Breeding Bird Research for the Crosswinds Wind Energy Site: Summary of Spring and Summer 2011 Field Seasons

Prepared By:
Joelle Gehring, Ph.D.
Senior Conservation Scientist-Zoology Leader
Michigan State University, Michigan Natural Features Inventory
P.O. Box 30444 Lansing, MI 48909-7944

Prepared For:
Consumer's Energy
1 Energy Plaza Dr.
Jackson, MI 49201-2357

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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 bird densities in May - July 2011. We also searched the Project Area on 6 May 2011 for the raptor nests and the presence of threatened and endangered species. We found three active Red-tailed Hawk nests and five Bald Eagle Nests. 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. The majority of the Project Area is planted in row crops and agricultural fields that would tend to have fewer of those species sensitive to the presence of tall structures than those species found in grasslands, pastures, hayfields, and herbaceous wetlands.

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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 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.

Breeding 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). Sixteen point count locations were established within the Project Area (Fig. 1). Surveys were conducted two times in the summer of 2011 to focus on quantifying the birds breeding through the Project Area.

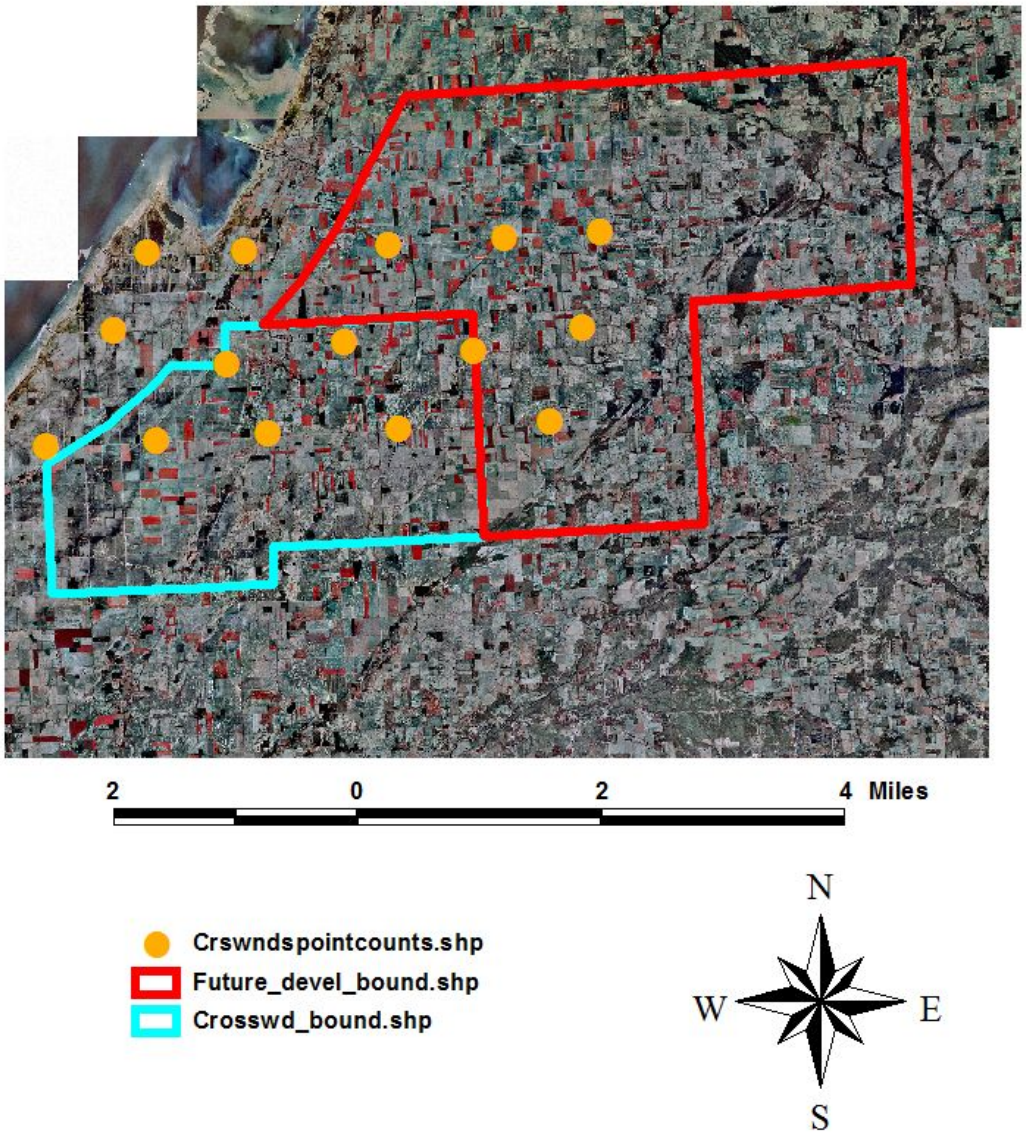

Figure 1. The Crosswinds Project Area in east-central Michigan and is predominantly agricultural lands with some interspersed forested areas. Point count sites were established and surveyed in the summer of 2011 for breeding bird use.

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.

Aerial large bird surveys

We conducted aerial nesting surveys on 6 May 2011. The entire Project Area was visually searched for raptor activity / nests using aircraft. Transects were flown each spaced 1 km apart and running north and south over the Project Area and in a 2-km buffer around the Project Area. We flew between 77 - 92 m above ground level, at approximately 145-160 km / hr. Surveys were conducted when winds were less than 32 km / hr, and when skies were clear and without fog.

Results and Summary

Breeding bird surveys

We visited 16 point counts in the Crosswinds Project Area two times during the summer of 2011. Surveys of point count stations detected 844 birds of 33 species (Table 1, Appendix A). We detected a mean of 24.8 birds per point count visit (mean of 10.1 species / survey; Table 1).

The three most abundant bird groups per survey were the blackbirds (5.8 birds / survey), followed by swallows (4.9 birds / survey), and then invasives (species not native to the area and invasive, commonly found in areas intensely disturbed by humans; 3.9 birds / survey, Table 2). These species groups were consistent with the open / grassland / agricultural habitats found in the Project Area. The majority of the blackbirds and invasives detected in the Project Area were generalists or those species that select more open habitats as compared to more forest dwelling species within their respective taxonomic group. No state or federally listed species were observed in the Project Area during the songbird breeding study.

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, 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.

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 would minimize their loss.

Table 1. Avian abundance and richness in the Crosswinds Project Area proposed for the development of wind energy. Data were collected in the summer of 2011 (breeding) at point count sites.

	Breeding
No. Species	33
Mean No. Individuals / Survey	24.8
Mean No. Species/Survey	10.1

Table 2. Mean bird abundance in the Crosswinds Project Area proposed for the development of wind energy. Data were collected in June 2011 (breeding) at point count sites.

Group	Mean Abundance [a] Breeding
Blackbirds	5.8
Finches/Buntings	1.5
Corvids	0.1
Doves	0.6
Flycatchers	0.2
Raptors	0.0
Invasives	3.9
Larks	0.4
Other Passerine	0.4
Shorebirds	0.4
Sparrows	2.4
Swallows/Swifts	4.9
Thrushes	1.2
Warblers	1.2
Woodpeckers	0.2
Waxwing	2.1

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

Aerial nesting bird surveys

We detected three active Red-tailed Hawk nests and five Bald Eagle nests in the Project Area and its buffer area (Fig. 3).

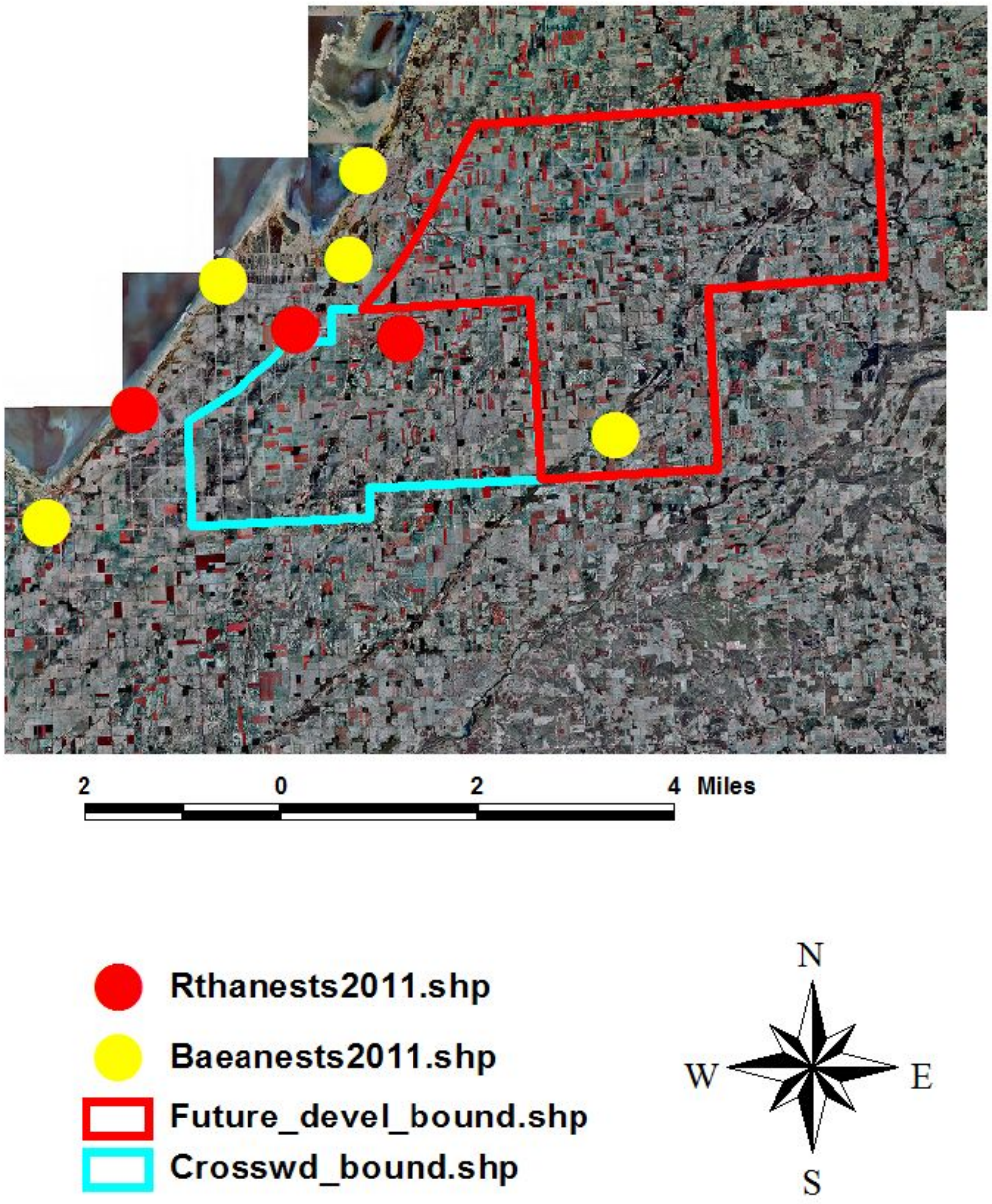

Figure 3. Nests of Red-tailed Hawks (red) and Bald Eagles (yellow) were detected in the Crosswinds Project Area proposed for wind energy development and its 2-km buffer.

Conclusions

The Crosswinds 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 2011 nesting period did not detect any Federally threatened or endangered avian species in the Project Area; however, the observed Bald Eagles are considered a species of special concern in Michigan.

Point counts in the breeding season determined that while there were few grassland specialist birds detected, some species were present. 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). Figure 3 identifies nesting raptors. Ideally, non-eagle nests should be buffered by at least 0.5 miles, based on the recommendation for nesting non-eagle raptors (http://www.fws.gov/windenergy/docs/Raptor_Nest_Searches.pdf). Due to the presence of Bald Eagle nests in and near the Project Area, I suggest that Consumer's Energy engage the United States Fish and Wildlife Service in consideration of these records and appropriate buffering distances.

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Appendix A. List of bird species observed during bird surveys conducted in the Crosswinds Project Area. This site was surveyed in 2011 for bird use.

Species[a]	AOU code	Status
Red-tailed Hawk	RTHA	
Bald Eagle	BAEA	Michigan Spp. of Sp. Concern
Turkey Vulture	TUVU	
Killdeer	KILL	
Mourning Dove	MODO	
Red-bellied Woodpecker	RBWO	
Hairy Woodpecker	HAWO	
Barn Swallow	BARS	
Bank Swallow	BANS	
Cliff Swallow	CLSW	
Tree Swallow	TRES	
American Cro	AMCR	
Blue Jay	BLJA	
American Roin	AMRO	
Gray Catbird	GRCA	
European Starling	EUST	
Tufted Titmouse	TUTI	
Common Yellowthroat	COYE	
Yellow Warbler	YWAR	
Eastern Wood-peewee	EAWP	
Willow Flycatcher	WIFL	
Red-winged Blackbird	RWBL	
Common Grackle	COGR	
Baltimore Oriole	BAOR	
Brown-headed Cowbird	BHCO	
Red-breasted Grosbea	RBGR	
Northern Cardinal	NOCA	
American Goldfinch	AMGO	
House Finch	HOFI	
Cedar Waxwing	CEDW	
Chipping Sparrow	CHSP	
Song Sparrow	SOSP	
House Sparrow	HOSP	

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