Large Bird Studies for the Cross Winds Proposed Wind Energy Site: Summary of Spring 2012 Field Season – Progress Report

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Executive Summary

The development of wind energy has the potential to significantly reduce the emissions of harmful air pollutants, greenhouse gases, and our reliance on fossil fuels. The majority of the areas with high potential for wind energy generation are near the shorelines of the Great Lake's. These shorelines have also been documented to provide important habitat for wildlife, including migratory songbirds and raptors. Avian collisions with wind turbines have been documented, but the frequency of those collisions is site and situation specific. Informed siting of wind turbines can minimize impacts to birds. Due to the potential for avian collisions with wind turbines we conducted surveys of large birds to better understand the densities of large birds in the Project Area, as well as the species composition, habitat use and flight behaviors. These data will help wind energy developers and resource managers to make appropriate decisions regarding the potential impacts to birds and the methods by which they might reduce those impacts.

We established seven raptor and other large bird viewing stations in the Project Area. We conducted 1-hour surveys at the stations in April and May 2012. During surveys, each raptor, large bird, and sensitive status species was recorded in addition to the bird's flight path, flight direction, approximate flight altitude, and the distance to each bird from the observer. Technicians also recorded the behavior and habitat use of each bird, and weather characteristics. Examination of the spring 2012 large bird survey data suggests that most species' flight behavior does not put them at frequent risk of collision. The overlap of flight altitudes and the estimated RSA in the spring data suggests that the following species may be at higher risk than others: Red-tailed Hawks, Sandhill Cranes, Bald Eagles, and Turkey Vultures. The sample sizes of Bald Eagles and Sandhill Cranes were very low (Table 3), therefore caution should be used when considering the level of risk.

Table of contents **Page**

Introduction

The development of wind energy has the potential to significantly reduce the emissions of harmful air pollutants, greenhouse gases, and our reliance on fossil fuels. The U.S. Department of Energy has a goal of 10 GW of wind energy deployment in Michigan by the year 2030. The majority of the areas with high potential for wind energy generation are near the shorelines of the Great Lakes. These shorelines have also been documented to provide important habitat for wildlife, including migratory songbirds and raptors. Shoreline areas have been suggested to be important as stopover sites for Neotropical migratory birds (Ewert 2006, Diehl et al. 2003) and as concentration or funneling areas for migrating raptors which avoid crossing large areas of water (Kerlinger 1989). Waterfowl (e.g., Mallard, Canada Goose) and waterbirds (e.g., gulls, herons, cranes) also use shoreline areas especially during the breeding and migration seasons. Research across North America has demonstrated a relationship between the densities of birds in an area and the numbers of avian collisions. Avian collisions with wind turbines have been documented but the frequency of those collisions is site and situation specific. Birds that use the airspace within the rotor swept area of a turbine are at risk of a collision and therefore the frequency of avian collisions at turbine sites can be directly correlated to the density of birds in the local area. These data will help wind energy developers and resource managers to make appropriate decisions regarding the potential impacts to birds and the methods in which they might reduce those impacts.

Study Site and Methods

Study site and description

Research was conducted in the Project Area within Tuscola and Huron Counties, located in east-central Michigan, USA (Fig. 1). The land use / land cover of the Project Area consists mainly of agricultural fields (e.g, corn, soybeans, and sugar beets), with some pastures, forested areas, fencerows, and some small wetlands. The natural vegetation in this area is generally described as mesic forests, and wet forests. The forest overstory typically includes components of maple (*Acer* spp.), oak (*Quercus* spp.), ash (*Fraxinus* spp.) and beech (*Fagus grandifolia*). Historically, the eastern inland portion of the Project Area was vegetated with beech-sugar maple forest mixed with black ash swamps. The western portion was predominantly mixed hardwood swamp and areas of mixed conifers with hemlock-white pine. The majority of these areas are now drained for agricultural use (Comer et al. 1995). The western edge of the Project Area is approximately 2.0 miles from the Lake Huron lakeshore (i.e., Saginaw Bay), which is considered by some to be a concentration area for migratory birds. Our Study Area includes the shoreline areas thereby providing a thorough survey effort.

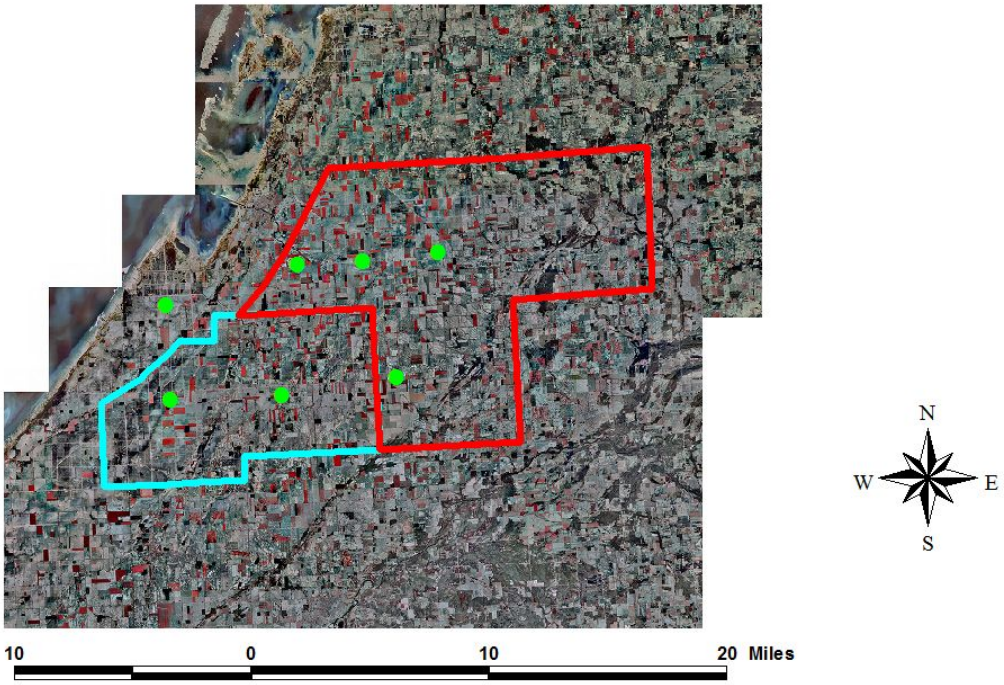

Figure 1. Large bird viewing stations (green dots) were established in Tuscola and Huron Counties, MI in and around the Project Area proposed for wind energy development. Large bird surveys were conducted at the viewing stations in the spring 2012. The Project Area is predominantly agricultural lands with some interspersed forested areas. Blue lines designate phase 1 and red is phase 2 of the Project Area.

Large bird surveys

We established seven raptor and other large bird viewing stations in the Project Area. These stations provided the best possible viewsheds of the proposed project sites (Fig. 1). Following methods similar to those used by Hawkwatch International, we conducted 1-hour surveys at the stations in April and May 2012. When conducting outdoor research, some flexibility in scheduling is needed and some surveys were missed due to inclement weather.

During surveys each raptor, large bird, and sensitive status species was recorded in addition to the bird's flight path, flight direction, approximate flight altitude (lowest and highest flight altitude), whether it flew within the proposed project area, and the

distance to each bird from the observer. Technicians used landmarks as reference when measuring distance to birds and flight altitude (Fig. 2). Technicians also recorded the behavior and habitat use of each bird. Behavior categories were as follows: perched (PE), soaring (SO), flapping (FL), flushed (FH), circle soaring (CS), hunting (HU), gliding (GL), and other (OT, noted in comments). Any comments or unusual observations were also noted. Weather data were collected in concert with large bird surveys; specifically, temperature, wind speed, wind direction, and cloud cover. The date, start, and end time of observation period, species or best possible identification, number of individuals, sex and age class, distance from plot center when first observed, closest distance, height above ground, activity, and habitat(s) were recorded.

Figure 2. In the spring 2012 observers surveyed the viewshed for large birds from the viewing stations in the Cross Winds Project Area.

Results and Summary

Large bird surveys – Spring 2012

During the 181 large bird surveys, observers detected 3588 large birds of 25 species. There was a mean of 19.8 birds detected per survey (19.8 birds / hour; Table 1). The waterbird group (e.g, gulls, herons, cranes) was the most common species group detected with 13.9 birds / survey, 13.9 birds / hour (Table 2). Waterfowl was the second most frequently detected species group with 2.5 birds / survey (Table 2). The raptor group (2.2 birds / survey; Table 2) was the third most frequently detected species group.

Assuming the wind turbine rotor-swept area (RSA) would be 50 – 150 m above the ground, 16% of all bird observations were below the RSA, 26% within the RSA, and 56% flew above the RSA. The mean flight altitude of the most common species, the Ring-billed Gull, was 34 m above ground level (AGL) with 76% flying below the RSA, 22% within the RSA, and 2% flew above the RSA. This species, among other species of waterbirds and waterfowl used the agricultural fields for foraging and loafing, which is made evident by the low flight altitudes.

The United States Fish and Wildlife Service (USFWS) recently developed the Draft Eagle Conservation Plan Guidance (USFWS 2011). These guidelines provide an approach that allows agencies and wind developers to assess the risks of wind projects to eagles. The large bird surveys provide data supportive to the process of accessing the risk to Bald Eagles. Observers detected six Bald Eagles during these surveys. Their mean flight height was 132 m AGL, with 16% flying below the RSA, 50% within the RSA, and 33% above the RSA.

Table 1. Large bird abundance and richness in Tuscola and Huron Counties, MI in and around the Project Area proposed for the development of wind energy by Consumers Energy. Data were collected in the spring of 2012 at seven large bird survey sites.

	Large Bird Survey
No. Species	25
No. Individuals	3588
Mean No. Birds / Survey	19.8
Mean No. Birds / Hour	19.8

Table 2. Mean bird abundance in Tuscola and Huron Counties, MI in and around the Project Area proposed for the development of wind energy by Consumers Energy. Data were collected in the spring of 2012 at seven large bird survey sites.

Group	Mean Abundance [a]
Corvids	1.0
Raptors	2.2
Other	0.1
Waterbirds	13.9
Waterfowl	2.5

[a] Mean Abundance = mean number of individuals observed per survey

Table 3. Avian abundance and richness in Tuscola and Huron Counties, MI in and around the Project Area proposed for the development of wind energy by Consumers Energy. Data were collected in the spring of 2012 at seven large bird survey sites.

Species	No. Bird
American Crow	185
American Kestrel	6
Bald Eagle	6
Black-bellied Plover	7
Broad-winged Hawk	5
Canada Goose	428
Great Blue Heron	9
Great Egret	17
Unknown Gull	1089
Herring Gull	12
Mallard	29
Merlin	1
Northern Harrier	17
Northern Saw-whet Owl	1
Osprey	1
Pileated Woodpecker	1
Ring-billed Gull	1376
Rough-legged Hawk	4
Ring-necked Pheasant	19
Red-shouldered Hawk	1
Red-tailed Hawk	28
Sandhill Crane	11
Snowy Owl	1
Sharp-shinned Hawk	1
Turkey Vulture	325
Wild Turkey	1

Summary of large bird flight behavior in the Project Area

Upon examination of the spring 2012 large bird survey data, it appears that most species' flight behavior did not put them at frequent risk of collisions (Figs. 3). The overlap of flight altitudes and the estimated RSA in the spring data suggests that the following species may be at higher risk than others: Red-tailed Hawks, Sandhill Cranes, Bald Eagles, and Turkey Vultures. The sample sizes of Bald Eagles and Sandhill Cranes were very low (Table 3), therefore caution should be used when considering the level of risk. In addition, some species have demonstrated the ability to avoid wind turbines, such as waterfowl (ducks and geese; Desholm and Kahlert 2006).

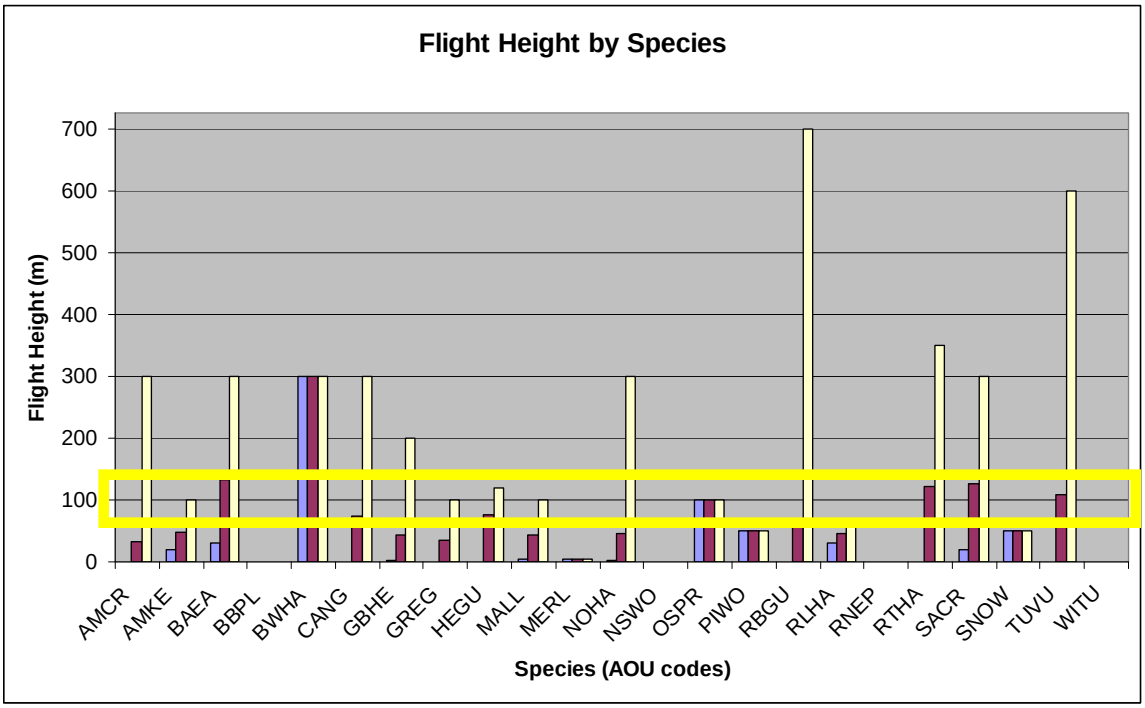

Figure 3. In the spring of 2012 large bird surveys were conducted in Tuscola and Huron Counties, Michigan, in and around the Project Area proposed for the development of wind energy by Consumers Energy. The AOU species codes are detailed in Appendix A, the top of the blue bars represent the minimum height of flight, the top of the dark red bar represents the mean height of flight, and the top of the cream bar represents the maximum flight height of each species. The rotor swept area is designated by the yellow rectangle.

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Appendix A. List of bird species observed during bird surveys conducted in Tuscola and Huron Counties, Michigan, in and around the Project Area proposed for wind energy development. These sites were surveyed in spring 2012 for bird use.

Species[a]	AOU code	Status
American Crow	AMCR	
American Kestrel	AMKE	
Bald Eagle	BAEA	State Special Concern
Black-bellied Plover	BBPL	
Broad-winged Hawk	BWHA	
Canada Goose	CANG	
Great Blue Heron	GBHE	
Great Egret	GREG	
Unknown Gull	NA	
Herring Gull	HERG	
Mallard	MALL	
Merlin	MERL	State Threatened
Northern Harrier	NOHA	State Special Concern
Northern Saw-whet Owl	NSWO	
Osprey	OSPR	State Special Concern
Pileated Woodpecker	PIWO	
Ring-billed Gull	RBGU	
Rough-legged Hawk	RLHA	
Ring-necked Pheasant	RNEP	
Red-shouldered Hawk	RSHA	State Threatened
Red-tailed Hawk	RTHA	
Sandhill Crane	SACR	
Snowy Owl	SNOW	
Sharp-shinned Hawk	SSHA	
Turkey Vulture	TUVU	
Wild Turkey	WITU	

[a] names of birds follow the AOU Check-list of North American Birds