county – off the plateau. Sedge Wren may nest on or near the site, but they are rather nomadic in their nesting tendencies and move from year to year making it virtually

impossible to say with probability where they will nest. Vesper Sparrow, Grasshopper Sparrow, and Horned Lark nest in grass and hay fields like those that are present on site.

What these information sources demonstrate is that there are locations in Lewis County in which state threatened species and species of special concern may nest. Most of the species are not likely to be within the areas where turbines will be located.

Table 1. Birds of New York state that are endangered, threatened, or species of special concern (NY Department of Environmental Conservation, Endangered Species Program). For species found in New York State Breeding Bird Atlas (BBA) blocks at or within 5 miles of the Flat Rock, Lewis County project site. BBA status was noted: Poss = possibly nesting, Prob = probably nesting, Conf = confirmed to be nesting. Also noted was whether the habitat at the project site or immediately surrounding the site (within 400 m) was suitable (S), marginally suitable as indicated (MS), or not suitable (NS) for that species. A question mark indicates that a definitive determination was not possible or there was uncertainty in the evaluation.

<u>Endangered/Threatened Species</u>	<u>Status Suitability of Project Site Habitat*</u>
Pied-billed Grebe	Threatened - NS
Least Bittern (BBA - Prob)	Threatened - NS
Bald Eagle	Threatened - (Federally Threatened) - NS
Northern Harrier (BBA - Conf)	Threatened - S
Golden Eagle (extirpated)	Endangered - NS
Peregrine Falcon	Endangered - NS
Spruce Grouse	Endangered - NS
King Rail	Threatened - NS
Black Rail	Endangered - NS
Upland Sandpiper (BBA - Poss)	Threatened - MS?
Piping Plover	Endangered (Federally Endangered Great Lakes, Threatened on Atlantic Coast) - NS
Eskimo Curlew (extinct)	Endangered - (Federally Endangered) - NS
Common Tern	Threatened - NS
Roseate Tern	Endangered - (Federally Endangered) - NS
Black Tern	Endangered - NS
Least Tern	Threatened - NS
Short-eared Owl	Endangered – NS-MS
Loggerhead Shrike	Endangered – NS-MS
Sedge Wren	Threatened - MS
Henslow's Sparrow (BBA - Poss)	Threatened - MS?

Species of Special Concern

Common Loon	NS
American Bittern (BBA - Poss)	NS
Osprey	NS
Sharp-shinned Hawk (BBA - Poss)	NS-MS?
Cooper's Hawk (BBA - Poss)	MS?
Northern Goshawk	NS-MS?
Red-shouldered Hawk (BBA - Poss)	MS?
Black Skimmer	NS
Common Nighthawk (BBA - Poss)	MS?
Whip-poor-will (BBA - Poss)	MS?
Red-headed Woodpecker (BBA - Conf)	MS?
Horned Lark (BBA - Prob)	MS?
Sedge Wren (BBA Poss)	NS?
Bicknell's Thrush	NS
Golden-winged Warbler	MS?
Cerulean Warbler (BBA - Poss)	NS
Yellow-breasted Chat	NS
Vesper Sparrow (BBA - Conf)	MS?
Grasshopper Sparrow (BBA - Prob)	MS?
Seaside Sparrow	NS

Table 2. Breeding Bird Surveys examined in the Flat Rock, Lewis County, New York area (1990-1999), including state Threatened Species and Species of Special Concern. No New York Endangered species or Federally Endangered or Threatened species were found on the Breeding Bird Surveys.

Breeding Bird Survey	Years	Number of Species (Min-Max) Threatened (T)/Species of Concern (SC) – Number-Year(s)
Highmarket (61076)	8 – 1990-92,94,96-99	68-71 American Bittern (SC) – 1-96 Northern Harrier (T) – 2-92,4-96,1-8 Cooper’s Hawk (SC) – 1-96 Upland Sandpiper (T) – 1-97 Horned Lark (SC) – 1-91,2-92,7-94, 9-97,3-98,5-99 Cerulean Warbler (SC) – 3-92,2-99 Grasshopper Sparrow (SC) – 1-91
Number Four (61077)	8 – 1991-98	57-62 Northern Harrier (T) – 2-91,2-93,1-8 Upland Sandpiper (T) – 1-93

Migrating Birds

There are no references to major or significant migration stopover sites or pathways in Lewis County or on or adjacent to the Flat Rock Wind Power Project site. There is little to attract or concentrate migrating birds in this area. The surrounding topography is not suggestive of locales where large numbers of birds are seen during migration. It is devoid of large rivers (except the Black River 5+ miles [8 km] to the east), lakes, coastlines, or ridges, which could serve to divert or attract migrating hawks and songbirds. Also, habitat on site and immediately adjacent to the Flat Rock site is not suitable for waterbirds or shorebirds. The habitat on site, while suitable to some migrating songbirds and hawks, is common in this part of the state such that these birds are spread over a wide geographic area with few concentration points. Because the project site contains habitat that is not special to migrants, the numbers that are likely to frequent the site for migration stopovers are undoubtedly small.

Nocturnal Songbird Migration

The literature is virtually devoid of references to songbird migration in the upstate New York area and Lewis County in particular. Nothing was found about the project site or area immediately surrounding it in the ornithological literature, although a radar and visual (both nocturnal and diurnal) and acoustical study was conducted at Copenhagen and Martinsburg in 1994 (Cooper, et al. 1995, W. Evans personal communication). Both of these locations are near the project site. The study was conducted during one spring and one autumn migration season. The results showed that small numbers of songbirds flew over the project site. The rate for spring migration averaged fewer than 60 birds per hour, and in autumn the average was less than 40 birds per hour. The radar probably sampled birds over an area of about one-mile (1.6 km), or a mile of front that extends to the east and west of the observation point (roughly perpendicular to migration pathways). Compared with studies done with radar elsewhere the migration passage rates are small. Gauthreaux (1971, 1972), working in the southern United States, reported rates of more than 20,000 to 50,000+ birds per mile of front per hour. However, Evans states that more migrating songbirds fly over this region than over western New York State south of Lake Ontario (W. Evans, personal communication; also see Evans and Rosenberg 1999). Thus, the numbers of migrants flying over Lewis County are small to moderate and there is no evidence of a major concentration there.

The altitude of most songbird migration ranges between 300 and 2,000+ feet (92-615+ m) AGL (Kerlinger 1995, Kerlinger and Moore 1989). Because the rotors of most modern turbines extend to a maximum of slightly more than 350 feet (107 m) AGL, only small numbers of migrants passing over the site will fly within the altitude range of the turbine rotors. Nocturnally migrating birds have infrequently been demonstrated to collide with wind turbines. At wind power facilities in the United States, these incidents involve small numbers of birds (mostly single birds), unlike the catastrophic, mass mortality events that occur at communications towers that are usually greater than 500 feet (154 m). One possible exception to this is a coastal site in the Netherlands where small numbers of songbirds and shorebirds collided with turbines. At that site there were 18 turbines. The numbers of birds involved were small, involving few individuals of a variety of species, but larger than from sites in the United States. At an inland site in California (Anderson in press) where there are now more than 3,000 turbines, only a hand full of nocturnal migrants have been shown to collide with turbines. Whereas the same is true for a site in southwestern Minnesota with hundreds of turbines. In Wyoming, where there are about 100 turbines, small numbers of night migrants were found beneath the turbines. No dead migrants were found in a study of 11 turbines in southern Vermont and 8 turbines in Somerset County, Pennsylvania. After 7 months of study, including autumn migration, at 8 turbines that extend to more than 300 feet (91 m) in Madison, New York, only two night migrant fatalities (songbirds) have been noted. It should also be mentioned that no dead migrants were found beneath the two Kenetech 33-kvs turbines that were studied at Copenhagen, NY (adjacent to the Flat Rock site) during a 1994 spring and autumn migration mortality study (Cooper et al. 1995). Those two towers were shorter than those planned for the Flat Rock project.

Hawk Migration in Upstate New York and at the Flat Rock Wind Power Project Site

New York State is well explored with respect to hawk migration pathways. Each year, thousands of people watch migrating hawks at a large number of sites throughout the state. From the early 1970s through the 1990s, hawk watchers scoured the state to find the best locations from which to observe migrating hawks. Thus, the migration of hawks in New York State is well known with respect to concentration sites and it is probable that all of the localities where large numbers of hawks occur during migration have been identified. Despite the large number of hawk watchers and hawk watching sites, there are fewer than a dozen high quality hawk watching sites in the state (Zalles and Bildstein 2000). In general, the best hawk watching is either in the far southeastern corner of the state in the lower Hudson Valley and on Long Island or along the southern and southeastern shore of Lake Ontario (Derby Hill, Braddock Bay) and Lake Erie (Table 3). Away from these locations, few sites consistently produce more than a few dozen hawks in a migration season.

Derby Hill, just east of Oswego, New York near the towns of Texas and Mexico on Lake Ontario is more than 35 miles (56 km) to the southwest of the Flat Rock Wind Power site. It is listed by Zalles and Bildstein (2000) in their directory of significant hawk migration sites in New York state. It is also a New York State IBA (Wells 1998) and is listed in *Hawks Aloft* as a significant migration site. At that site, tens of thousand of migrating hawks of at least 13 species can be seen in autumn.

Many other sites have been studied in central New York, but few have been used more than a small number of times. The reason is a paucity of hawks. An examination of recent issues of *Hawk Migration Studies* (Journal of the Hawk Migration Association of North America) revealed no sites that qualified as significant migration pathways within 40 miles of the Flat Rock site, other than Derby Hill.

The work of Cooper et al. (1995) at Copenhagen and Martinsburg in both autumn and spring confirms the paucity of hawk migration in the area immediately adjacent to the project site. They reported no daily flights that totaled more than a few dozen birds during autumn and spring. Broad-winged Hawks were the most numerous during autumn, numbering more than 300 individuals, and accounting for a majority of the hawks observed. These species fly higher than most other species of raptors and seldom fly at the level of turbine rotors. Very few individuals of other species were observed. Cooper et al. used both visual and radar techniques just a few miles from the project site making their study thorough.

A phone conversation with Gerry Smith, an avian ecologist who managed the Derby Hill hawk watch on Lake Ontario for many years before joining the Nature Conservancy staff, did not reveal any major concentration locations near the Flat Rock project site. His opinion was that migration was generally diffuse in the project area, although he suggested that late season raptor migrants did aggregate in some numbers on the project area where they foraged before moving farther south. This phenomenon is limited to late October and November (sometimes into early December), ending when snow cover makes foraging for rodents unproductive. Smith also lives in Barnes Corners near Route 177, only a few miles from the project site.

Autumn hawk migration in this area of New York State is mostly broad front and occurs at relatively high altitudes. This has been shown both by ground based counts and radar techniques (Kerlinger 1989). The reason so few hawks are likely to fly over project site is because there are no topographic features nearby that attract hawks (Heintzelman 1975, 1986; Kerlinger 1989). Such features would include long ridges like those found at Hawk Mountain Sanctuary in Pennsylvania, or the coastline of a large lake or ocean, as is the case at Braddock Bay on Lake Ontario near Rochester, NY or Derby Hill, also on Lake Ontario. Neither ridges nor coastlines occur at the project site, so it is highly improbable that significant numbers of hawks pass over the project site at low altitudes.

Other Migrants. The work of Cooper et al. (1995) demonstrated that small numbers of other types of migrants pass through over project site area in autumn and spring. They observed small numbers of geese, waterfowl, finches, and other birds in small numbers. They were mostly spread over a wide front and there was no indication of a major migration concentration.

Summary. The geographic location, topography, and habitat of the Flat Rock project site are not special, and there do not seem to be concentrations of migrants at or near the site. Furthermore, although the habitat is suitable for migratory stopovers of certain species, it is unlikely that many of these birds will be attracted to the immediate area of the wind plant because there is a plethora of similar habitat throughout the region. The types of habitats that attract songbirds during migration are riparian forests, lake edges, river edges, ocean coastlines, oases, ridge tops, and a few other situations. These are not present at or adjacent to the project site. Grassland songbirds and raptors are likely to use project area farm fields on occasion during migration. It is almost certain that songbirds making stopovers in the region would be spread thinly over hundreds of square miles.

Wintering Birds

The winter climate and weather on the Tug Hill Plateau in upstate New York is some of the harshest in the northeastern United States. The project site in Lewis County is subject to strong winds, very low temperatures (sub-zero Fahrenheit is not uncommon), and deep, lake effect snow. Snow often accumulates in November or early December and lasts until mid to late April. Record snowfalls for the United States have been recorded on the Tug Hill Plateau near the project site. These attributes combine to make the area inhospitable to birds during the winter. Such harsh weather necessitates high caloric intake for avian survival and makes survival problematic. Because avian food resources at and adjacent to the project site in winter are scarce, the area supports a low diversity and small number of birds during this season.

The primary source of information on birds wintering in and around Lewis County were three National Audubon Society Christmas Bird Counts (CBCs) located in the area around the Flat Rock project site (Table 3). CBCs during the period 1995 through 1999 were examined for New Boston CBC (Lewis County) - center is about 5-6 miles (8-9.6 km) west of the center of the project site; Watertown CBC (Jefferson and Lewis Counties) - centered about 16 miles (25.6 km) northwest of the site; and Old Forge CBC (Herkimer County) - about 30 miles east of the project site. A portion of the Flat Rock project site is within the New Boston CBC area. The New Boston and Watertown CBCs are most representative of the project site and the Old Forge CBC is close enough to be somewhat representative. The Watertown CBC includes more lake, river, and wetland habitat, whereas the Old Forge CBC contains more forest than the project site. Together these three CBCs provide an overview of the type and number of birds wintering in the region. These Christmas Counts each included the area within a 15 mile (24 km) diameter circle, an area of about 177 square miles (453 square km). Thus, all three covered a total area of 531 square miles (1,360 square km). A total of 30 people were involved in searching for birds in this area during the 1999 CBC.

Christmas Counts provide an excellent overview of the birds that inhabit an area during winter. Each winter within about 10 days of Christmas, dozens of birders comb their local CBC area counting all birds encountered. These birders search during the day, and to a lesser extent at night, in the entire area encompassed within a particular count area. In addition, they scout for birds during that season, especially during the "count week" period, to prepare for the actual count day. Although most of these birders are unpaid amateurs, they are usually proficient or highly skilled observers. The CBC count data are used by environmental groups and government wildlife agencies for determining population changes, as well as geographic ranges and abundance of species. In the analyses that follow, all birds seen on the counts and during count weeks were included.

Table 3. Summary of Christmas Count data sets used for assessment (1995-1999) of wintering birds at and near the Flat Rock Wind Power Project, Lewis County, New York.

Christmas Bird Count	Count Center/Years Conducted	Number of Observers 1998/99 / Species Counted (min-max)
New Boston	New Boston/1995-1999	14 / 31-42
Watertown	Brownville/1996-1999	14 / 37-55
Old Forge	Old Forge-Sugarloaf Mountain/1997-1999	2 / 26-33

The minimum number of bird species observed on the three CBCs during the investigated time period ranged from 26 species on the 1998 Old Forge count to 55 species on the 1998 Watertown count (Table 3). Differences within a five year period for a given CBC is attributable to natural, yearly weather variation and specific weather on a given count day. By using a five year period for three locations, the impact of poor weather for finding birds (snow, rain, etc.) is minimized. The range of high counts among these three sites during the five-year period was 33 to 55 species.

The diversity of birds observed at the three sites during the five-year period is considerably below the diversity of most sites in New York State and only about one-half the number of species from the New York metropolitan area and CBCs along Lake Ontario and Lake Erie. For example, the number of species observed from Captree, Long Island, was 123 species and from Rochester was 92 species in 1999. These counts reflect a larger number of species because they are situated at large bodies of water and are not characterized by the brutal winter weather typical of the Tug Hill Plateau.

The most numerous birds on the New Boston CBC in 1999 were Black-capped Chickadee, Rock Dove (pigeon), and European Starling, followed by Snow Bunting. None had more than 1,000 individuals and two of these species are not native to North America. The reason for the lack of diversity and for the low number of birds overall on these CBCs is the absence of open water at these sites and harsh weather. A portion of the Watertown CBC includes the shoreline of eastern Lake Ontario, which explains the larger number of bird species and individuals counted at this site than at the other two CBC locations. It particularly explains presence of waterfowl.

A vast majority of the birds reported on the five Christmas Bird Count data sets were common species. There were no federal or state listed endangered species present on any of the five years of counts from the three CBCs. A single Bald Eagle, now federally and state threatened, was seen on the 1998 Watertown count and single Bald Eagles were seen on the Old Forge count (only in count week but not on official count day) in 1997, 1998, and 1999. The open water on these sites undoubtedly attracted these individuals, although only in small numbers and they may be present only as long as water bodies are not frozen. The fact that there is no open water during winter on or adjacent to the Flat Rock project site with the exception of the Black River (5+ miles [8 km] east of the site), in all likelihood, precludes this animal from being present in the winter.

One more New York State listed threatened species, Northern Harrier, and six species of special concern were found on the counts (Table 4) during the winters of 1995 through 1999. Table 4 provides a list of those species and their occurrences, in addition to an evaluation of the suitability of the habitat at the Flat Rock project site for these species. Northern Harriers, found in small numbers near the site during winter, are likely to use the site on occasion during the winter. Their numbers and use of the site will be low, especially in years when there is significant snow cover. Most harriers winter farther south.

With respect to the six species of special concern that were found to sometimes winter in the area, all were present in small numbers and few individuals are expected on the project site. Common Loons require open water and will not be on or near the project site during winter, or in other seasons. Red-headed Woodpeckers are sometimes found in farm fields like those around the turbines. However, only one individual was seen in the five year period and not near the project site. For Sharp-shinned and Cooper's hawks, the best places for them are within the towns and suburban centers where bird feeders are present. The feeders attract sparrows and other small birds, which in turn attract avian predators. Outside of these residential neighborhoods, there are not sufficient densities of prey species to keep these birds at this latitude during winter. Thus, they are not likely to use the project site to a great extent during winter. Northern Goshawk is more adapted to northern climates and habitats like the project site, although these birds usually wander over large areas. This species also prefers forest or forest edge habitats. Horned Larks will be found at times on habitats like those on the project site. Deep snow in the dead of winter will make these birds move farther south, although manure spread on the snow will attract them. The numbers found on the CBCs were small, given the amount of farmland in the area. Most of the species of special concern that might be found on the project site during winter are undoubtedly from populations that migrate into the state and, therefore, they are not part of the New York nesting populations that are listed as being species of special concern.

In summary, a small number of species that are threatened, or species of special concern in New York State were present in small numbers in the general area of the Flat Rock Wind Power Project during winter. Most are migrants that move into the Flat Rock area. These species are also likely to move considerably during the winter depending on food availability and snow depth. Few, if any, waterbirds will be present on site during winter because there is no open water on site or nearby. The farmland, brush, and forest edge habitats on and adjacent to the project site will attract small numbers of common species during the winter. Raptor species

that are likely to be found on site in winter near where the turbines will be placed may include an occasional Red-tailed Hawk, Rough-legged Hawk, Northern Goshawk, Northern Harrier, and, rarely, other species. However, there is little to attract significant numbers of raptors or songbirds to the site. There are no known major wintering bird concentrations on or adjacent to the project site or in Lewis County.

Table 4. New York State Endangered, Threatened, and species of concern found on three Christmas Bird Counts examined in the Flat Rock project area, Lewis County, during the 1995 through 1999 counts. In addition, a rating of suitability of habitat for each species in winter at the project site is provided.

Species	Count	Number of Birds/Years Found			Habitat Suitability
<u>Endangered</u>					
None					
<u>Threatened</u>					
Bald Eagle	Old Forge	3	/	3	NS
	Watertown	1	/	1	
Northern Harrier	Watertown	2	/	1	MS
<u>Species of Special Concern</u>					
Common Loon	Watertown	2	/	1	NS
Sharp-shinned Hawk	Watertown	2	/	2	MS-NS
	Old Forge	1	/	1	
	New Boston	4	/	3	
Cooper's Hawk	Watertown	3	/	3	MS-NS
	New Boston	3	/	3	
Northern Goshawk	New Boston	6	/	4	S
Red-headed Woodpecker	Watertown	1	/	1	N
Horned Lark	Watertown	82	/	3	S
	New Boston	59	/	2	

Important Bird Areas, Parks, Nature Preserves, Sanctuaries, and Sensitive Habitats Near the Flat Rock Wind Power Project site, Lewis County, New York

Important Bird Areas. According to Dr. Michael Burger, Director of Bird Conservation for New York State (National Audubon Society) and Wells (1999), there are no IBAs at or near the project site. None are now located in Lewis County, although the Fort Drum Grasslands on the border of Jefferson and Lewis counties is an IBA. This area is more than 20 miles (32 km) to the north of the project site. No new IBAs have been proposed within 10 miles (16 km) of the project site.

Nature Conservancy Properties. TNC owns no properties within 5 miles of the project site, although the organization has a Tug Hill Plateau initiative. Most of their efforts are to the south and southwest of the project area where the forests are large and contiguous. They wish to be included in the overall permitting process.

New York State Parks. The nearest state park is Whetstone Gulf State Park, 4 miles (6.4 km) to the southeast of the project site. This park is listed by Drennan (1981) as a fine birding site, mostly for nesting woodland birds.

New York State Wildlife Management Areas. The Tug Hill State Wildlife Management Area is more than 2 miles (3.2 km) southwest of the project site. Others are within 10 miles (16 km). None of these lands are within the project boundaries. Drennan (1981) lists this area as a fine birding site for woodland warblers and other songbirds.

New York State Forests. There are at least two state forests within 2 miles (3.2 km) of the project site, but none is within the project boundary.

Adirondack Park. The project site is more than 13 miles (21 km) west of the western boundary of the Park.

Tug Hill Region. The Flat Rock Wind Power Project site is within the boundaries of the Tug Hill Region (Tug Hill Reserve Act) as defined and covered by the Tug Hill Commission.

Watchable Wildlife Viewing Areas. Other than the Salmon River Fish Hatchery, near Pulaski, there are no Watchable Wildlife Viewing Areas within 20+ miles (32 km) of the site (Knight and Wilson 1998).

Aside from the above locations, there do not seem to be any significant wildlife areas within 10 miles of the project site.

Interviews With Local Avian and Environmental Experts. The following people with specialized knowledge of avian or related environmental issues were consulted. They were asked about the birds of the Flat Rock Wind Power Project site and Lewis County in general (Appendix I for interview procedure and questions). They were first informed that a wind power facility was being planned and that this author was conducting a Phase I Avian Risk Assessment for the project. Specifically, they were asked if they had knowledge (1) regarding rare, threatened, or endangered birds (or other species) at the project site or the Lewis County area, (2) sensitive or important bird habitat, (3) bird concentration (migration, foraging, wintering, and nesting) sites, and (4) other people who would have knowledge about the area. In addition, they were asked to express their concerns regarding the construction of a moderate-sized wind power facility in the project area with respect to bird impacts. Summaries of interviews are in Appendix III.

Pete Nye - Chief Endangered and Nongame Species Unit, New York State Department of Environmental Conservation, Delmar, NY

Robert Miller - Coordinator for Partners in Flight, Biologist with the Endangered Species Unit, New York State Department of Environmental Conservation, Delmar, NY

Dennis Faulknham, - Regional Wildlife Biologist, New York State Department of Environmental Conservation - Region 6 Office - Watertown, NY

Mike Burger - Important Bird Areas Program and Head of New York State Bird Conservation Programs for National Audubon Society - Ithaca, NY

Kim Hunsinger - New York State Department of Environmental Conservation, Director - New York State Breeding Bird Atlas – Albany, NY

Bob Long – New York State Region 6 Coordinator for the New York State Breeding Bird Atlas

Jerry Letendre – North Country Bird Club, former president and retired from New York State Department of Environmental Conservation

Jim Farquar – biologist with New York State Department of Environmental Conservation, Watertown office and local bird expert, Region 6, Watertown, NY

Bob Henrickson – local bird expert who conducts breeding birds atlas field work for DEC

Nick Leone – local bird expert who has knowledge of area

Mike Stoll - Biologist, United States Fish and Wildlife Service, Region 5, Cortland, NY

Gerry Smith - Avian Biologist, The Nature Conservancy, Oswego, NY (residence in Barnes Corners, Lewis County)

Dr. Lee Harper - President, St. Lawrence-Adirondack Chapter, National Audubon Society – avian ecologist and consultant

Mary Alice Koeneke - President of the Federation of New York Bird Clubs, Oswego County, NY

William Evans – Bird migration/ bird vocalization expert from central New York, Ithaca, NY

Risk Assessment: A Comparison of Avian Risk at the Flat Rock Wind Power Project, Lowville, Lewis County, New York, With Existing Wind Power Facilities

Perhaps the best means of assessing risk to birds at proposed wind power project sites, is to compare the avifauna, geographic setting, habitat, and topographic conditions found at that site with locations where risk is known and has been documented empirically. By comparing the species present, numbers of individuals of those species, seasonal presence, and behavior of birds that are likely to nest on or use the Flat Rock project site in different seasons with wind power facilities that have documented risk or lack of risk, an educated assessment can be made as to the overall risk to birds that can be anticipated at the Flat Rock project.

Reviewing what is known about avian impacts, two types of negative impacts have been documented at wind power sites. Habitat alteration with resulting impact on birds is not well known or documented. Few studies have addressed this problem because habitat alteration is not often construed as a legal issue, except in the case of federally endangered and threatened species or some state listed species. Habitat alteration is minimal and somewhat temporary with respect to wind plant construction and operation activity. In a study done in southwestern Minnesota at a large wind power plant, reduced nesting activity was detected in grazed areas and farm fields close to wind turbines as opposed to farther from those turbines (Leddy et al. 1999). For this reason, researchers recommended the placement of wind turbines in planted fields.

Regarding habitat alteration and destruction, the impact from the wind turbines and other infrastructure at the Flat Rock project site is expected be minimal. Construction of the turbines will require cutting a small number of trees in a few places because a majority of the turbines will be located in active agricultural fields (hay and corn). Turbine construction will require only a few acres from the entire site for the turbine bases (<20 feet [6 m] in diameter) and one-lane service roads. Normal farming practices, specifically plowing, tilling, planting, and cutting are done each year. Wind turbine construction and operation should not add significant negative impact, as current farming practices are likely to continue on-site.

Fatalities from avian collisions with turbine rotors are the second type of impact and have been studied at more than a dozen wind power sites in the United States (Erickson et al. 2001). These studies have been done systematically and methods have been scrutinized by various wildlife agencies and the National Wind Coordinating Committee. We now know more about wind turbines that about communication tower and transmission line collisions. Overall, the number of fatalities involved at project sites has been small and is not suspected to impact populations. Furthermore, no federally threatened or endangered species have been involved.

Fatalities of birds at wind plants pales in comparison to the numbers killed by communication towers, automobiles and trucks, transmission lines, and glass windows (Erickson 2001). A summary of fatality studies at wind plants in the United States and Canada is presented in Appendix IV.

The only wind power site in the United States where risk to birds has been documented to be significant is the Altamont Pass Wind Resource Area (APWRA) of California, where raptor fatalities have been reported for more than a decade. Golden Eagles, Red-tailed Hawks, American Kestrels, and some other birds collide with turbines in varying numbers in the AWRA. Raptors seem to be the most susceptible group of birds. Large numbers of gulls, ravens, vultures, and other birds fly amongst the turbines and almost never collide with them. The situation with respect to raptor impact in the AWRA seems to be an anomaly.

Several factors are now believed to contribute to risk in the Altamont. They are: an extraordinarily large concentration of operating turbines (N=5,400, reduced from about 7,000 several years ago), closely spaced turbines that may not permit birds to fly between them safely, the presence of very large numbers of foraging raptors throughout the year, a superabundant population of California ground squirrels (which attract the raptors), steep topography with turbines placed in valleys and along canyon edges, turbines mounted on lattice type towers that permit perching and provide shade and cover from the sun and rain, and turbine rotors that revolve at high revolutions rates (>40 rpm). These factors have been hypothesized, by various researchers, to act alone or in concert (Howell and DiDonato 1991, Orloff and Flannery 1992, 1996, Curry and Kerlinger in press), to produce mortality in the AWRA.

In Europe, avian fatality has not been shown to be significant at wind power plants, although in a few localities small to moderate numbers of fatalities have been reported. In coastal Netherlands, at a wind power site where there are about 18 turbines, several dozen songbirds and shorebirds of a variety of species were found dead under the turbines (Winkelman 1995). This site was adjacent to the North Sea, where migration is concentrated into a relatively small area. That several species were involved is important because the fatalities were spread among species, all but eliminating the possibility of population impacts. In Tarifa, Spain, where one of the largest concentrations of migrating raptors and land birds occurs (Straits of Gibraltar), fatalities of migrants have been rare. Local Griffon Vultures are killed on occasion, apparently because they habituate to the turbines and frequently forage amongst or near them (Marti Montes and Barrios Jaque 1995, Janss 2000).

At new wind power facilities in the United States, avian mortality has or is being studied intensively. Appendix IV summarizes the number of fatalities documented at those sites. In the eastern United States, fatalities have been examined at three wind power facilities and a study at a fourth is now in progress. In Vermont, searches done in June through October 1997 revealed no fatalities at 11 new turbines situated on a forested hilltop (Kerlinger 2000). In upstate New York, several months of searches during spring and autumn migration beneath two wind turbines located in open fields revealed no carcasses (Cooper et al. 1995). After 7 months of study at 7 wind turbines in Madison County, central New York, only two night migrating songbirds have been found under the turbines (Kerlinger and Curry in progress). At an older wind power facility of about a dozen small turbines in a forested setting in Massachusetts, no fatalities have been

reported (M. Jacobs, personal communication). Surprisingly, the wind power facility in Massachusetts is on Mount Watchusett, which is the site of one of the largest inland hawk watches in New England. At an facility with 8 turbines located in farmland in Somerset County, Pennsylvania, fatality searches conducted in June-September 2000, the first four months of operation, have yet to reveal avian fatalities (unpublished data from Curry & Kerlinger, L.L.C.).

Studies done in the Midwest in farmed areas also revealed few avian fatalities. At the Buffalo Ridge wind power facility near Lake Benton, Minnesota, small numbers of fatalities have been reported (Strickland in press) from the more than 200 wind turbines searched at this site. The species composition included a variety of birds, but did not include raptors or significant numbers of migrating songbirds. A one-year study in the Door County peninsula of Wisconsin revealed only three songbird fatalities under 35 turbines situated in farm fields.

In the western United States (Appendix IV), avian mortality resulting from collisions with wind turbines has been studied at several sites. For example, the number of fatalities recently reported from the San Gorgonio Pass involved fewer than 40 fatalities (no raptors) at 120 turbines. In the Tehachapi Mountains, fewer than 90 birds were found at 180 turbines (Anderson 2000 - in press). Few raptors and no eagles were involved at these sites. After 21 months of systematic searches at 29 new turbines in a prairie situation in northern Colorado, only eight fatalities have been documented (5 Horned Lark, 1 McCown's Longspur, 2 White-throated Swifts; Dr. Ronald Ryder, Colorado State University, personal communication). At new wind power site in Oregon, at which there are 38 turbines in farmland, a one year study documented no raptor fatalities, 8 songbird fatalities, and 4 gamebird fatalities (3 of which were alien species). Most of these projects have been situated in agricultural fields or grazing lands and small numbers of fatalities have been documented. There has been no suggestion of population impacts at any of these facilities, nor have fatalities involved endangered or threatened species.

Fatalities at modern wind power facilities do not compare in absolute numbers with those in the Altamont and are usually an order of magnitude or more lower. In addition, the fatalities at other sites rarely involve raptors. Most often, the small numbers of fatalities are spread among a variety of bird species such that only very small numbers of a given species are involved, further reducing the potential for population impacts. From the recent studies it is obvious that avian fatalities at wind turbine sites are rare events and, to date, no population impacts have been demonstrated as resulting from collisions with wind turbines.

The type of turbines, their characteristics, and their spacing at the Flat Rock Wind Power Project will be similar to that of modern projects now operating on farmland in Colorado, Pennsylvania, Oregon, Minnesota, Iowa, and Wisconsin. Mortality at these sites has been low, involving no endangered or threatened species, no raptors, and few migrating songbirds. Disturbance to nesting birds is expected to occur, but because the turbines will be situated in agricultural fields that impact is not expected to be significant.

Comparing the project at Flat Rock with known or suspected risk factors is of heuristic value. Such a comparison (Table 6) reveals that none of the factors known or suspected to be high risk to birds are present at the Flat Rock site.

Whereas none of the risk factors discussed above pertain to or are present on the Flat Rock project site, other factors can be examined to assess risk to birds. At the Flat Rock site only a few species known to be susceptible to colliding with wind turbines are likely to present, including Red-tailed Hawk and American Kestrel. Risk to these species at the Flat Rock site is likely to be small in comparison with the Altamont for several reasons. Most importantly, these species are likely to be present on site in small numbers and during only a portion of the year. In the Altamont there are hundreds of individuals of these species that use the wind resource area year round. Second, turbines will be mounted on tubular towers, rather than lattice towers, that do not offer perching opportunities. Red-tailed Hawks, American Kestrels, and other birds perch extensively on lattice turbines in the Altamont. Thus, the turbines proposed at Flat Rock are not likely to attract raptors to the site. The other risk factors in Table 6 are also not present at the Flat Rock project site.

Table 6. Comparison of known or suspected risk factors at wind power facilities compared to the Flat Rock Wind Power Project, Lewis County, New York.

<u>Known or Suspected Risk Factors - California</u>	<u>Flat Rock, New York Project Site</u>
1. Large concentrations of turbines -1,000s	66 turbines
2. Lattice towers - perching raptors	Tubular towers - no perching
3. Fast Rotating Turbine Blades - 50-70+ rpm	Slow Rotating Blades <21 rpm
4. Closely Spaced Turbines - 80-100 feet	Widely Spaced Turbines 400+ feet
5. Turbines in Steep Valleys/Canyons	Turbines on Level Ground or Slight Slope
6. Large Prey Base - Attract Raptors	No Significant Prey Base
7. Raptor Use of Area High	Raptor Use of Area Moderate

The presence of Northern Harriers, a New York State threatened species, during the site visit suggests that harriers may nest within the project boundary or nearby. A very few harriers have been impacted in the Altamont (AWRA), although it is not considered as a susceptible species. The ground-hugging, foraging flight of harriers usually puts them below the rotor swept area where they might be at risk. The risk to these species is likely to be low, or, perhaps moderate.

The issue of night migrating songbirds and other birds colliding with turbines should also be considered when assessing risk. None of the studies listed in Appendix IV report significant

numbers of night migrants colliding with wind turbines, and some report no collisions. The reported incidents involve mostly single birds, unlike the catastrophic events that occur at communication towers usually greater than 400 or 500 feet (123-154 m). The total numbers of nocturnal migrants that have been reported dead at the approximately 15,000 wind turbines in the United States totals about 25,000 per year, as opposed to millions or hundreds of millions per year at other human structures (Erickson 2001). The reason so few nocturnal migrants collide with wind turbines as opposed to communication towers is related to the shorter height of wind turbines and their lack of guy wires. A majority of migrants fly between 300 and 2,500 feet (91-915 m) above the ground (Kerlinger 1995, Kerlinger and Moore 1989), with small numbers flying above 5,000 feet (1,524 m). Except for landing and taking off, few migrants are below about 500-600 feet (152-183 m). Mean hourly altitudes usually exceed 1,200 to 1,500 feet (366-457 m).

Communication towers that are responsible for the vast majority of avian fatalities are greater than 400 or 500 feet (123-153 m; from literature and recent unpublished studies) in height and are much taller than wind turbines. The most recent literature surveys conducted by the U. S. Fish and Wildlife Service and the U. S. Department of Energy (Trapp 1998, Kerlinger 2000, Kerlinger 200 – available on web, Erickson et al. 2001) reveal virtually no mass mortality events at communication towers less than 400-500 feet in height and often no fatalities at towers shorter than this height. With most migrants flying over 300 feet above ground level, they are mostly above the turbine rotors and even higher above turbine lights (which are at about 260 feet [80 m]). The fact that there are no guy wires on turbines is also important, because it is the guy wires of communication towers that account for most of the collisions.

The information currently available and contained in this report is sufficient to evaluate potential risk to birds at the Flat Rock Wind Power Project site. The absence of known and suspected risk factors at this project site, combined with what was learned about the bird life of the project site and surrounding area suggests minimal risk to birds, with the possible exception of Northern Harrier for which there may be low or moderate risk.

Summary

From what was observed of the avifauna, habitat, and topography of the Flat Rock Wind Power Project site near West Lowville, Lewis County, New York, and from results of the literature search and interviews, the following conclusions were made:

1. The Flat Rock Wind Power Project site is not sensitive habitat, nor is it suitable habitat for rare, threatened or endangered species, with the possible exception of some grassland nesting birds and Northern Harrier. There are small wetlands within the project boundaries that will, generally, not be disturbed by the project footprint.
2. Land use on this privately owned site is agricultural, primarily hay and corn, with some grazing for dairy cows. Small woodlots of early-mid successional deciduous forest are scattered throughout, as are single-family homes.
3. The U. S. Fish & Wildlife Service reported no known endangered, threatened, or species proposed for listing on or within one mile of the site. The New York Natural Heritage Program reported two listed species that might be on the edge of the project site. Neither was found during the site visit, nor was habitat that appeared suitable. Northern Harrier (NYS threatened species), present during July 2000, may nest within the project area.
4. The Flat Rock project footprint supports mostly common nesting bird species.
5. The nearest Important Bird Area is located >10 miles (16 km) from the project site. No state parks, sanctuaries, and preserves are within 4 miles (6.4 km) of the site. There is a state forest about 2 miles (3.2 km) from the site and a state wildlife management area within about 2 miles (3.2 km) of the site. The large, contiguous forests of the Tug Hill Plateau are at least 3 miles (5 km) from the site. The site is not within the officially designated Tug Hill Region.
6. Significant hawk, songbird, waterfowl, shorebird, or other bird migration is not known to occur over the project site or adjacent lands. Experts voiced concern about impacts on night migrating songbirds.
7. The habitat on-site suggests no major concentrations of birds (shorebirds, waterfowl/water birds, raptors, songbirds) stopping over during migration. One expert suggested significant numbers of raptors might use the project area during late autumn migration.
8. Few birds will be found on site from November through March because of harsh winter weather, resulting in virtually no risk for one-third to one-fourth of the year. This time period coincides with the primary wind season.

Conclusion: Based on the findings provided above, the Flat Rock Wind Power Project in Lewis County, New York is likely to pose minimal risk to birds. The present study revealed nothing that indicated the need for further investigation, although harrier nest sites should be located and considered in the site plan.

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*Not all of the above references are cited specifically in the text. In some cases the references were consulted and information (or lack of information) was noted without citing the specific reference.

Figure 1. Map showing location of the Flat Rock Wind Power Project site, near West Lowville, Lewis County, New York.

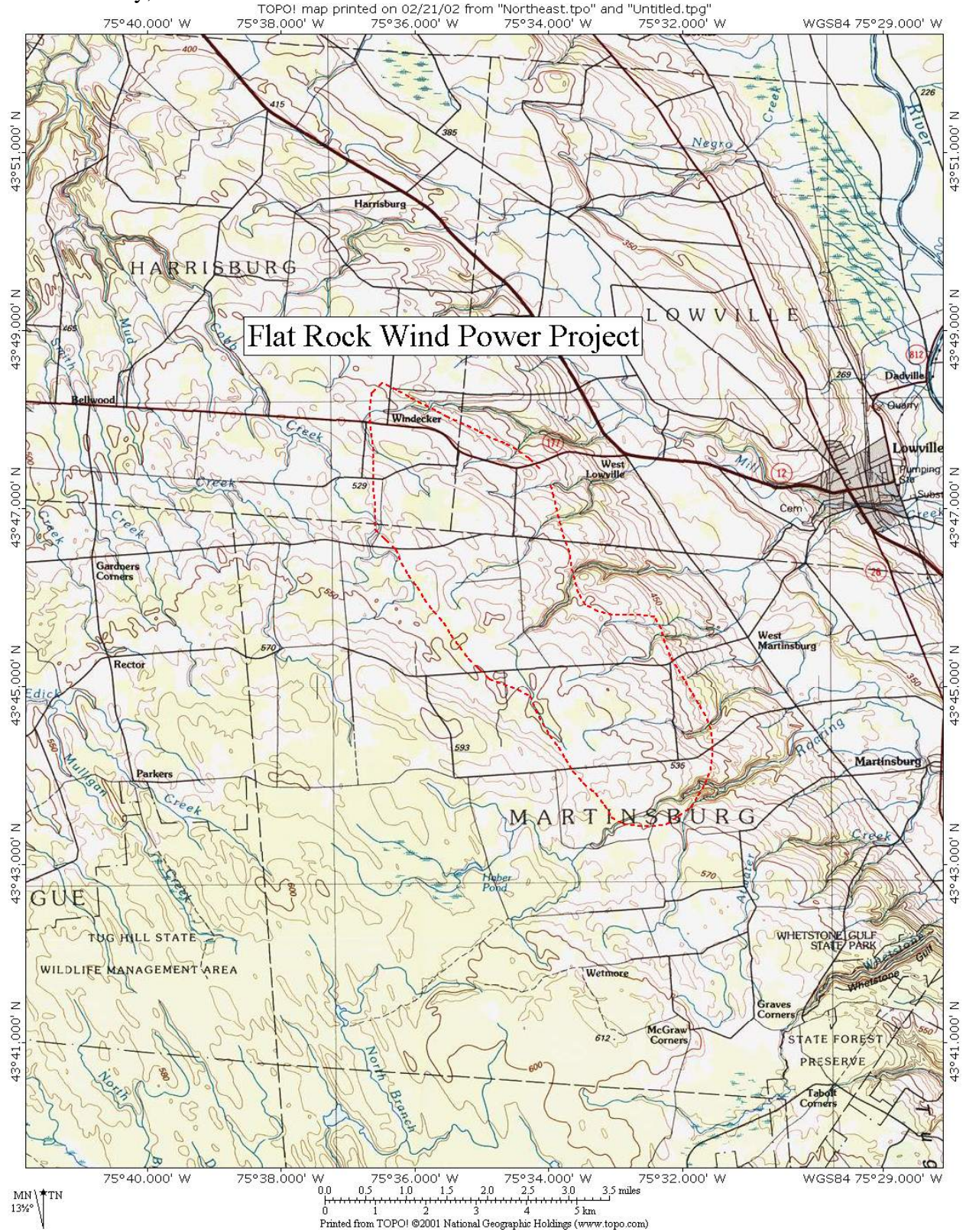


Figure 2. Photographs showing exemplary habitat at the Flat Rock Wind Power Project site near West Lowville, Lewis County, New York (taken July 2000).



Figure 2. Photographs showing exemplary habitat at the Flat Rock Wind Power Project site near West Lowville, Lewis County, New York (taken July 2000).



Appendix I. Protocol for interviews of agency staff, environmental organization staff, and knowledgeable parties/avian experts.

- Interviewer identifies himself and identifies client.
- Interviewer states purposes of phone call:
 - a) That he is doing a Phase I Avian Risk Assessment of a wind power project.
 - b) What a Phase I Avian Risk Assessment is (site visits, literature search, and interviews with experts - resulting in a report for developer and others to use to evaluate overall risk at a given site if it is developed as a wind power facility).
 - c) Location of the project - county, township, mountain or other distinguishing feature.
 - d) Brief description of project - megawatts of power, approximate number of turbines, characteristics of turbines (tubular towers, height, rotation speed of blades).
- Ask the following:
 - a) What is the policy of the agency or organization on wind power - if there is one.
 - b) Knowledge of bird life of a site/area at or near the project.
 - c) Specifics about nesting species, migration concentrations, wintering concentrations, migratory stopover concentrations, rare, threatened or endangered species, species of special concern.
 - d) Knowledge of significant habitats on project site or nearby.
 - e) Their concerns about wind power and risk to birds.
 - f) Other experts who should be contacted - names, phone numbers/organizations/agencies, etc.
- Ask if they wish to know anything about wind power or wind power in relation to birds.
- Inform them that they can call in the future to supply information or ask questions about wind power, the specific project, or risk to birds.

Interviews are not always conducted the same way. In some cases the order of the questions and information supplied changes as a result of the person being interviewed having questions or taking the lead. Overall, however, all of the above questions are asked and information supplied.

Appendix II. Letters from New York State Department of Environmental Conservation, Division of Fish, Wildlife, and Marine Resources (New York Natural Heritage Program) and the U. S. Fish and Wildlife Service in response to an inquiry for information regarding endangered, threatened, and species of special concern and wetlands at or near the Flat Rock Wind Power Project site near West Lowville, Lewis County, New York.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 LUKER ROAD
CORTLAND, NY 13045

June 21, 2000

Dr. Paul Kerlinger
Curry & Kerlinger, L.L.C.
P.O. Box 453
Cape May Point, NJ 08212

Dear Dr. Kerlinger:

This responds to your letter of June 7, 2000, requesting information on the presence of endangered or threatened species in the vicinity of the proposed Atlantic Renewable Energy Corporation's wind-turbine development in the Town of Lowville, Lewis County, New York.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) is required with the U.S. Fish and Wildlife Service (Service). Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered. A compilation of Federally listed and proposed endangered and threatened species in New York is enclosed for your information.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under the Fish and Wildlife Coordination Act or other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact:

New York State Department of
Environmental Conservation
Region 6
State Office Building
317 Washington Street
Watertown, NY 13601
(315) 785-2236

New York State Department of
Environmental Conservation
Wildlife Resources Center - Information Services
New York Natural Heritage Program
700 Troy-Schenectady Road
Latham, NY 12110-2400
(518) 783-3932

To reduce the potential for migratory bird mortality, it is recommended that:

1. The height of any individual tower be reduced to less than 200 feet.

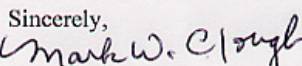
2. Individual towers be co-located on an existing structure or within an antenna farm.
3. If lighting is required only white strobe lights are used.

National Wetlands Inventory (NWI) maps may or may not be available for the project area. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853
(607) 255-4864

Work in certain waters and wetlands of the United States may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without stipulations, or recommend denial of the permit depending upon the potential adverse impacts on fish and wildlife resources associated with project implementation. The need for a Corps permit may be determined by contacting Mr. Paul Leuchner, Chief, Regulatory Branch, U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, NY 14207 (telephone: [716] 879-4321).

If you require additional information please contact Michael Stoll at (607) 753-9334.

Sincerely,

ACTING FOR
David A. Stilwell
Field Supervisor

Enclosure

cc: NYSDEC, Watertown, NY (Environmental Permits)
NYSDEC, Latham, NY
COE, Buffalo, NY

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Wildlife Resources Center - New York Natural Heritage Program
700 Troy-Schenectady Road, Latham, New York 12110-2400
Phone: (518) 783-3932 FAX: (518) 783-3916



June 30, 2000

Paul Kerlinger
Curry & Kerlinger
PO Box 453
Cape May Point, NJ 08212

Dear Mr. Kerlinger:

In response to your recent request, we have reviewed the New York Natural Heritage Program databases with respect to the proposed Wind Power Development, area as indicated on the map you provided, including a one-mile radius, located in the Towns of Lowville, Harrisburg and Martinsburg, Lewis County.

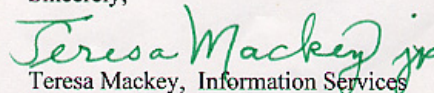
Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

This response applies only to known occurrences of rare or state-listed animals and plants, of significant natural communities, and of other significant habitats. For information regarding regulated areas or permits that may be required under state law (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

Sincerely,


Teresa Mackey, Information Services
NY Natural Heritage Program

Encs.

cc: Reg. 6, Wildlife Mgr.
Reg. 6, Fisheries Mgr.
Peter Nye, Endangered Species Unit, Delmar

Natural Heritage Report on Rare Species and Ecological Communities

Prepared 29 June 2000 by NY Natural Heritage Program, NYS DEC, Latham, New York

Records within, or possibly within, project boundary.

Records with a Precision value of "S" or with a blank Precision are known to be in a location that may be impacted by the proposed action. Records with a Precision value of "M" may possibly occur within the project area in appropriate habitat. This report contains SENSITIVE information that should be treated in a sensitive manner -- Please see cover letter. Refer to the User's Guide for explanations of codes, ranks, and fields.

Page 1

County	Town	Scientific Name, COMMON NAME, & Group Name	NY Legal Status, Heritage Rank, & Federal Status	Precision & Average	EO Rank & Last Seen	General Habitat and Quality	Detailed Location	USGS Topo Quad	Office Use
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* LEWIS
** MARTINSBURG

<i>Lanius ludovicianus</i>	ENDANGERED	M	H	1888-04-25	WEST MARTINSBURG	WEST LOWVILLE	4307575	ESU
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** MARTINSBURG,
MONTAGUE

<i>Phebe maculata</i>	RARE	1	BC	1999-07-13	MOST HERBACEOUS EDGES OF FOREST AND WETLANDS ALONG THE 150-200 PLANTS ALONG THE ROAD.	RECTOR ROAD GO S OF RT 177 ON SEARS POND ROAD TO RECTOR. FROM RECTOR, GO EAST ON RECTOR ROAD. PLANTS ARE ON THE N SIDE. 1.4 MI E OF RECTOR. ON THE S SIDE, 1.55 MI E OF RECTOR AND ON THE N SIDE, 3.55 MI E OF RECTOR.	WEST LOWVILLE	4307575
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Natural Heritage Report on Rare Species and Ecological Communities

Prepared 29 June 2000 by NY Natural Heritage Program, NYS DEC, Latham, New York

Records within 1 mile of project boundary.

Records with a Precision value of "S" or with a blank Precision are known to be in a location that may be impacted by the proposed action. Records with a Precision value of "M" may possibly occur within the project area in appropriate habitat. This report contains SENSITIVE information that should be treated in a sensitive manner -- Please see cover letter. Refer to the Users' Guide for explanations of codes, ranks, and fields.

Page 1

* County	** Town	Scientific Name, COMMON NAME, & Group Name	NY Legal Status, Heritage Ranks, & Federal Status	Precision & Average	EO Rank & Last Seen	General Habitat and Quality	Detailed Location	USCS Topo Quad	Office Use
* LEWIS	** MARTINSBURG	<i>Spirilla pallida</i> CLAY-COLORED SPARROW Bird	PROTECTED G-5; S2	M	E 1985-07-05	OLD FIELD WITH SCATTERED YOUNG APPLE TREES, HAWTHORNS AND WHITE PINE, MOST NO MORE THAN 15 FT. TALL. GROUND COVER MOSTLY GRASSES.	FLAT ROCK ROAD SITE FLAT ROCK RD., HALFWAY BETWEEN SWERNICKI ROAD AND WEST ROAD.		4307565

1 Records Processed

Natural Heritage Report on Rare Species and Ecological Communities

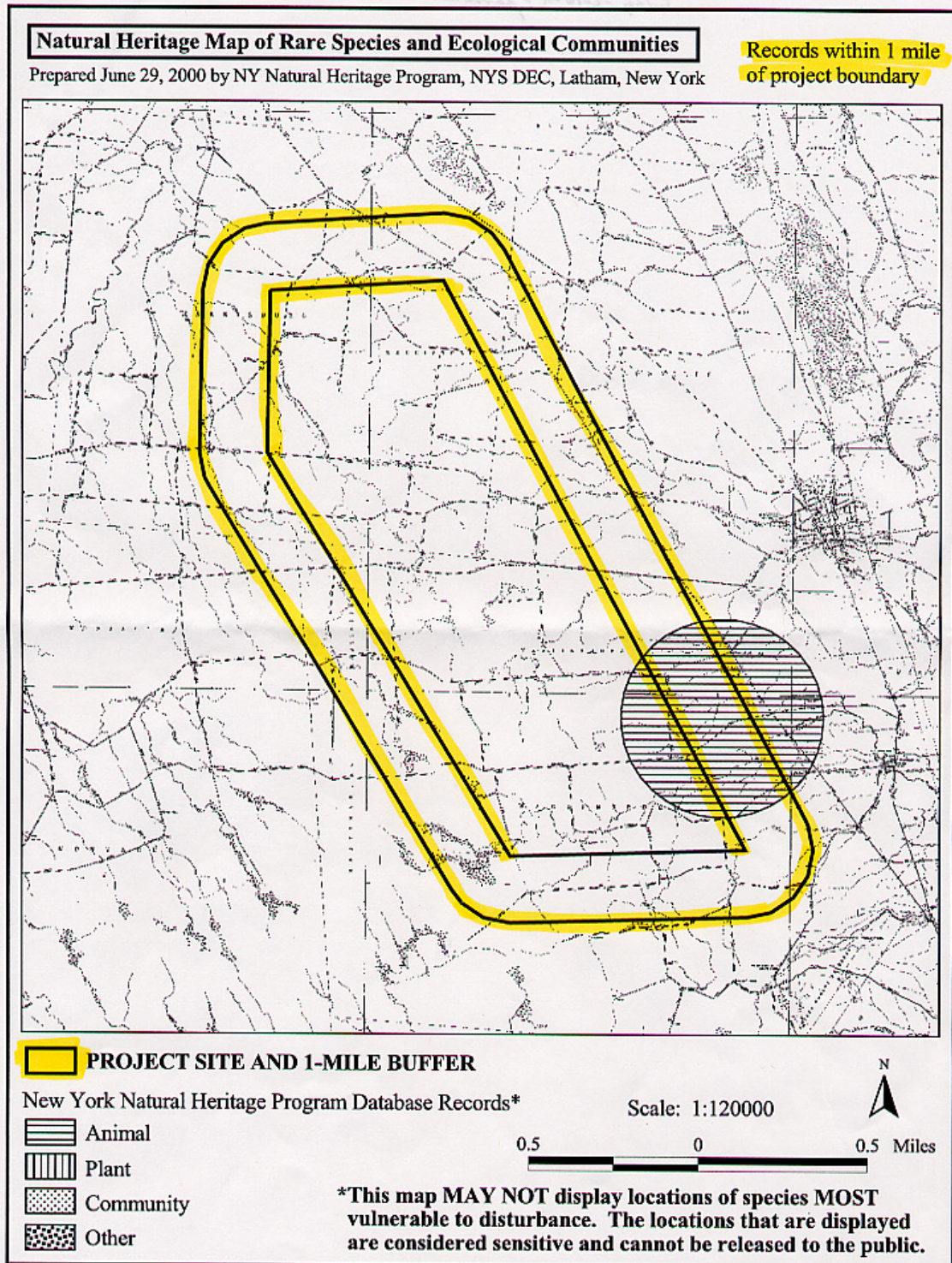
Prepared 29 June 2000 by NY Natural Heritage Program, NYS DEC, Latham, New York

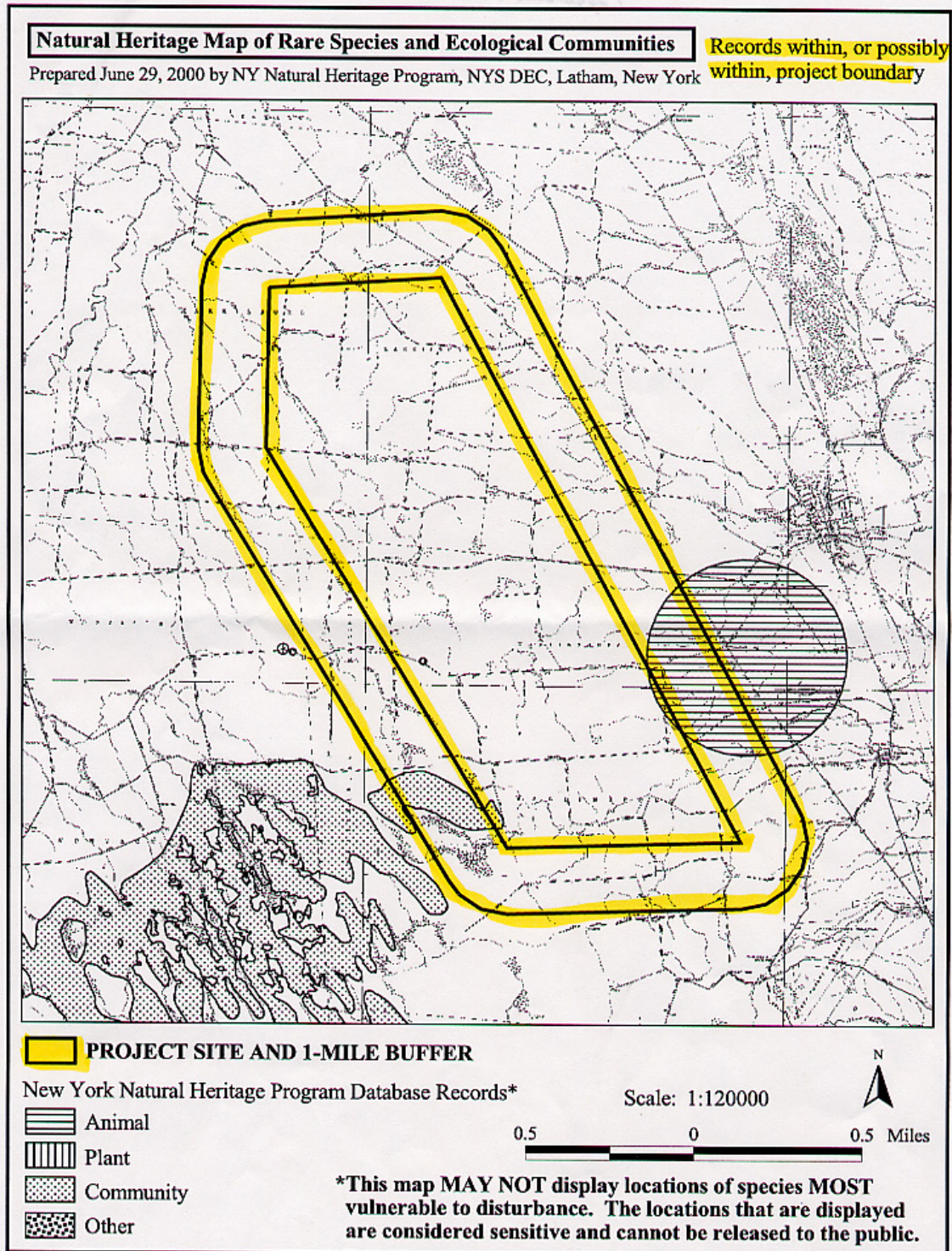
Records with a Precision value of "S" or with a blank Precision are known to be in a location that may be impacted by the proposed action. Records with a Precision value of "M" may possibly occur within the project area in appropriate habitat. This report contains SENSITIVE information that should be treated in a sensitive manner -- Please see cover letter. Refer to the Users' Guide for explanations of codes, ranks, and fields.

Page 2

* County	** Town	NY Legal Status, Heritage Rank, & Federal Status	Precision & Average	EO Rank & Last Seen	General Habitat and Quality	Detailed Location	USGS Topo Quad	Office Use
* LEWIS, OSWEGO	** MARTINSBURG	UNPROTECTED	S	AB	LARGE RELATIVELY REMOTE AREA OF APPROXIMATELY 66,400 ACRES FORMING THE EASTERN EDGE OF AN APPROXIMATELY 121,000-ACRE MATRIX BLOCK BEECH MAPLE MESIC FOREST COMMUNITY OF THE CENTRAL TUG HILL PLATEAU. VERY LARGE SIZE WITH SOME AREAS OF A GRADE FOREST (MATURE -80+ YEARS BUT NOT OLD GROWTH) BUT UNDER	CENTRAL TUG HILL FOREST THE ENTIRE CENTRAL CORE OF THE TUG HILL. PERIMETER ROADS INCLUDE: 1) RTE 26 TO THE EAST, 2) RTE 177 TO THE NORTH, 3) RTE 17 TO THE WEST AND 4) RTE 46 TO THE SOUTH.	REDFIELD	4307557

3 Records Processed





Appendix III. Summaries of interviews with avian experts, environmental organization representatives, and state and federal wildlife agency staffers.

New York Department of Environmental Conservation

Peter Nye, Chief of the Endangered and Threatened Species Program for New York State – to be interviewed 10/2/00

Bob Miller, Nongame Biologist (New York State coordinator for Partners in Flight) – Asked questions regarding footprint of area and asked if Dennis Faulknham, Regional DEC Biologist had been contacted (see below). Miller had no information regarding the project site or the area. He has previously voiced concern regarding night migrating songbirds.

Dennis Faulknham, Regional Wildlife Biologist with DEC Region 6 office in Watertown – Faulknham did not have personal knowledge of the project site or area. He stated that he would ask people in his office about the project site, especially among those in the habitat office at DEC.

Kim Hunsinger, Director for the new NYS Breeding Bird Atlas project – Was interested in the project, but deferred to Region 6 coordinator for the atlas (Bob Long – see below).

New York State Federation of Bird Clubs

Mary Alice Koeneker, President for the Federation – Although she lives and passes through the area not infrequently, Koeneker did not have information on the project site. She stated that the Federation currently has no policy regarding wind turbines. She also stated that there were very few birders that might know the area. She referred to several people including Jerry Letendre, Gerry Smith, Nick Leone, and Bill Evans as potentially having information about the project site and that the North Country Bird Club should be contacted (via Letendre).

Important Bird Areas - National Audubon Society - New York State office

Michael Burger, Ph.D., did not believe that the state office of Audubon had any policy regarding wind power development. He stated that turbines were not on the Audubon list of legislative resolutions. He had no knowledge of significant avian concentrations in the area and stated that there were no IBAs proposed for the area surrounding the project site. Dr. Burger stated that he would be in touch if he found any information about birds that would be germane to the project site.

U.S. Fish and Wildlife Service

Mike Stoll, Endangered Species Biologist – Stoll had no information to add about the project site or area. Although he did not know the exact project site, he knew the general area. He knew of no major migration routes through the area. He did ask about the migratory bird issue and deferred to Gerry Smith (see below) regarding specific birds that might be on the project site.

Partners in Flight

Bob Miller - see above under New York State DEC. He previously stated Partners in Flight did not have a policy regarding wind power development.

The Nature Conservancy

Gerry Smith, biologist and expert birder from Oswego County (who lives in Barnes Corners on Route 177), is very knowledgeable about the birds of the Tug Hill, New York, area. He stated that he had limited information about the project site, but referred me to the Tug Hill Commission (saying they would not have information about birds). He asserted that both the Nature Conservancy and Tug Hill Commission would have great interest in the project. He did not believe there were major migration pathways or stopover sites in Lewis County, except for late autumn along the eastern escarpment of the Plateau. He suspected that there could be concentrations of Rough-legged Hawks there until the snow became deeper, but he did not have data or first-hand information. He did state that grassland birds, including Northern Harrier, might nest in some hay and grazing fields, but that they were likely to be unsuccessful as a result of mowing of hay. Regarding the ecology of the site, Smith stated that the property was outside of the sensitive portion of the Tug Hill Plateau in that it was not heavily forested.

Hawk Migration Association of North America

Jeffrey Dodge, former editor of Journal of the Hawk Migration Association of North America – Dodge was interviewed about the general area in 1999. He knew of no concentrations of migrating hawks and deferred to Gerry Smith, an expert on hawk migration in that region (see above).

St. Lawrence – Adirondack Audubon – Chapter of National Audubon Society

Dr. Lee Harper, President of the chapter and an ecological and avian consultant – Dr. Harper did not know the specific site, but did have knowledge of the region. He stated that he would ask others in his chapter, including the Conservation Committee chairperson regarding concerns and what birds might be in the area. He did state that Loggerhead Shrike has not nested successfully in the area for many years and that the site where they used to nest near the project site (see attached letter from NYS DEC Natural Heritage Program) has not hosted these birds in recent

years. He did not know of any significant migration through the project region, nor did he know of significant wintering aggregations of birds.

Other Knowledgeable Birders from the Tug Hill, New York State, Area

Bill Evans, avian biologist and migration expert – Evans has studied migration in numerous sites in New York State and across the United States. Using acoustical methods (listening to migrants), Evans has added significantly to our knowledge of migration. He stated that songbirds migration east of Lake Ontario is greater than south of the Lake, possibly because of lake effect. He studied migration for two nights at a location close to the project site and found migration traffic rates (numbers of birds passing in a given period of time) to be similar to other areas east of Lake Ontario – not outstanding. He further stated that birds may be flying lower there than farther south, based on his own information and that of Cooper et al., with whom he collaborated.

Jerry Letendre, North Country Bird Club, former president and retired from New York State Department of Environmental Conservation – Letendre knew the general area, but did not have specific information regarding the farms on which the project will be constructed. He deferred to Nick Leone and Jim Farquar.

Jim Farquar, Biologist with New York State Department of Environmental Conservation, Watertown office and local bird expert – to be contacted 10/2/00

Bob Henrickson, local bird expert who conducts breeding birds atlas work for DEC – Henrickson conducts atlas work in blocks adjacent to the project site and is very familiar with the area. He stated that there are not likely to be eagles in the area, but Northern Harriers are likely to nest nearby. He knew of no significant migration aggregations or aggregations in other seasons. Henrickson did not know of other endangered or threatened species nesting on or near the project site.

Nick Leone, local bird expert – He did not know the “exact location” but was knowledgeable about the area. Leone spends considerable time birding in the general area. He suspects that the only listed species that may nest on or adjacent to the project site is Northern Harrier. He knew of no migration routes or concentrations of birds in the area of the project. He also stated that there were not likely to be nesting Henslow’s Sparrows or Upland Sandpipers – two species that are listed by New York state and are known to nest in the Fort Drum grassland areas. The occurrence of these and other grassland listed birds in the Tug Hill area is rare according to Leone.

Appendix IV. Review of avian studies in the United States and Canada.**UNITED STATES**

- **Vermont** – Searsburg near Green Mountain National Forest, 11 modern turbines in forest on hill/mountain top, nesting and migration season, 0 fatalities, Kerlinger 2000
- **New York** - Tug Hill Plateau, 2 modern turbines on farmland, 2 migration seasons, 0 fatalities, Cooper and Johnson 1995
- **New York** – Madison County, 7 modern turbines on farmland, 7 months (of a 1 year project in progress), 2 songbird migrant fatalities, Curry & Kerlinger, 2001 in progress
- **Pennsylvania** – Garrett (Somerset County), 8 modern turbines, farm fields, 12 months, 0 fatalities, Curry & Kerlinger, LLC, unpublished report
- **Massachusetts** – Princeton, 8 older turbines - type unknown, forest (hardwood) and brush, autumn & winter, 0 fatalities, Jacobs 1995
- **Minnesota** – Buffalo Ridge near Lake Benton, 200+ of modern turbines in farm and grassland, several years (1997-1999), 53 fatalities (mostly songbirds and 1 hawk); some displacement found among grassland nesting songbirds; Osborn et al. 2000, Johnson et al. 2000, Johnson et al. 2000, Johnson et al. 2000, Strickland et al. 2000, Leddy et al. 2000
- **Kansas** – St. Mary's, 2 modern turbines in grassland prairie, 2 migration seasons; 33 surveys, 0 fatalities, E. Young personal communication
- **Wisconsin** – Kewaunee County Peninsula, 31 modern turbines in farmland, 1+ year, 18 fatalities (3 waterfowl, 14 songbirds, some night migrants), report to Wisconsin Dept. of Natural Resources, Madison Gas & Electric, and Wisconsin Dept. of Public Service
- **Wisconsin** – Shirley, 2 modern turbines in farmland, 54 surveys, 1 fatality (night migrating songbird), report to Wisconsin Department of Natural Resources Bureau of Integrated Science Services and Richter Museum of Natural History Special Report
- **Iowa** – Algona, 3 modern turbines in farmland, three seasons, 0 fatalities, Demastes & Trainer (2000)
- **Colorado** – Ponnequin, 29 modern turbines in rangeland, 2.75 years - 1999-2001, 14 songbird, 1 duck, 1 American Kestrel fatality, Kerlinger, Curry, and Ryder 2001 unpublished
- **Wyoming** – Foote Creek Rim, 69 modern turbines in rangeland, 2 years, 75 fatalities (songbirds - one-half were night migrants - and 4 raptors), Johnson et al. 2001

- **Oregon** – Vansycle, 38 modern turbines in farm and rangeland, 1 year, 11 birds (7 songbirds [~ 4 night migrants], 4 gamebirds, Erickson et al. 2000
- **California** - Altamont Pass Wind Resource Area (APWRA), 5,400 older turbines mostly on lattice towers in grazing and tilled land, many years, large numbers of raptor fatalities (>400 reported) and some other birds, Howell and DiDonato,1991, Howell 1997, Orloff and Flannery 1992, 1996, Kerlinger and Curry 1997, 1999, Thelander and Rugge 2000
- **California** – Montezuma Hills, 237 older turbines, 11 modern turbines in farmland, 2+ years, 30+ fatalities (10 raptors, 2 songbirds, 1 duck), Howell and Noone 1992, Howell 1997
- **California** - San Geronio Pass Wind Resource Area, thousands of older turbines, 120 studied in desert, 2 years, 30 fatalities (9 waterfowl, 2 raptors, 4 songbirds, etc.), Anderson et al. 2000
- **California** - Tehachapi Pass Wind Resource Area, thousands of turbines, 100s of mostly older turbines studied, in Mojave Desert mountains (grazing grassland and scrub), 2+ years, 84 fatalities (raptors, songbirds), Mitchell et al. 1991, Orloff 1992, Anderson et al. 2000
- **Texas** - no reports available from more than 200 modern turbines, fatalities have yet to be reported, communication from FPL Energy official
- **Iowa** - no reports available from more than 200 modern turbines other than Algona, farmland, fatalities have yet to be reported, communication from FPL Energy official

CANADA

- **Quebec** - Le Nordais, Gaspé, 2 projects, 133 modern turbines in forest, 26 studied, two seasons, no fatalities, report to Province of Quebec Ministry of Environment 2000
- **Alberta** –Medicine Hat and Lethbridge, 2 projects, no reports of avian fatalities to date