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Erin M. Crotty
Commissioner

December 31, 2004

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

Re: Draft Avian Risk Assessment
Chautauqua Wind Farm, Chautauqua WindPower LLC
Town of Ripley and Westfield, Chautauqua County
DEC# 9-0699-00043/00001

Dear Mr. Perri;

As you know, the Department of Environmental Conservation (DEC or Department) is presently conducting a review of the draft *Avian Risk Assessment for the Chautauqua Wind Project* (ARA). The draft ARA represents an extensive effort on the part of the Chautauqua Windpower LLC (CWP), and the Department appreciates the opportunity to provide comments on this document prior to its incorporation into the Draft Environmental Impact Statement (DEIS). Staff further appreciate the assistance that CWP provided during the October 5, 2004 site visit, and the recent offer to meet with representatives of the co-Lead Agencies, and staffs of the United States Fish and Wildlife Service and DEC.

At this point in our review, DEC staff would like to offer the attached set of draft comments on the ARA, since we understand that CWP is making progress on the DEIS. We welcome the opportunity to meet after all the parties have a chance to review this document and our hope is that this document will make for a productive meeting.

In addition, it is important to consider these comments relevant to only the Chautauqua Windpower Project. DEC staff was not asked to review this document in context with any other project in the state. As the comments herein indicate, DEC staff find that the draft ARA for this project does not accurately assess the potential impacts to birds, particularly migrating raptors and federal and state listed species.

Please feel free to contact me at any time in your review of DEC's comments and thank you again for the opportunity to review the ARA.

Sincerely,

Kevin Kispert
Project Manager

cc: w/attachment, w/enclosure
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Draft Comments of the Department of Environmental Conservation
Draft Avian Risk Assessment for the Chautauqua Windpower Project

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Overview of DEC Staff's Comments

It is apparent that a significant amount of time and effort went into the production of this document. Further, it is clear that Chautauqua Windpower LLC (CWP) attempted to characterize risk to birds from their proposed project. However, staff believe the analysis presented in the ARA suffers from several fundamental flaws. Staff's primary concerns center on the fact that this document makes a quantitative determination of "negligible risk" to avian resources from this project, based on: 1) bird passage rates derived from a sparse and incomplete collection of data; 2) an avian avoidance-mortality factor inappropriately derived from other studies; and 3) a series of broad, general statements provided without sufficient scientific basis or documentation.

While some of the methodology employed in the ARA may have merit at some time in the future, such as when a sufficient quantity of reliable data has been collected on avian impacts from windpower projects, staff does not find the applicant's current approach credible.

Several important caveats should be kept in mind in review of staff's initial comments. First, to DEC staff's knowledge, final turbine locations for the Chautauqua Windpower project have not been disclosed. The ARA states that 31-34 turbines may be included in this project, and all of the maps provided indicate both "primary" and "alternate" turbine locations. Most of the maps depicting the "Wind Resource Area" (WRA) in the ARA show 23 primary and 12 alternate turbine locations. However, other maps provided by the applicant, such as the Bald Eagle Study Area map, present a larger area with 29 primary turbine locations and 22 alternate turbine locations. This larger number of turbines and larger geographic size also appeared to be reflected in the map shown to us by the applicant during our site visit on October 5, 2004. It appears that numerous alternate turbine locations may have been added (B13-22).

Thus, it is difficult to analyze the breadth of the project without knowing exactly which turbines are proposed to be within the final project area. For this reason, staff assumes all of these 51 locations are the "project," and further that Ripley Hawk Watch (RHW) viewing areas 4, 5, and 6 are within or alongside the project area. Staff are concerned that the ARA seems to address a WRA that encompasses a smaller sub-set of turbines, and hence all calculations are based upon a smaller than necessary WRA. This in turn affects numbers presented for abundance, utilization, mortality, etc.

Second, please note that this document comprises staff's initial comments and illustrate our primary concerns with the draft ARA. As the ARA indicated it is a draft document, DEC's comments should also be considered preliminary in nature. In addition, there were a number of non-technical, legal and policy-type comments which staff chose not to comment on at this time. The lack of a response to any portion of the ARA should not be considered to be agreement or endorsement of the applicant's approach.

Third, it has come to DEC's attention that there is a previous version of the report included in Appendix A of the ARA. Staff is in possession of a July 29, 2003 version of the spring 2003 radar study. Although the July 29, 2003 version of the spring radar study is marked "Final Report", it is not identical to the April 27, 2004 final report provided in the ARA. For the purposes of these comments, staff assumed that the version provided in the ARA was the official "Final Report"; a copy of the earlier version is enclosed for your reference.

Staff's comments are arranged in five major sections. First, staff briefly recaps the area of the proposed project and its importance as a migration corridor. Second, staff points out some of the limitations of the radar data collected for this project. Next, DEC staff addresses the avoidance mortality factors and the use of data from Tarifa, Spain and the Stateline project in Oregon, to derive the mortality factors for raptors and passerines respectively. DEC staff then corrects some of the statements made about bald eagles and the potential impact from the project. The fifth section is a general discussion of other listed species and bats in the project area, followed by a discussion of the ARA's comparison of other sources of mortality to wind turbines.

The Importance of the Project Area as a Bird Migration Corridor

Since 1991, the project area has been an important and recognized raptor migration area, and for more than two decades has been an officially monitored "Hawk Watch," known as the Ripley Hawk Watch (RHW). The eastern and southern shore of Lake Ontario and the eastern shore of Lake Erie are documented and well recognized migratory bird pathways, which are important within Eastern North America on a regional scale, particularly during spring migration as birds move north. This is clearly acknowledged in the ARA (p5-1). Twenty-one species of birds of prey have been confirmed at RHW and on average, approximately 16,000 raptors move through the area annually. This is not the largest Hawk Watch in New York State, but is one of only six spring migration locations recognized by the Hawk Migration Association of North America (HMANA) within New York. Further, RHW ranks as the third most significant New York spring raptor migration site in terms of annual numbers of raptors moving through (HMANA 2004).

The ridge line, which encompasses the project area, has also been designated an "Important Bird Area" in New York State by the National Audubon Society, based upon its significance as a raptor migration corridor. This is one of only five such areas designated for raptors in New York State. The ARA calculates a "total seasonal raptor abundance in the Chautauqua Wind Resource Area" to be 100,000 individuals (p7-25). The ARA states that more than 1 million landbirds in the spring and more than 2 million landbirds in the fall pass through the Chautauqua WRA (p 12 and p 7-35). ABR, Inc., a consultant to CWP, also found that approximately 5,200 to 5,300 raptors during peak daylight hours and 30,000 to 31,000 nocturnal migrants passed through Chautauqua WRA at or below turbine height during their 30-day spring study, (Appendix A p 25) and that 32,000 to 33,000 nocturnal migrants (birds and bats) passed through the Chautauqua WRA at or below turbine height during the 30-day study in fall 2003. (Appendix B, p18)

ABR also reported that "[w]e found that the Chautauqua Study Area has higher spring daytime migration of raptors and spring nocturnal migration of passerines than other locations that have been studied in New York". (Appendix A, p 25) The ARA Executive Summary in fact indicated that "for this Project, qualitative methods, standing alone, were deemed insufficient to assess avian impacts....[due to the Project's location in a regional migratory flyway and important bird area, as well as due to the requirements to assess avian impacts imposed by regulatory agencies]."(p 4) Although it is unclear what requirements CWP referred to since CWP was not obliged to do a quantitative risk assessment by regulatory agencies, it is clear that the project is proposed for an area with significant avian resources.

Limitations in the Radar Data: Discussion of Data Collection Methodology and Duration

While ABR clearly found that the Chautauqua site had a higher concentration of birds than other sites in New York they had studied, these findings may be more significant when one considers some of the limitations in ABR's study. That is, the number of birds actually occurring in the Chautauqua WRA may be much higher than reported. This portion of DEC's comments focuses on the numbers of birds assumed to be in the project area based on ABR's field studies and touches on some of the overall conclusions made by CWP in the ARA about the field studies. In sum, staff must seriously question the final figures arrived at in the ARA of the expected numbers of birds at "risk" of flying into the Project Exposure Area (PEA), and by implication, the estimates of birds likely to be killed by the project.

Before staff addresses the radar data directly, staff must respond to the statements in the ARA that conclude that the 2003 field surveys provide sufficient data to describe the 2003 spring and fall songbird migrations. (p 5-84). CWP concluded that, "2003 results are also consistent with historical data and existing information," and that "[m]eteorological conditions in 2003 did not create any anomalies or aberrations in either the spring or fall songbird migration." CWP references this information to conclude that a second year of study would not produce dissimilar results. To arrive at the conclusion that the 2003 data is "typical" of a given year, CWP averaged temperature and precipitation from 2003 and compared it to data from previous years. However, CWP noted that precipitation in May was 54% above normal. Considering the fact that the spring study continued only until Mid-May, more useful information could be gained by examining the effect of these weather fluctuations on bird migration behavior. To elaborate, birds will typically fallout during inclement weather and this could be followed by an increase in passage rates when favorable conditions prevail. Staff raises this issue to caution against the use of averages as a basis to conclude how bird behavior is affected by site-specific, weather-specific conditions. In addition, it is unclear why CWP made a connection between "typical" weather conditions in the project area and a determination that a sufficient baseline of data was available on which to base the ARA. Other factors, such as meteorological conditions outside the region, could have affected the arrival time of some migrants to western New York.

Little Time Was Spent on Actual Data Collection.

One of the problems with the ARA relates to the allusion there were actually 30 days of data from the "30-day" studies conducted in the spring and fall of 2003. While staff understand it is difficult to get a sufficient data set due to factors such as the weather, there are some limitations in the data provided by ABR that should have been more readily disclosed and addressed by CWP. Staff's first criticism of the radar/visual studies documented in Appendices A and B of the ARA involves the amount of sampling.

Reviewing the sampling days presented in the ARA, as well as the explanation of just how each sampling period was conducted, one quickly sees how little time was actually spent sampling, and hence, how little sampling information has been used in the construct of subsequent values such as numbers of birds, flight paths, passage rates, flight altitudes, ground speeds, percent within the PEA, etc. (Appendix A, Table 1, *Visual and radar sampling schedule at the Chautauqua Study area, New York, during spring 2003*) Specifically, Appendix A, Table 1 and the ARA indicate that visual and radar sampling was conducted for 31 days between April 15, and May 15, 2003. However, Table 1 footnotes indicate that rain or insect clutter made it "impossible to collect any radar data for at least part of the session". It is never stated exactly how much of the session could or could not be properly sampled, so one cannot arrive at a total time that radar or visual sampling was actually conducted. However, fully 19 of the 31 radar sampling days, well over half, were so footnoted, meaning all or some of that sampling period was useless in terms of data collection. Thus for radar sampling, it appears that only 13 full sampling days were achieved.

Although no such footnotes were made for the visual sampling periods on these same days, staff questions whether the conditions that made it impossible to collect radar data on particular days also effected the visual observations made. Most of the diurnal radar sampling occurred at the same time as the visual sampling. The ARA implies, and calculations are based on "30 sampling days." In light of the above, this statement seems erroneous.

Dissecting even the "good" sampling days further, the diurnal radar sampling time consisted of 4, 60-minute sampling periods, where for each 60 minutes, 20 minutes were spent in set-up and weather data collection. No radar data was therefore collected. Only 5 minutes per hour, or 20 minutes total each sampling day, was spent collecting information on migration passage rates (in the horizontal radar mode). A total of 10-minutes per hour, or a possible 40 minutes per day, was spent collecting information on ground speed, flight direction, species identification, number, flight behavior, and whether or not any identified "targets" actually crossed the proposed turbine string "as time allowed" (remembering here that the actual placement of the turbines has not even been decided).

It should also be noted that the vertical placement of the diurnal radar had similarly brief, actual sampling periods during the sampling "hour": 20 minutes for flight altitudes below 1500m, and only 5 minutes per hour spent collecting information on migrants below 140m. The area below 140m is the critical potential turbine-intercept area of the proposed turbines.

Therefore, carrying these short, actual sampling sessions out over the entire sampling period, eliminating the days when some or all of the data collection was "impossible", staff finds that the actual diurnal *horizontal* radar sampling time for the entire spring season might have been only a total of only 4.3 hours to determine passage rates, and a total of 8.6 hours to determine ground speeds, flight directions, species, numbers, and whether targets crossed the turbine area. Similar total seasonal sampling times are associated with the diurnal radar in the *vertical* mode, with only 4.3 hours total time collecting information on passage rates near the lower altitude turbine heights

A review of the sampling days presented in the ARA for the fall study (Appendix B, Table 1, *Visual/acoustic and radar sampling schedule at the Chautauqua Study area, New York, during fall 2003*) reveals a scenario very similar to that of the spring study. Except for the fact that the nocturnal radar sampling time consisted of 6, 60-minute sampling periods, the same amount of time - only 5 minutes per hour - were spent collecting radar data. Coupled with the fact that similar footnotes that "rain or insect clutter made it impossible to collect any radar data for at least part of the session," staff has little confidence that the data adequately represents actual conditions. For the fall study, a total of 12 of the 30 radar sampling days were footnoted (as opposed to 19 of the 31 for the spring) meaning all or some of that sampling period was useless in terms of data collection.

The ARA's calculations of total numbers and risks are based on this minimal sampling time, and the extrapolation from the number of sampling days in the fall migratory season was based on 30 days, not 4.3 hours. For example, the calculation of the "number of birds in the WRA" (p7, Appendix A), specifically the estimated numbers of raptors passing through the WRA below wind turbine height, could be considerably higher depending upon the number assigned to the "mean movement rate of birds within 140 m". This value, used in calculations, was possibly arrived at with only a total of 4.3 hours of sampling for the entire season.

<u>Factors Which Could Affect the Number of Birds Reported in the WRA</u>

There were a number factors under either CWP's or ABR's control which could have affected the number of birds reported during the spring and fall studies. They include, but are not limited to: the operator of the radar equipment; the choice of the daily radar sampling period; the location of the radar dish and timing of the two radar studies to capture the peak period of seasonal migration.

Further Discussion of Quality Control Measures is Warranted

First, ABR indicated in their own words that, "oftentimes there were too many targets on the radar screen at once to collect data on all of them." (Appendix A, p 6) ABR also reported that the species composition and size of a flock of birds observed on radar usually was unknown and that the term "target" rather than "flock" or "individual" was used to describe birds detected by the radar. The ABR studies also indicated that the radar data were not corrected for differences in detectability with distance. Therefore, it would stand to reason that a small bird at close range would send back a similar target strength as a large bird at a greater distance from the radar lab. The reports did not discuss any measures used to correct the data set and it does not appear that the analysis of the radar data in the main text of the ARA discussed any adjustments necessary to account for these sources of error. Therefore, some accounting needs to be made for the number of birds that may have been missed.

Staff is cognizant of the level of involvement that the radar operator has in data collection. For example, by adjusting the gain on the radar screen, the operator could fill or almost empty the screen of potential targets. While it may not be unusual for the quality of the radar data to be influenced to a large degree by the skill of the particular operator on any given session of data collection, it is important to be candid about the use (or lack of use) of quality control measures. The ability of the radar operator to estimate flight speed, altitude and even species, without aid of the radar equipment, should also be taken at face value since the ability to make these estimates may vary from observer to observer.

Given the inability of the radar to differentiate large birds away from the radar lab from small birds flying closer to the lab, plus the inability to distinguish between individual birds and flocks of birds, staff does not have the ability to judge the validity of the data set.

Daily Radar Sampling Period May Have Been Too Short

The time of day chosen for data collection presents staff with concerns about the validity of conclusions drawn by CWP on the radar data. To explain, the ABR reports indicate that the sampling time was limited to approximately five hours between 2100 h and 0300 h for the spring study, and six hours between 2100 h and 0300 h for the fall study. No explanation is given for why the fall study was expanded to six hour sessions and how this may have affected passage rates reported. The reports also indicate that the sampling period was conducted during the peak period of nocturnal migration within each of the sessions. However, the data collected by ABR indicates that there were no discernable hourly patterns in the passage rates within the nocturnal sampling periods. Since the data showed no drop-off in the passage rate, this would suggest that a large number of birds were not sampled as they continued to pass, after the sampling period was terminated at 0300 h. There is no explanation as to why the study was limited to these hours. Since there are inter-species differences in the timing of nocturnal migration, failing to sample the <u>entire</u> night-time migration period may have missed species that have different flight/avoidance characteristics compared to those that were recorded during the mid-night sampling effort. It is unclear why the reports would indicate that the "peak" of night migration was captured, when the data demonstrates otherwise.

Although ABR did not observe patterns in flight altitudes among hours of the night, they did note that other studies have found that flight altitudes of migrating birds vary within a night and are highest near or just before midnight, and decline slowly until dawn. Specifically, as twilight approaches nocturnally-migrating birds are known to descend to the ground in search of a place to rest during the day. During the spring radar study, CWP also looked at the number of migrants found on mornings following data collection while they conducted migratory bird surveys. High passage rates of 426, 640.8 and 364 targets/km/hr were recorded on April 30, May 7 and May 14, respectively. Subsequent visual observations during daylight hours the following day recorded "elevated" populations of migrants. The high passage rates on April 30 and May 7 correlate positively with the highest species counts and total counts of birds of any daytime migratory surveys.

These observations show, at least to DEC staff, that as high passage rates of nocturnally-migrating birds are evident along the southeast shoreline of Lake Erie in the proposed project area, large numbers of migrants descend to land within the wind resource area. During these slow descents, birds may be susceptible to injury as they encounter the project exposure area (PEA). Without conducting radar sampling during the early morning periods to account for the descents of these songbirds through the WRA, the limited data collected, by design, did not account for birds that other studies indicated would be present.

The Location of the Radar Dish is Problematic

Another factor clearly decreasing the utility of the overall numbers presented in the ARA concerning the radar sampling, is the placement of the radar dish. Noteworthy is the fact that the radar dish was placed on top of the ridge, near or on one of the highest points with the forward edge of the antenna elevated over the ground by "approximately" 20 degrees. Considering the angle of the radar beam out from this position, one can imagine that the radar did not cover a very significant amount of the potential bird-utilization-area, especially areas immediately below the ridge top.

The ABR reports indicate that the determination of the radar sampling site was based on site visits, and it was chosen to provide radar coverage over the largest area. ABR indicated that, in the horizontal position (i.e., in surveillance mode), the radar scanned "the entire area" around the radar van and was used to determine flight paths, passage rates, and ground speed of birds. The DEC has concerns with the sampling site selection, for the following reasons:

- ABR stated in the reports that because ground-clutter echoes can obscure bird targets, they reportedly minimized this echo by parking the radar lab "in locations that were surrounded fairly closely by low trees or low hills." However, the site selection at the top of the ridge was adjacent to a woodland area to the west that would not allow horizontal sampling.

- ABR reportedly further minimized this ground clutter by elevating the forward edge of the radar antenna by ~20° during the spring study and ~15° during the fall study. A major concern with this approach is that by raising the antenna either ~15° or ~20°, even less of the airspace to the west was sampled. Also, differences in the effective sampling areas, which alters the sampling effort between the spring and fall, introduces bias in the passage rates making comparisons between seasons difficult. Despite these apparent differences, CWP stated that similar methodologies were used during the spring and fall studies.

- ABR indicates that small passerines are only detectable to 1-2 km, depending on atmospheric conditions and many other factors. The data collected at this site during the Spring 2003 showed a drop in density beyond ~1,000 m for the radar at night, which ABR attributed to an artifact of effective radar range for small birds (i.e., detectability of targets drops off rapidly beyond ~1000 m from the radar), rather than lower densities of birds in those areas. This sampling scheme left a vast airspace over the slope that was not sampled during the nocturnal radar sampling periods.

The Peak of the Migration Periods May Have Been Missed.

A factor that further decreases the utility of the overall numbers for songbirds presented in the ARA is that the spring radar studies for songbirds should have continued beyond May 15. The timing of the spring data collection was coordinated by CWP to occur during spring migration periods, which are generally from late April to mid-May for songbirds, depending on weather and other conditions in the region. DEC staff recommendations would have had nocturnal radar sampling continue through the end of May.

However, radar sampling was conducted for 30 days during the spring migration season from April 15 to May 15, 2003. Data collected during this sampling effort supports the DEC recommendation since the peak, or the highest nocturnal passage rates, occurred during the second week of May, during what probably was the peak of passerine migration. Although the highest rate observed was 1,705 targets/km/hr on May 10, no data was collected on May 11-12 or 15, so it's not certain that the actual peak of bird migration was even covered by the survey work. This is even more troubling when considering that the three sampling days within the second week of May were discounted due to precipitation or insect contamination. Since migration may have increased following the rain events, a large quantity of birds may have been missed soon after the sampling effort was suspended on May 15. DEC staff consider this sampling suspension to be premature, and consider it likely that a large numbers of nocturnal migrants were unaccounted for during mid to late-May. Staff is aware that certain species of passerines typically migrate late in the overall spring migration period. Considering this behavior, certain species-specific flight/avoidance behaviors were not adequately considered and addressed in the ARA.

The fall sampling effort was split into two sampling periods and this also proves to be problematic. Thirty nights of radar observations of bird migration were made during September 2-25 and October 5-10, 2003. ABR indicated that the study was intentionally split to overlap with the peak migration periods of different passerine species. However, DEC staff previously recommended to CWP that the fall study be conducted continuously between early September and mid-October to account for the entire migration period, consistent with historic peak fall songbird migration identified in the literature (Bull, 1985). Therefore, the fall data has limited utility for purposes of comparison to other fall nocturnal bird passage studies. Further, although the spring study was not split into two sessions, CWP stated that similar methodologies were used during the spring and fall studies.

Therefore, similar to the spring study, the fall radar study appeared to span the peak of migration, but was not conducted when the actual peak of migration may have occurred, (i.e., Sept 26 - Oct 4). This may account for the lower mean number of birds in fall vs spring. This also runs counter to the applicant's claim that they were ultra-conservative along every step of their assessment. ABR cites excessive precipitation and insect contamination as the reason for the gap in the fall survey work while at the same time CWP suggests that this gap in coverage was intentional: ("Rather than survey for 30 consecutive nights in September, the radar study was put on hold in late September and resumed during early October in order to cover a later group of migrants [i.e. sparrows and a greater migration period. . . ."])

It is also interesting to note that in their response to a question from the co-Lead agencies, CWP states that they sampled during peak periods. Clearly this statement warrants further explanation. (August 2004 Response to Town Questions to Jasper, p 13)

The Raw Data Has Not Been Provided

During the December 16, 2003 meeting at the USFWS' Cortland Office, the Department was asked to provide an opinion of the compatibility of the project with avian resources. Staff indicated there are serious concerns about avian impacts, but that it would be premature to offer an opinion of this nature prior to examining the relevant data compiled for this project. It should be noted that the Final Scope received on November 3, 2003, indicated radar migration data and other observational data did exist, but to this date, have not been provided to DEC or the USFWS. During this meeting, CWP offered to provide a draft risk assessment prior to the filing of the DEIS, and indicated that the radar migration and other avian data would be provided to both DEC and USFWS along with the ARA. The Department would like to request again that the raw data be provided since the ARA does make use of this data.

In summation, the studies that provide the data for the foundation of the ARA were:

- undertaken for a very limited period of actual sampling time,
- failed to sample a vast amount of airspace over the slope, and
- appear to have missed the actual peak periods of migration for passerines.

Data Analysis

In the section above on radar data, DEC staff described some of the inherent limitations in the data collected in support of the ARA. Here, DEC staff discuss some of the problems with the manner in which the applicant used that data to calculate potential risk. On the whole, it appeared to staff that the applicant went to extraordinary lengths to convince the reader that their approach to estimating risk was "ultra-conservative," in order to infer that the estimate of risk would overstate the actual number of birds likely to be killed by the project. However, the applicant made many unexplained assumptions about bird behavior, abundance, and the applicability of other mortality studies, and, as a result, it is not possible, at this time, for staff to have any confidence in the ARA's quantitative approach. Also, it was difficult to follow how all of the abundance and mortality figures were calculated since the ARA does not provide any form of comprehensive equation for either. While staff did not provide an exhaustive analysis of the main text of the risk assessment, this should provide an overall sense of how the ARA was received by DEC staff.

The Avoidance-Mortality Factor

The applicant came up with a multiplier or constant for raptors and for passerines, referred to as the "Avoidance-Mortality Factor (AMF)," which was used throughout the ARA to represent assumed kills from wind turbines. The AMF was derived from (1) a wind farm in Tarifa, Spain for raptors, and (2) the Stateline WRA for landbirds. This constant was applied, respectively, to all raptor species and passerine species equally. That is, all of the calculations done in the ARA, and thus the applicant's conclusion that this project will have a negligible effect on avian populations, hinged upon selection and use of this constant. However, given the lack of relevant data, DEC staff believe that this is not a reasonable or appropriate approach.

Starting with raptors, this constant value was calculated as 0.000042 for spring raptor migrants and is based upon a single, theoretically similar, study conducted at a wind-turbine site in Tarifa, Spain (Tarifa; E3). Department staff question the compatibility of the study done at Tarifa and the abundance data collected in Chautauqua County. More specifically, DEC staff question whether the data from this Tarifa study is appropriate, and comprehensive enough, to be relied on so heavily in the ARA.

As to landbirds, the AMF was calculated to be 0.0008 for both spring and fall passerine migrants even though the ARA states that for nocturnal fall landbirds, similar abundance/mortality data are lacking. (p 7-11) Similar to the raptor AMF, this constant value is based upon a single, theoretically similar, study conducted at the Stateline wind-turbine site in Oregon and Washington. Again, DEC staff questions whether the data from this Stateline study is appropriate, and comprehensive enough, to be relied on in this manner in the ARA.

As explained below there are a number of factors, such as landscape, turbine numbers and design, turbine size, and the make-up of migrant bird populations at each location, that cast doubt on the relevance of a comparison between Tarifa and Chautauqua, and between Stateline and Chautauqua. The ARA does purport to quantitatively estimate project-related risk by accounting for these site-specific conditions and avian behavior (see pg. 7-9) by stating that:

> *"it must be recognized that beyond the calculation-based variability....., avian avoidance-mortality factors are influenced by a number of physical, biological and technical factors. These include geographical and topographical differences, species-related 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. That notwithstanding, extrapolation from one facility to another may validly be made based on reasonable comparisons between facilities, consideration of site-specific or Project-specific considerations that are known to either lessen or increase risk, and the constraints of the available data"*. [emphasis added]

However, the ARA then failed to recognize or even address these caveats. The ARA neglects to provide the critical comparisons made by CWP which led to their team of avian experts to accept the transferability of data from Tarifa, Spain and the Stateline Wind Project (hereafter referred to as Stateline), located on the Oregon-Washington border. Site-specific considerations - or factors known to either lessen or increase risk - were not discussed. Further, the constraints of the data from both Tarifa and Stateline were not detailed. The failure to provide this justification supports the contention that CWP made a number of inappropriate assumptions in the development of the ARA regarding the validity of extrapolating data from Tarifa and Stateline to the Chautauqua Windpower Project (CWPP).

For example, the study sites used for determining the AMF are geographically incomparable to the Chautauqua windfarm location (e.g., Chautauqua PEA versus Tarifa, Spain PEA or the Stateline PEA which straddles the Oregon-Washington border). The Chautauqua Windpower Project is proposed for a relatively long, treed ridgetop adjacent to the western shore of Lake Erie that has been partially dissected by agricultural lands. Whereas the Stateline facility is located in rolling tree-free grassland plains.

The ARA should clearly indicate what criteria were used to select the Tarifa and Stateline sites and discount other existing windfarm projects. Since the ARA's reliance on the AMF is the foundation upon which all mortality estimates, risk factors, and prognostications are made, it is imperative to take a closer look at the Tarifa and Stateline projects as well as other studies referenced, but not included, in the ARA.

The Tarifa Study & the AMF

The raptors studied at Tarifa, Spain were, by design, based only on two species of large soaring birds of prey and did not include the size of birds of prey and vultures that are characteristic of Chautauqua, New York. The Tarifa, Spain study focused solely on griffon vultures (*Gyps fulvus*) and the short-toed eagle (*Circaëtus gallicus*). These birds do not adequately represent the birds of prey and vultures that typically migrate over western New York State. More similar species do pass over Tarifa, however, they were not included in the mortality studies performed at the wind project in southern Spain. Had they been included in the study, which would have been more representative of the species composition within western New York, the total raptor mortality would have been higher as many of these birds are not large birds that typically soar at great heights.

The griffon vulture is characterized as a high altitude soaring bird, with a wing span of 240-280cm. This very large vulture can only fly well in warm weather, and relies on upward-moving air currents to help it keep aloft. In comparison to birds of prey typically found in the vicinity of the CWPP, the griffon vulture wingspan is twice as large as the red-tailed hawk (*Buteo jamaicensis*) at 115-145 cm, and three times as long as the broad-winged hawk (Buteo platypterus) which is typically only 82-100 cm. Even our largest soaring bird are comparatively smaller; the bald eagle's (*Haliaeetus leucocephalus*) wing span is only 180-225cm and the turkey vulture (*Cathartes aura*) has a wingspan of 172-183cm. The short-toed eagle (*Circaëtus gallicus*) favors soaring over hills, slopes or hilltops on updrafts at heights of up to 500m. Its wingspan is 185-195cm; comparable to our bald eagle but not representative of most of the migrating birds of prey found in western New York State.

Taking the above into account, staff questions the use of a calculated mortality value of 0.000042, which is based upon the recovery of only two specimens - - a Griffon Vulture and a Short-toed Eagle - - of an estimated 47,500 of these species flying over the wind farm per year, as reported in Janss (2000). Of the numerous estimated mortality rates reported in the literature from other wind power projects, it is unclear why this particular mortality rate was chosen, particularly since other mortality data, including larger mortality estimates, was available from Tarifa. Yet these were not addressed in the ARA. The Janss mortality estimate is based upon weekly searches under 66 turbines, and were not corrected for biases from scavengers who may have removed carcasses over the week's time. Other researchers such as Barrios and Aguilar, who conducted studies at Tarifa in southern Spain, have estimated mortality of up to 0.45 birds/turbine/year while applying a correction factor for scavenger-loss (Barrios and Aguilar,1995). Their estimate, a mortality factor fully 10,000 times greater than that presented in the ARA, would amount to a possible 15.3 birds per year at the Chautauqua site, all else being equal.

Again, it is interesting that CWP has chosen one mortality rate (the Janss reference) from which to select their mortality factor. CWP appears to have chosen this value because (as they report) this is the only wind project in the world where both abundance and mortality data were available for raptors from the same facility. However, after reading the subject paper and others related to this study, the accuracy, and hence the utility, of the Janss numbers are in doubt. Staff also question the need to limit selection of a "mortality value" to instances where abundance is supposedly known. Many studies have reported mortality values as the total number of known mortalities over time *per turbine*, which would seem to provide an estimate of the scale of mortality, at least, without any reference to abundance. It is unclear why it is essential to approach an impact assessment as the percentage of the population being killed. Although abundance data is certainly essential information to have, the use of such a value to calculate a mortality risk is unsound when only one data set is available from a project.

Looking at Tarifa more closely, an earlier study conducted at Tarifa, involved two turbine projects including the "E3" project (66 turbines), which was the subject of the Janss study, and the PESUR Project (190 turbines). In total, 256 turbines were under study by the Spanish Ornithological Society (SEO) between 1993 and 1994 (Marti Montes, 1995), just one year prior to the Janss study (1995). In the Marti summary of this study, 87 of the 256 turbines were searched generally twice per week for dead birds over a period of one year. During this time, a total of 65 large birds, mainly soaring species, were found dead as a result of collision with the turbines. These included thirty (30) griffon vultures and two (2) short-toed eagles, considerably more birds than the Janss study reported (only 1 vulture and 1 eagle at E3).

An extrapolation of these findings to the entire project area for just vultures would result as follows:

	PESUR	E3
a-# turbines	190	66
b-# turbines searched (34%)	65	22
c-#vultures found in search area (34%)	28	2
d-tot est. vultures dead (all turbines)	82	6

Using the calculated mortality found at E3 during this study, even assuming the same abundance reported by Janss (47,500), we get a "new" mortality value 10 times higher than the value of

0.000042 used in the ARA. Perhaps more interesting though is the fact that the Marti summary reported "3,832 sightings of vulture flights recorded near the turbines of PESUR." Using this as the vulture "abundance" value against the vulture kill documented (as was done in the ARA for E3-Janss), we calculate a mortality constant of .02, a value <u>500 times</u> higher than that used in the ARA.

One of the more obvious problems with the use of 47,500 as the "observed abundance" at E3 under Janss, is that we are <u>not</u> told how many of these birds were actually within the PEA or "near the turbines" as was reported in the above study for PESUR, a much more accurate value to use in calculating a mortality constant. CWP noted in response to questions from the Towns that no such data exists on abundance below the maximum turbine height. (*See,* August 9, 2004 Town Questions to Jasper). The ARA states the 0.000042 constant "is based on total (raptor) abundance data and is not limited solely to the PEA; therefore, in the ultimate risk calculation, it must be applied to the adjusted utilization value (i.e. reflecting total raptor abundance in the WRA)". This instruction is an important admission and staff would like to illustrate what this sentence means with an example:

> Let's say that 1000 raptors is the "total abundance" figure, meaning that 1000 raptors fly around and above the maximum turbine height. If 16% actually use the PEA, that is 16% fly below the maximum turbine height this would amount to 160 birds. Applying the ARA's mortality factor (.000042), the projected mortality within the PEA would be only .007 birds within the PEA, rather than .04 based on overall abundance. Thus, applying the mortality constant to just the PEA, results in a much smaller number of birds projected to be killed.

This seems to be the point of the mortality factor. However, the applicant is using the mortality constant both ways. The mortality constant chosen for use is based upon the TOTAL abundance of the two chosen species, not just the number within the Tarifa project PEA. Therefore, it, potentially, represents a gross underestimate of mortality associated with the Tarifa project. In other words, the Janss paper does not reveal how many of the 47,500 birds actually flew within the PEA (the "adjusted utilization value"), as the applicant is applying this constant to in this case. What if only 16% (or less?) of those 47,500 birds were actually within the PEA of the Tarifa Project? That would be only 7,600 birds, two of which were recovered, for a "new" mortality constant of .0003 (again, at least 10 times higher than the mortality factor of .000042 that CWP used, even assuming the abundance value is accurate). To be fair, apples need to be compared to apples, and this does not seem to be the case in the ARA.

Also noteworthy is that the Marti summary goes on to say that observations showed that "only 3% of the flights of vultures in E3 were determined to be in risk situations" (in relation to the turbines). Given this, one could re-calculate that only 1,350 of the reported 47,500 vulture-abundance estimate by Janss at E3 were actually "at risk." Thus, re-calculating the mortality constant using the number of dead vultures found/estimated (6), results in a mortality value of .004 again, <u>100 times higher than that used in the ARA</u>. The Marti statements of "low risk" of vultures flying over E3 and higher risk to vultures flying over PESUR are borne out by the mortality reported (table above). Based on a critical reading of the ARA, staff must question why a mortality value was chosen from a wind-project site demonstrated to be of less risk to birds.

CWP appears to have simply divided the number of carcasses found in this study (2), by the total estimated number of such birds flying over the project in a year (47,500). Since the author of the study they used (Janss), as well as many other researchers, admit that species differences exist in flight behavior and susceptibility to impact with turbines, staff questions why species-specific mortality factors were not calculated when mortality and abundance are purported to be known. For example, using this method for Short-toed eagles, the mortality estimate would be higher (1 out 2,500) by a factor of 10 (0.0004). As the author, Janss, also admits, "death rates appear to vary considerably between study areas" (as was documented for PESUR versus E3), and "much higher death rates have been estimated for coastal areas in the Netherlands of 2.4 to 56.2 for large birds." Applying these figures to the Chautauqua Project results in a range of annual numbers of birds killed of 82 to 1,911 on a birds-per-turbine basis.

All of these observations seem to contradict CWP's theory that the size and design differences between Tarifa and Chautauqua are irrelevant in analyzing the risk of avian mortality from wind turbines. As DEC staff pointed out there was other data available from Tarifa that could have been used to calculate mortality estimates, yet CWP appears to have chosen data that best served the project. In addition, it appears that there were any number of ways to calculate the avoidance mortality factor, some of which are provided here for illustration purposes. DEC staff offer that other ways of calculating risk and other mortality data should have been considered in the ARA and should be discussed in any subsequent impact assessment.

The Stateline Study and the AMF

It must be recognized that avian avoidance-mortality factors are influenced by a number of *physical* factors. These include geographical and topographical differences. The study site used for determining the land bird AMF is geographically distinct from the Chautauqua windfarm location and the project features are not comparable. However, the data from Stateline Windpower Project in Oregon/ Washington was used by CWP to determine the avoidance-mortality factor for migrating landbirds in Chautauqua County. The Chautauqua Windpower Project is proposed for a relatively long, treed ridge top adjacent to the western shore of Lake Erie that has been partially dissected by agricultural lands, whereas the Stateline facility is located in rolling tree-free grassland plains.

It must also be recognized that avian avoidance-mortality factors are influenced by a number of *biological* factors. These include habitat, land use and species-related differences. The habitat types within and adjacent to the windpower project sites, have an effect on the bird distribution and species composition that would be expected to be present, and therefore would influence risk to birds should wind turbines be present. The wide open landscape of the Stateline wind resource area is lacking any biological features that would be typical of western New York State. The proximity of Lake Erie to the Chautauqua Windpower Project area causes birds migrating north to concentrate along the shoreline. The ARA states that The Nature Conservancy (TNC) and the New York Natural Heritage Program found that habitat within a half mile of the shoreline along the south shore of Lake Ontario held higher numbers and diversity of migrant birds than areas several miles inland (Agard 1995). The ARA continues by stating that "similar patterns are seen along the south shore of Lake Erie during spring migration." This potentially valuable statement is vague and no reference to any study or publication is made. This statement and any other information that may hold value regarding passerine migratory movements in the vicinity of the proposed project should be made available for review.

Another important biological factor affecting the use of the Stateline study is that the species compositions of landbirds in the western United States differs from that of the east. Migrating songbird species typically encountered in the western United States are predominantly intra-continental migrants (i.e. those birds that migrate back and forth from the southern areas of our continent to northern areas of our continent), with a small proportion being neotropical migrants. The species composition of birds identified at the Stateline project is therefore predominantly prairie and grassland species compared to the predominantly woodland and upland species encountered in Western New York State. In the eastern United States the species composition of migrating birds are primarily intercontinental neotropical migrants that move between North America and South America. Although a number of species found dead due to turbine strikes at Stateline can also be found in the eastern United States, the largest percentage of mortality was attributed to native grassland species; horned lark being the most frequently killed species. An additional point is that mortality studies at Stateline were conducted over an entire 18 month period and as such, represented both migrating birds and the resident nesting birds of the open grasslands (e.g., horned lark). The data used to determine the avoidance-mortality factor for the Stateline project was not provided to DEC staff. The only data provided in support of the use of Stateline information is a single, one-page email to Mr. Morgante, one of CWP's consultants. Without the raw data it is impossible for staff to determine what species were considered when calculating songbird mortality. This is important because the 18 month study at Stateline encountered non-songbird species such as great blue heron and mallard which should not be used to represent the high-flying nocturnal passerines that are typical in western New York State.

As the ARA states, it must be recognized that avian avoidance-mortality factors are influenced by a number of technical factors. The height of the structures used for supporting windpower turbines vary greatly. The height of the proposed turbines at Chautauqua, therefore the PEA, are much different than those studied in the Stateline study. The physical structures of the proposed Chautauqua turbines are 60% larger in overall height and turbine rotor diameter than those constructed and studied at Stateline. The size of the proposed turbines for Chautauqua are grossly mis-represented in Figure 1-3 of the Avian Risk Assessment. The rotor diameter is undersized relative to the height of the tubular tower which promotes the image of a much smaller PEA.

As staff found for the Tarifa study, all of these observations seem to contradict CWP's theory that the size and design differences, and the difference in location between Stateline and Chautauqua are irrelevant in analyzing the risk of avian mortality from wind turbines. Staff concur with the statements in the ARA which indicate these factors must be accounted for in an impact assessment and staff are uncertain why the document fails to do so.

Other Comments on the Mortality Analysis

Overall, it is difficult to follow all the abundance and mortality calculations referenced in the ARA since many are described in written text only and are not in any table or clear formula. Nevertheless, DEC staff have some other observations worth noting at this time.

Returning to the AMF, staff questions the seasonality of the figures used. The Tarifa "total abundance" value for the two species, 47,500, is the total number estimated for an entire year. As in the discussion provided above regarding the number of birds within the PEA, the actual numbers of these species counted within the 90-day spring migration season are unknown. The ARA also did not discuss when the two carcasses were found. Again, the mortality factor is being applied to the ARA-abundance numbers for only the spring period. This begs the question of how much larger might the mortality figure from Tarifa be, if it were calculated based using just the numbers of these species flying within the PEA and only within the spring migration period. Conversely, how much larger would the ARA's mortality estimates be, if based on whole-year abundance numbers at Chautauqua?

Perhaps one of the biggest problems with use of the Tarifa Project to select this mortality constant is that the turbines under study in the E3 Tarifa Project were a maximum height of 112 feet with a maximum blade diameter of 66 feet. This compares to the Chautauqua Project proposed turbine height of 397 feet and blade-disk diameter of 253 feet. Thus the proposed project turbines will be fully 285 feet higher with a rotor disk-diameter 187 feet larger than those used at Tarifa. This is an amazing 47,000 square feet larger turbine intercept area PER TURBINE, for an overall increased project intercept area for Chautauqua of nearly 1.5 million square feet (1,485,318). Although CWP argues that there is some proportionality between turbine height and migration altitude, it is unreasonable to dismiss the potential for much larger mortality figures with an increased bird/turbine intercept area. The data available indicate that the mean flight altitudes of soaring birds at Tarifa referenced in the Janss paper and by De Lucas, et.al. (2004) were 110 meters at the wind farm (E3) and only 101m and 79 m at two nearby comparative study areas. Given that knowledge, one has to seriously question what the actual mortality would have been had the Chautauqua turbines been in place at Tarifa. Based upon the heights presented in these papers, substantially more raptors could have been intercepted in the turbines.

Please note, the above bird-height figures were presented for the post-breeding season only. Other figures presented in the papers for soaring-bird mean flight-heights at other times of the year (breeding season and winter period) would be even more troubling as they were much lower on average within the Tarifa Wind Farm; only 57m and 59m respectively. All of these reported flight-height means were well above the maximum height of any of the Tarifa turbines, but would be well below the proposed Chautauqua turbines, again, pointing out the limitations of using the Tarifa mortality value for Chautauqua.

While the ARA admits (p 7-9) that "it must be recognized that avian avoidance-mortality factors are influenced by a number of physical, biological, and technical factors, including topographical differences, species-related differences, weather related differences, timing of migration, and project design" (size, density, etc.), and that, "accordingly, determining avoidance-mortality factors for this Project based on studies from other facilities must recognize these caveats" - - the ARA fails to do so. For this most significantly important Avoidance-Mortality Factor, no such comparative data is provided, even though it is recognized as a necessary consideration by the ARA.

CWP seems to trivialize the need to consider species-related differences when, in response to a question from the co-Lead agencies on the comparison of Tarifa and Chautauqua, CWP stated "[h]owever, since the raptor species at Tarifa and Chautauqua are diurnal migrants and since there is significant similarity between species groups at both sites, the difference in species composition between the two sites is not expected to result in any measurably disparate effects on avoidance behavior or proportional mortality. Thus, species-specific differences between the two locations is of no moment in terms of the ARA analysis." The apparent message from this statement is that while the applicant agrees it is important to consider site specific factors such as species composition, weather, and geography, in doing such a comparison between Tarifa, Spain and Chautauqua County, New York, any differences in species specific or site-specific factors are easily dismissed.

The applicant has made many broad-sweeping conclusions such as this, purportedly to demonstrate their confidence in mortality risk. However, staff's critical review of the ARA finds its conclusions are unreliable. Staff believes that some standard of reason should be applied to an assessment of impact, and while some of the raw data provided in the ARA is useful, the applicant should acknowledge some of the limitations in the data and the state of science in this field.

In general, concerning the overall numbers presented in the ARA and all of the various calculations used to estimate where birds are traveling and where they may be impacted, it is informative to quote two passages from the applicant's consultant, ABR, in their report summary (Appendix A p ii): "we found that the Chautauqua Study Area had relatively high spring passage rates for daytime migration of raptors, with an estimated 5,200-5,300 raptors passing through the Chautauqua Wind Resource Area at or below turbine height during our 30-day study". The ABR executive summary goes on to state, "our vertical radar observations suggested that there was a tendency during both day and night for birds to concentrate either over, or northwest of, the ridge line where the proposed turbine string would be located".

In many instances, the applicant attempted to attribute behavioral explanations to observed data or tried to explain away some of the anticipated weaknesses of the data sets used in their analysis. This practice, however well intentioned, attenuated any confidence in the conclusions which could have been drawn from the available data.

Bald Eagles: Current and Expected Use of Wind Resource Area

The ARA separately addressed risk to bald eagles in Section 7.10. DEC staff have a number of comments on both the factual information provided on the nests near the project area and of the analysis of risk to bald eagles. As to the factual assertions made about the nests, the applicant reported that the Twenty-Mile Creek nest is 3.9 miles from the WRA and that the Chautauqua Creek nest is 2.1 miles from the WRA. However, as staff indicated in the beginning of our comments, the final turbine locations have not been established. Therefore an exact distance can not be ascertained. DEC staff arrived at shorter distances than the applicant, using turbine locations P1 and P34 for the Twenty-Mile Creek and Chautauqua Creek nests, respectively. Again, without final turbine locations, the distance reported is subject to change.

The ARA also states that the "productivity of the two nests in 2003 is unknown." DEC staff confirmed that the Twenty-Mile Creek bald eagle nest was productive and successful in 2003, fledging two young.

As to the analysis of risk to bald eagles, the ARA suffers from at least two overall defects. Perhaps the biggest failing of the ARA's evaluation of risk to bald eagles, is that the analysis is entirely focused on the breeding biology of bald eagles and of their needs and behaviors in terms of nesting, foraging, perching and territoriality in relation to the breeding season. Staff describes below, why a deeper exploration of bald eagle behavior, especially outside of the breeding season and post-fledging of young, is appropriate.

Another major problem with the entire bald eagle analysis is that the applicant and/or their consultants did no actual in-field investigation of habitat/territory use by either pair of bald eagles, except for occasional and poorly documented observation sessions staked out near the nest sites. No scientifically designed eagle movement study was conducted. The ARA states that the "breeding territories of the two nests are small (1 to 2 square kilometers) and do not overlap the Chautauqua WRA" (p7-57), but provide no evidence or study supporting this territory size or conclusion. However, staff can glean from both available data and from staff's experience with bald eagles, that bald eagles already use the WRA and can be expected to use the project area in the future.

Bald Eagles Do and Can Be Expected to Use the WRA

Although there are a number of statements in the ARA, related to bald eagles, DEC staff experts limit the discussion to five general areas below. They are: 1) sightings inside the WRA; 2) foraging behavior; 3) territorial behavior; 4) fledgling movements and 5) assessment of risk.

Sightings Inside the WRA:

Data supplied by both the applicant's consultants and the Ripley Hawk Watch (RHW) clearly demonstrate that bald eagles occur within the Chautauqua WRA. Further, it appears from the data presented in the ARA, and updated from the RHW, that bald eagles are observed in the area both as migrants and as residents. The long-term average number of bald eagles observed by the RHW is over 30 per migration season, with 86 observed in 2003 and 58 observed during 2004. A number of these eagles, both adults and immatures, were observed at RHW sites 4 and 5, two of the six RHW sites located within or near the Project Area. Similarly, the consultants visual observations from the center of the project area, also RHW station 5, recorded 14 bald eagles over the "30 day" visual sampling period (see discussion above about actual sampling periods), at least two of which were estimated to be within the turbine sweep altitude (below 140m). Although no ages of observed eagles were provided by the consultants (immature vs. adult), all 14 eagles were observed after April 15. DEC Fish and Wildlife staff generally consider any adult eagles observed in New York after April 15 each spring to be resident birds, since all of the eagles (n=22) captured and tracked in our 20-year study of migratory behavior of New York State wintering bald eagles have departed for northern breeding grounds by April 15 each year (Nye, et al 2002). Thus, both migrants and resident bald eagles appear to use the project area annually.

Foraging:

Foraging or search flights could be expected to take eagles through the project area. The "Summary of Exposure Risks to Resident Eagles" at Section 7.10.10 of the ARA (p 7-56) states that the WRA does not contain preferred foraging habitat. DEC generally agree with this statement. The ARA goes on, however, to indicate the possibility of carrion being present, such as dead deer, cows, etc., that "could attract eagles to the area", and further, that as mitigation, to avoid such attraction, the applicant "will work in conjunction with landowners to remove any carrion found within the Chautauqua WRA".

First, this is an impractical statement that should not be used to imply mitigation. There is little to no chance that sufficient manpower would (or could) be employed to adequately scour an area the size of the WRA on a regular basis, year-round, to ensure carrion would be found and (theoretically) removed. This statement, as proposed mitigation, has no validity. Second, this statement appears to admit that eagles "could be attracted" to the WRA by carrion, after going to great pains in other sections to assure the reader that eagles do not and will not use or go near the WRA for any foraging purposes. Bald eagles are consummate opportunists, and are regularly on the lookout for sources of food. This may well be one reason for soaring, and such search-flights might well take them over the ridge and through the WRA. Staff believe it is very possible that winter-killed deer/carrion would be available on the ridge and within the WRA.

The ARA goes to lengths to identify "preferred" foraging areas, to suggest that these areas are away from the WRA, and that "it is unlikely that eagles will cross the WRA to access these foraging areas". While, again, generally this may be true during the breeding season when the predominant diet of these resident breeders and their young is likely fish, this may well not be the case during the fall and especially the winter. As a matter of fact, carrion is a staple for most bald eagles during the harshest winter months, especially important to inexperienced juvenile and immature eagles. Food resources (and access to those resources) become much more scarce during the winter months, requiring eagles to range further in search of food; they are not tied to their immediate nesting sites during this time. Department Fish and Wildlife staff also believe that both the Chautauqua Creek and the Twenty-Mile Creek are relatively depauperate in terms of their piscivorus food base, except during limited times of the year, likely requiring more extensive and wide-ranging foraging flights than many of our other breeding pairs. One way staff believe they identify possible food resources is by soaring, specifically for the purpose of locating other bald eagles some distance away, who might be indicators of food in a distant area. So, for example, rather than simply follow Twenty-Mile Creek or Chautauqua Creek out to Lake Erie, especially at these times of the year, resident eagles might well rather use the nearby ridge to gain lift for soaring-search flights.

Another reason staff believe resident eagles might use the ridge (and thus the WRA) is to gain access to Lake Erie (a preferred foraging area, identified as such in the ARA) in order to avoid human-dominated features such as the Village of Westfield, Route 20, and the NYS Thruway. Eagles will avoid such disturbed areas, and to do so, staff's belief is that eagles would want to gain the height advantage offered by the nearby ridge to then be able to glide/soar over to the Lake Erie shoreline unimpeded. Conversely, off-shore winds might be used to gain lift for the return trip, above and away from the human disturbances, taking them back over the ridge area.

Regarding overall home range territory size for breeding eagles, staff also believe that, as alluded to above, in terms of prey-abundance/availability, both the Twenty-Mile Creek and Chautauqua Creek pairs must have territories on the larger end of the scale. Both of the immediate aquatic habitats of these pairs, the Twenty-Mile Creek and the Chautauqua Creek, are relatively small habitats that we believe are at the lower end of the scale in terms of fish/forage provision (perhaps except at very limited times of the year when the salmonid are running up these creeks). This would necessitate larger home ranges in order to sustain breeding pairs and their young adequately throughout the year. When nesting eagles are supported by small bodies of water (<10 hectares or 24 acres) they tend to fly greater distances to access more open-water sites in order to maximize resources (Peterson 1986). As the ARA correctly references, one study reports home range territories were a "minimum" of 3.8-5.8 square miles (Gerrard 1980). When food gets scarcer, especially during fall and winter, eagles are likely to extend their foraging-search flights into upland areas in search of carrion, and especially attractive would be winter-killed deer. In order to encompass the overall home range necessary to sustain either of these bald eagle pairs, it is staff's belief that the area would encompass some of the Project Area, if not for directed scavenging/search flights as described above, then as possible flight paths to and from other necessary foraging areas.

Territorial Behavior:

The two currently active bald eagle nests abutting the Project are approximately 10 miles apart, with the intervening ridge the primary landscape feature now separating and connecting the two territories. Given this relatively close nesting distance, it is common for bald eagles to "assess" their closest conspecifics, especially other breeders, and to often test the boundaries of their and their closest neighbor's territories. Based upon their respective nesting locations, we believe the most efficient and likely way for such testing between these two pairs to occur, would be for either pair to fly or soar along the ridge directly toward the other in an almost confrontational manner, in order to ascertain where an aggressive response might be obtained. The ridge line is the place such occasional boundary-testing may occur between these two breeding territories.

Fledgling movements:

Although the ARA states (p 7-55) that "fledglings perch within 1.5 km of the nest" the applicant fails to differentiate between the temporal periods in fledgling behavior as time post-fledging passes. This statement by the applicant appears to imply that fledglings stay relatively close to the nest and will not enter into or be vulnerable to the turbine area. At best, this is a limited characterization of fledgling movements and can be construed as an attempt to give the reader the false impression that young eagles produced at these two nest sites will not move into the WRA and thus face harm. Most young, but not all, may be within 1.5 km of their natal area for up to about seven weeks post-fledging, but some young disperse farther from their natal areas after only about one month (or in some cases even earlier). Six to ten weeks after fledging all fledglings begin to break family ties and leave the nesting area, exploring a much wider area miles from their nest site (Stalmaster 1987). In a recent satellite-telemetry study of four bald eagle fledglings from nests in New York State (Seneca and Sullivan Counties), movements from the nest area (beyond 1.5 km from the nest site) ranged from 9-28 days post fledgling. Full departure from the nest area occurred from 6.5-12.5 weeks post-fledging, whereupon these young eagles vacated their immediate natal territory and initiated much wider-range movements (Nye et al 2004 unpubl. data).

Some of the data from these four young bald eagles from our 2004 study follow:

Eaglet #	Fledge Date	Location Date	Distance Moved(mi) from nest site
Y89	9 July	29 July	3.04
		9 August	5.04
		12 August	8.13
		31 August	190.39
Y90	27 June	29 July	4.63
		18 September	11.05
Y94	7 July	16 July	5.79
		31 August	8.52
		2 October	11.02
Y96	7 July	24 July	6.18
		30 July	7.14
		29 August	10.86

And, in most cases, the above movements represent birds not yet dispersed from nest sites, just "local" movements with these young birds returning intermittently to the nest site. Therefore the 1.5 km figure cited in the ARA is a generalization not supported by available data. The advent of satellite technology, as we are employing in New York, has created data-streams much more complete and accurate. To get an idea of just how far these fledglings go in just a short time, attached are maps for just two of the birds with data from fledging to November 1.

The salient point here is that while fledglings stay close to their nest site for a given (short) period of time after leaving the nest, as the ARA asserts, they indeed do move out of the immediate natal territory at some point and do go on wide-ranging exploratory flights. Staff believes these exploratory flights will take some of the eagles, especially young from the Chautauqua Creek nest, over the ridge and within the proposed WRA.

Risk of Injury/Mortality to Bald Eagles:

The ARA also states that it is unlikely that either pair "frequently" cross the WRA (p 7-57). While DEC staff might agree with the frequency, the applicant does at least acknowledge that these eagles may infrequently cross the ARA, which appears to be supported by the visual observations of both the RHW and the applicant's visual accounts. The ARA also openly acknowledges in a different section of the ARA that "the nesting bald eagles will occasionally fly through the Project Area" (p 4-10).

Concerning bald eagles flying within the PEA, within the Risk Section (p 7-40) the ARA states: "thus, based on the radar data, bald eagles are expected to have no exposure (to the PEA) and, therefore, no mortality". This statement is contradicted within the ARA in Appendix A, where the consultants visual study documented 2 of 14 observed bald eagles (14%) flying "below 140 m agl, within the zone of potential risk" (Appendix A p 21). In addition, 2 of 7 observed golden eagles (29%) and 1 of 2 (50%) peregrine falcons were documented to be within this risk zone. Apply on top of this that, "because of visual bias, visual counts also are likely to be lower than the actual number of birds flying past the station" (Appendix A p 22), and that, also as attested to within the ARA, " flight altitudes during both day and night were lower during periods of low cloud ceilings" (Appendix A p 24). Thus, more bald eagles (and other listed raptors) can be expected to be using the WRA and be flying within the PEA-zone of risk than actually reported.

The ARA also makes numerous statements about the ability of birds to "actively avoid wind turbines", and in particular relating to bald eagles, that "Eagles have excellent eyesight and maneuverability; thus, it is to be expected that they see the oncoming turbines and avoid them". This is unsubstantiated speculation. Golden eagles have equally acute eyesight and maneuverability, yet over 1000 of them have been killed at the Altamont Pass wind-project in California. The fact that no bald eagle has ever been reported as being killed by a wind turbine is not germane, and is most likely a function of a lack of turbines in or near occupied bald eagle areas. As further evidence that "excellent eyesight" will not convey protection to bald eagles from wind turbines, numerous other species of eagles around the world have been documented as being killed by wind-turbines, including other sea eagles of the same genus as the bald eagle. Recently, eight white-tailed sea eagles (*Haliaeetus albicilla*), perhaps the bald eagles closest relative, were found killed by wind turbines in Germany (Iberica. 2000 at http://www.iberica2000.org/Es/Articulo.asp?Id=1223).

Other Listed Species: Current and Expected Use of Wind Resource Area

In addition to significant numbers of migrants using the Avian Study Area (ASA), numerous New York State listed (Endangered, Threatened, Special Concern) species are local breeders within the project area and/or the ASA, as acknowledged in the ARA and as reported during New York State's 1985 and 2000 Breeding Bird Atlas.

These include no less than ten species, including four *threatened* species (bald eagle, northern harrier, upland sandpiper (possible nester), Henslow's sparrow (possible nester); and six *species of special concern* (sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, red-headed woodpecker, vesper sparrow, and grasshopper sparrow (possible nester). In addition, numerous other bird species, including several more raptors (red-tailed hawk, broad-winged hawk, American kestrel), were confirmed breeding in the ASA, and acknowledged to be using the WRA (p. 5-56, "local turkey vultures and red-tailed hawks fly along the ridge area in the summer"). By nature, these local breeders will not be "high in the sky" as most migrants might be, but rather can be expected to be coursing the WRA and ASA at low altitudes while carrying out their normal behaviors, bringing them frequently into the zone of the Project Exposure Area (PEA).

As discussed earlier, the ARA's determination of "estimated listed raptor annual mortality" is skewed far downward by the UAM Mortality Factor used (0.000042). If other potential mortality multipliers are used, as referenced in the ARA (Winkleman, 15.7%), using the ARA's figure of 1821 listed raptors within the WRA (Table 7-39), the potential kill could be as high as 286 listed raptors per year. Even if the "corrected" seasonal abundance value for raptors thought to be actually flying within the PEA (16% of those within the WRA) is used, 46 listed raptors could be killed under this mortality estimate. These calculated values are significantly different than those presented in the ARA, again, because of the single and highly dubious mortality calculation multiplier used from the single Tarifa study.

Also, it must be noted that the ARA, under "Listed Raptors" (p 7-36), erroneously indicates that only "four" are protected. Although not protected as Endangered or Threatened, all other raptors, including all of the Special Concern species referenced here, are Protected Wildlife under the NYS Environmental Conservation Law as well as under the United States Migratory Bird Treaty Act.

<u>Bats</u>

As of this writing, it is apparent that CWP has not conducted any studies to address either resident or migrating bats. This is troubling since DEC staff provided written comments concerning bats in two letters sent to CWP. The first letter (8/29/03) provided comments on the draft scope, and the second letter (12/23/03) was written to follow up a meeting on avian issues held with CWP, USFWS, and a representative of the co-Lead agencies. In our December 23, 2003 letter, we had asked that CWP provide us with all project data compiled on bats in addition to the avian radar migration studies and any other relevant site data available. That letter indicated specific concerns regarding the presence or absence of the Indiana bat, Red bat, Hoary bat and the Silver-haired bat at this site, as well as the potential for the site to be used as a spring and/or fall migration route by bats. It stated that if bats are found to be present and will be adversely impacted by the project, mitigation strategies will need to be evaluated.

The ABR report in Appendix B makes reference to bats, and in fact indicates that more bats than birds were observed during one part of the study. The report states on page 8 that "[w]e virtually observed 2.5 ± 0.8 birds/h (n=12 birds during 9 of 58 sampling sessions) and 3.5 ± 1.1 bats/h (n=17 bats during 13 of 58 sessions) along a vertically-oriented ceilometer beam during fall 2003 (appendix 1). All of the birds and bats that we observed were flying below 100 m agl, which was the approximate range of our visual sampling effectiveness for songbird/batsized individuals." However, no further discussion of bats is provided in the report or in the ARA.

The impact of wind turbines on bats can be significant as illustrated by a recent study of the deaths of 400 bats over two months at the Florida Power and Light (FPL) Mountaineer Wind Energy Center near Thomas, West Virginia. This study raised concerns that bat mortality rates from wind turbines may have been higher than those of birds. At a minimum, we would strongly urge CWP to provide the information requested in our December 23, 2003 letter.

Comparative Risk to Other Mortality Sources

The ARA states (p 4-2) that, as a basis to comparatively assess risk, CWP performed mortality monitoring in the vicinity of two large communications towers in the project area. The ARA continues that such observations are useful and comparative because these structures are "more obtrusive" and because they are "thought to pose a greater risk to birds than do turbines". However, this is an unsubstantiated statement (no references are given) that cannot be accepted by staff. Staff do not accept the statement that a communications tower less than 300 feet high, even with guys wires, would be "more obtrusive" than a 450-foot high tower with a 253 foot diameter disk at the top whirling at close to 200 miles per hour at the blade tips.

This is one of numerous examples throughout the ARA where the applicant has slanted the discussion in favor of their proposal. The second part of that statement, concerning risk, as well as a statement in the ARA Introduction that "it is well documented that mortality to avian species from wind turbines projects is 'minor' when compared with other sources of avian mortality that are common and widespread in our society" is equally fallacious (Executive Summary, p 1). Wind turbines are a relatively new feature on our landscape, and numerous and sufficiently definitive "comparative" studies have not been done.

The applicant presents a table (p 1) suggesting other sources of avian mortality from collisions, as from cars, buildings, etc. If one were to accurately make such comparisons, even if such were valid to compare, it would be done on a unit for unit basis. For example, the table lists "60-80 million" birds killed annually by vehicles. It is not apparent whether the ARA means just in the United States, or the entire world, but it clearly fails to reference this figure with respect to the total number of vehicles in existence or in use. The ARA also fails to do the same with buildings and "power and transmission lines". An honest effort would provide the number of buildings and power lines in a given area and divide this out by the purported number of bird-kills. It would then be possible to look at the total number of wind-turbines worldwide and make the same comparisons.

In addition, the above mortality monitoring study conducted to assess effectiveness of collision monitoring (p 4-13) was terribly inadequate. A total of only 3 birds were put out, and only one was used to assess observer efficiency. Furthermore, it was stated that no monitoring was done in fall, due to tall vegetation which made searches difficult. Clearly this is not a valid reason for failing to do the work and does little to add to the ARA's credibility.

The discussion about other sources of mortality listed in the ARA are simply invalid comparisons and, at this time, unsubstantiated statements that cannot be accepted as any type of justification for a project's impacts. By making such comparisons, the applicant is suggesting that mortality from this project or in fact any wind-turbine project, is lower than these other sources, and is "insignificant" and so, therefore, is acceptable. This is simply not an appropriate argument because each project, whether it consists of wind-turbines, new transmission lines, or cell-towers, needs to be evaluated with respect to its own impacts, especially within the context of its location and the immediate natural resources therein.

Summary of Comments

In summary, DEC staff's four major points are as follows:

1. The proposed project area is an extremely important bird/raptor migration area.
2. Data collection methodology and duration for this project is extremely limited.
3. The mortality constant chosen and its application to available data are inappropriate.
4. Bald eagles and other protected species do and can be expected to use the project area.

As confirmed in the ARA, large numbers of both passerines and raptors migrate along the Lake Erie corridor each spring, including within the proposed project area. All parties involved in this project recognize this area as a major and important bird migration area not only within New York, but regionally. Also, the applicant has not yet addressed bats and bat migration in any way, and has done little to no analysis or study of fall migrating raptors or the projects potential impact on them.

As discussed above, staff believe that bald eagles do and will use the Project Area. The applicant states numerous times in the ARA that "most birds passing through the WRA will not encounter a turbine" and "for the very small percentage that do, the vast majority will survive" (p 7-8). The ARA states (p7-9) that in at least one study (Winkelman 1994), "only 15.7% of birds that passed through the RSA (rotor sweep area; same as "PEA" in ARA) were killed". Translated to the "worst-case scenario", the numbers of birds the ARA acknowledges could pass through this project WRA within the turbine height (p 7-21) (16,000 individuals) results in a potential raptor kill of 2,512 individuals. A conservative interpretation using the ABR-calculated number of raptors presumed to be flying through the PEA (1,494) would still result in the death of 235 raptors. These numbers exceed by orders of magnitude the expected kill value calculated in the ARA of only 4.2 raptors (p 7-25), further pointing out the concern of abandoning the "conservative assumptions" in the selection of a mortality-factor multiplier.

In addition, little is said in the ARA about "resident" raptor mortality, as the vast majority of the discussion and calculations address only "migrant" raptors. While one could argue that the percentage of resident raptors (all those outside of the spring migrants) within the PEA will be much greater than that presented for migrants (16%), due to their more localized flight behavior, application of the ARA's own number to potential residential/rest of the year mortality (Erickson 2003, p 7-29), shows that 59% more raptors or 338 individuals could be killed, resulting in a total raptor mortality of 573 birds.

The bird-wind literature is replete with mortality values for birds at wind-farms, some as high as 35 fatalities/turbine/year (Salajones Windfarm, Spain, in The Lekuona Report, 2001) and we have presented several other alternative ones in this memo. The point we hope to have made here, and within the extensive discussion of the ARA-chosen value under *Tarifa*, is that the mortality value used by the applicant in the ARA is unreasonable, and the most reasonable conclusion is that the actual mortality from a fully-constructed Chautauqua project may well be many orders of magnitude greater than that presented in the ARA.

The ARA frequently states that "the vast majority of birds actively avoid wind turbines", yet the critical focus should be on the other end; meaning how many birds, even if a relatively small percentage of the overall population, might be lost (killed) due to placement of this project. What are the real numbers of birds not in the "vast majority"? As described above from one reference given in the ARA for raptors, the number could be in the hundreds or even the thousands. Another example from within the applicant's ARA cites a "90% avoidance value" based on golden eagle collisions at the Altamont Pass Project (p7-8). Using this value, we could again expect up to 10% of the raptors, including listed species and bald and golden eagles, to be killed.

Depending on the figure used for the total number of raptors flying within the PEA, the project could result in the death of hundreds or thousands of birds of prey, if the "10%" value is accepted. As was shown for golden eagles at Altamont, nearly 20% of the marked golden eagle population (covering an area including lands well outside of the WRA) were killed by the turbines (Hunt, 2002). Again, this involves a project with smaller turbines than proposed for Chautauqua. But, as we indicated previously, this is somewhat akin to comparing apples and oranges (golden eagles at Altamont), something the CWP has done freely in the ARA and we do here just to illustrate how the numbers can be utilized.

Staff strongly believe that the mortality expected from a completed Chautauqua project will be significantly higher than 0.000042 (raptors) or 0.0008 (passerines) birds of whichever abundance figure is chosen.

DEC staff know from the base-figures of birds reported in the ARA, as problematic as staff may feel the data is, that thousands of birds fly over this ridge each year and within the potential turbine intercept area. We also know, that on a regional and state-wide scale, the project area is located in one of perhaps six known major spring migratory bird areas in New York State, based on our current state of knowledge of these areas and on recognized Hawk Watch stations throughout the state.

Finally, while the ARA relies on "biological significance" as the only basis upon which to measure project impact, there is no discussion or definition of biological significance or an explanation of how or why "biological significance" should be applied to threatened and endangered species. Nor does the draft ARA discuss whether it should be applied on a global, state-wide, or regional basis. DEC staff reject the assertion that biological significance should be the basis of how to measure the acceptability of a project. Even if staff were to accept this premise, this project could be biologically significant to one member of the four adult bald eagles breeding in the immediate area. These eagles are two of only three pairs located along or near our western New York boundary. This project could also be biologically significant to the two reported breeding pairs of Northern harriers nesting within the WRA. To appropriately measure significance, it could be argued that one would also need to consider future, additional wind-turbines on the landscape which may intercept raptors and other birds. The cumulative impact of all of these projects would need to be taken into consideration to truly measure "biological significance" on our bird populations. Importantly, as discussed above, staff do not believe the issue of significance can be answered by deriving a mortality coefficient from two studies done in Spain and Oregon that are of questionable relevance to a study of wind development in western New York.

In conclusion, DEC staff appreciates the opportunity to comment on the draft ARA and again acknowledges that an appreciable amount of time and effort were involved with the production of the ARA. However, as discussed above, staff cannot endorse the use of the ARA to determine the impact or risk to avian resources from the Chautauqua Wind Project. While DEC staff supports, and strongly encourages wind energy as a potential source of renewable, clean energy, the draft ARA does not fully and accurately analyze the site-specific impacts of this project.

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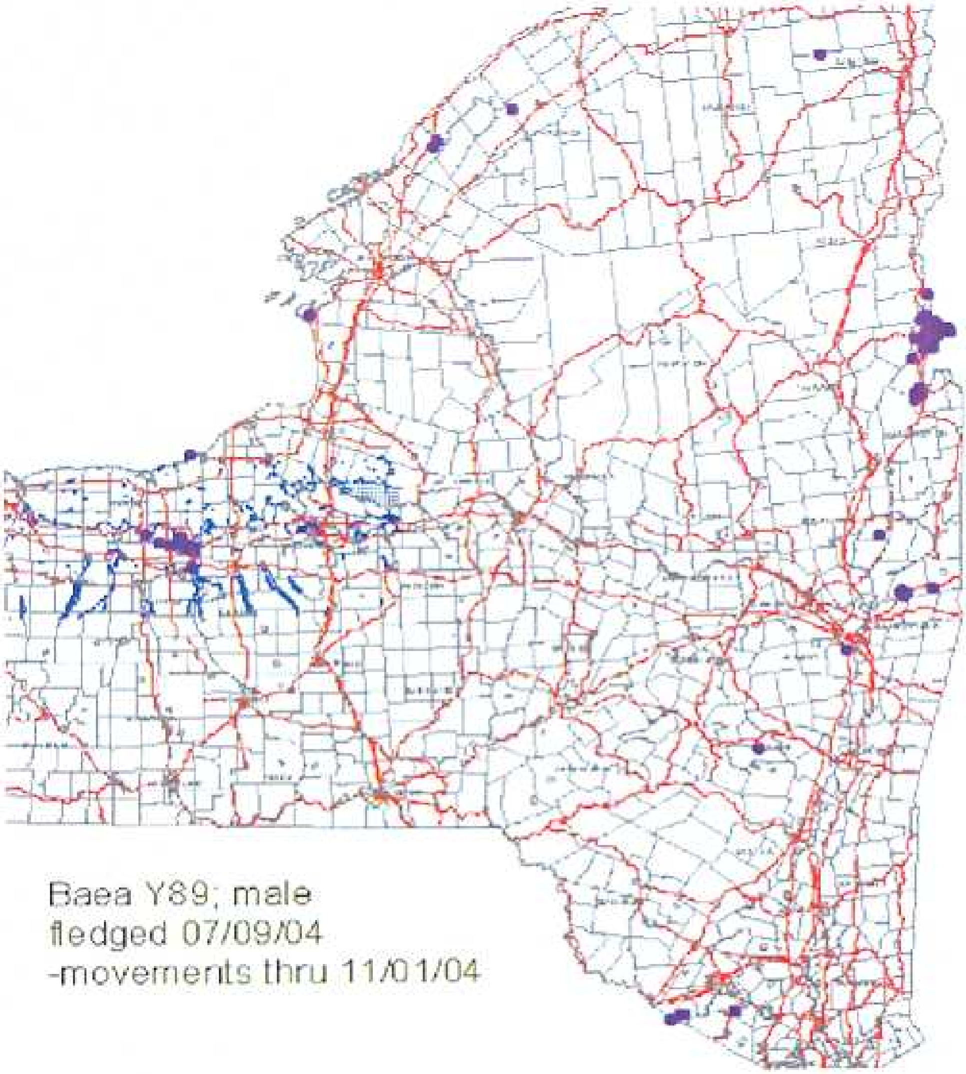

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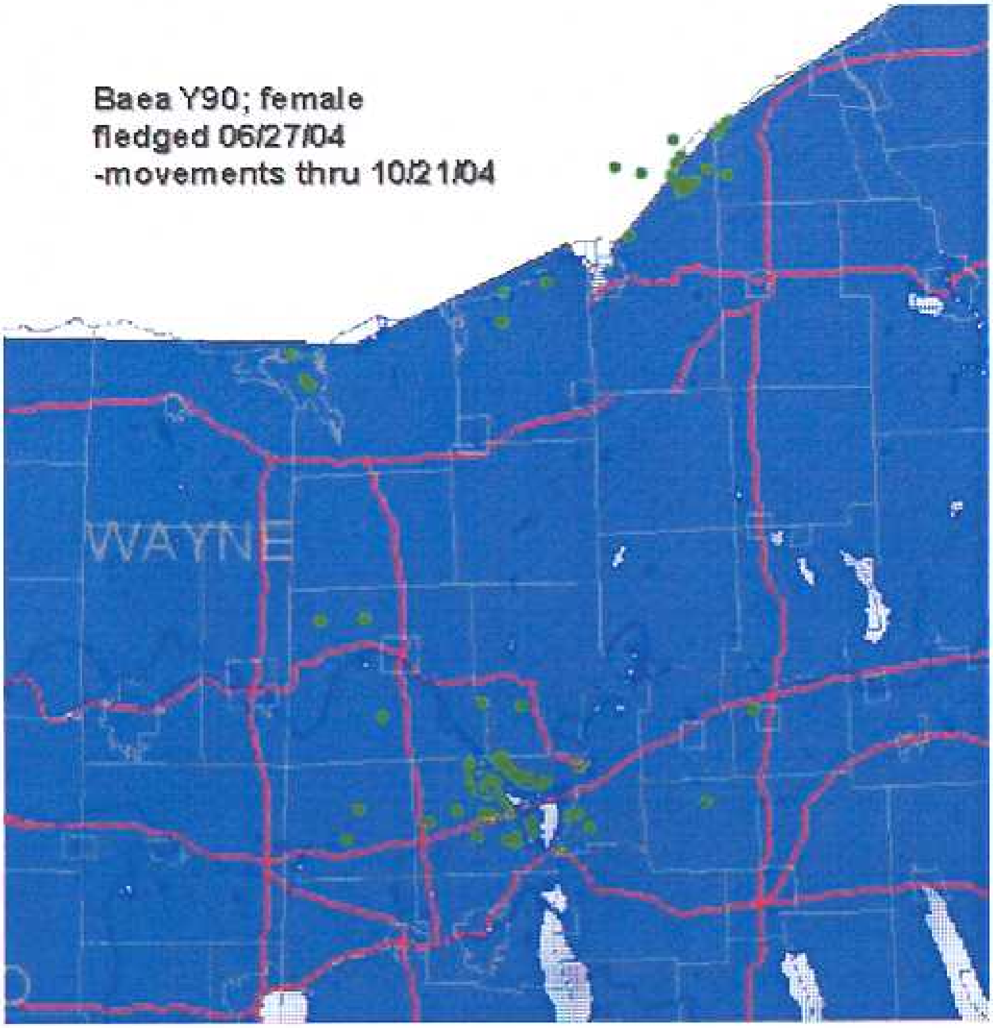
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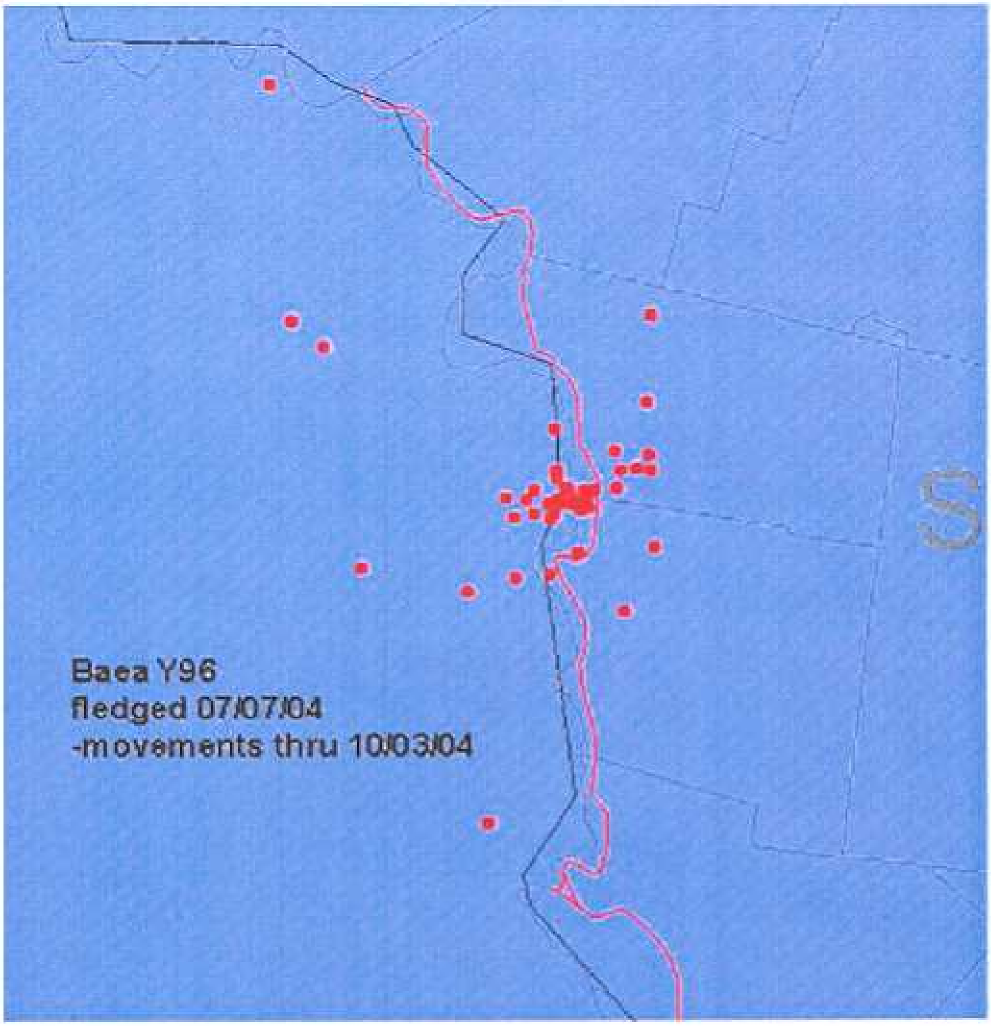
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