United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

October 12, 2005

David Perri, P.E.
Executive Vice President
Chautauqua Windpower, LLC
550 Mamaroneck Avenue, Suite 303
Harrison, NY 10528

Dear Mr. Perri:

The U.S. Fish and Wildlife Service (Service) has reviewed the Avian Risk Assessment (ARA) Report for the proposed Chautauqua Wind Project (CWP) located approximately 1.5 miles inland of Lake Erie, in the Towns of Ripley and Westfield, Chautauqua County, New York. The ARA was prepared by the project sponsor, Jasper Energy, and its consultants, Pandion Systems, Inc., and Ecology and Environment, Inc. The intent of an ARA is to examine potential risk to avian species from constructing and operating wind turbines at a proposed project site.

Our comments in this letter are provided pursuant to the Fish and Wildlife Act of 1956 (70 Stat. 1119, as amended; 16 U.S.C. 742 *et seq.*), Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) (BGPA), as applicable. In addition to these comments, we will provide additional future comments pursuant to the ESA and other authorities, including the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 *et seq*), as applicable. This letter should not be construed as all-inclusive on the issues pertaining to this project as the Service will provide future comments. The focus of our comments in this letter pertains to the Migratory Bird Treaty Act (40 Stat. 755; 16 U.S.C. 703-712) (MBTA).

Migratory birds, such as waterfowl, passerines, and raptors, are Federal trust resources and are protected by provisions of the MBTA. The Service is the primary Federal agency responsible for administering and enforcing the MBTA. This act prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." The unauthorized taking of even one bird is legally considered a "take" under the MBTA and is a violation of the law. Neither the MBTA nor its implementing regulations, 50 CFR Part 21, provide for permitting of "incidental take" of migratory birds that may be killed or injured by wind projects. However, we recognize that some birds may be killed at structures such as wind turbines even if all reasonable measures to avoid it are implemented. Depending on the circumstances, the Service's Office of Law Enforcement may exercise enforcement discretion. The Service focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when proceeding without adequate preconstruction study or where conservation measures have been either not developed or not properly implemented.

The Service previously provided project-specific comments to the project sponsor in letters dated January 8, 2003, August 26, 2003, February 4, 2004, and September 17, 2004. In addition, we met with the CWP team to discuss various project issues on April 17, 2003, August 12, 2003, December 16, 2003, June 4, 2004, and October 5, 2004. Numerous phone conversations and electronic correspondence have also been exchanged between the involved parties including resource and regulatory agencies and local elected officials. A recent meeting to discuss the ARA was held on August 10, 2005, between the project sponsor, representatives of the Towns of Ripley and Westfield, staff from the New York State Department of Environmental Conservation (NYSDEC), and the Service. While some of the issues raised in this letter were discussed at the meeting in August, we offer to participate in other meetings to further clarify issues of concern, if necessary, and to discuss the attached comments.

This cover letter summarizes the main concerns we have at this point in project review, and enclosed, are our substantive text-specific comments and concerns. Finally, below we provide a summary of recommendations for continued coordination and consultation on this project.

Summary of Service Comments: Our comments on the proposed project consistently state a concern that the construction and operation of wind turbines in a known migratory bird corridor results in significantly elevated risk of harm to migratory birds, including raptors.

The Department of the Interior and the Service support the responsible development of renewable energy sources (e.g. wind) where feasible and appropriate. However, our agency believes that the siting of windpower facilities should consider site-specific risks to wildlife. We may not support the development of wind energy at certain sites where there is an obvious elevated risk to wildlife. With respect to the draft ARA report for the CWP, our evaluation, to date, leads us to conclude that:

- The scope of data collected specific to the unique features and wildlife use at this site is inadequate for a number of reasons which we will elaborate on in the enclosure;
- Use of, and reliance on, information from other sites around the world has limited application, as impacts to wildlife are very site- and species-specific;
- The risk assessment methodology developed for, and used in, this ARA report is not one we can support;
- The interpretation of State and Federal regulations in the ARA is not one that we can concur with;
- Recommendations made by the Service early in the coordination process have not been embraced; and
- Because of the above points, many of the conclusions drawn in the ARA report are not supported by the Service.

The arguments made in the ARA report did not convince us that putting turbines in a documented avian migratory pathway, and in listed species habitat, is prudent. Based on the above, and articulated in detail in the enclosed comments, the Service does not support the conclusions of the ARA.

Recommendations:

- We recommend a minimum of 3 years of comprehensive data collection at the proposed project site;
- Radar studies should extend throughout the entire migratory periods, cover additional seasons not sampled, and include times of the day when birds may be congregating at the project site (i.e. early morning);
- Additional information on bald eagle use of the site, including migratory and resident birds, should be provided;
- The project design has recently changed but revisions have not been made to the ARA analysis. The risk assessment protocol should be revisited in light of the comments provided, and a method which would likely produce more reliable results should be undertaken;
- The section on applicable regulations should be removed; and
- Once the degree of risk to migratory birds is more accurately documented, additional efforts should be proposed for mitigating those effects.

Should you have questions regarding these comments, please do not hesitate to contact Tim Sullivan of my staff at 607-753-9334.

Sincerely,

David A. Stilwell

David A. Stilwell
Field Supervisor

Enclosure

cc: Jasper Wind, Harrison, NY
Town of Ripley, NY
Town of Westfield, NY
NYSDEC, Albany, NY (J. Harie)
NYSDEC, Albany, NY (K. Kispert)
NYSDEC, Albany, NY (P. Nye)
USDOI, Boston, MA (D. Rothstein)
USFWS, Arlington, VA (A. Manville)
USFWS, Hadley, MA (A. Hoar)
NYFO, Project & BR Files
Sullivan File
ES:NYFO:TSullivan:trs:mlp
L. Zicari
M. Clough

Enclosure to the U.S. Fish and Wildlife Service's letter of October 12, 2005

U.S. Fish and Wildlife Service
New York Field Office
Comments on our review of 2004 Avian Risk Assessment Report
Chautauqua Wind Project
Towns of Ripley and Westfield, Chautauqua County, New York
October 2005

I. Introduction and Project Description

The State Environmental Quality Review Act (SEQRA) environmental review process provided the U.S. Fish and Wildlife Service (Service) with an opportunity to express concerns and provide comments to the representatives of the Towns of Ripley and Westfield, Co-Lead Agencies in the SEQRA process, on the protocols which should be followed by the project sponsor to evaluate the proposed wind farm project's potential impacts on wildlife. During the course of that review, the Service informed Chautauqua Wind Project (CWP) of the following concerns:

- Additional avian studies may be required to account for data variability if studies were conducted for only one spring and one fall migration period.
- An adequate avian mortality monitoring study should be conducted to fulfill the requirements of the Final Scope of Work. (During the scoping process, we informed the project sponsor that the spring 2003 mortality study was insufficient.)
- Descriptions of all data collection protocols used by project consultants, as well as all raw data and data sheets should be included in appendices of the revised Avian Risk Assessment (ARA) report.

II. Interpretation of State and Federal Law Found in the ARA Report

The introductory section of the ARA report contains an interpretation of State and Federal laws pertaining to wildlife and the proposed project with which we cannot concur. Ideally, a robust and scientifically-supportable ARA would be presented to the involved agencies so that they could independently determine whether the project will satisfy their requirements.

- We do not concur with the interpretation of the Federal wildlife laws as addressed in the ARA. Further, we do not agree with the inclusion of this section within a technical report.
- Because we do not concur and we are the regulating agency in many cases, it would be misleading to the public for CWP to assume the accuracy of this section of the ARA.
- Based on the above, we recommend this section be removed from the ARA. Since the ARA is essentially a technical document, the issue of interpretation of the law could be handled separately in another venue. Further, we recommend that these interpretations not be provided in a Draft Environmental Impact Statement Report as well.

III. Description of the Physical Characteristics of the Chautauqua Wind Farm Project

Understanding the full extent of the risk of the project to birds and bats includes knowing the amount of exposed transmission lines and cables along with all other tall structures. We recommend that the ARA report be revised to include this information.

The basic project features include a maximum of 34 turbines, an electrical substation, 15 miles of access roads, a small maintenance building, and an electrical connection to an existing 230-kilovolt transmission line within the 3 square mile project area. While Section 1 does mention that an interconnection to the existing nearby 230-kV transmission line is required, no specific information is given on the amount of overhead cables and transmission lines required for project operation. Likewise, in Section 3, Site and Project Description, no mention is made of the amount of utility line needed to operate the project, or if these lines would be buried cable or an overhead power line. Similarly, construction staging areas, equipment storage, temporary roads, and lay down areas were not identified. All of this information is important in understanding the collective risk to birds and bats posed by these features. It has been well documented that overhead transmission lines can cause avian mortality and injury (Erickson *et al.* 2001). Also, avian mortality at tall structures has been well documented (Avery *et al.* 1980). Likewise, recent studies have shown that turbines can be dangerous to bats as well (Kearns and Kerlinger 2004).

Turbine size and placement of the structures will have an influence on risk to birds and bats and should be further addressed within the ARA report.

Reference is made to the turbine size and output capacity on Pages 1-2 with specific dimensions given for the proposed structures. However, during our field view of the project site on October 5, 2004, we were informed that because of an expected reduction in the number of turbines for this project due to siting problems, the project sponsor may choose to select larger structures with greater electrical output (3 Mw) to compensate for fewer turbines. These larger structures may be taller and have a larger rotor swept area. Orloff and Flannery (1996), as well as Thelander *et al.* (2003), concluded that larger turbines with a bigger rotor swept area could kill more birds. Based on data collected at Altamont, they concluded that the number of avian fatalities increased in relation to the total rotor swept area of a turbine string and was more significant than the number of turbines in a string. If larger turbines are selected, CWP should determine if additional risk would result to birds and bats and provide that information in the ARA report.

The project sponsor should identify whether any streams or wetlands under Federal jurisdiction will be impacted by this project and require Federal authorization of any type (by individual permit, general permit, or nationwide permit) from the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act.

This has a bearing on how potential impacts to listed species will be evaluated, both how long it may take, and which section of the ESA will apply (7 or 10). Reference is made on Page 3-2 to the presence of onsite wetland areas typical of forested spring seeps and unconsolidated emergent wetlands. Field investigations identified 12 streams which potentially could be impacted by project infrastructure such as access roads, cables, and other features. It is mentioned that a wetland delineation report has been prepared. In previous letters to the project sponsor

(January 8, 2001, February 4, 2004, and September 17, 2004), and at our meeting of December 16, 2003, we requested a determination of whether or not the project will require a permit from the Corps. The applicant has not provided detailed project plans to the Corps or the Towns of Ripley and Westfield (the Lead Agencies) which would indicate if permit approvals are necessary.

IV. Baseline Avian Study Methods

Many of the recommendations made by the Service to CWP pertained to pre-construction (baseline) studies. However, our recommendations were either not incorporated into the Draft Public Scoping Document (DPSD), only partially addressed in the DPSD, or inadequately addressed by the project sponsor.

The study methods section presents protocols used to gather baseline avian data about the project site. Protocols were developed with input from interested parties during the public scoping process. The Service provided comments to the Town Supervisors on the DPSD in a letter dated August 23, 2003. In that letter, we made several recommendations pertaining to the avian studies, particularly the need for bald eagle surveys, fall radar surveys (spring radar studies had already been completed), an analysis of weather data during the migration periods (both spring and fall), and additional wildlife mortality and scavenger studies. In addition, we recommended that a revised avian and bat mortality and scavenger study be developed by the project sponsor and included in the DPSD. This recommendation was not embraced.

Anderson et al. (1999) noted that mortality searching and scavenger observer efficiency rates are an integral part of studies to detect fatalities at wind energy projects and are routinely conducted at many sites. We believe that adequate mortality and scavenger efficiency studies were not conducted at the existing communication towers located within the CWP area. This information would allow for the calculation of avian mortality at the existing tower structures and adjustment of mortality rates if the proposed CWP were to be constructed.

At the time the DPSP was being developed in the summer of 2003, the project sponsor had already completed a brief mortality and scavenger study earlier that spring. The survey was conducted adjacent to two cellular phone communication towers for a period of only 28 days. These towers are approximately 290 feet in height (approximately 109 feet shorter than the proposed turbines). We reviewed the information in the DSPD and informed the sponsor that the protocol study was inadequate. The area searched for carcasses is completely surrounded by chain link fence, limiting surveyor access. In addition, the study was conducted concurrently with the radar surveys, with the mobile radar unit parked only several feet from the towers. Personnel conducting the radar studies may have biased the results of the mortality searches due to constant human activity at the site. More information on conducting mortality studies is available in Morrison (2002) and Anderson (1999).

The project sponsor should document the temporal and spatial distribution of birds during all seasons, over multiple years, in order to account for the variability of bird migration.

We stated in our January 8, 2003, and August 26, 2003, letters, that the project sponsor should document the temporal and spatial distribution of birds during all times of the year. No winter bird occurrence data were collected at the project site; only existing information from Christmas Bird Counts in Dunkirk and Jamestown was provided. Considering that a number of the species listed on these counts are either rare, of special concern, or designated as threatened or endangered, surveys of the project site are warranted to document if these species use the project site during the winter season. Likewise, in the above letters and in meetings on April 17, 2003, and August 12, 2003, we recommended that adequate studies be completed during the spring and fall migration seasons over multiple years. We informed the project sponsor that from the Service's perspective, one data set (i.e. data collected during limited portions of two seasons in a given year) would not be sufficient to account for the variability of bird migration. Many variables, particularly variations in weather conditions, may influence the timing and intensity of bird movements through the project site. Therefore, to account for this variability and ensure a representative data set is obtained to document the temporal and spatial use of the project site by birds, more data collection is required.

The project scoping document indicates that additional avian monitoring would be performed to provide adequate data with which to evaluate avian risk.

The DPSD (in the Avian Resources Data Collection and Impact Assessment Methodology section) indicates that "Supplemental data collection study will be undertaken if it is determined that the existing literature and the 2003 project data do not accurately describe the existing avian community." At this point in our review of the project, it is not possible to adequately determine the extent of avian use of the site or associated project risk to birds.

We recommend that an evaluation of the impacts on bats be completed by the project sponsor. During the avian radar study, a small number of bats were detected. However, the data are insufficient to draw conclusions about bat use or risk at this site.

Previous studies indicate that bats seem to be very susceptible to mortality from turbines during the summer as well as during migration. Therefore, preconstruction surveys are necessary to document the abundance and distribution of these animals and associated potential impacts.

Bat mortality at wind turbine sites in North America has been documented to occur during summer foraging activities as well as during migration (Keely *et al.* 2001, Erickson *et al.* 2002, Kerns and Kerlinger 2004). An estimated 2,092 bats representing at least six species were reported killed between August 18 and November 9, 2003, at the Mountaineer Wind Energy Center located on Backbone Mountain in Tucker County, West Virginia (Kerns and Kerlinger 2004). A large number of bats were killed again during 2004 at this site and also at the Meyersdale Wind Energy Project in Pennsylvania. Kerns and Kerlinger (2004) and Arnett (2005) provide evidence that record high rates of bat mortality by wind turbines on ridge lines of the Appalachian plateau are recurring.

In our January 8, 2003, and February 4, 2004, letters, we recommended that an evaluation of the impacts on bats be undertaken. Likewise, the New York State Department of Environmental Conservation (NYSDEC) requested that information be gathered on bats in the project area in their DPSD comments. Specifically, the agencies requested that at a minimum, field surveys, such as mist netting, be conducted at the site. This evaluation was not conducted. Concern was expressed over this lack of evaluation at a December 16, 2003, meeting between the agencies and the sponsor. It was specifically requested that data be gathered at the site to determine bat use, primarily because very little information exists for Western New York and because large numbers of bats have been killed by wind turbines at other sites. Instead of conducting the requested studies, the applicant stated that an evaluation, based on a literature review, would be provided in an Environmental Impact Statement Report. Given the general lack of data gathered at this site, a review of existing information is not sufficient to determine if there will be impacts to bats at this site. During the avian radar study, a small number of bats were detected by ABR, Inc., (ABR); however, the data are insufficient to draw conclusions about bat use or risk at this site. In addition, searching for bats was not the focus of the ABR study. It should be pointed out that the fall radar survey did not overlap with the majority of the bat migration season. Most species of bats are known to migrate from July through mid-September, but the radar survey did not start until September 2.

The report should clarify which sources of avian information were used in the risk assessment analysis, and why other data were not utilized.

In Section 4.2, the various sources of existing avian information were listed. However, not all of the data were provided in subsequent sections of the document. For example, a reference is made to avian data collected by an individual in the project area but this information was not included in the ARA. The report should indicate which sources of information were pertinent to the risk assessment analysis and why some sources of information were not included.

Diehl *et al.* (2003) examined data from the Buffalo, New York, Next Generation Radar (NEXRAD) station, to pattern bird migration adjacent to, and over the Great Lakes. The CWP should review this study and provide a similar analysis for this project, if applicable.

Radar sampling procedures are discussed in Section 4.3. We note that no mention was made of using NEXRAD for meteorological monitoring or a large scale analysis of avian distribution and movements. The NEXRAD data is collected at the Buffalo, New York, station which covers not only the project site but also the entire coast of Lake Erie in New York State. Complete coverage is available for 143 miles from the radar station's location (National Weather Service 2004). While NEXRAD has limitations in providing some site-specific data, it can be useful for studies of bird migration on a landscape scale (Gauthreaux and Belser 2003).

The limitations of using marine radar to detect wildlife, and the <u>specific assumptions</u> made relative to this study, should be noted in the ARA report. A more detailed discussion is needed in the ARA text on how the limitations and assumptions of the radar study would affect the conclusion of the ARA report.

Radar sampling was conducted by ABR using a marine surveillance radar unit located within the project area. The ARA reports that radar sampling occurred for a 30-day period in the spring and fall migration periods. However, not every day was sampled, and on some days when sampling did occur, the presence of precipitation or insects prevented accurate data collection, yet there is no acknowledgement of radar limitations in the text of the ARA report. In addition, it should be noted that the number of radar targets observed do not necessarily reflect the total number of birds or bats flying through the site. In some cases, a target may not be one bird but actually be a small flock of birds, resulting in an underestimate of the total number of individuals. The detection of birds in the surveillance mode depends upon body size, flock size, flight profile, atmospheric conditions, and the range of the radar setting. As acknowledged by ABR, radar has limitations when used in the horizontal mode and at distances greater than 1-2 km (Cooper *et al.* 1991). Cooper reported detecting passerines to a distance of only 1-2 km, individual hawks to a distance of 2-3 km, and flocks of waterfowl to 5-6 km. Targets closer than 50 m are also difficult to detect. These limitations should be pointed out in the ARA report. Further, a more detailed discussion is needed in the ARA text on how the limitations and assumptions of the radar study affect the conclusions of the ARA report.

The Service's Region 5 Regional Office recently convened a panel of experts in the field of radar ornithology to discuss this technology and survey protocols for wind energy projects. A majority of the experts expressed concern with the limitations of most marine radar units in accurately determining wildlife distribution and abundance in the airspace. Several key reasons for the lack of confidence in the mobile radar units include: 1) most radar units require manual counting or video recording of data on a radar screen which can lead to error and bias (digital recording and processing of data are recommended), 2) manual counting of radar targets is tedious and subject to error and bias orders of magnitude higher than digitally collected data, 3) some targets which appear as pulses may not be counted but are indeed birds, 4) continual sampling picks up much more data than short 5 or 10 minute sample intervals every hour and 5) radar sampling for a few hours, instead of the entire night, may result in an underestimation of targets, especially around dawn when birds descend to roost for the day.

It should be noted that the radar survey coverage shown on Figure 4-2 includes only three turbine locations. Radar coverage did not include the area below the ridge line or the southwestern portion of the project area where many raptors are known to migrate. This lack of coverage in a key area can provide an underestimate of birds moving through the area. While it can be argued that turbines will not be placed below the ridge, turbines are proposed southwest of the radar site. Based on Ripley Hawk Watch data, birds are often observed (in this case, mostly raptors during spring migration) flying from the south through this area until they encounter the Lake Erie shoreline. Migrating birds then generally turn in a northeasterly direction to follow the coast. However, raptor abundance through the project site is dependent on a number of factors. Particularly important is the direction of the prevailing wind. If strong winds are from the west or northwest, more birds are likely to be pushed away from the lake and fly over the project area. This pattern was documented by Haugh (1972) when studying raptor movement along Lake Ontario.

Migratory bird surveys were conducted by the sponsor's consultant, as described in Section 4.4. One of the surveys, the visual raptor surveys, was conducted by CWP from mid-March until the beginning of May. Typically, raptor migration begins in mid-March and continues until early June. Given the early termination date of these visual raptor surveys, it is very likely that many birds were missed during the month of May when sampling did not occur.

The ARA report suggests that migratory bird surveys were conducted in accordance with the protocol developed by the Service used to detect breeding birds. We caution that the Service's breeding bird protocols were not developed to detect migrating birds, and we believe this was an inappropriate use of the methodology.

Specifically, the breeding bird surveys rely on collecting both visual and audio data to detect birds establishing breeding territories. Since most migrating birds were not establishing territories at the time the surveys were conducted by the consultant and not exhibiting the behavior necessary to conduct the survey as intended, we believe this was an inappropriate use of the methodology. We note, however, information gleaned about resident breeding birds is relevant to the analysis of risk.

The surveys described in the ARA report and conducted so far, are inadequate to support claims in the ARA report that bald eagles have no reason to ever be in the project area.

Section 4.5 discusses breeding bird surveys conducted in the project area. These surveys were conducted by an observer traveling along roads and stopping at regular intervals to listen for bird calls. Two surveys were conducted in the project area on June 15 and 28, 2003. While the surveys were conducted during the breeding season for most birds, early breeders may not be singing, and sampling for only two days is problematic. As indicated in the discussion of radar data above, one data set normally will not provide adequate representation of bird activity in the area. As a case in point, at the time when the breeding bird surveys were being conducted, no bald eagles were noted by the project sponsor, yet two bald eagle nests were located adjacent to the proposed project. These eagles were observed by the radar crew, members of the Ripley Hawk Watch (RHW), and local residents. The lack of eagle observations during the breeding bird survey may reflect that these surveys did not result in data that adequately represents the breeding bird community in the project vicinity (Table 5-15).

Section 4.6 references the use of survey protocols to document bald eagle activity in the project area. While these protocols are discussed in the text of the ARA report, they should be included in the report as an appendix for reference, similar to that of the avian radar survey protocols.

The ARA report correctly points out that the project is located within a known spring avian migration corridor where an annual average 16,000 raptors are counted by the RHW. This site is one of six in New York State identified by the Hawk Migration Association of North America (HMANA) as being critical for the spring migration of raptors. Only two other hawk watch locations in New York State document more migrating raptors than this site (HMANA 2004). The project site also meets the criteria of an Important Bird Area as designated by the National Audubon Society. Criteria for designation include the importance of the area as an avian migration corridor and a documented location where Federal- and State-listed species are found during migration.

V. Visual Studies

The computed hourly passage rates of raptors in the three geographically grouped locations (lake plain, near ridge area, and inland area) from data collected by the sponsor's consultants indicates that the number of raptors observed was very similar between the lake plain and ridge (47 raptors/hour versus 40 raptors/hour, respectively). The inland area had a much lower passage rate of 12 raptors/hour.

In this section, the document describes how raptors migrate along the edge of lakes, thus avoiding open water which is devoid of thermal winds. The authors acknowledge that these birds take advantage of ridges where the thermals facilitate migration. The text describes the ridge as being northwest of the project area, when, in fact, the project is located on the ridge itself (ARA Figure 4-1). Page 5-11 indicates that a majority of raptors do not enter the project area and that most birds fly over the lake plain rather than the ridge or inland areas. However, the highest numbers of raptors observed by CWP were found on the ridge area (Table 5-5). Due to an inconsistent sampling effort among the three geographic regions, total numbers were not compared, but rather, comparisons of passage rates were used.

It is difficult to compare visual data collected by the RHW, E&E, and ABR due to differences in methodology, survey locations, and survey effort, including the timing of the surveys.

According to the ARA, the RHW collected data from March 8 until June 10; E&E collected information from March 17 until May 22; and ABR collected visual data from April 15 until May 15. Yet, ABR radar and visual data (which are from the shortest time period) forms the basis for the risk assessment. There is conflicting information in Sections 4.4 and 5.2.2 with regard to the extent of visual raptor surveys conducted by E&E. Section 4.4 indicates surveys ended in the beginning of May. However, on page 5-11, it is indicated that the surveys were conducted up until May 22. A review of the data on Table 5-3 indicates that only 4 raptors were observed by E&E after May 6. Whereas, the RHW observed 1,659 raptors from May 6 to May 30 (www.hawkcount.org 2003).

Even when data were collected during the same time period, different numbers of birds were observed.

On April 19, RHW observed 3,676 raptors while E&E observed only 1,895. Both RHW and E&E noted the highest passage rate of raptors on April 19. However, RHW noted a passage rate two times higher with a rate of 460 raptors/hr, while E&E noted only 223 raptors/hr on that day. The ARA should point out this important fact to the reader and explain the significance of this information.

ABR estimated that 17 percent of all targets for the spring migration season flew below turbine height, quite a high percentage, indicating the potential risk to diurnal migrants.

The altitudes of 5,842 raptors were noted by E&E during their visual surveys. Approximately 89 percent of these raptors flew below an altitude of 450 feet (page 5-34). Elevations less than 450 feet represent the area below the turbine rotor swept area. ABR's radar data provided additional information on flight altitude and indicated that approximately 3.8 percent of all nocturnal targets flew below this height. Similarly, 4 percent of all nocturnal targets flew below turbine height during the fall migration. It should be noted that the number of targets flying within the rotor swept area of the turbines is based on a relatively small data set and do not represent all birds flying within this zone.

As previously mentioned, the avian mortality study conducted at this site was inadequate to document mortality from collisions with the towers and to calculate scavenger removal rates. The absence of information does not definitively indicate whether avian collisions occur or not, nor the degree of carcass scavenging that may take place at this site.

On page 5-36, the ARA report discusses avian behavior observed at two existing 290 foot tall communication towers. Several examples are provided of raptors avoiding the towers and guy wires during flight. However, it should be noted that no scientific study was conducted at this location to adequately characterize avian avoidance behavior and strike and mortality rates.

All raw data collected or referenced in the report should be provided for review, and any statistical computations used to analyze data should be provided for verification of findings. This would include essential information about the weather conditions at the site during the study periods.

Several sections of the ARA report indicate that data were collected to document bird use of the project site; however, these data are not provided in the report. Likewise, mention is made of weather data gathered from various sources but none are provided with the exception of ABR data found in the appendices.

The findings in the ARA report stress the need for sufficient site weather data. Citing a report by Haugh (1972), the ARA authors determined that raptors are more likely to move along the lake shore than the ridge. While Haugh's report on Lake Ontario raptor migration did mention that birds flew along the lake when there was a southerly wind, it also stated that large numbers of birds moved when winds were from the west or northwest in late April and into May. These large groups of birds, Haugh found, were moving on winds from directions other than the south, and the winds facilitated movement further inland.

ABR states that "Although the ability of weather to influence migration passage rates and flight altitudes of nocturnal birds has been established in many studies, <u>it will require additional field data under a greater variety of weather conditions throughout the full migratory season to build predictive models that would identify those conditions that would put nocturnal migrants at risk of collision with wind turbines.</u>"(emphasis added) (Appendix A, page 24).

The weather data sample size at this site was too small to draw conclusions regarding weather's role in the altitude of passerine migration (page 5-53). Only three sessions with fog, eleven sessions with precipitation, and twelve sessions with a low cloud ceiling were sampled to make inferences about passage rates. ABR recognized the fact that the weather during the spring migration was unusually cold and wet which may have delayed migration (Appendix A, page 20). This contrasts with the ARA report which indicates that the sampling period represents a typical migration year. However, ABR indicates on pages 14, 23, and 24 of Appendix A (see also pages 14 and 17 of Appendix B) that the small weather data set was not adequate to draw conclusions about the influence of weather on bird migration during the study. More comments on weather are found in other sections of this report.

Limitations in the scope of data collection notwithstanding, the data that were collected indicates a high diversity of bird species found moving through the project area.

Visual observations by various sources recorded at least 194 species of birds within the project area (Table 5-12). We note that the migratory bird surveys conducted by E&E in the spring did not begin until April 24 and, therefore, missed species of birds migrating prior to that date. Likewise, surveys were not conducted at night; therefore, nocturnal migrants were not counted as well. At least 90 percent of all birds migrate at night (Lincoln *et al*. 1998) indicating the importance of surveying at that time.

It is difficult to reach reliable conclusions regarding the correlation between data collected visually by E&E and the radar data collected by ABR.

The ARA report suggests that there was a positive correlation between visual observations and radar data. A discussion is provided on page 5-46 regarding the comparison of visual observations noted during the day and radar data collected the previous night. Only 4 day/night comparisons were provided in the text, therefore, there may be a high degree of variability associated with the data. In addition, factors such as observer bias, bird movement patterns, species detectability, weather, and other variables would influence the E&E survey results. We question the completeness of this visual survey and the corresponding radar survey.

ABR's passage rates, based on visual observations, indicate variability within the survey period with high pulses on April 21 and the second week of May. However, both were conducted during limited portions of the day and terminated in mid-May, at a time when large numbers of birds may have been moving through the project area.

The ARA makes statements about bird distribution without providing sufficient data. For example, migratory bird surveys were conducted by E&E on only 6 days of the spring migration period. The total number of breeding birds surveyed is provided in tabular form, but the information is not provided for each geographic location.

Geographical variation of visual songbird observations are discussed on pages 5-49 to 5-51 and in Table 5-13. As with the raptor surveys, it is hypothesized that more passerines will travel along the shoreline than along the ridge or further inland. However, the total numbers of birds by geographical area are not provided. Instead, the average species counts and the average total counts are provided in Table 5-13. These data indicate that the average species count (14.8 for the lake plain versus 13.4 for the ridge area) is not very different between the three areas, and the average total count is only slightly higher on the Lake Plain than the other two areas. The average number of species found inland (64) was higher than on the ridge (50.6) or lake plain (49.6).

Breeding bird surveys were conducted by E&E on two dates, June 15 and June 28. While these surveys covered the project area and resulted in the counting of 82 species, the bald eagle was not among those species observed. However, several State-listed species were observed during the breeding season (Table 5-15). Two breeding bird routes, located in adjacent areas, were not referenced because, according to the footnote on page 5-56, they were too far from the project site. We believe this information to be important and relevant and disagree that the sites are too far removed to be useful. The ARA report *did* present avian data from more distant locations, such as the western United States and even Spain.

Fall visual data were not collected because the project sponsors believe that the project area is not a major fall migration corridor for raptors.

However, radar data collected at the site during the fall migration indicated that more nocturnal birds pass through the site in the fall than in spring. This is to be expected given that more individual birds are found in the population after the breeding season. Based on the ABR radar study, the total number of land birds predicted (based upon radar data) to cross through the CWP wind resource area is twice as many in the fall than in the spring (2 million versus 1 million).

Based on the radar data, it was estimated that slightly more birds, approximately 4 percent of the total number, flew through the project area at turbine height in the fall when compared to spring (3.8 percent flew through the area at turbine height).

Reference is made several times to avian data from the Buffalo Ornithological Society (BOS) in Section 5.4. This data should be provided in the ARA report for review. Annual counts have been conducted by BOS in the Towns of Ripley and Westfield, among others, during the fall migration. As a result of these surveys, the BOS has produced a birding checklist - *Seasonal Checklist of the Birds, the Niagara Frontier Region*, which lists birds expected to be found in the area.

We believe that it may have been possible to perform carcass searches at the existing communication towers by either using dogs or mowing vegetation to facilitate searching.

The ARA report, in Section 5.4.2, states that mortality observations at the existing communications towers in the project area were not conducted in the fall due to the height of grassy vegetation. Arnet *et al.* (2005) identifies sampling methods of different vegetation types for locating bat carcasses. It should be noted that two dead birds were found beneath a communication tower in August 2003 near the project site during wetland surveys.

Winter avian surveys were not conducted in the project area. While use of Christmas Bird Count survey data is a good reference, it does not substitute for project-specific data. Habitat will influence the diversity and abundance of wintering birds in the project area.

Instead, the ARA report evaluates existing sources of information to determine the composition and abundance of birds. For example, the BOS checklist is again mentioned as a source; however, this information is not provided in the report. The only data provided are the Christmas Bird Count survey data for Chautauqua County. Two areas are sampled, Jamestown and Dunkirk-Fredonia, between December 15 through January 15 of each year.

ARA Section 5.52 states that there is limited use of the project area by songbirds in winter, yet no data are provided to support that statement. We recommended that CWP conduct survey at all times of the year to document the temporal use of the project site by birds; however, this was not completed for the winter season.

The ARA report further states, that overall numbers of songbirds and other species are at their lowest during winter. While this may be true when compared to the migration seasons and total numbers of birds, the Christmas Bird Count data indicates that the mean number of species for all surveys, 62, listed on Table 5-18, is similar to that documented by E&E during their June 28 breeding bird survey (69), and close to the June 15 total (71) as well (see Table 5-15). Members of the RHW have documented several rare birds in the area between the months of November and March (DeFrancisco pers. comm. 2005) including snowy owls, snow buntings, and northern shrikes (State-listed endangered). The loggerhead shrike has also been documented in this vicinity during the winter.

VI. Radar Studies

Surveillance radar has limitations in detecting small targets (e.g. passerines), especially at long distances. In addition, the number of targets counted does not necessarily reflect the total number of birds passing through the radar field.

A mobile radar unit was used to document the number of targets (namely birds and bats) in the project airspace during the spring and fall migration. A target may actually be a flock of small birds flying together, so the total number of birds counted will be underestimated. Also, when large groups of birds are flying through the radar field, it is possible that the technician who is counting the birds will miss some of the targets. Some targets appear on the computer screen, disappear, and then reappear again in a different location making it difficult to track all of them. Consequently, there is a high potential for variability associated with the data. Unfortunately, there is no permanent record of the data for verification. These limitations in using radar are generally stated in the protocol provided by ABR.

No techniques were used at CWP to verify and supplement data collected at night by radar. Because no other techniques were used to verify the radar data collected during nocturnal monitoring, we have concerns about drawing conclusions from this data set.

Larkin *et al.* (2002) found a positive correlation between the use of radar and acoustic monitoring to determine the use of airspace by nocturnal migrants. Likewise, Farnsworth *et al.* (2004) wrote in the Journal of Avian Biology that some correlation exists between calls detected by acoustic monitoring and targets identified by radar.

Radar data should have been collected during the poor weather conditions to provide an accurate picture of bird migration when conditions may pose the highest collision risk at turbines due to poor visibility.

Weather influences on avian movements are discussed in several sections of the ARA report. Passage rates are expected to be lower during some storm events but higher numbers of birds are usually pushed ahead of fronts. Also, precipitation, fog, and a low cloud ceiling have been known to lower the altitude of bird flight to lower elevations. However, we note that the number of radar sampling sessions with precipitation (15 sessions), fog (11 sessions), and low clouds (9 sessions) was much lower than sessions without these conditions (Appendix A). Sessions without these conditions consisted of 81 without precipitation, 85 without fog, and 87 without low clouds. Therefore, a greater sample size of avian movement under low visibility conditions is needed to determine the risk to birds, particularly night migrating individuals.

ABR's spring and fall reports use different criteria for filtering insect contamination in the radar data. We question whether some targets identified in the spring radar study and flying at speeds between 6 and 8 meters per second were actually birds rather than insects.

In the spring report, on page 7, all targets with a speed of less than 8 meters per second were filtered and assumed to be insects. However, on page 6 of the fall report, a speed of less than 6 meters per second was used to differentiate between insects and birds (or bats). Studies by Larkin (1991) and Diehl *et al.* (2003) were cited as the references for this information. In both studies, the speed of 6 meters per second is considered the delineation point between insect and bird target speed identified by radar. This point should be clarified in both the ARA and ABR's reports.

ABR's report (found in Appendices A and B), indicate that radar surveys were conducted for only a fraction of the full spring and fall migration periods (April 15 to May 15, September 2 to 25, and October 5 to 10, respectively). A footnote to Table 1 in Appendix A indicates that data were only collected during portions of the survey period and that a large proportion of the survey days produced inadequate or incomplete results.

The ARA report indicates that a total of 31 days were monitored in the spring and 30 days were monitored in the fall. However, due to ground clutter, precipitation, and insect contamination, a full data set was not collected during these time periods. In fact, the actual number of days spent collecting complete data during the radar monitoring period was limited to 12 days in the spring and 18 days in the fall. This equates to only 39 percent of the planned survey days during the spring and 60 percent of the days during the fall surveys. However, discussion in the ARA report does not clearly present this fact. Long term data from established bird banding stations, such as Long Point Bird Observatory in Port Rowan, Ontario, provides valuable information on the timing and duration of bird migration. Avian data has been collected at Long Point for more than 40 years and, therefore, is an excellent reference. Long Point is located on the north shore of Lake Erie, approximately 20 miles north and 25 miles west of the CWP. Migration timing varies, but generally the spring passerine migration period at the eastern end of Lake Erie is considered to be approximately 60 days in duration (Bird Studies Canada, 2005), therefore, only 20 percent of the spring migration period was sampled. Likewise, only 18 percent of the 100 day fall migration was sampled for this project.

ABR reported (Cooper letter to K. Kispert, January 18, 2005) that missed sampling in the spring accounted for 15 percent of the diurnal surveillance sessions, 15 percent of the diurnal 1.5-km range vertical radar sessions, and 51 percent of the 3-km range nocturnal surveillance sessions. In the fall, 11 percent of the surveillance radar, 11 percent of the 1.5-km range vertical radar, and 20 percent of the 3-km range vertical sessions were missed due to insect and precipitation interference. While the less critical 3-km range vertical sampling sessions constituted most of the missed radar work, collectively all of the sessions could have provided important information about avian movements, especially during those periods of inclement weather. It is periods of low cloud cover and precipitation that can force birds to fly at lower altitudes.

The estimates of the number of raptors flying through the project site based on radar data are at least 45 percent lower than visually observed by the RHW.

The spring radar survey did not start until mid-April and ended in mid-May. Prior to the start of the radar survey on April 15, at least 7,905 raptors were counted by RHW, which is approximately 40 percent of the total number of raptors enumerated by that organization during the spring 2003 migration. The actual number of birds passing through is probably higher given the inability of observers to record all birds. A smaller amount of birds (1,037 individuals or 5 percent) were observed by RHW after the radar study concluded.

In addition to days missed due to ground clutter, precipitation, etc., large numbers of birds were inevitably missed due to the timing of the surveys. The radar study was stopped

during spring migration and, therefore, may underestimate the total number of birds found migrating through the project area because late migrants were not tabulated.

ABR radar data in Appendix A indicates that the highest passage rate of nocturnal targets (1,705 targets/km/hr) observed during the spring study period occurred on May 10. No sampling was completed during the following two days, due to precipitation or insect contamination, and a large number of migrants may have been overlooked. Because the study was stopped on May 14, a portion of the peak of the migration may have been missed entirely. This would grossly underestimate the total number of birds found migrating through the project area. In addition, many species of birds such as thrushes, flycatchers, and certain warblers typically arrive later than mid May. During the spring of 2003, an acoustic monitoring study was being conducted by Mr. William Evans in northern West Virginia. Evans reported large flights of birds after May 14 including the 6th largest flight on May 21 (Evans 2004). While different methods were being used to detect birds, this information indicates that large flights of birds were still migrating from the south after mid-May when the radar survey ended.

Total bird abundance for fall migration cannot be estimated with an incomplete data set which does not cover the majority of the migration period, including the peak period, and which is based on a small sample size.

Unfortunately, fall sampling was discontinued for 10 days at the end of September and the beginning of October. While the purpose of this split in the sampling session was to identify different avian species at different points in the migration season, the magnitude of bird abundance is not known because of the incomplete data set. This small data set, however, is used to predict the total number of birds flying through the project area, the total number of birds at risk within the rotor swept area, and the total number of birds expected to be killed or injured by the project. As with the spring monitoring, a portion of the peak migration period may not have been sampled with the radar equipment. ABR indicates in Appendix B that nocturnal passage rates generally were higher after mid-September than they were during early September.

A portion of the study area was not sampled by radar due to ground clutter. This could lead to underestimating the number of birds flying through the area.

ABR's report indicates that a 600 meter-wide area, which varied in altitude from 200 to 300 meters above ground level and centered on the radar equipment, was not sampled due to interference with objects in the path of the radar beam. Ground clutter can cause targets to be hidden from detection on the radar screen for a portion of time. We noted that ground clutter obscured a large portion of the radar screen to the south of the radar collection site, possibly resulting in some targets not be counted.

Since radar sampling was not conducted at CWP just prior to dawn, any birds passing through the study area at this time would have been missed by the radar study. But the ARA report assumes that these birds would be identified by radar and/or visual observations during the diurnal or nocturnal sampling sessions later that day.

In the ARA text on page 5-64, and the radar data in Figure 5 of Appendix B, indicate that little change occurred in the hourly passage rates overnight. However, radar sampling was generally conducted from 2100 to 0300 hours during the migration period according to the ABR reports (no sampling occurred after 0300). Although the radar work is meant to capture the peak of nightly migration, there was no confirmation that large numbers of birds flew through the site after 0300. Diehl *et al.* (2003) reported large numbers of birds "falling out" in the area adjacent to Lake Erie around dawn. These birds were apparently seeking habitat in which to rest and feed after the nocturnal flights. Diehl's radar data indicated that these large densities of birds flying over water would often ascend and redirect toward the shoreline at sunrise prior to descending on land.

Missing many sampling days during migration, and using short duration sampling periods is problematic.

During the 4-hour diurnal radar study, only 5 minutes per hour, or a total of 20 minutes per day, were sampled using the radar equipment in horizontal mode to collect information on passage rates in the study area. Likewise, only 10 minutes per hour, or 40 minutes per day, were spent collecting bird speed, direction, tangential range, species, and flight information, and whether or not the bird passed through the proposed turbine string. Only one 5 minute session per hour was monitored in the vertical mode and at a scale sufficient to determine bird altitude below the height of the proposed turbines. ABR has indicated that the short sampling sessions are representative of the hourly passage rates (although only one session has been tested). For other projects, ABR has collected data over longer sampling periods to verify the variation in passage rates; however, this was not conducted for the CWP (Cooper, per. comm.).

We believe that the small amount data set is not adequate to draw conclusions regarding bird use at the CWP site. The limited number of days actually sampled and the limited number of minutes available to sample during the diurnal study resulted in the development of an inadequate data set.

The actual time spent sampling during the entire spring migration period, which can last for over 60 days, may have been approximately 4 hours to determine passage rates in the horizontal mode, approximately 8 hours to determine bird speed, direction, range, and position relative to the turbines, and approximately 4 hours to determine bird height in the vertical mode. Therefore, actual sampling equaled less than 1 percent of the migration period. Similarly, the fall nocturnal study consisted of the same sampling regime, except that 6 sampling periods were used instead of 5.

Despite the fact that there are several data gaps and the total number of birds flying through the project area may have been underestimated, ABR reported that the number of spring diurnal migrants is higher that any other location studied in New York (Appendix A).

Even though the radar sampling was limited, a high number of targets were noted by ABR during the spring of 2003. The spring radar data collected at the CWP site indicates a nocturnal passage rate of 395 targets/km/hr. In comparison, radar data was also collected by ABR (Cooper and Mabee 2000), with similar methods and equipment, at a site in Wethersfield, New York, located approximately 60 miles to the northeast (inland) of the CWP. Spring passage rates at the Wethersfield site were 41 targets/km/hr. Therefore, the passage rate at the CWP was approximately 10 times greater than at Wethersfield. Based on this data, it appears that a spring migratory corridor exists at the CWP site.

In recent years, several radar studies have been conducted to detect avian movement in other New York State locations. A spring radar study conducted in Carthage, New York, (inland of Lake Ontario) which also showed a much lower passage rate (150 targets/km/hr). Likewise, Cooper (2005) reported a spring passage rate of 170 targets/km/hr at the Prattsburgh Wind Power Project, also located in western New York State. Evans (2004), in his critique of the ARA report, indicates that the migration rates recorded by ABR at CWP are the highest reported in North America in the last 10 years. However, it should be noted that data collected from other locations may have dissimilar terrain and species composition. In any case, the data suggests the magnitude of migration at this site and its importance as an avian movement corridor.

Total bird abundance in the project area is estimated to be approximately 100,000 raptors and 1 million land birds during the spring migration, and 2 million land birds in the fall. These estimates are based on the diurnal and nocturnal radar sampling conducted by ABR.

The CWP reported that birds in the fall are concentrated on the northern and western sides of Lake Erie during south bound migration. The fall migration season typically has higher numbers of individuals due to the addition of juveniles into avian populations during the summer months. Fall avian migration was also thought to be diffuse through New York State. The ARA report suggests that migration is not concentrated in the project area during this time of year. However, the radar data from this site suggests that a moderate migration rate occurs along the east side of Lake Erie and through the project area during the fall (238 targets/km/hr). For comparison, Wethersfield, the site closest to the project, recorded 168 targets/km/hr, while the Harrisburg and Carthage sites on Tug Hill reported 122 targets/km/hr and 225 targets/km/hr, respectively. The passage rate at CWP is approximately 30 percent higher than the inland Wethersfield location during the fall. These studies were all conducted by ABR over the last 10 years using similar equipment and techniques.

We believe that 1 year of radar data does not provide a complete picture of avian use of the project site, especially given the limited sampling periods used to date.

We have previously stated that to draw adequate conclusions about bird use, a study sampling regime consisting of multiple seasons and multiple years is necessary to portray temporal and spatial avian distributions. Conclusions are quite tenuous if drawn from a study that contains only one data set. Bernstein and Zalinski (1983) reported that increasing sample effort increases the power to detect trends and draw conclusions about environmental data. Variation in data cannot be identified or explained without multiple data sets.

We believe that ABR conducted their work in a professional manner. Unfortunately, weather conditions and insect contamination produced less than desirable radar data results and the study period was also limited to only 30 days of the migration period. Radar ornithologists have indicated that migration passage rates can vary significantly from year to year (B. Cooper, S. Gauthreaux pers. comm). For this reason, we recommended that avian data be collected over multiple years to account for variation in broad-scale and local weather, avian abundance, bird migration patterns, etc.

The Federally-listed (threatened) bald eagle (*Haliaeetus leucocephalus*) has been documented in the project area.

Section 5.6 discusses endangered, threatened, and special concern species. Whereas the previous chapters attempt to quantify and qualify abundance and diversity of avian use of the airspace and habitat at the project site, and the relative risk of the project causing them harm, the section on the Federally-listed bald eagle attempts to prove that eagles have no reason to be in the project area.

However, bald eagles have been documented in the project area. We will be examining whether they are likely present in the three dimensional airspace between the towers, and in the airspace swept by 34 rotating rotor blades.

The ARA authors conclude that there will be a loss of migratory birds from construction and operation of the project, but that it will not be a *significant* loss, in chapters on non-listed species. We will debate this matter elsewhere in these comments. But for compliance with the Federal ESA, we are looking at "take" of one or more *individuals*. Thus, our discussion and evaluation of existing information will focus on whether, since eagles are documented to be breeding at each end of the project area, and are known to migrate across the project area, there are specific behaviors known to bald eagles that may result in their being harmed, harassed, killed, etc., by direct and/or indirect effects of this project or by the effects of interrelated or interdependent actions. The subject of the "significance" of the take is only then evaluated in a Habitat Conservation Plan (Section 10) or in an effects analysis in a Section 7 Biological Opinion, which would be prepared in full compliance with ESA regulations.

A review of the data indicates that some unusual weather patterns did occur during both spring and fall migration. A more thorough evaluation of weather patterns and avian migration is required.

Historical weather trends and a comparison of the study period are discussed in Section 5.7. The ARA report correctly mentions that avian migration is influenced by weather. Important weather variables include temperature, wind direction, the movement of fronts, and precipitation (Lincoln 1998). For example, wind direction for April and May 2003 consisted of 36 percent of the winds coming from the northeast compared to an average of 16 percent. Southerly winds accounted for 26 percent of the days in the study period compared to the long term average of 46 percent. Precipitation was significantly below normal for April while it was significantly above normal for May. Likewise, precipitation in the month of September was significantly higher than normal. This information indicates that the weather patterns of the study period did not match the long term average annual conditions during most of the migration period. Yet, in Section 5.8, it is stated that the weather conditions were typical or reasonably comparable to other years when averaged. Certain weather patterns, on a continental scale, may alter the timing and intensity of avian migration; however, this is not discussed in the report.

Information, such as historical NEXRAD data, from the Buffalo NEXRAD station should be reviewed for additional insight into avian migration.

Weather patterns in the southern United States and Gulf of Mexico influence avian migration timing and density as well as distribution in the northeast. It is known that warm southerly winds tend to move birds ahead of a warm front in the spring, while birds will wait until after the passage of a cold front to allow southward migration in the fall. The ARA report should identify the extent of these weather conditions during the migration and particularly within the context of the avian monitoring. The small data set may not be sufficient to reach conclusions about avian use of the site under various weather conditions. In addition, the effects of climate must be measured over a longer time period to determine how the 2003 weather variables influenced avian migration. Weather patterns will greatly influence the abundance of birds found in the wind resource area (WRA).

While the local weather data provides a picture of conditions at the project site, a larger regional approach to weather analysis should be completed to examine migration. For example, large numbers of birds typically move ahead of a low pressure system to facilitate flight and save energy reserves. Data on the movement of these fronts in relation to the study period would give an indication of when birds were moving through the area and if visual or radar surveys had encountered these birds. We believe a more detailed analysis is required. As mentioned previously, weather plays an important part in avian migration and the data used to draw conclusions about bird movements in the project area should be provided in the report.

We believe that the avian data to date is not sufficient to draw accurate conclusions about bird use of the project site or the risks associated with the construction of 34 wind turbines in this migration corridor.

Section 5.8 discusses the data collected for the ARA report, arguing that it is complete and adequate for the analysis of avian risk. However, to date, no wind energy project has yet been constructed in the same geographical setting in the eastern United States. We recommend that additional data should be gathered to establish a clear pattern of avian temporal and spatial use of this site. This would include the collection of spring and fall radar data over 2 additional years. Collectively, 3 years of data for this project should identify variability in weather patterns, bird migration, and other factors which would affect the analysis of data and prediction of risk.

VII. <u>Avian Risk Assessment</u>

Given the importance of the project site to avian species, we do not support the use of this methodology at the CWP without the procedure first being validated.

The procedure for evaluating potential impact to birds from the CWP is based on the U.S. Environmental Protection Agency's (EPA) Ecological Risk Assessment Methodology. This methodology involves four steps; problem formulation, characterization of effects, characterization of exposure, and risk characterization. This methodology is typically used in evaluating the ecological risk associated with environmental contamination.

Step 1 of the EPA methodology involves the formulation of a specific problem as outlined in the Risk Assessment Guidelines (EPA 1998). However, none of these important points were collectively discussed with stakeholders such as the local jurisdictions, regulatory agencies, or those knowledgeable about avian issues at the project site.

According to the guidelines, formulation of a specific problem statement involves a discussion of the goals and desired outcomes of the risk assessment and takes place collaboratively with other parties. Through this process, many issues are discussed, including, what is an appropriate scale of analysis, what is an acceptable level of uncertainty, what data analyses are appropriate, and what are the potential constraints. We are not aware of any discussions between the CWP sponsors, representatives of the local jurisdiction, and the regulatory agencies, and, therefore, the basic foundation of this methodology was not provided. Consequently, the process, as it relates to this project, may not address critical issues or the regulatory agency requirements.

In addition, with respect to problem formulation, the EPA Guidelines state "The interface among risk assessors, risk managers, and interested parties during planning at the beginning and communication of risk at the end of the risk assessment is critical to ensure that results of the assessment can be used to support a management decision. Because of the diverse expertise required (especially in complex ecological risk assessments), risk assessors and risk managers frequently work in multidisciplinary teams."

Step 2 of the EPA process involves the characterization of wind turbine effects on avian species. There are several shortcomings in the information presented as it relates to wind energy projects in the eastern United States and, in particular, to the CWP, including:

- The ARA authors attempt to characterize avian risk at the CWP by reviewing mortality data from other wind energy projects, including factors which will reduce or increase risk, and provides a comparison of wind turbine impacts to other sources of bird mortality. In order to make a comparison between the CWP and other wind energy projects, the ARA report provides data from Erickson *et al.* (2001), in Table 6-1. This table describes the number of avian fatalities on a national basis. The mortality data supplied in Table 6-1 reflects mostly projects constructed in the western United States. Only two eastern states, Pennsylvania and Vermont, are represented in this summary. Nineteen turbines from these eastern states were included, while the majority of the 11,429 turbines came from other areas of the country.

- The duration of the monitoring period is listed as multi-year; however, upon closer review, most of the project sites were searched for only 1 year or a portion of a year, as was the case for the Pennsylvania and Vermont sites.

- Mortality sampling methods were not standardized and in most cases did not take into account influencing factors such as time between surveys, survey area, searcher bias, scavenger rates, or differences in study design.

- Most of the mortality studies were conducted on an irregular basis, often allowing weeks or months to elapse between search efforts.

- Many of the turbines studied were much smaller in size than those being proposed by the CWP, both in the height and the size of the turbine blade rotor swept area.

- The summary of mortality searches at wind energy projects indicates data were collected over a relatively short time period and do not include many projects that have been constructed in the last 5 years.

Erickson *et al.* reports an average of 2.19 birds killed per turbine per year. This figure is typically used by the wind industry to illustrate the low number of birds killed per turbine when averaged on a national basis. However, the analysis has several flaws, as discussed below.

On several occasions, the ARA report makes the comparison between this national average and the CWP. We believe it is inappropriate to use such a generalization in discussing the potential impacts at the CWP, as this project site is unique from other sites in many aspects (site characteristics, weather patterns, avian use, etc.).

The ARA authors do not acknowledge the limitations and assumptions of the Erickson data, such as a lack of scavenging and searcher efficiency studies, to provide a balanced approach for the reader. Erickson concedes that most studies have been inconsistent with respect to adequate mortality searches and accounting for scavenging. He comments, with respect to the national mortality average and two California projects, "A relatively high level of uncertainty exists in these estimates due to the lack of detailed fatality monitoring for small birds at Altamont and Tehachapi Pass."

As previously mentioned, the national avian mortality estimate is based primarily on turbines constructed in the western United States, particularly California, where site topography, bird species composition, climate, and migration are different than in New York State. Only 589 turbines of the study's more than 11,000 turbines were located outside of California, and only 19 were from the eastern United States. Currently, the number of turbines located in the east is less than 400 (AWEA 2005). Two recently constructed wind projects in West Virginia (Mountaineer Project) and Tennessee (Buffalo Mountain Project) were monitored for avian mortality and results indicate that the number of birds killed could be much higher than previously estimated (Kearns and Kerlinger 2004). Mortality estimates for these projects are 4.0 birds per turbine per year in West Virginia and 7.7 birds per turbine per year in Tennessee. It is important to note that many of the mortality searches in California focused on finding dead raptors and searches were not conducted for passerines.

Unfortunately, no complete estimates of bird abundance are provided for the other sites used in the mortality comparison. Without this information, it is impossible to determine if the rates of mortality provided for other projects would be comparable to the CWP. However, given the very large numbers of birds which move through the area, the chances for mortality are expected to be higher when compared to other sites.

It is also impossible to predict that the CWP will come close to the national average of 2.19 avian deaths per turbine per year. The fact remains that there are no accurate estimates of avian mortality which can be applied to this site due to its unique location, avian species composition, and influencing climate and topography.

The ARA report makes several statements regarding the Altamont Pass wind energy project's affect on raptors, indicating that it is dissimilar to the CWP. We disagree with some of these points. The ARA authors indicate, for several reasons, that the older versions of turbines are more dangerous to birds.

Discussion is provided in the ARA report regarding the difference between the Altamont Pass wind energy project and the CWP. Several items are discussed in an attempt to draw a distinction between the two projects. In discussing the differences between older turbines versus newer models, the ARA report indicates, for several reasons, that the older versions are more dangerous to birds. We do not agree that older turbines with a smaller rotor swept area of 18 meters necessarily pose more risk to wildlife than the proposed 82 meter blade diameter turbines at the CWP. Some evidence suggests that a larger rotor swept area (associated with newer turbine design) would lead to higher avian mortality. In fact, a report published by the National Renewable Energy Laboratory indicates that bird fatalities increase with an increase in total rotor swept area (Thelander *et al*. 2003). This report concludes that "it is reasonable to infer that reducing the number of turbines in a particular area will not result in a reduction of bird fatalities unless the total rotor swept area is also reduced." Other factors, however, such as tower height, turbine position, and terrain also influence bird strikes with these structures.

The ARA authors state that newer turbine blades generally turn at slower speeds than older models and would result in fewer avian deaths.

The blade tip speed of a newer model turbine can exceed 150 miles per hour. It has been shown that bird vision cannot identify the tip of the moving blade, known as motion smear or motion transparency (Hodos 2003). When an object, such as a turbine blade, moves across the retina with increasing speed, it becomes blurred to the vision. In an experiment with kestrels, a small raptor, it was determined that as the bird moved closer to a moving turbine blade, it saw only the transparent blur. Seeing only the transparent blur of the turbine blades may not be perceived as a threat to the bird. When the bird gets closer and the blades disappear, it feels safe enough to approach or pass through the rotor swept zone. This phenomenon may explain much of the avian wind turbine mortality. Therefore, regardless of visual acuity, birds may not attempt to avoid the moving blades if they do not perceive them as a threat.

The ARA authors argue that the high raptor mortality at Altamont Pass in California is due to the unique environmental setting and the size and structure of the wind turbines in that area.

Specifically, the ARA authors state that the lattice-type structure of the turbines permitted raptor perching during hunting and contributed to mortality. However, Thelander *et al*. (2003) found that more birds were killed by wind turbines on tubular towers than lattice structures. A total of 685 turbines were searched (more than 5,000 turbines exist in the WRA) once every 5 to 6 weeks. Given the long time period between searches and that only 14 percent of the turbines were searched, it is highly probable that many carcasses were removed by scavengers or decomposed. The study concluded that the mortality rate per turbine is nearly 10 times that of previous estimates. While the ARA authors call this situation an anomaly, we know of at least one other wind energy project where golden eagles have been killed by turbines, which apparently did not involve feeding raptors (Howe, pers. comm.2004). Additionally, many species of eagles along with other rare raptors have been killed by wind turbines in Spain, Germany, and Australia (Duchamp 2004). We again recommend that these issues be thoroughly examined prior to project construction.

The ARA authors state that the project size difference between Altamont and the CWP will result in far fewer raptor deaths.

In one study (Thelander 2003) during a 33 month period, the total number of raptors at Altamont Pass (6,146 sightings) was far fewer than the number of raptors which typically fly through the CWP area in just one spring migration (average of 15,765). We note that there are differences in the study methodologies used for tallying birds in the two areas.

The ARA authors state that less mortality will occur at the CWP because birds only have to make one pass through the area.

This statement ignores the fact that birds must run the gauntlet through approximately 34 turbines, and that some birds may reenter the turbine field resulting in multiple exposures and higher risk. Resident raptors will be at the highest risk. While it can be argued that a greater risk probably exists at a site where there are more spinning blades, the fact remains that both areas have a concentration of raptors, and that a high level of use increases the probability of mortality when compared to other wind energy project areas. Recent changes to the project design indicate that birds may have to travel through several groups of turbines, which may increase potential risk.

Raptor mortality varies from site to site based on different species composition, site, and habitat characteristics and, therefore, broad generalizations, such as those made in the ARA report, are not valid.

Further discussion about raptor mortality in the ARA report indicates that the number of collisions is low among this group of birds (based on Erickson 2001). For United States wind projects outside of California, the ARA authors state that 2 percent of the fatalities are raptors, but we note that only five projects were reviewed. In addition, the text does not point out the high percentage of raptor deaths in California at Tehachapi Pass (20 percent) and Montezuma Hills (61 percent), in addition to Altamont Pass (47 percent). In Europe, raptors were most affected by turbines at six Navarre wind farms, accounting for a total of 65 percent of the avian mortality (Lekuona 2001).

In the discussion of avian mortality within the WRA, the ARA authors provide examples of studies in the Netherlands and Spain. We question the applicability of the data provided therein because of the sampling protocols followed, and because of differences between turbine diameters.

Mortality data from Winkleman (1994) is cited as an example of the low number of bird deaths in the Netherlands. Winkleman observed, at one site, only 8 birds of 51 (16 percent) being killed by rotors. However, this sample was collected over only 14 nights and may not have captured the peak migration period or represent typical conditions. At another project site, it is reported that only 1.2 percent of birds passing at the maximum turbine height were killed, but this data was collected over only a 7-night period. Further, many turbines studied were smaller that those proposed at the CWP. It should be noted that the mortality rate at these two sites ranged from 14 to 32 bird deaths per turbine per year.

VIII. Comparison to Wind Project in Stateline, Oregon

Few studies have been conducted to document the influence of behavioral, environmental, and engineering/design factors on avian risk or mortality at wind energy projects. The ARA report cites a few studies conducted in Spain and the Netherlands. However, no studies have been conducted in the eastern United States where the CWP is located.

We have concerns about the extent to which avian mortality data can be used to compare one wind energy project to another when so many variables, such as the physical properties of the project sites, climate, avian species composition, migration patterns, and project design features, are completely different.

To assess potential avian mortality within the WRA for the CWP, the ARA report reviews studies from Spain and the northwest United States. Using the Stateline project as an example, the ARA report explains that, based on bird flight behavior and the physical aspects of the proposed turbines, a model can be developed to predict avian mortality. To do this, the model uses data from the Stateline project on the Oregon and Washington state border, where bird observations were made during the operation of the turbines concurrently with mortality studies. The Stateline data is then used to predict land bird (raptors not included) mortality at the CWP.

The Stateline project is located in semi-arid grassland where trees are almost non-existent. Land use in the area is limited to cattle grazing and the production of wheat on rolling fields. In marked contrast, the Chautauqua site is located atop a steep ridgeline where land use consists of active and inactive agricultural fields, forests, river gorges, and residential areas. In contrast to the semi-arid climate of the Stateline project, the CWP is proposed to be sited adjacent to Lake Erie and the lake plain. This large body of water is known to funnel birds through the CWP project area during spring migration, but no such feature is found at Stateline. The Great Lakes even create their own weather from the sheer volume of water they contain. Clearly, the habitat types are completely different and many of the species and life histories of birds found in the two areas are dissimilar. In fact, it could be said that no features found in the Stateline project area are common to western New York.

Avian species composition is also different between the two sites with grassland birds, such as the horned lark and western meadowlark, being the most common species observed at Stateline (percent composition of 64 and 13 percent, respectively). These two grassland species account for 77 percent of the total number of birds observed at the Stateline site. Horned larks were the most common fatality (38 percent of the total) found beneath the turbines at Stateline. Only one horned lark was observed at the CWP, while the western meadowlark was not observed there.

To model the project exposure area (PEA) for the Stateline project, the PEA is defined as the vertical airspace below maximum height of the turbines for the entire project area, not just in the rotor swept air space. The authors of the ARA report dilute the "significance" of avian mortality by using the entire project footprint area, not just the turbine swept area. This approach significantly impacts the calculation and outcome of mortality.

A calculated mortality rate of 0.1 percent for land birds passing through the PEA of the Stateline project is provided on page 6-17. The PEA is defined as the vertical airspace below the maximum height reached by operating turbine blades. However, the ARA report extrapolates this number and expands it to encompass the entire WRA, thus diluting the percent of mortality to 0.01 percent. This approach significantly impacts the calculation and outcome of mortality. A WRA is defined as the total geographical area (or footprint) within which turbines are located and the space between them (where no turbines are located). Thus, the larger area equates to a smaller percentage of avian mortality.

The landbird mortality estimate for the CWP is based on the Stateline wind project which has different bird species composition and abundance.

Only nocturnal migrant songbirds were included in the mortality data collected at the Stateline project. The estimate did not include horned larks and other non-nocturnal migrants found at the site. Horned larks were among the most abundant species in the area and accounted for approximately 38 percent of the total mortality. Over 18 months of monitoring the project, approximately 60 birds were collected at 3 sites (Nine Mile Canyon, Buffalo Ridge, and Stateline). It is important to note that this monitoring was conducted over the migration and breeding seasons.

Turbine sizes and rotor diameters differ greatly between Stateline and the proposed CWP, and, thus, caution must be used in comparing potential mortality. In addition, the number of animals flying between the ground and 100 meters at the CWP is more than three times the number of those flying between 0 and 75 meters at Stateline.

Among the problems with comparing the Stateline project and the CWP is the difference in turbine size. Turbines at Stateline were mounted on 50 meter towers, but the CWP turbines will be mounted atop 80 meter towers (62 percent taller). Further, there is a significant difference in the rotor diameters, with the Stateline rotors being 47 meters and the CWP rotors being 82 meters in diameter. A 57 percent larger rotor diameter which reaches to a higher altitude, such as those proposed for the CWP, may pose a greater risk to birds than those found at Stateline.

Therefore, the predictive model in the ARA report may underestimate the mortality at the CWP by a factor of three. Clearly, there is a difference between the project designs and the number of birds flying within the PEA.

IX. <u>Comparison to Wind Project in Tarifa, Spain</u>

Similar to the mortality estimate for land birds derived from the Stateline data, the ARA authors also attempt to derive a mortality factor for raptors from one project. However, the smaller height and rotor swept area are not comparable between the two projects. Likewise, the percent mortality that can be expected at both sites will not be comparable.

On page 6-19, the ARA authors stated that raptor mortality at one site, in Tarifa, Spain, was only 2 birds per 47,500 raptors passing through the WRA (Janss 1998). This equates to 0.0042 percent mortality or 0.000042 as a constant value. This number becomes the basis for calculating raptor mortality at the CWP in Section 7 of the ARA report. However, what is apparently not taken into account or disclosed are the significant differences between tower and turbine dimensions of the two projects. The height of the wind turbines at Tarifa is only 40 m with 10 m diameter rotors. As a comparison, the proposed turbines at the CWP will be approximately

121 m tall with 82 m diameter rotors. Thus, both the turbine height and rotor swept area of the CWP turbines is much larger than what was studied in Tarifa, Spain.

There is some question related to the efficacy of the mortality searches at Tarifa, as the Janss paper provides conflicting information on the number of searches per week.

The report is vague as to whether searches were conducted only for raptors or also for other birds. No scavenger removal or searcher efficiency studies were conducted to test the accuracy of the mortality searches, and, therefore, it is unknown how many bird carcasses were removed by scavengers between the mortality surveys. Also, it is not clear if mortality searches were conducted during other surveys, such as the bird abundance and nest surveys. Bird observations at Tarifa were made during searches along transects (distance between transects was not provided) and by video cameras (although it is not revealed how many camera locations were used). It is also not clear if the birds observed were actually within the WRA or the PEA.

Another difference between the two projects, again, are site characteristics such as the geography, topography, and habitat types.

Tarifa is located on the Strait of Gibraltar, a narrow land bridge between Spain and Africa, whereas the CWP is located on a ridge adjacent to Lake Erie. The Strait of Gibraltar is a rocky, narrow peninsula generally devoid of vegetation, where the CWP is located on a wooded ridge adjacent to the lake plain. There are also differences in climate, such as wind direction, speed, and timing which result in different migration patterns.

Again, the avian composition of the two sites is expected to be completely different. There is no basis from which to accept the argument that avian risk and mortality will be similar at both sites when approximately 84 percent of the avian species found at the location in Spain do not occur in New York. The ARA report even states on page 6-19 that "Certainly, the fractional mortality (i.e., ratio of fatalities to abundance, or fatality rate to passage rate) will vary based on site-specific, species-specific, and project-specific differences."

To confirm this, information on bird species observed migrating through the Strait of Gibraltar was provided by the Gibraltar Ornithological and Natural History Society (2003). This information reveals that of the 308 species observed (all groups of birds included) at the Strait of Gibraltar, only 52 species (16 percent) are also found at the CWP. Of the raptor group (hawks, owls, and vultures), only 10 species occur in both locations. It should be noted that bald eagles do not occur at the Strait of Gibraltar. As previously mentioned, two raptors were killed at Tarifa. One bird was a griffon vulture and the other was a short-toed eagle, neither of which has been documented in New York State.

The ARA methodology assumes that avian risk exposure is directly tied to utilization of the project wind resource area.

Utilization of the project airspace is based on avian behavior and influenced by many factors such as temperature, wind direction, the passage of low or high pressure systems, precipitation, etc. Some avian behavior, even when not greatly influenced by weather, can affect the degree of risk to certain species.

For example, species which typically fly at low altitudes, such as the northern harrier, can be at greater risk exposure within the rotor swept zone. Other species, such as the turkey vulture, may not typically migrate at lower altitudes but will search for food within the turbine height zone. These different risk factors are not taken into account using this methodology. Although the ARA report purports to have accounted for avian behavior, it is obvious that the analysis did not go into significant detail to accurately evaluate risk for some species. Separate utilization rates are not calculated for each species to account for these behaviors and greater potential risks.

We cannot concur with the basis for the raptor mortality estimate given that it was derived from a project with markedly dissimilar geography, topography, avian species composition, and project design features than the CWP. The ARA authors assume that mortality estimates will be comparable between the projects without sufficient scientific evidence to affirm such. Further, the ARA authors incorrectly assume that all bird groups should behave in similar fashions when encountering turbines, even in the face of different environmental variables. This is an unreasonable assumption because of the physical and behavioral differences between the various groups of birds.

X. Other Sources of Avian Mortality

Table 6-4 cites estimates of avian fatalities from human structures including wind turbines. This comparison of wind turbines to other structures is made several times in the report but it is an unequal comparison.

Table 6-4 indicates that buildings, cars, powers lines, and communication towers kill far more birds than wind turbines. While the magnitude of avian deaths is greater from these sources than from wind turbines, the number of deaths per unit is not known. The authors do not discuss how many cars are driven on the road or how many vehicle miles are traveled. The fact that cars move and pose a different form of risk whereas the other structures do not (except for the blades of a wind turbine), would further complicate any comparison drawn between these potential sources of avian mortality. Likewise, the authors do not discuss how many miles of power lines or how many buildings or communication towers are associated with this estimate. Thus, the mortality per unit of measure of avian fatalities from these sources cannot accurately be compared to wind turbines without a standardization of the mortality. There is no common means of comparison (unit for unit) between the various sources or mortality.

The number of wind turbines being constructed and operated is increasing rapidly, requiring consideration of the cumulative effects on avian resources, especially when projects are located at multiple locations along migratory routes.

Many studies have been conducted to show that most Neotropical migrants are declining and further reductions could have a negative cumulative impact which may be significant (Rich *et al.* 2004). As identified in the North American Land Bird Conservation Plan, at least 100 of the 448 native land birds that breed in the United States and Canada warrant inclusion on the Partners in Flight watch list due to threats to habitat, declining populations, already small population sizes, and limited distribution. At least 72 species need immediate management action to reverse population declines.

As mentioned previously, the sponsor has yet to generate an adequate baseline describing the timing, duration, and assemblages of species present in the project area to analyze project-related impacts, no less the effects on populations.

Mortality estimates in Table 6-4 do indicate that large quantities of birds are being killed and injured from a variety of sources, and it underscores the serious need to prevent additional unnecessary mortality. Both direct habitat loss and indirect effects of turbines on avian populations are discussed in the ARA report but very few studies have been conducted to measure these effects at the population level. Our concern with this is two-fold. First, the ARA report provides no valid support for the conclusions provided. A population-level analysis must be conducted to demonstrate the significance of bird mortality on a species as a whole.

Second, if not more importantly, even if the project sponsor justified a conclusion regarding the "biological significance" associated with project impacts, this simply is not the measure or standard that the Service employs when implementing laws such as the ESA or MBTA. This is a particularly important point, as compliance and liability under these statutes would be assessed differently than the ARA report implies. More information must be collected at existing wind energy projects to reach conclusions about the long term effects of these structures on wildlife.

The ARA report concludes that biologically significant impacts will not occur to birds as a result of constructing and operating wind turbines. However, little is known about the effects of wind turbines on some species, especially those of conservation concern. Only recently, it was discovered that turbines killed disproportionate numbers of bats in comparison to birds. It is likely that turbines may have an adverse effect on certain avian species populations. Certain bird species may be at a much higher risk of mortality due to behavioral characteristics and/or biological factors. Others, with already low population levels, are inherently at risk if there is a loss of individuals with which to sustain the population.

The ARA authors state that the EPA risk assessment process involves characterizing project-related effects on avian species, using an analysis of field data, and prediction of avian mortality.

Step 3 in the EPA Risk Assessment Process involves characterizing project-related effects on avian species. A Utilization/Avoidance-Mortality (UAM) method was developed to calculate predicted mortality based upon bird abundance and avoidance behavior. The authors state that this method draws upon other methodologies and refines the analysis to account for project-specific features and avian behavior. However, we found no evidence to support that statement. We found basic flaws with this methodology and some of those flaws have been discussed above and additional comments are provided below.

The UAM method is described as a "real life" analysis; however, we disagree and find basic flaws with this method which makes it an unacceptable approach to assessing avian risk for this project. First, the ARA does not use a sufficient data set to characterize avian movements in the project area. Second, the ARA has not provided specific information on avoidance behavior or a quantifiable measure of avoidance behavior for the various species of birds found in the project area. Third, the UAM method does not differentiate between different bird species. And fourth, the UAM method does not factor in variables such as weather into the analysis.

An overview and critique of qualitative evaluation methodologies is provided by ARA authors in Section 7.2. These methodologies are then rejected by ARA authors as inappropriate for this project. The Service finds that use of the UAM method is a similarly flawed approach with respect to the methodology's failure to successfully evaluate species-specific risk, allow for valid comparisons with other projects, or to allow for a determination of the biological significance of the risk. These are limitations (3) (4), and (5) of EPA's risk assessment process.

<u>Limitation (3) "evaluate species-specific or avian group-specific risk."</u>

While the evaluation includes discussion of avian groups, such as raptors versus passerines and spring versus fall migrating land birds, these generalizations are too broad to adequately characterize the risk to the various species of birds which use the site.

The UAM method for this project does not characterize risk to all avian species or even all avian groups (waterbirds, for example). The UAM method has taken a very broad approach to evaluating the potential project impacts and assumes that the impacts will be the same to all bird species within a particular group (for example, it assumes impacts to swallows will be similar to warblers). We disagree that these broad generalizations can accurately predict avian risk to all species in a group based on large variations in bird behaviors. Many authors have recognized the importance in bird behavior in assessing potential risk from wind turbines. Also, many have reported that different species behavior uniquely when encountering turbine structures. In summarizing various papers on this subject, Smallwood and Thelander (2004) list a dozen authors who have reported that behavior can predispose certain bird species to turbine collisions.

<u>Limitation (4) "allow for valid comparisons with other projects."</u>

We recommend that a more accepted method be selected to calculate avian risk after additional data has been gathered from the project site. As previously mentioned, at least 3 years of preconstruction data is necessary to adequately document wildlife use of the project site.

A limitation listed in the ARA report for qualitative assessment of wind projects is the lack of methods to compare projects. The UAM method falls within the same category of not being able to provide comparable data and assessment methods with other wind projects. While we acknowledge that there is no one accepted method for conducting avian assessments at wind energy facilities, it would be preferable to use one of the more common evaluation methods for this project which has been in use over the last few years, some of which have been peer reviewed. For example, Erickson (2000) monitored three phases of the Buffalo Ridge wind project using a Before/After - Control/Impact design to evaluate potential impacts and monitor mortality. This design is described in more detail in Morrison (2002). While the ARA report does use a metric common to other projects, the number of birds predicted to be killed per turbine per year, the method in which the estimate was derived is not considered sound.

Limitation (5) "allow for a determination of the biological significance of the risk."

The ARA report states that the project will have no biologically significant impacts but, as discussed earlier, the ARA authors provide no supporting documentation for this conclusion.

The limitation of not providing a methodology which evaluates biological significance of risk is also inherent in the UAM method. Clearly, the UAM method does not evaluate the project risk to 10 species of birds which are listed as rare, threatened, or endangered and found in the project area, with the exception of the bald eagle. To date, we are unaware of a single credible evaluation of this sort that has been completed for a wind energy project. We believe that this is due to the fact that studies are not of sufficient scope or duration to accurately estimate avian populations or population level impacts.

XI. Utilization of the UAM Method for the CWP

Section 7.3 provides details of the UAM method and of the underlying assumptions used by the ARA authors to determine avian risk. This method is based on two variables: (1) utilization of the WRA *(i.e.* the number of birds flying through the project site); and (2) the degree to which the birds miss colliding with turbines by avoidance (*i.e.* the "avoidance-mortality factor" [AMF], also described as the ratio of fatalities to total avian abundance). Calculations were completed for nocturnal migrating land birds and spring migrating raptors, but for other groups of birds, the analysis was not completed.

The UAM method is conducted in three steps; 1) determining seasonal avian utilization of the WRA; 2) calculating the avian avoidance-mortality factor; and 3) applying the predicted avian mortality to the entire migratory season. The process was completed for both spring and fall migration seasons for nocturnal migrating land birds. A similar calculation was also completed for diurnal migrating raptors in the spring only. No such analysis was completed for diurnal migrating land birds (e.g. certain species of water birds, kingbirds, swallows, blackbirds, etc.), breeding birds, fall migrating raptors, or wintering birds. Therefore, the ARA may underestimate the potential mortality for a number of bird species at various times of the year.

1) Determining seasonal avian utilization of the wind resource area

Although the ARA report indicates that data collected at the project site is representative of normal migration conditions, we believe that the sample size is not robust enough to draw that conclusion. References to statistical methods in Moore (1995) and Green (1979), among others, indicate that increased sample size obviously reduces variability and increases statistical predictive strength. A sample size of one data set is too weak to draw reliable conclusions regarding avian utilization of the WRA at the CWP site.

On page 7-4, the first step in the UAM method of determining avian abundance in the PEA is described. Avian abundance is based on radar and visual observations. However, radar monitoring only indicates the number of targets per unit of time and does not always distinguish between bird, insect, or bat targets. For this project, all targets detected by radar were assumed to be birds. Measuring target speed can sometimes differentiate insects from birds and bats. In some cases, it may not be possible for the observer to determine if a target is a bird or a bat.

Further, visual verification of data collected during nocturnal radar sessions is difficult or sometimes impossible for high flying animals.

Radar data were collected in the spring of 2003 from April 15 to May 14 to determine seasonal avian abundance. However, it is doubtful that the peak of the migration season was captured due to ending the study in mid-May. A typical spring migration season will cover approximately 90 days from March until June of any particular year. Therefore, the abundance of birds observed in the project area may have been under-represented even though the ARA report states that the estimate is extremely conservative. Further, it has been demonstrated that avian migration is influenced by local as well as continental weather patterns which vary from year to year. The only way to account for this variability is to collect data over multiple years.

<u>2) Calculation of the avoidance-mortality factor</u>

Step 2 in the UAM method involves the calculation of the AMF based on the percent of the RSA occupied within the WRA. After the percentage of birds flying through the RSA is determined, it is assumed that a certain percentage of the birds will pass through unaffected and some will be killed or injured.

Avian mortality is assumed to be proportional to the area of turbine rotor swept area (RSA) when compared to the total airspace of the project site. However, the limitations of this approach should be acknowledged:

- It is assumed that a bird will only fly through the RSA of one turbine rather than multiple turbines;
- It assumes that there will be only one flight through the project site. It does not account for multiple passes by migrating or resident birds which may be feeding in the area; and,
- The analysis also does not acknowledge the risk of collision with the monopole towers or the impact from displacement of habitat around the structures.

Turbine configuration and location can be key factors in the degree of avian risk at some wind projects. The ARA report should evaluate the final turbine configuration and determine the risk to flying animals. This analysis should determine if there is an elevated risk to individuals flying through multiple clusters of turbines.

Original project plans showed the turbines placed generally in a string along the edge of the ridge. This is the location where many raptors have been observed during migration. For example, Johnson *et al.* (2003) found that only a few turbines accounted for most of the mortality at the Klondike Wind Project. Likewise, structures placed in saddles between mountains in Montana were shown to have a higher mortality rate than structures at other locations (Ellis *et al.* 1978).

Project plans have changed as some landowners refused to renew lease agreements and turbine locations have shifted. We understand that the turbine locations have been revised and are now generally arranged in three clusters.

An assumption seems to have been made that bird flight will remain constant through the WRA and not change. The analysis does not account for birds that may initially fly above (or below) the PEA of one turbine but within the RSA of a subsequent encountered turbine.

More importantly, the AMF analysis does not take into account other important variables, such as weather, which would influence avian movement through the WRA. Although mention is made of the need to consider geographical and topographical differences between projects, when using data from one project to analyze the risk of mortality at another, these factors are not addressed and not numerically factored into the mortality analysis.

If adverse weather conditions, such as fog, rain, or a cold front pushed birds down to lower altitudes, there would be an increased level of mortality risk. Although the ARA report does mention that the AMF would be influenced by a number of physical, biological, and technical factors, these factors are not addressed and not numerically factored into the mortality analysis. Recognizing the importance of these factors, the ARA report on page 7-9 states "These include geographical and topographical differences (e.g., morphology, visual acuity), weather related differences, the timing of migration (e.g. day versus night), and project design (e.g., size, scale, density, and other mitigative features). Accordingly, determining avoidance-mortality factors for this project based on studies from other facilities must recognize these caveats." We found no such adequate comparison of these factors in the ARA report.

3) Applying the predicted avian mortality to the entire migratory season

The third step in the UAM method involves the prediction of mortality and risk for the entire spring and fall migration seasons. Seasonal mortality and risk is determined by multiplying utilization by the avoidance factor for a particular migrant group (diurnal spring raptors, nocturnal fall land birds, and nocturnal spring land birds). Annual mortality is then determined based on the proportion of the seasonal mortality which is applied to the non-migratory periods (discussed further in Section 7.8). As previously mentioned, the analysis does not address breeding birds.

According to the ARA report, several measures of conservatism were incorporated into the UAM method. These include applying "peak" utilization rates, using pre-construction data, rounding up numbers during calculation procedures, expanding the PEA by 15 meters, and assuming all targets are birds. Although the CWP claims to have sampled during the "peak" utilization period, as stated before, a portion of the migration period was not sampled and it cannot be determined, from the data collected, if the peak of the migration period was captured or the magnitude of migration is adequately represented.

A portion of the migration period was not sampled and it cannot be determined, from the data collected, if the peak of the migration period was captured or the magnitude of migration is adequately represented. Even though a "correction multiplier" was added to the number of birds utilizing the project site, the accuracy of predictions made by the CWP cannot be confirmed.

The UAM method does not consider the effects of inclement weather and poor visibility which has been shown, in some cases, to lower bird flight altitude (and increase PEA utilization). We believe that reduced visibility and flight altitudes will make birds more susceptible to collisions with turbines and, thus, these effects should be considered. Rounding up numbers, increasing the

PEA by 15 meters over the blade tips, and assuming that all targets are birds does not substantiate the validity of the UAM method.

The ARA authors suggest that the use of pre-construction data make the utilization estimate higher because no turbines are present to deter birds. However, the ARA authors also cite a study conducted by DeLucas et al. (2004) in the Straits of Gibraltar where the topography, weather patterns, and bird composition are all different from the CWP.

XII. Data Usage and Validation for the UAM Method

Section 7.4 describes data usage and validation for the UAM method. A correction factor was developed to account for the radar equipment's inability to determine the number of birds in a flock. We have some concerns about the use of the correction factor.

For spring migrating raptors, visual observations of flocks of raptors were conducted to a distance of 100 meters. It was not clear to us if the results of the visual observations of mean flock size also represent areas outside of the 100 meter zone. There was no data collected for groups of raptors greater than 100 meters from the observer. This monitoring was conducted by the CWP consultants and does not include the RWH counts. The mean flock size was determined to be 1.4 raptors per radar target. For land birds, similar diurnal observations were made. Due to visibility constraints at night, similar flock size verification for nocturnal migrants was not determined. Therefore, it was assumed that birds fly singly at night, and that one radar target equals one bird. We have observed "targets" on a radar screen which were actually flocks of waterfowl. Many species of passerines are known to fly in flocks during migration, but the numbers are unknown.

The ARA report presumes that the various land bird behaviors would be similar enough to estimate risk to the hundreds of different bird species with one simple calculation. Unfortunately, the mortality-avoidance factor does not take into account behavioral or physiological differences. Thealander *et al* (2003) found differences in bird behavior and risk based on flight time, wind speed, and season among three raptors, red-tailed hawks, northern harriers, and American kestrels. A similar analysis of the species found in the CWP project area was not completed.

The numbers of birds flying through the CWP site that will be killed or injured are based on studies of only two projects, the Stateline project along the Oregon and Washington state border, and the Tarifa project in Tarifa, Spain. We again question the applicability of this data to the CWP site. No studies of this type have been conducted at a wind energy project in the eastern United States.

At both Stateline and Tarifa, bird abundance and mortality data were collected simultaneously. Unfortunately, these studies were of relatively short duration and in different geographic areas containing different bird species with different migration patterns, raising serious questions regarding its applicability to the CWP.

The Tarifa project is located near the Strait of Gibraltar and described as being within a major raptor migration corridor, according to the ARA report. However, Montes (1995) indicates that the actual project location is farther inland than where a majority of the avian migration takes place. No preconstruction data is available for either the Tarifa site or a nearby reference site. Actual bird abundance is not known for the area prior to construction of the wind energy facility. The studies did not account for any changes in avian behavior that may have been caused by the proximity to the wind turbines.

A recent study of differences in wind turbine size at the Altamont WRA concluded that the RSA is one of the most influencing factors on avian mortality with respect to turbine design (PIER, 2004). Examination of the details of the differences between projects reveals that the Tarifa turbines are 40 meters tall compared to the proposed CWP 121 meters; the RSA at Tarifa has a diameter of 10 meters as compared to the CWP proposed 82 meter rotors.

Mortality data collected from the Tarifa project are questionable. It appears that extensive mortality searches were not conducted at the Tarifa project, yet the ARA authors base the CWP raptor mortality estimate entirely on these data.

The AMF for raptors at the CWP is based on raptor mortality data collected at the Tarifa, Spain wind project. This study, conducted by Guyonne Janss over 14 months beginning in 1994, consisted of 66 turbines arraigned in a single row on top of a north-south oriented ridge.

The authors state that mortality searches were conducted at least once per week, but later indicate that "Although we did not conduct any experiments of scavenger removal of dead birds, the number of dead birds found in our two visits per week was well below the average found in other studies of power lines using similar methodology."

A major flaw with the mortality estimate for the CWP, using the Tarifa data, is that the Janss study provides no information on how many of the 47,500 Griffon vultures flew through the Tarifa PEA. Therefore, raptor abundance in the PEA it is not known.

Two dead raptors were found at Tarifa, a Griffon vulture and a short-toed eagle in 14 months of searching. The total number of raptors flying through the Tarifa project area was estimated at 45,000 Griffon vultures and 2,500 short-toed eagles. Therefore, the AMF was calculated to be 2/47,500 or a factor of 0.000042. This number was then multiplied by the number of raptors flying through the CWP site PEA to determine a total raptor mortality estimate.

The AMF is derived by combining the carcass and abundance totals of two different species. However, as we have noted previously, different bird species behave differently and, thus, mortality will also differ.

If an AMF were to be calculated for each species, much different results would occur. The AMF for short-toed eagles would be 1 death out of 2,500 birds (of that species) observed, or a rate of 0.0004, which is 10 times higher than the AMF used by the CWP. Of course, the AMF for Griffon vultures (1 out of 45,000 birds) would only be 0.000022. This example shows how mortality can vary by species.

Two other mortality studies conduced at Tarifa produced very different results. They were conducted prior to the Janss study in the same area, but not used in the ARA report.

The Spanish Ornithological Society, in 1993 and 1994, conducted mortality searches at 256 turbines located in Tarifa. Montes (1995) reports that 87 of 256 turbines were searched twice a week for avian mortality. Although the level of sampling is limited, a total of 65 large birds, mostly raptors, died after colliding with turbines, including 30 Griffon vultures and 2 short-toed eagles (compared to the 1 vulture and 1 eagle found by Janss). However, the ARA report uses the lower mortality estimate of 2 raptors killed out of 47,500 as a basis for raptor mortality at the CWP.

Barrios and Aguilar (1995) also conducted mortality searches in Tarifa and estimated the number of birds killed to be 0.45 bird per turbine per year. This mortality figure was adjusted for predator scavenging and is 10,000 times greater than the CWP mortality estimate. The ARA report should include a discussion explaining why certain data were excluded from consideration in the modeling effort.

XIII. <u>Characterizing Project-related Exposure and Risk</u>

Step 4 of the EPA Risk Assessment Process involves characterizing project-related exposure and risk. However, this procedure has not previously been used to assess risk to birds from wind turbines. It has not been demonstrated to be accurate or reliable for wind energy projects and we are concerned about the potential underestimation of mortality, especially given the small data set collected at the CWP site. In addition, since the project design was recently changed, we recommend that the project sponsor provide an updated estimate of direct habitat related impacts as well as potential avian collision risk.

Unfortunately, during the project scoping process, the UAM methodology was not available for review. Had this methodology been available, we would have expressed our concern about the assumptions utilized in the ARA report.

As previously mentioned, the data collected may not represent average annual conditions of bird migration at the proposed CWP site. Therefore, the risk assessed in this section is based on a small data set, and any errors in the interpretation of this data may be magnified. As we have recommended previously, multiple years of data must be collected at this site to account for data variability.

It is important to remember that only 30 days (12 days in the spring and 18 days in the fall) of site-specific data are included in this analysis. Avian abundance data collected by direct observations and radar equipment is then multiplied by a mortality factor derived from studies collected in Oregon and Spain, neither of which have any similarity to the project site in terms of weather, topography and habitat conditions, avian species composition and abundance, or position within migratory pathways. The quantification of bird mortality and predictions of bird behavior are based on this unrelated mortality factor.

The scope of the impacts is unknown at this time because the location of the turbines has changed. Indirect impacts could occur in the form of habitat fragmentation. In addition, some species are sensitive to human activity and structures, which may affect breeding, feeding, or resting. Further information should be provided by the CWP based on the final project design. Because each of the three sites contains many different variables, it is difficult, at best, to make comparisons among them let alone make accurate predictions of avian mortality.

This correspondence does not include a review of the ARA report with respect to listed species, primarily the bald eagle. Therefore, no comments are included in this letter on Sections 7.9 (Exposure and Risk to Listed Species in the Chautauqua WRA, Including Migrant Bald Eagles) and 7.10 (Characterization of Exposure and Risk to Resident Bald Eagles). Comments related to these sections of the report will be provided under separate cover.

XIV. Alternatives and Avian Risk Reduction Strategy

The ARA report discusses the alternatives considered by the project and evaluated pursuant to the SEQRA environmental review process. As with all SEQRA evaluations, various practicable alternatives, as well as the No Action Alternative, needed to be included. To evaluate the No Action Alternative, the ARA report discusses the local and global perspective of both existing structures which may harm avian species and the implications of continuing to rely on existing conventional energy in lieu of using wind power.

First, the discussion in the ARA report focuses on the local effects of existing tall structures such as communication towers and power transmission lines. Two communication towers taller than 200 feet are located in the project area along with a power transmission line. Several other towers are located to the south of the site. The ARA authors hypothesize that these structures (communications towers, power lines) will cause greater avian mortality than the CWP. However, there is no data to support this conclusion. To our knowledge, there have been no properly conducted studies of avian mortality at these structures within the project area.

Collectively, these existing structures, along with those which are reasonably foreseeable, and the presence of the proposed 34 wind turbines, may pose a serious hazard to birds migrating through the area. The turbines of the CWP add to the gauntlet of hazards that birds must avoid during migration.

Ideally, an appropriate evaluation of the No Action Alternative would include data on avian mortality from the tall structures located within the project area to provide a baseline. This analysis would include information on existing conditions during all times of the year (breeding, wintering, migration, etc). Since this information is not available, discussion in the ARA report should plainly state what the project conditions and associated risks are to birds from the existing structures. While this discussion would most likely be qualitative, any available data from similar facilities should be provided in this section (i.e. documented mortality at communication and power line facilities). A comparison of these baseline conditions can then be made to the proposed 34 wind turbines at the CWP.

While electricity derived from "green" energy sources other than fossil fuels will reduce harmful emissions, the placement of wind turbines within an avian flyway certainly would not have greater environmental benefits to wildlife.

On a larger, global scale, the ARA report identifies the potential environmental impacts to birds from electricity derived at existing electric generation facilities, such as coal and nuclear fired power plants. The ARA authors argue that producing electricity from nonrenewable sources will have greater social, environmental, and economic impacts. However, there is no indication that the CWP will replace any other electricity source, but may be only adding to the electrical generating capacity of New York to address increasing energy demand.

The ARA authors claim that if the CWP is not permitted to be constructed, due to its location within an avian migratory flyway, all wind energy development in New York State and in the Northeast will be virtually banned. This statement is completely unsupported by fact.

While windy conditions may concentrate birds in some areas, such as the project site, not all sites necessarily will have a concentration of birds. We know of other wind energy projects which have been or will be constructed in New York State where there appears to be sufficient wind resource and fewer birds (i.e. Fenner, Madison, and Flat Rock projects). To date, no other terrestrial wind energy facility has been proposed within a known major avian migratory corridor in New York State. However, if another wind facility were to be proposed within a major avian flyway, it would likewise raise serious concerns over the potential risk to birds.

We agree that there are serious consequences associated with burning fossil fuels to generate electricity, and we support energy policies which promote renewable sources, such as wind and solar, to provide alternate forms of electricity. However, construction of wind energy facilities will not reduce air pollution emissions at existing power generation facilities. Coal, oil, and nuclear generating facilities must be kept in operation and online to provide the main source of electricity, especially when the wind resources are not turning the turbine blades. The intermittency of wind, coupled with the fact that the times of peak availability of wind resources in a given location may not coincide with the times of peak demand for electricity, makes wind energy less suitable from an energy standpoint.

The ARA report provides a discussion of the environmental impacts associated with burning coal and oil to generate electricity (such as the nearby Dunkirk coal-fired generating facility). We agree that there are serious consequences of burning fossil fuels to generate electricity. Increased levels of pollution prevention are needed at these facilities. Further, we support energy policies which promote renewable sources, such as wind and solar, to provide alternate forms of electricity. However, construction of wind energy facilities will not reduce air pollution emissions at existing power generation facilities.

Likewise, adverse environmental impacts such as thermal water discharges, toxic effluents, or water consumption at existing facilities will not be abated by the construction of 34 wind turbines. This is simply due to the fact that coal, oil, and nuclear generating facilities must be kept in operation and online to provide the main source of electricity, especially when the wind is not turning the turbine blades. Due to the intermittent nature of wind-generated electricity, none of the existing coal, oil, or nuclear powered generation facilities will be shut down or run as reserve units. The intermittency of wind, coupled with the fact that the times of peak availability of wind resources in a given location may not coincide with the times of peak demand for electricity, makes wind energy less suitable from an energy standpoint.

Importantly, any energy deficiencies that may occur in the future in downstate New York will not be addressed by constructing a 50 Mw wind energy facility over 300 miles away in Chautauqua County.

In upstate New York, the greatest wind resource is found during the winter and at night when demand is the lowest. Peak demand for electricity is during the summer months and during the day (NYISO 2005a). We note that an excess supply of energy is expected to be available in New York State during the summer of 2005 with supply expected to exceed forecasted demand by 1,522 Mw. Generally, electricity deficiencies do not occur in upstate New York but may occur in the future in downstate areas, particularly New York City and on Long Island (expected surpluses for the summer of 2005 are 330 and 240 Mw respectively). Several State agencies are working on addressing this situation through energy planning which includes provisions for constructing additional power plants in the areas that need it the most.

New York State has pushed for reducing air pollution emissions at existing power plants such as the Dunkirk facility along with five other major pollution sources across the State. These plants account for approximately 60 percent of the power plant pollution in the State (Post Standard, January 12, 2005). An agreement has been reached to reduce emissions by 70 to 90 percent, chiefly sulfur dioxide and nitrogen oxide. Operating changes in these power plants will be more effective at reducing emissions that constructing thousands of wind turbines across the landscape.

The nameplate capacity of the CWP is 50 Mw, which is roughly 8 percent of the capacity produced at the nearby 600 Mw Dunkirk generating station. However, the amount of electricity actually produced by this project will amount to a much smaller portion due to intermittent wind and equipment repairs. Typically, a wind energy project functions at approximately 30 percent of the nameplate capacity, or in the case of the CWP, a total of 35 Mw. By comparison, coal fired plants typically run at 75 percent of capacity (DOE 2005). Therefore, the CWP will only generate 3 percent of the electricity produced at the Dunkirk facility. Combined, oil and coal are used to generate approximately 27 percent of New York's electricity.

Overall, New York State has an installed generating capacity of 37,254 Mw, but the peak record demand stands at 30,983 Mw (NYISO 2005b). In addition, some electricity is imported into New York from nearby states due to lower generating costs and could push the total to over 41,000 Mw. While it is expected that a modest increase in electricity demand is expected in the future (approximately 1.5 % per year), it appears that there will not be a critical shortage in supply which would necessitate the construction of the CWP. The overall contribution of the CWP's 50 Mw project (assuming 35 Mw of power is produced) to the State's current energy supply would be less than one tenth of one percent (0.00085). Likewise, the CWP would contribute only 1.5 percent of energy toward the goal of producing an additional 3,300 Mw of power from wind, as identified in the State's renewable portfolio standard.

Construction is underway of four new generation facilities that will add approximately 2,000 Mw of power in the next 2 years. In addition, approximately 3,600 Mw of electricity at eight additional facilities have been approved for construction. One application is currently pending for review of a 1,100 Mw facility bringing the grand total to over 6,700 Mw of new generation sources for the State in the near future. However, we believe that energy efficiency and conservation are vital to reducing harmful emissions from power plants and impacts associated with electricity generation. New York State is making progress in energy conservation through its New York Energy Smart program which annually saved an average of 1,300 gigawatt-hours of electricity (NYSERDA 2005).

More information should be provided to explain why alternative turbine locations away from the edge of the ridge and evaluated by CWP, are not feasible. It should also be explained why wind speeds between 6.0 to 7.0 meters per second, which are deemed suitable by the NREL, are not sufficient for this project.

The ARA authors indicate that alternate turbine locations, south of the original project site, were investigated for wind potential. An expanded wind resource study provided a refined wind resource map. Figure 8-2 in the ARA report shows the revised wind map along with the annual average wind speeds. A majority of the map has wind speeds of 6.0 to 7.0 meters per second, designated as an unsuitable wind resource by the CWP. However, the Department of Energy, National Energy Resource Laboratory, indicates that Class 3 winds with speeds of 6.4 to 7.0 meters per second are suitable for wind projects (NREL 2005). The ARA report states that pockets of adequate wind resources exist south of the ridge, but due to the locations, were considered not viable. Alternative locations should be given careful consideration.

Additional baseline information about avian use of the site is needed before effective mitigation strategies can be developed.

Mitigation strategies are discussed in Section 8.4, including the collection of carrion from local roadways to discourage the feeding of raptors such as turkey vultures and bald eagles. The project sponsor would need to maintain such an activity for 365 days a year for approximately 25 years. Likewise, the CWP proposes to shut down turbines for 48 hours during the peak spring migration period. The very short time frame offered by the CWP will not be sufficient to cover the peak migration of broad-wing hawks in the beginning of May if the turbines are shut down for 2 days in April to cover the peak migration of turkey vultures or red-tailed hawks. The 48 hour time period represents only 4 percent of the total spring migration period, if it was assumed that the migration lasts for 45 days. The basis for this time period and methodology to determine peak periods is not provided.

XV. Conclusions

The ARA report conclusions section reiterates that potential impacts of the project would result in biologically insignificant impacts to all groups of birds, including listed species; that the risk estimates within the ARA report suggest avian mortality will be within governing legal standards; and that project-related risk estimates compare favorably with other sources of avian mortality.

We do not agree with the ARA report's conclusions or the basis for them. As mentioned previously, the ARA report mischaracterizes the requirements and standards that apply under Federal wildlife laws. We continue to emphasize to all wind energy project sponsors that proper siting of wind turbine structures outside of bird concentration areas is critical. We previously informed the CWP of this issue in both correspondence and during meetings to assist them in making informed project decisions. We have also worked with the Lead Agencies and the public to inform them of the issues under our jurisdiction.

There is currently a paucity of rigorous avian studies from which to draw relevant information and apply to the CWP. Further, the conclusions presented in the ARA report suffer from a lack of site specific data and appropriate comparative studies. Unless relevant data from other wind energy projects found in similar locations becomes available, it appears to us that additional site specific information is required to draw accurate conclusions about avian risk at CWP.

Others have expressed legitimate concerns about the siting of a wind energy project in migration flyways. The National Audubon Society, in their October 4, 2004, letter, to representatives of the Towns of Ripley and Westfield, stated it does not support the development of a wind energy facility at this site. Likewise, the HMANA has strong concerns about the effects of the project on raptors and adopted a resolution which denounces the project in its current location.

Similar to the Service Guidelines recommending that projects not be situated in areas where birds congregate or migrate, other environmental organizations, even those supporting wind energy, have expressed concerns about placing turbines in migration flyways and provided guidance and input. The National Wildlife Federation, Defenders of Wildlife, the American Bird Conservancy, and the National Wind Coordinating Committee all have adopted policies or resolutions recommending against placing these structures in areas which may be hazardous to wildlife, namely birds and bats. Even the American Wind Energy Association recommends against placing structures in bird concentrations areas, especially where threatened and endangered species are found, stating "Still, areas that are commonly used by threatened or endangered bird species should be regarded as unsuitable for wind development" (AWEA 2004). On an international scale, the Canadian government guidelines recommend against siting projects along ridges where raptors move, and avoid Important Bird Areas and bird concentration areas (Kingsley and Whittman 2003). Likewise, the Council of Europe, Convention on the Conservation of European Wildlife and Natural Habitats, recommends avoiding Important Bird Areas, areas of large concentrations, and migration crossing points (Birdlife International 2003).

Certainly, it has been well documented how important birds are to our society from a number of perspectives. For example, from an economic standpoint, 32 billion dollars were spent in 2001 to observe, photograph, and feed wildlife, mostly birds (LaRouche 2003). From an ecological health standpoint, birds and bats provide insect control to protect crops and prevent the spread of insect borne disease. Obviously, the continued decline of bird and bat populations will result in a substantial cumulative loss for our society.

According to the American Wind Energy Association, the total installed capacity of wind turbines in New York State, prior to 2001, was estimated at slightly more than 2,500 Mw, but today the estimated total capacity is over 6,700 Mw. The wind energy industry is growing extremely fast but without comprehensive planning on a large scale. Therefore, the scope of future avian mortality from wind turbines, particularly in the east, is still unknown. However, it is clear that New York has an aggressive policy to add more electricity to the State grid via renewable sources, chiefly from wind power. The State's Renewable Portfolio Standard, approved in 2004, has spurred interest in providing renewable energy from wind and has resulted in prospecting across the State. At least 3,300 megawatts of electricity from wind energy is requested by 2013. While providing renewable energy will have some obvious benefits, placing projects in migration corridors (such as the CWP) may have impacts to birds and bats.

XVI. Bald Eagles

We have reviewed our files and determined that our initial response is still applicable to the project site. The bald eagle (*Haliaeetus leucocephalus*) is a Federally-listed threatened species known to occur in the project vicinity. Our comments on this evaluation will be forthcoming. We note that not all project features have been provided to our office, such as the current locations of construction staging areas, access roads, interconnect cables, transmission lines, and substations.

The Service recommends that the project's environmental documents should include an evaluation of the potential direct, indirect, and cumulative effects of specific project-related activities on the bald eagle or its habitat, and include appropriate measures, if necessary, to protect this species and its habitat. The evaluation should include all project features, including those mentioned above. When specific plans are identified, the plans and the results of the evaluation should be provided to this office to determine the need for further consultation pursuant to Section 7 or Section 10 of the ESA of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

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