

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



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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 Project Area, we collected point count data to estimate migratory bird densities in mid April – May 2011 and breeding bird densities in June and July 2011. We also searched the Project Area on 5 May 2011 for the raptor nests and the presence of threatened and endangered species. We found 6 active Red-tailed Hawk nests and 3 heron rookeries. 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. The majority of the Project Area is planted in row crops with approximately 11% in habitat suitable for grassland birds. Row crop agricultural fields 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.

<b>Table of contents</b>	<b>Page</b>
Introduction.....	3
Study Site and Methods.....	4
Study site and description.....	4
Migratory bird surveys.....	4
Nesting bird surveys.....	6
Results and Summary.....	6
Migratory bird surveys.....	6
Nesting bird surveys.....	10
Conclusion.....	13
Literature Cited.....	14
Appendix A.....	15

## **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 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 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 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 Lenawee County, located in southeastern Michigan, USA (Fig. 1). The land use / land cover of the Project Area consists mainly of agricultural fields (e.g. corn, soybeans, and wheat), with some pastures, forested areas, and some small wetlands. Habitats suitable for grassland birds cover 11% of the Project Area. Various streams and drains traverse the Project Area within the watershed of the River Raisin, which runs partially within and to the north of the Project Area. The natural vegetation in this area is generally described as mesic forests, wet forests, and forested riverine corridors. The forest overstory typically includes components of maple (*Acer* spp.), oak (*Quercus* spp.), ash (*Fraxinus* spp.) and cottonwood (*Populus deltoides*) with an understory of bracken fern (*Dennstaedtiaceae* spp.). The land type is predominantly Ann Arbor Moraine and Maumee Lake Plain (Albert 1995) which is predominantly flat with some gently sloping areas. Historically, the northern portion of the Project Area was vegetated with beech-sugar maple forest and the southern portion was predominantly mixed hardwood swamp which is now drained for agricultural use (Comer et al. 1995). The Project Area is approximately 22 – 29 miles from the Lake Erie lakeshore, which is considered to be a concentration area for migratory birds.

### **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). Eleven point count locations were established within the Project Area (Fig. 1). Surveys were conducted 2 times in April – May 2011 to focus on quantifying the birds migrating through the Project Area in the spring.

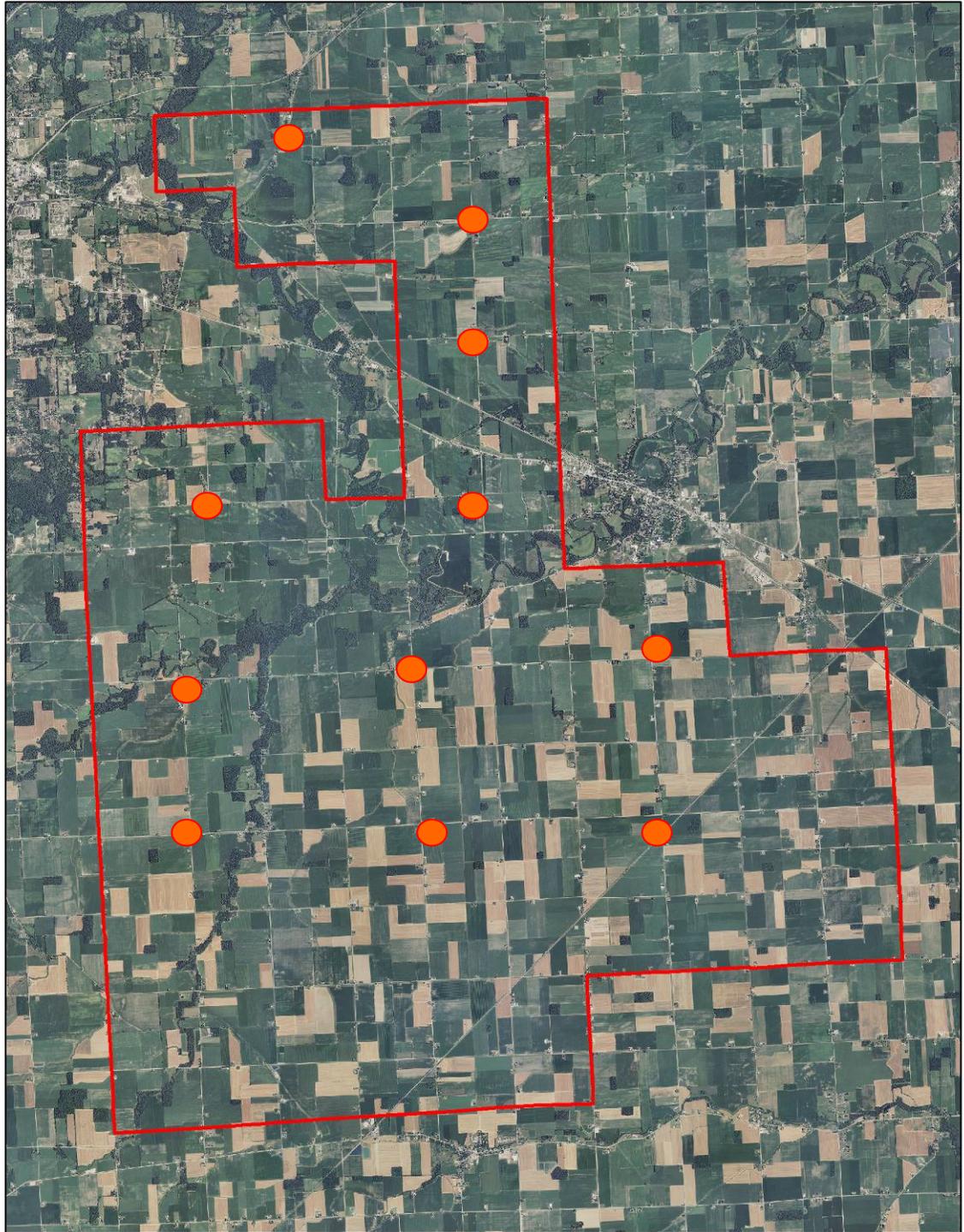


Figure 1. The Blissfield Project Area in southeastern Michigan (Lenawee County) and is predominantly agricultural lands with some interspersed forested areas. Point count sites were established and surveyed in April - May 2011 for migratory bird use.

Surveys at point count sites were 7 min. long (after 2 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.

### **Nesting bird surveys**

Based on species-specific timing, we conducted nesting surveys between early May and early July 2011. The entire Project Area was visually searched for raptor activity / nests using aircraft and road-based surveys. In addition, 11 7-minute point counts were conducted throughout the Project Area to quantify the species and density of nesting birds in a higher diversity of habitats (Fig 1).

## **Results and Summary**

### **Migratory bird surveys**

We visited 11 point counts in the Blissfield Project Area 2 times between 24 April and 21 May 2011. Surveys of point count stations detected 390 birds of 22 species (Table 1, Appendix A). We detected a mean of 17.7 birds per point count visit (mean of 8.7 species / survey; Table 1).

The 3 most abundant bird groups per survey were the blackbirds (5.4 birds / survey), followed by invasives (species not native to the area and invasive, commonly found in areas intensely disturbed by humans; 3.3 birds / survey), and raptors (1.7 birds / survey) (Table 2). These species groups were consistent with the open / grassland / shrubland 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 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,

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, Eastern Meadowlark, and Song Sparrow. The migration period point count location where we detected these 3 species is highlighted in Figure 2. 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, such as Bobolink, avoidance of grassland areas would minimize their loss.

Table 1. Avian abundance and richness in the Blissfield Project Area proposed for the development of wind energy. Data were collected in April - May 2011 (migration) and in June 2011 (breeding) at point count sites.

	Migration	Breeding
No. Species	22	23
Mean No. Individuals / Survey	17.7	31.4
Mean No. Species/Survey	8.7	9.3

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

Group	Mean Abundance <sup>a</sup>	
	Migration	Breeding
Blackbirds	5.4	7.2
Finches/Buntings	0.5	1.0
Corvids	0.0	0.1
Doves	1.1	1.8
Flycatchers	0.0	0.2
Raptors	1.7	0.0
Invasives	3.3	11.9
Larks	0.7	0.4
Other Passerine	0.0	0.1
Shorebirds	0.8	0.7
Sparrows	1.5	2.2
Swallows/Swifts	0.0	2.7
Thrushes	1.6	2.6
Warblers	0.0	0.1
Waterfowl	0.8	0.0
Woodpeckers	0.2	0.0

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

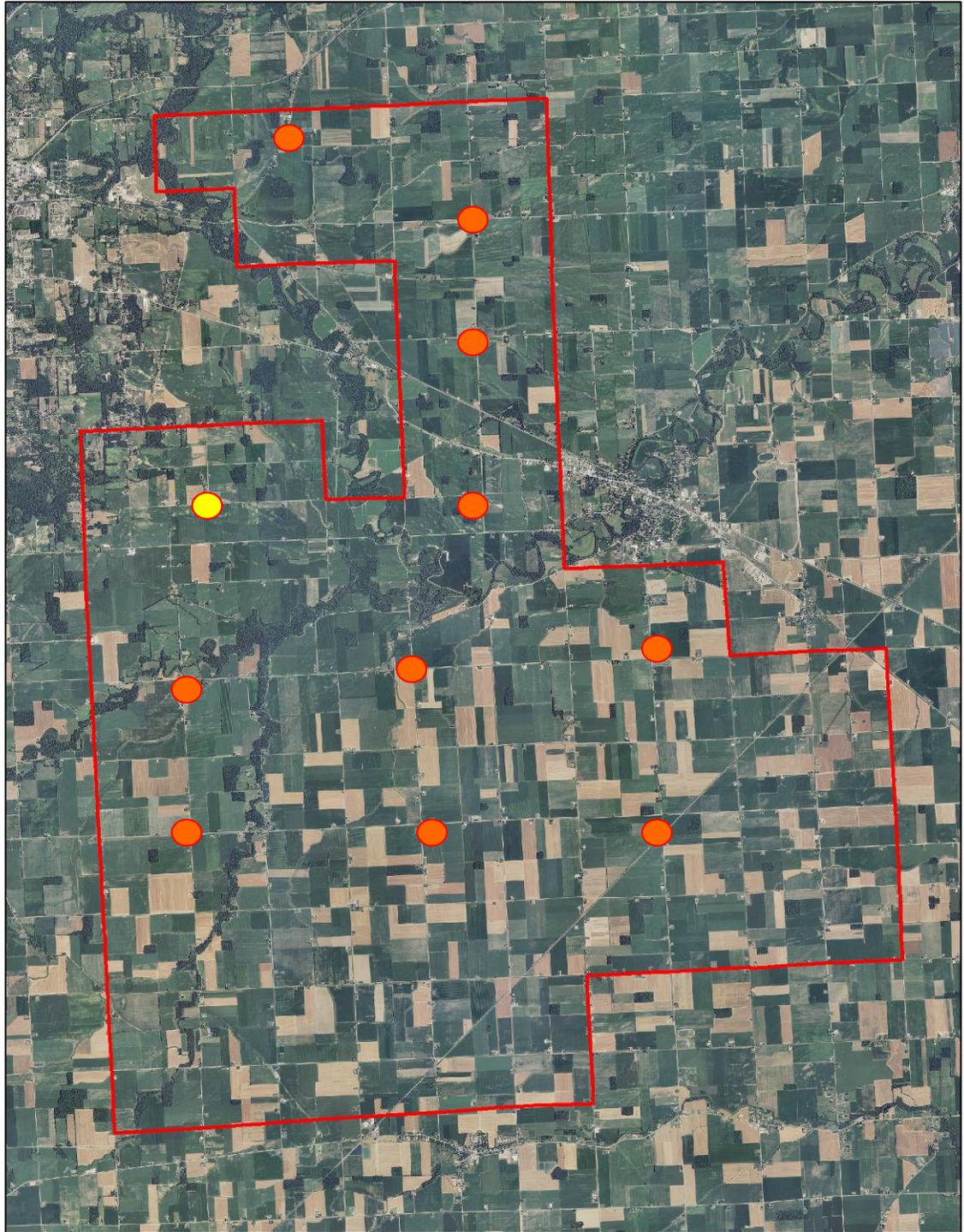


Figure 2. Point count sites were established in Lenawee County, MI in the Blissfield Project Area proposed for wind energy development. Point count sites were surveyed in April and May 2011 for migratory bird use. The point highlighted with a yellow circle included 3 species detections that are potentially open-area sensitive to the construction of tall structures.

### **Nesting bird surveys**

We detected 6 active Red-tailed Hawk nests in the Project Area and 3 heron rookeries (Fig. 3). The majority of the nesting herons in the Project Area appeared to be Great Blue Herons, however there were a small proportion of nesting Great Egrets as well.

We visited 11 point counts in the Blissfield Project Area on June 30, 2011. Surveys of point count stations detected 345 birds of 23 species (Figure 1, Table 1, Appendix A). We detected a mean of 31.4 birds per point count visit (mean of 9.3 species / survey; Table 1).

The 3 most abundant bird groups per survey were the invasives (species not native to the area and invasive, commonly found in areas intensely disturbed by humans; 11.9 birds / survey), followed by blackbirds (5.4 birds / survey), and swallows (5.4 birds / survey; Table 2). These species groups were consistent with the open / grassland / shrubland habitats found in the Project Area. The majority of the invasives and blackbirds 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 breeding season study.

Similar to the migratory bird surveys, 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. The species detected in the Project Area during the breeding season that could be potentially sensitive to the construction of tall structures include: Red-winged Blackbird, Bobolink, and Song Sparrow. The breeding period point count where we detected 3 or more of those species is highlighted in Figure 4. The portions of the Project Area with this diversity of sensitive birds are located near grasslands, pastures, and hayfields while those areas with more row crops have a lower proportion of sensitive birds. It is likely that populations of grassland songbirds, such as these species, are more negatively impacted by farming practices, including hay mowing and tilling of existing grasslands, than by turbines (Guarnaccia and Kerlinger, 2007).

The majority of detected birds were habitat generalists and fairly common in the region. Impacts to the less common species can be minimized by avoiding construction in grassland areas and wetland areas.

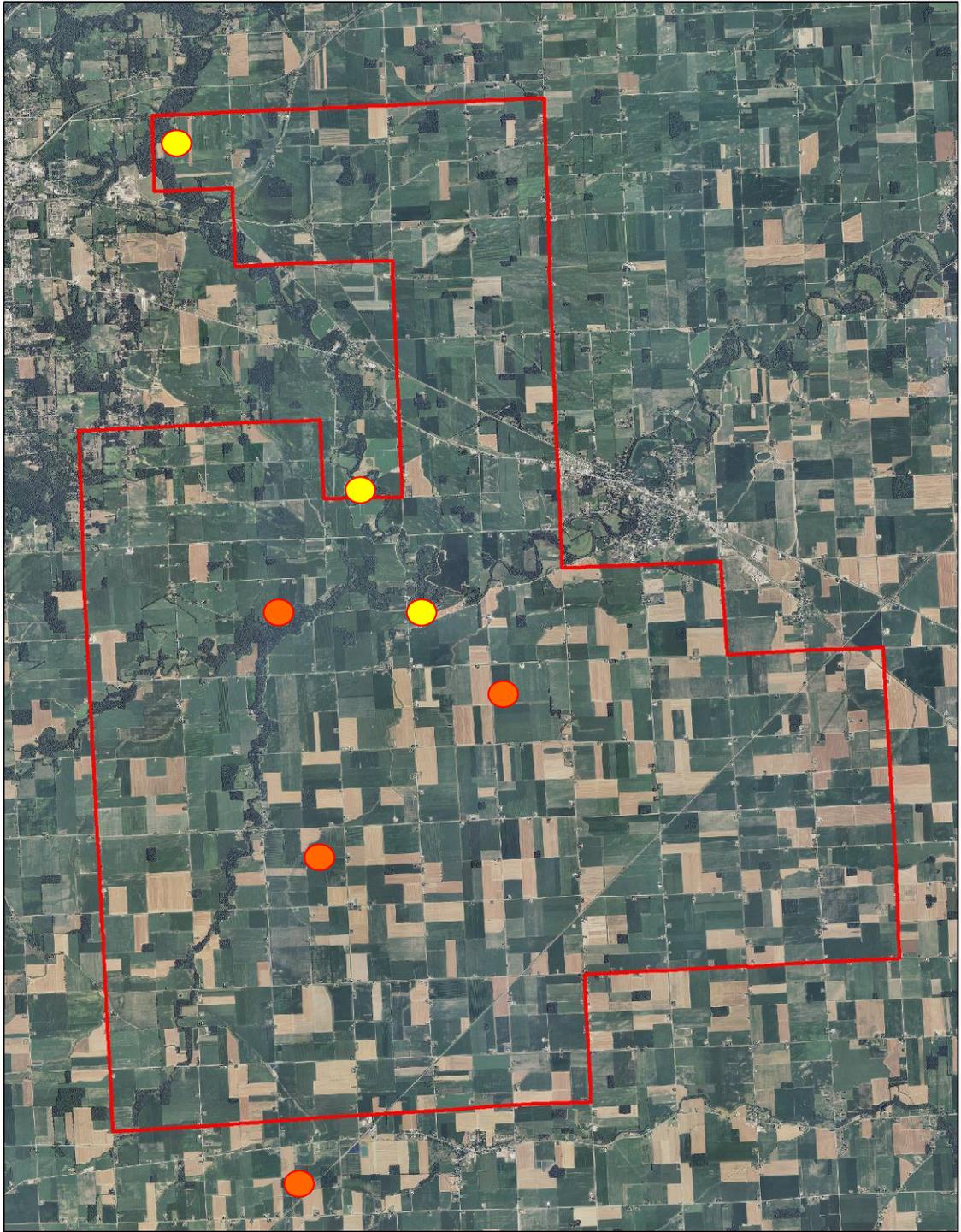


Figure 3. Nests of Red-tailed Hawks (orange) and heron rookeries (yellow) were detected in Lenawee County, MI in the Blissfield Project Area proposed for wind energy development.

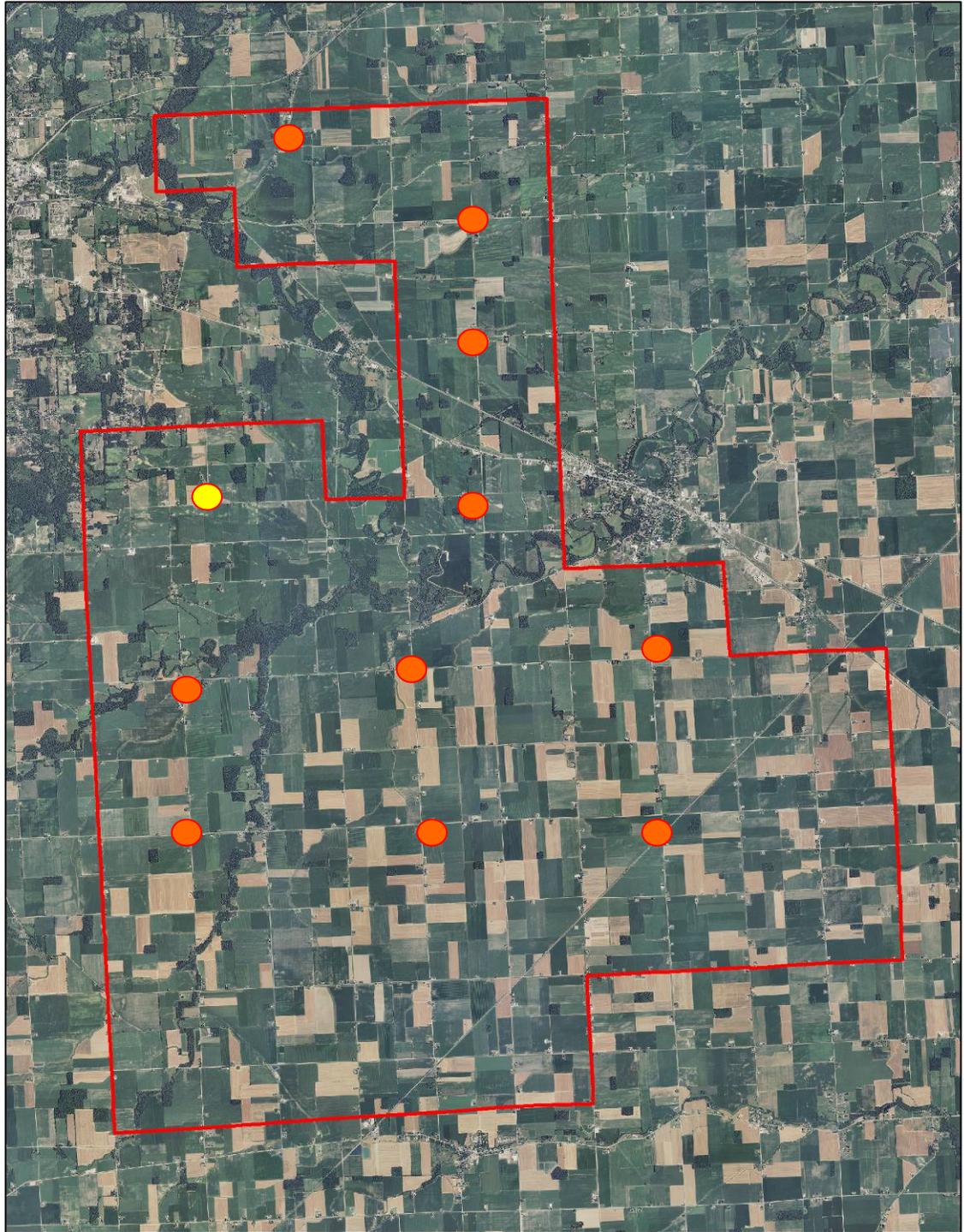


Figure 4. Point count sites were established Lenawee County, MI in the Blissfield Project Area proposed for wind energy development. Point count sites were surveyed in June 2011 for bird use. Those point highlighted with a yellow circle is where we detected 3 species that are potentially open-area sensitive to the construction of tall structures.

## Conclusions

The Blissfield Project Area is predominantly agricultural fields (e.g., corn, soybeans, and wheat), with some grassy pastures and waterways as well as woodlots, and ponds. The River Raisin watershed contains unique natural habitats; however, the agricultural landscape in the Project Area reduces the likelihood of the presence of rare species of birds. Surveys conducted during the 2011 migration period and nesting period did not detect any threatened or endangered avian species in the Project Area. Our sampling period did include the potential passage and stopover of shorebirds in spring migration; however, we did not detect any large flocks of shorebirds during our sampling.

Point counts in both migration and breeding season determined that one point in particular provided habitat to several species of birds that are sensitive to the obstruction of open habitats (Figs 2 and 4). When the specific turbine array is designed for the Project Area, this area should be buffered by at least 180 m (Guarnaccia and Kerlinger 2007). \ Figure 3 identifies nesting raptors and waterbirds. Ideally, these 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](http://www.fws.gov/windenergy/docs/Raptor_Nest_Searches.pdf)). ( This may not substantially affect the Project as the waterbird nests are in existing wetlands not likely to be developed for the Project. In previous years Bald Eagle nests have been located in and near the Project Area. Exelon, LLC and ERM are engaging the United States Fish and Wildlife Service in consideration of these past records.

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 Blissfield 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.

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Appendix A. List of bird species observed during bird surveys conducted in Lenawee County, MI, in sites proposed for wind energy development. This site was surveyed in 2011 for bird use.

Species <sup>a</sup>	AOU code
Canada Goose	CAGO
Blue-winged Teal	BWTE
Mallard	MALL
Great Blue Heron	GBHE
Red-tailed Hawk	RTHA
Turkey Vulture	TUVU
Killdeer	KILL
Mourning Dove	MODO
Rock Pigeon	ROPI
Northern Flicker	NOFL
Red-bellied Woodpecker	RBWO
Eastern Kingbird	EAKI
Barn Swallow	BARS
Cliff Swallow	CLSW
Chimney Swift	CHSW
American Crow	AMCR
Blue Jay	BLJA
American Robin	AMRO
Eastern Bluebird	EABL
European Starling	EUST
Ruby-throated Hummingbird	RTHU
Common Yellowthroat	COYE
Bobolink	BOBO
Red-winged Blackbird	RWBL
Eastern Meadowlark	EAME
Common Grackle	COGR
Brown-headed Cowbird	BHCO
Northern Cardinal	NOCA
American Goldfinch	AMGO
House Finch	HOFI
Horned Lark	HOLA
Chipping Sparrow	CHSP
Song Sparrow	SOSP
House Sparrow	HOSP

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