

**Migratory Bird Research for the Proposed County Line Wind Energy Site:  
Fall 2011 Field Season**



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:  
ERM  
3352 128<sup>th</sup> Avenue  
Holland, MI 49424-9263

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### **Executive summary**

Many areas in Illinois 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 or foraging 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 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.

In an effort to quantify the songbird use of the Project Area, we collected point count data to estimate migratory bird densities in early September- the end of October 2011. No Threatened or Endangered species were detected during the fall surveys in the Project Area. Several of the grassland / open land species observed in the Project Area are thought to be sensitive to the presence of tall structures in their breeding habitats, potentially forcing their displacement. Row crop agricultural fields would tend to have fewer of those species sensitive to the presence of tall structures than those species found in pastures and hayfields.

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## **Introduction**

Many areas in Illinois 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 migratory 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 lighting systems of the structure (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 which decreases the likelihood of songbirds becoming attracted into the site. 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 areas upon construction of a nearby wind turbine (Leddy et al. 1999).

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 County Line Project Area in Lee and Bureau Counties, located in north-central Illinois, USA (Fig.1). The land use / land cover of the Project Area is predominantly agricultural fields (e.g, corn, soybeans, and wheat), with some grassy pastures and waterways. The tree species in this area include: maple (*Acer* spp.), oak (*Quercus* spp.), and cottonwood (*Populus deltoides*). The topography is predominantly flat with historic oak savannahs and wetlands now drained for agricultural use.



Figure 1. The County Line Project Area in Lee and Bureau Counties, IL are predominantly agricultural lands with some interspersed grassland and forest areas.

### **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). Six point count locations were established within the Project Area (Fig. 2). Surveys were conducted 3 times between early September and the end of October 2011 to focus on the quantification of the birds migrating through the Project Area in the fall.

Surveys at point count sites were 7 min. long (after 2 minutes of silence) and conducted between 15 minutes before sunrise and 1030 AM CST. 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.

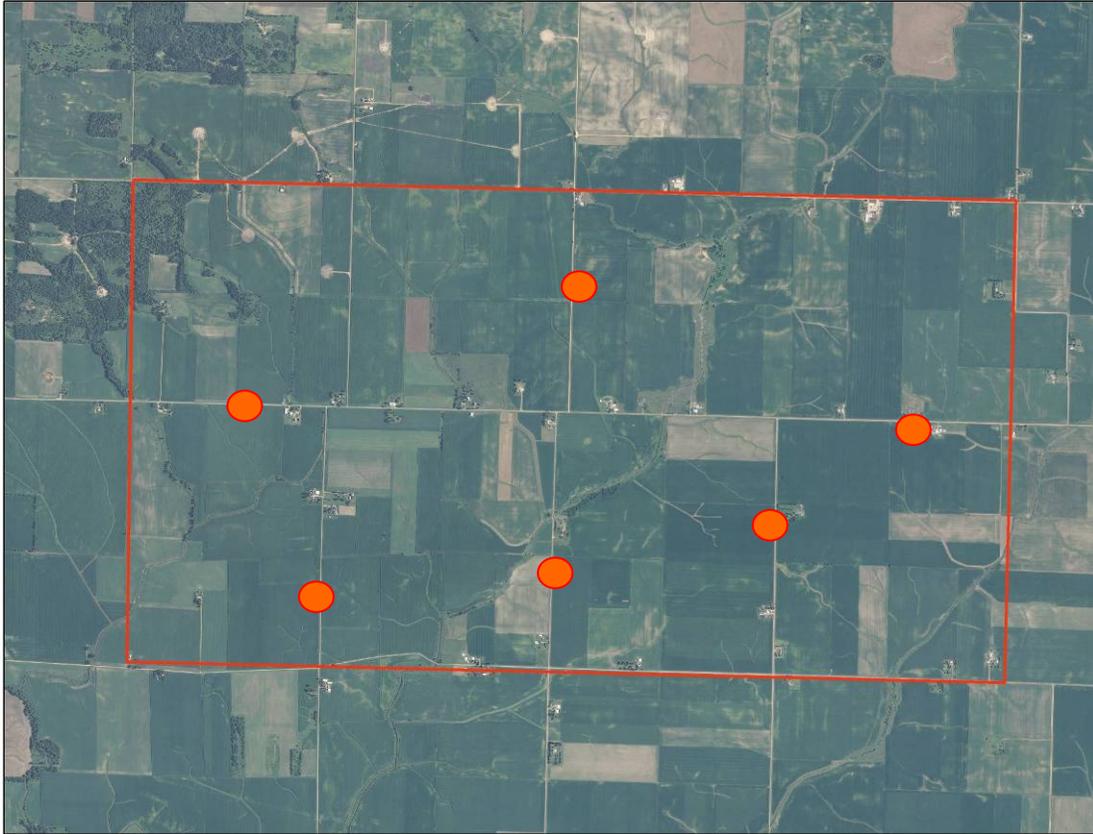


Figure 2. Point count sites were established in the County Line Project Area. Point count sites were surveyed between early September and the end of October 2011 for migratory bird use.

## **Results and Summary**

### **Migratory bird surveys**

We visited 6 point counts in the County Line Project Area 3 times between early September and the end of October 2011. Surveys of point count stations detected 100 birds of 14 species (Table 1, Appendix A). We detected a mean of 7.1 birds per point count visit (mean of 3.9 species / survey; Table 1).

The 3 most abundant bird groups per survey were the sparrows (2.0 birds / survey), followed by invasive species (1.7 birds / survey), and next the blackbirds and shorebirds shared the same mean number of birds per survey (0.8 birds / survey, Table 2). These species groups were consistent with the open / agricultural / grassland / shrubland habitats found in the Project Area. The majority of the birds 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 spring migration study.

Several of the grassland / open land species observed in the Project Area are thought to be sensitive to the presence of tall structures in their breeding habitats, 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 tend to have fewer of these sensitive species than pastures, and hayfields. While there are almost no pastures and hay fields in the Project Area, construction of wind turbines in those areas may result in these species avoiding areas previously utilized. Loss of foraging habitat to turbine avoidance has the potential to be mitigated via mowing delay agreements with owners of leased land. Specifically, a delay in mowing grass until the middle of June provides grassland nesting birds an opportunity to successfully forage during migration after the area has been mowed and allowed to regrow.

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 loss. In addition, a delay in mowing of all grassland areas in the Project Area has the potential to offset habitat loss near turbines and loss of individual birds due to direct collision with wind turbines.

Table 1. Avian abundance and richness in the County Line Project Area proposed for the development of wind energy. Data were collected in between early September and the end of October 2011 (migration) at point count sites.

	Migration
No. Species	14
Mean No. Individuals / Survey	7.1
Mean No. Species/Survey	3.9

Table 2. Mean bird abundance in the Green River Project Area proposed for the development of wind energy. Data were collected in between early September and the end of October 2011 (migration) at point count sites.

Group	Mean Abundance <sup>a</sup> Migration
Blackbirds	0.8
Corvid	0.3
Doves	0.5
Invasives	1.7
Other passerines	0.7
Raptor	0.3
Shorebirds	0.8
Sparrows	2.0
Thrushes	0.7
Waterfowl	0.3
Woodpeckers	0.2

<sup>a</sup> Mean Abundance = mean number of individuals observed per survey

## Conclusions

The County Line Project Area is predominantly agricultural fields (e.g., corn, soybeans, and wheat), with some grassy pastures and waterways as well as some woodlots, and ponds. The agricultural landscape in the Project Area reduces the likelihood of the presence of rare species of birds. Surveys conducted during the 2011 fall migration period did not detect any listed species that have been known to use the Project Area. Due to their conservation status we also made special note to record any observations of the following birds during all visits to the Project Area: Black-crowned Night Heron, Common Moorhen, Yellow-headed Blackbird, Whooping Crane, and Least Bittern. No observations were made of any of these species.

Avian collision rates at wind farms tend to be positively correlated with the densities of birds using the wind farm. Therefore, the limited amount of habitat for rare bird species in the County Line Project Area and our survey results demonstrating no detections of listed species suggest that collisions of rare bird species with turbines would be unlikely in this Project Area.

## **Acknowledgements**

The K. Shank (IL DNR) provided suggestions for this study. I would like to express my gratitude to E. Underwood (Mainstream Renewable Power) for his involvement in the process of including natural resource issues in the development of the Project Area and for securing access to private lands. H. Heater, and S. Koster of ERM provide valuable input to and coordination of this effort. My colleagues at Michigan State University, Michigan Natural Features Inventory, provide logistical and technical support; especially, B. Klatt, S. Ridge, N. Toben, R. Rogers, and H. Enander.

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Appendix A. List of bird species observed during bird surveys conducted in Lee and Bureau Counties, IL, in a site proposed for wind energy development. This site was surveyed in 2011 for bird use.

Species <sup>a</sup>	AOU code
Killdeer	KILL
American Kestrel	AMKE
American Crow	AMCR
Mourning Dove	MODO
Gray Catbird	GRCA
American Robin	AMRO
Red-bellied Woodpecker	RBWO
European Starling	EUST
Red-winged Blackbird	RWBL
Baltimore Oriole	BAOR
Horned Lark	HOLA
Song Sparrow	SOSP
House Sparrow	HOSP

<sup>a</sup> names of birds follow the AOU Check-list of North American Birds