Small Bird Research for the Cross Winds Wind Energy Site: Summary of Fall 2012 Field Season

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15 January 2013
2013-08

MICHIGAN STATE UNIVERSITY EXTENSION

Executive summary

Many areas in Michigan possess winds adequate for the efficient generation of wind energy. These areas have also been documented to provide habitat for wildlife, including migratory songbirds and raptors. Avian collisions with wind turbines have been documented in the Midwest, but the frequency of those collisions is site and situation specific. Informed siting of wind turbines can minimize impacts to birds. In addition to collision risks, some grassland or open-land nesting bird species are not adapted to nesting near any tall structures, including a wind turbine, and can be displaced. Due to the potential for avian collisions with wind turbines or turbine related avian displacement from nesting areas, we conducted avian surveys to better understand the densities of birds in the Project Area, as well as the species composition. These data have the potential to help wind energy developers and resource managers make appropriate decisions regarding the potential impacts to birds and the methods by which they might reduce those impacts.

In an effort to quantify the songbird use of the Study Area, we collected point count data to estimate migratory (spring and fall) and breeding (June) bird densities in 2012. We also searched the Project Area on 17 April 2012 for raptor nests and the presence of threatened and endangered species. In this report we present the results of fall songbird migration surveys as the remaining topics were reported on in previous reports. Several of the grassland / open land species observed in the Project Area may be sensitive to the presence of tall structures in their breeding habitats, potentially forcing their displacement. Much of the Project Area is planted in row crops and agricultural fields. Focusing turbine construction in these areas may minimize the impact to the species sensitive to the presence of tall structures in grasslands, pastures, hayfields, and herbaceous wetlands. Bird densities were higher at point counts located within 3 km of the lakeshore. The Project Area currently focuses on developing areas more distant from the lakeshore than 3 km.

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Introduction

Many areas in Michigan possess the quality of winds necessary for the efficient generation of wind energy. These areas have also been documented to provide habitat for wildlife, including songbirds and raptors. Avian collisions with wind turbines in North America have been documented but the frequency of those collisions is site and situation specific. Songbird collisions with turbines, as well as with other tall structures, are related to the presence of lighting systems on the structure and the characteristics of the lighting systems (Gehring et al. 2009). Songbirds can become attracted to non-blinking lights, especially during nocturnal migration; thereby, increasing their risk of collision with any structure illuminated with these types of lights. Most turbines are lit with Federal Aviation Administration recommended blinking lights or left unlit; which decreases the likelihood of songbirds becoming attracted into the site (Kerlinger et al. 2011). 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 and behavior of birds in the local area.

In addition to collision risks, some grassland or open-land nesting bird species are not adapted to nesting near any tall structure, including a wind turbine (Strickland 2004). These species can be displaced from traditionally used open areas upon construction of a nearby wind turbine (Leddy et al. 1999, Strickland 2004, Guarnaccia and Kerlinger 2007).

Due to the potential for avian collisions with wind turbines or turbine related avian displacement we conducted avian surveys to better understand the densities of birds in the area as well as the species composition and habitat use. 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 3.5 km (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.

Methods

Migratory bird surveys

In an effort to quantify the songbird use of the Project Area, we collected data using methods similar to those used in studies estimating breeding bird densities (Reynolds 1995, Johnson et al. 2000). Fifteen point count locations were established within the Project Area (Fig. 1). Surveys were conducted two times during the fall 2012 migration season (September and October).

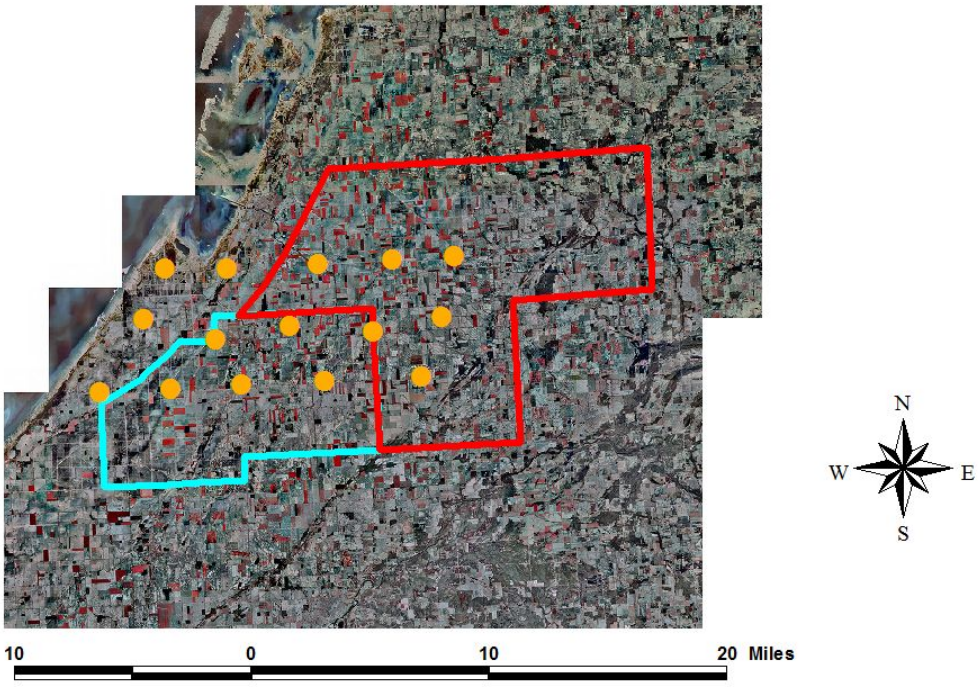

Figure 1. The Cross Winds Project Area in east-central Michigan and is predominantly agricultural lands with some interspersed forested areas. Point count sites were established and surveyed in the fall (migration) of 2012. Blue lines designate phase 1 and red is phase 2 of the project.

Surveys at point count sites were seven min. long (after two minutes of silence) and conducted between 15 minutes before sunrise and 1030 AM EST. Technicians recorded the following data: date, survey start time, temperature, wind speed, wind direction, cloud cover. Each individual bird observed during a survey was recorded by species, as well as the azimuth to the bird, gender (if known), distance from the observer, estimated flight height (if applicable), and other comments.

Results and Summary

Migratory bird surveys

We visited 15 point counts in the Cross Winds Project Area two times during the fall of 2012 (September - October). Surveys of point count stations detected 681 birds of 35 species (Table 1, Appendix A). We detected a mean of 34.05 birds per point count visit Table 1).

The three most abundant bird groups per survey were the waterfowl (15.6 birds / survey), followed by invasives (species not native to the area and invasive, commonly found in areas intensely disturbed by humans; 5 birds / survey, Table 2), and sparrows (3.3 birds / survey). These species groups are often associated with open / grassland / agricultural areas located near wetlands and large bodies of water that are found in the Project Area. The waterfowl were typically Canada Geese and ducks. The majority of the invasives detected in the Project Area were European Starlings, Brown-headed Cowbirds, and House Sparrows. No federally listed species were observed in the Project Area during the songbird surveys. However, the Northern Harrier (Michigan Special Concern) was detected. (Appendix A).

Several of the grassland / open land species observed in the Project Area may be sensitive to the presence of tall structures in their breeding habitats, potentially forcing their displacement. Those species in the Project Area that could be potentially sensitive to the construction of tall structures include: Red-winged Blackbird, Bobolink, Savannah Sparrow, Vesper Sparrow, Horned Lark, Northern Bobwhite, Indigo Bunting, and Song Sparrow. Row crop agricultural fields would tend to have fewer of these sensitive species than pastures, and hayfields. Construction of wind turbines in the areas that support species sensitive to tall structures may result in these species avoiding areas previously utilized and relocating to new areas.

The Great Lakes shorelines are thought to be areas with high concentrations of migratory birds. Figure 3 delineates the relationship between the numbers of migratory birds detected during point counts and the distance to the lakeshore of each point count. These data suggest that there were more birds within 3 km (10,000 ft.) of the shoreline. Point counts greater than 6.3 km from the shoreline had numbers of birds similar to one another and less than the areas closer to the shoreline. The Project Area is delineated as

being greater than 3 km from the shoreline, which will likely minimize an increased avian collision rate that could be present in areas closer to the shoreline.

Overall, most of the species of birds detected in the Project Area were habitat generalists and fairly common in the region. Of those species that are less common in the region avoidance of grassland areas and shoreline areas would minimize their loss.

Table 1. Avian abundance and richness in the Cross Winds Project Area proposed for the development of wind energy. Data were collected in the fall (migration) of 2012 at point count sites.

	Migratory
No. Species	35
Mean No. Individuals / Survey	34.1

Table 2. Mean bird abundance in the Cross Winds Project Area proposed for the development of wind energy. Data were collected in fall (migration) 2012 at point count sites.

Group	Mean Abundance [a] Migratory
Blackbirds	2.9
Finches/Buntings	0.5
Corvids	1.8
Doves	0.6
Raptors	0.2
Invasives	5.0
Larks	1.5
Other Passerine	0.4
Pheasant/quail/turkey	0.2
Shorebirds	0.8
Sparrows	3.3
Thrushes	0.9
Waterbird	0.3
Waterfowl	15.6
Warblers	0.1
Woodpeckers	0.2

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

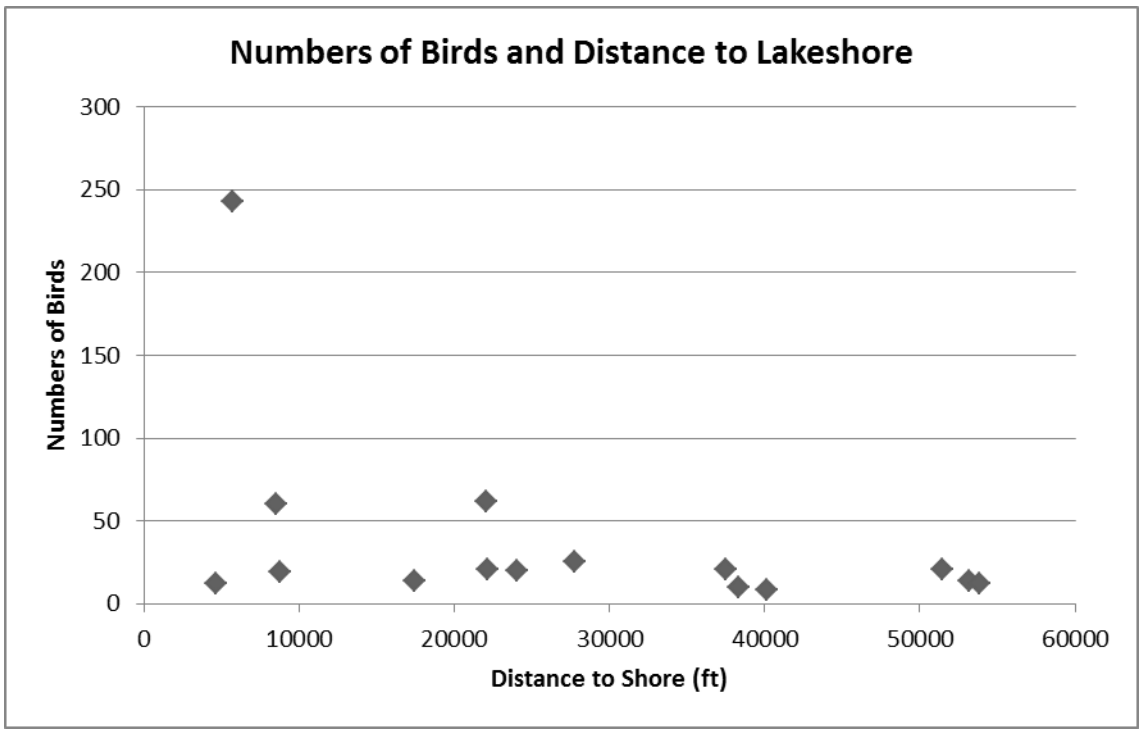

Figure 3. The Cross Winds Project Area in east-central Michigan and is predominantly agricultural lands with some interspersed forested areas. Point count sites were established and surveyed in the fall of 2012 for migratory bird use. More birds were detected at point counts sites approximately closer than 3 km (10,000 ft.) to the lakeshore.

Conclusions

The Cross Winds Project Area is predominantly agricultural fields (e.g., corn, soybeans, and sugar beets), with some grassy pastures and waterways as well as woodlots, fencerows, and ponds. The Saginaw Bay shoreline and the Fish Point Wildlife Area contain unique natural habitats; however, the agricultural landscape in the Project Area generally reduces the likelihood of the presence of rare species of birds. Surveys conducted during the 2012 fall migration period did not detect any Federally threatened or endangered avian species in the Project Area; however, the Northern Harrier (Michigan Special Concern) was detected. (Appendix A).

Point counts in the breeding season detected several species that are potentially sensitive to the construction of tall structures in their breeding habitat. When the specific

turbine array is designed for the Project Area, grassland areas should be buffered by at least 180 m (Guarnaccia and Kerlinger 2007

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Appendix A. List of bird species observed during bird surveys conducted in the Cross Winds Project Area. This site was surveyed in fall 2012 for bird use.

Species[a]	AOU code	Status
Mallard	MALL	
Canada Goose	CANG	
Great Blue Heron	GBHE	
Killdeer	KILL	
Ring-billed Gull	RBGU	
Red-tailed Hawk	RTHA	
Northern Harrier	NOHA	Michigan Spp. of Sp. Concern
Northern Bobwhite	NOBO	
Ring-necked Pheasant	RNEP	
Mourning Dove	MODO	
Red-bellied Woodpecker	RBWO	
Hairy Woodpecker	HAWO	
Red-breasted Nuthatch	WBNU	
Belted Kingfisher	BEKI	
American Crow	AMCR	
Blue Jay	BLJA	
American Robin	AMRO	
Eastern Bluebird	EABL	
European Starling	EUST	
House Wren	HOWR	
Horned Lark	HOLA	
Parula Warbler	PAWA	
Red-winged Blackbird	RWBL	
Common Grackle	COGR	
Brown-headed Cowbird	BHCO	
Northern Cardinal	NOCA	
American Goldfinch	AMGO	
House Finch	HOFI	
Slate-colored Junco	SCJU	
American Pipet	AMPI	
Savannah Sparrow	SAVS	
Song Sparrow	SOSP	
Tree Sparrow	TRSP	
Vesper Sparrow	VESP	
House Sparrow	HOSP	
White-crowned Sparrow	WCSP	
White-throated Sparrow	WTSP	

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