Addendum to the Phase I Avian Risk Assessment for the Flat Rock Wind Power Project, Lewis County, New York: Phase One and Phase Two

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Introduction

A Phase I avian risk assessment was conducted for Atlantic Renewable Energy Corporation for the Flat Rock Wind Power Project west of West Lowville, Lewis County, New York. The report that resulted was finalized in 2002 (Kerlinger 2002) and included the assessment of risk for a project that originally consisted of about 66 turbines and a nameplate power generation capacity of about 99 megawatts. Since the report was completed, the originally proposed project has been changed, with respect to the geographic extend of the project and the number of turbines (i.e., generation capacity). The Flat Rock Wind Power project that was originally assessed is now being considered as the Phase One portion of the Flat Rock project and an additional area, hereafter referred to as Phase Two, is now being considered for development.

This report is an addendum to the Phase I avian risk assessment (Kerlinger 2002). It includes a description of changes to the Phase One portion of the Flat Rock Wind Power Project, details regarding the Phase Two portion of the project, and an approximation of potential risk that may result from the larger project. In addition, the report identifies the uncertainties of predicting avian risk for the Phase Two portion of the project and additional research that is needed to more thoroughly assess risk.

Phase One - Project Changes. Only one potential change has been made to the original Phase One project previously assessed by Kerlinger (2002). That change includes the possible addition of about 14 turbines to the Phase One project. This would bring the total number of turbines within the Phase One boundary to about 80 from the previous 66 that were proposed.

Phase Two – Project Description. The Phase Two project is proposed for the properties immediately surrounding the Phase One project area (Figure 1). The largest expansions are to the south, of Roaring Brook and to the west of Porter Road. These areas and the others around the Phase One boundary, basically double the area within the boundary of the original Flat Rock project. Within the Phase Two area between about 80 and 117 turbines would be constructed. The maximum number of turbines within the two Phases would be about 183, although this is tentative. These turbines would produce the electrical equivalent usage of about 275 megawatts of emission free power. The turbines used in Phase Two would be about the same size as those proposed for Phase One; each providing a nameplate 1.5 megawatts of power per turbine. The towers would be 80 m (262 feet) tubular towers with a 35.25 m (116 feet) long rotor. Towers would be lit according to FAA obstruction lighting guidelines and, if permitted by FAA, correspond to the recommendations of the U. S. Fish and Wildlife Service communication tower guidance document. All transmission within the project site would be underground. Any differences in transmission lines from the site to the grid are described in other Atlantic Renewable documents.

Habitat and Topography of Phase Two. Habitats observed within the Phase Two project area appeared to be similar to those within the Phase One project area. However, not all of Phase Two was examined during the Phase One site visit in July 2000. During the course of evaluating habitat and birds that reside on and use the Phase One portion of the Flat Rock project, portions of the Phase Two area were examined. Those areas included Harrisburg south of O'Brien Road

and east of Porter Road (all above Route 177). Only a small portion of the area west of Porter Road was examined. Little of the habitat south of Roaring Brook was examined. It is likely that the habitat that was not observed was also similar, but until the site is visited there will be uncertainty. Based on examinations of topographic maps, the elevations and topography of the Phase Two site are very similar to that of the Phase One project area. The maximum elevation within the Phase Two project area is just under 2000 feet (ASL and the minimum elevation is around 1,500 feet ASL. The site appears to be mostly farm fields with small woodlots, with a few narrow, riparian strips. Land use is likely to be mostly farming. The habitat within about one half of a mile (~1 km) to the southeast of the Phase Two is relatively unfragmented forest. That forest is likely to be high quality nesting habitat for various forest nesting birds including interior and sensitive species.

Endangered and Threatened Species. A letter from the U. S. Fish and Wildlife Service Ecological Services office in New York State did not reveal any records of listed species within the Phase One and Phase Two project areas. A similar letter from the New York Department of Environmental Conservation Natural Heritage Program listed the same two state listed species as were included in a letter from 2000 from that agency. These two species, Clay-colored Sparrow (state "protected") and Loggerhead Shrike (state "endangered"), were known to occur on or near the project area. These records were old. The Clay-colored Sparrow location was at the boundary of the Phase Two area and the Loggerhead Shrike location was not disclosed.

Another database of listed species was consulted. The New York Breeding Bird Atlas was recommenced in 2000 and there are now data from several "blocks" (6 blocks per 1:24,000 topographic quad) that are either included in the Phase One and Two project site. Several listed species were found within these New York State Breeding Bird Atlas blocks, although it is not known if they occur withn the project boundary. The threatened species include Northern Harrier and Upland Sandpiper. Species of special concern include American Bittern, Osprey, Cooper's Hawk, Northern Goshawk, Red-shouldered Hawk, Red-headed Woodpecker, Horned Lark, Sedge Wren, Vesper Sparrow, and Grasshopper Sparrow. The presence of these species in nearby Atlas blocks suggests nesting surveys are needed to determine whether they are present and, if they are, where they occur.

Nesting Birds. The larger size of the Flat Rock project expansion that results from the addition of Phase Two and the uncertainty about habitat within the Phase Two area suggests that, at minimum, a site visit is needed to examine habitat suitability to listed species. No assessment of risk can be made without examining the habitat within the Phase Two project boundaries. The presence of habitat within the Phase One boundary that was marginally suitable for some grassland nesting birds, including some of the species listed above, suggests that some of these species nest in the general area. A nesting bird survey of those portions of the Project sitewith suitable habitat would provide an excellent means of determining what and if displacement/disturbance type impacts were likely to occur as a result of the presence of wind turbines. Those data would also serve as baseline data to determine impacts following construction.

Migration. The fact that a thorough migration study was conducted by Cooper et al. (1995) for Niagara Mohawk Power Corporation in Copenhagen and Martinsburg. The Copenhagen study

site was about 4 miles (6.4 km) north of the northern Project boundary and the Martinsburg study site was near the center of the Phase II project area. That study was conducted to determine potential risk to day and night migrating birds at a site where a moderate to large-scale wind power project was planned. Both surveillance and vertical beam radars were used to determine overall numbers of migrants, their geographic pattern over the ground, and as well as their height. In addition, the Cooper et al. study conducted visual observations of birds flying over the site during daytime. The Cooper et al. study is similar to a study conducted at the Buffalo Ridge wind power resource area of southwestern Minnesota, where there are now hundreds of wind turbines. That study revealed more than 3.5 million birds per year passing over the project site. Subsequent mortality studies demonstrated that large numbers of migrants passing over a wind power project site does not mean that large-scale or significant mortality will occur.

Wintering Birds. Winter use of the Project area by birds was concluded to be relatively low in the risk assessment (Kerlinger 2002). The harsh weather, both deep snow and strong winds, results in a scarcity of birds between late November and mid-March within the Project and surrounding areas. The conclusions made in the avian risk assessment for Phase One are likely to be the same for the larger area – that there will be few birds present during winter and use of the site is likely to be low, despite the larger area encompassed.

Important Bird Areas, Parks, Nature Preserves, Sanctuaries, and Sensitive Habitats Neaer the Flat Rock Wind Power Project Site, Lewis County, New York. In general there are few changes that need to be noted to the original risk assessment. One important change is the southern boundary of the Phase Two project is immediately adjacent to the Whetstone Gulf State Park and the State Forest Preserve. The original project boundary was about 4 miles (6.4 km) north of these areas. This places wind turbines closer to preserved areas. The southwestern boundary of the project is now closer to the Tug Hill Wildlife Management Area and is less than 2 miles (3.2 km) from the wind power project boundary. It should further be noted that the streams that flow out of and through the project area are tributaries of the Black River to the east of the project site, which is know to have high quality habitat both within and along the riparian area.

Risk Assessment and Revised Wind Power Literature Search

An assessment of risk to birds at the Flat Rock project site, both Phase One and Phase Two areas, follows. There is a degree of uncertainty with respect to assessing risk, based on a lack of first hand information on the habitats present within the Phase Two project boundaries. Thus, the risk assessed herein, especially for Phase Two, is preliminary.

<u>Endangered, Threatened, and Species of Concern</u>. Because federally listed species are not known to occur on or immediately adjacent to the project site and because they are not known to be killed by wind turbines, risk to these species is not likely to be ecologically significant. With respect to New York State listed species, collision impacts are not likely to be ecologically significant. However, disturbance and subsequent displacement of New York State listed species (threatened and species of concern) that are known to nest in the area, could result if the species nest within the Project boundary. Nesting surveys for these species are needed to fully assess risk to these species.

Nesting Birds. Risk to nesting birds (non-listed species) is likely to be somewhat higher than was assessed for the Phase One project area. The reason for this is that both phases of the Project will, basically double the Project footprint. This could displace individuals of more sensitive species and displace them over a larger area than was examined for Phase One. As with listed species, nesting surveys are indicated as a means of assessing risk to species that may be sensitive. These surveys would also serve as baseline data for postconstruction impact studies. Standardized methods of surveying for both listed and non-listed species are appropriate.

Migrating Birds. The risk to migrants at the project site is likely to be somewhat greater than was determined in the risk assessment done for the Phase One project. The fact that avian mortality at wind power facilities is often measured in birds killed per turbine per year implies that with a larger number of turbines, absolute numbers of fatalities would increase. This increase could be proportional to the number of turbines constructed. It is important to note that neither communication towers less than 500 feet (152 m) in height, nor wind turbines are known to be involved in large-scale avian mortality events (Erickson et al. 2001). In fact, almost all studies at wind turbines and shorter towers (<500 feet) have shown avian collision impacts to be minor. This suggests that the likely impact to migrating birds at the Phase One and Phase Two projects will not likely to be ecologically significant. However, as the numbers of turbines increases, the absolute number of collision fatalities is likely to increase proportionately.

Literature Review – Updated

Since the Phase I risk assessment was completed, several new studies of the impacts of wind turbines and communication towers on birds have been published. The conclusions review included in the Phase I risk report The updated reference list is provided below, along with short annotations for those reports that needed more explanation than was provided in the report titles. In summary, there has been no indication that wind turbines impact ecologically significant numbers of birds. The average of about 2 birds killed per turbine per year (Erickson et al. 2001) would seem to still be accurate. Appendix I provides a summary of avian studies and reported impacts at wind power projects in the United States and Canada. This list updates Appendix IV that appeared in the Phase I risk assessment report.

Recommendations

The following recommendations are made based on what is known and what is not known about the Phase One and Phase Two portions of the Flat Rock Wind Power Project. Other recommendations may be made following completion of a site visit and the nesting birds surveys recommended below.

- A site visit to examine avian habitat within the Phase Two portion of the Project should be made in June to determine areas of sensitive avian habitat or areas that may at tract large numbers of birds.

- Nesting bird surveys for all areas within the Project site that could support listed and sensitive species, mostly in grassland and wetland areas.

- To avoid avian collisions, permanent meteorology towers should be free-standing and without guy wires.

- FAA lighting should correspond to the U. S. Fish and Wildlife Service recommended guidelines for communication towers, if permitted by the FAA. The number of towers that are lit should be kept to a minimum. Lighting on those towers that need to be lit should include the lighting that research has demonstrated Red incandescent blinking lights and constant on red or white night lighting should be avoided. White or red strobes should be used that blink simultaneously should be used so that double lights on turbines can be avoided.

Literature Cited

The following list of references updates the list provided in Kerlinger 2002. Each reference is annotated briefly, where necessary, to show its relevance to the Flat Rock avian risk assessment.

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Johnson, G.D., D.P. Young, Jr., W.P. Erickson, M.D. Strickland, R.E. Good, and P. Becker. 2000. Avian and bat mortality associated with the initial phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming: November 3, 1998-October 31, 1999. Report to SeaWest Energy Corp. and Bureau of Land Management.

Johnson, G.D., D.P. Young, W.P. Erickson, C.E. Derby, M.D. Strickland, and R. E. Good. 2000. Wildlife monitoring studies SeaWest Windpower Project, Carbon County, Wyoming, 1995-1999. Prepared for SeaWest Energy Corporation and BLM by WEST, Cheyenne, WY.

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Kerlinger, P. 2000. Avian mortality at communications towers: a review of recent literature, research, and methodology. Report to the U. S. Fish and Wildlife Service. www.fws.gov/r9mbmo Review of literature on impacts of communication towers and other tower-like structures on birds between 1995 and 2000.

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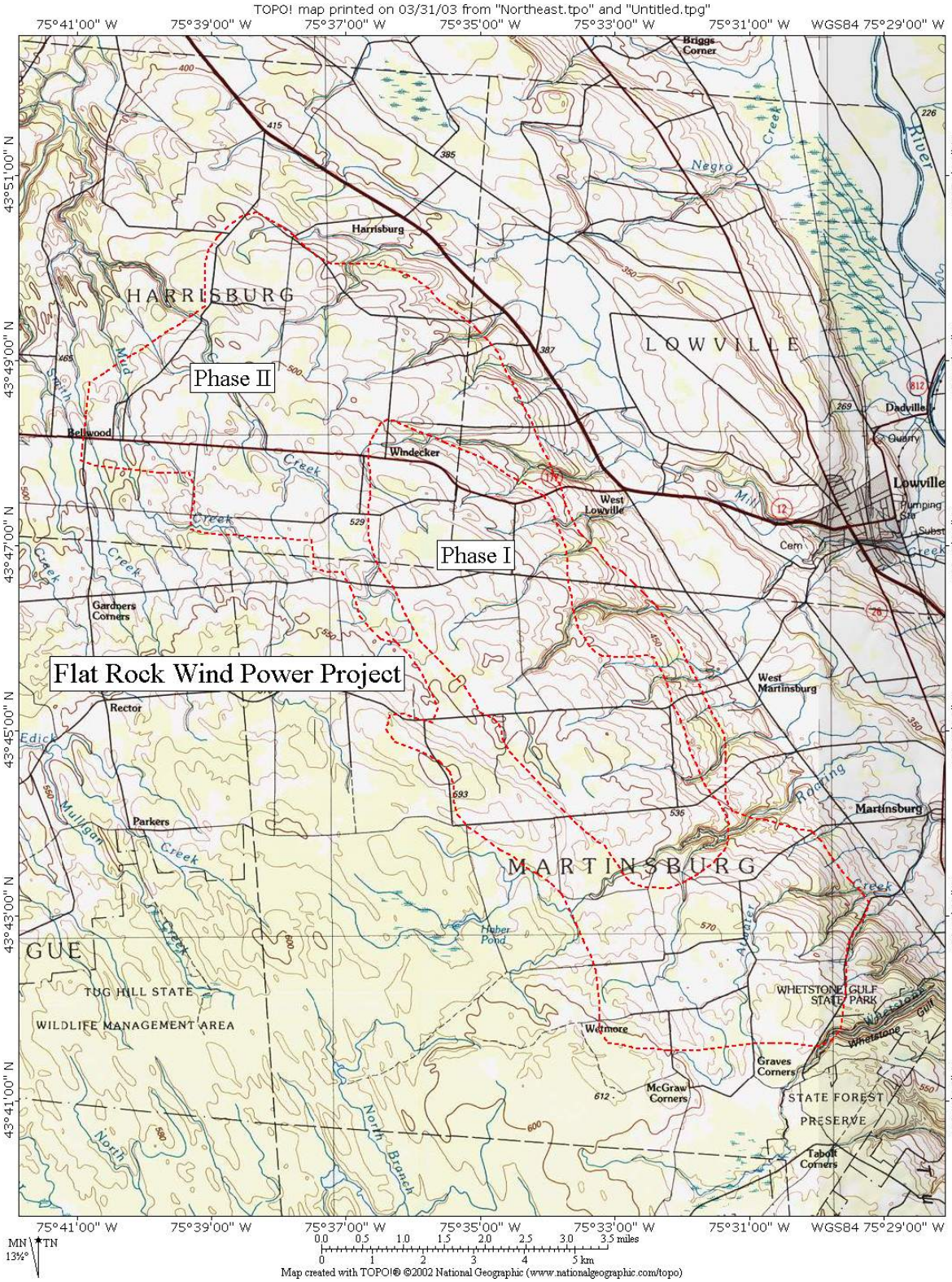
Figure 1. Map showing both Phase One and Phase Two of the Flat Rock Wind Power Project, Lewis County, New York. The outer dashed line includes both Phase One and Phase Two, whereas the inner dashed line represents the area assessed by the Kerlinger (2002) avian risk assessment.



Appendix I. Revised and updated 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, 7 modern turbines on farmland, 1 year, 5 fatalities (2 songbird migrants, 1 owl, 1 woodpecker), Curry & Kerlinger 2002, unpublished report.

- **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); 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 at two farmland sites, ~2 years, ~21 fatalities (3 waterfowl, 14 songbirds - some night migrants), report to Wisconsin Dept. of Natural Resources, Madison Gas & Electric, and Wisconsin Dept. of Public Service, Howe et al. 2002

- **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 (44 in 2001) modern turbines in rangeland, 4 years - 1999-2002, 25+ songbirds, 1 duck, 1 American Kestrel fatality, Kerlinger, Curry, and Ryder 2002 unpublished

- **Wyoming** – Foote Creek Rim, 69 modern turbines in rangeland, 2 years, 75 turbine fatalities (songbirds – 48% night migrants - and 4 raptors), Johnson et al. 2001 (15 additional fatalities were at guyed meteorology towers)

- **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 Gorgonio 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 300 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 official

CANADA

- **Quebec -** Le Nordais, Gaspe, 2 projects, 133 modern turbines in forest, 26 studied, two migration seasons, no fatalities, report to Province of Quebec Ministry of Environment 2000

- **Prince Edward Island** – 8 modern turbines in coastal habitat, 2 migration seasons, 1 dead songbird, preliminary report

- **Alberta** –Medicine Hat and Lethbridge, 2 projects, no reports of avian fatalities to date