

Site Characterization Study

**Site Characterization Study
Three Waters Wind Farm
Jackson County, Minnesota and
Dickinson and Osceola Counties, Iowa**



Prepared for:

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Confidential Business Information

EXECUTIVE SUMMARY

Three Waters Wind Farm, LLC, contracted Western EcoSystems Technology, Inc. to conduct a Site Characterization Study (SCS) for the proposed Three Waters Wind Farm (Project) in Jackson County, Minnesota, and Dickinson and Osceola counties, Iowa. This SCS describes biological resources in and near the Project, following guidelines described in the US Fish and Wildlife Service's (USFWS) *Land-Based Wind Energy Guidelines* and *Eagle Conservation Plan Guidance* (ECPG) for a Tier 2 Site Characterization and a Stage 1 Site Assessment.

The Project area encompasses 23,832 hectares (58,890 acres) within the Des Moines Lobe Level IV Ecoregion of the Western Corn Belt Plains III Ecoregion. The Project area is relatively flat and mostly cultivated cropland (89.9%), with smaller areas of emergent herbaceous wetlands (3.2%); developed, open space (3.1%); herbaceous (1.4%), and other land cover types.

The Project area includes several protected areas. Federally managed lands within the Project area include the Jackson County Waterfowl Production Area. State-managed lands within the Project area include the Illinois Lake, Sioux Valley, and Skunk Lake Wildlife Management Areas.

Protected wildlife and plant species may occur in the Project area. Five federally listed species were identified as having potential to occur in the Project area, including the endangered Topeka shiner, the endangered Poweshiek skipperling, the threatened northern long-eared bat, the threatened western prairie fringed orchid, and the threatened prairie bush-clover. Sixty-three state-listed threatened or endangered species may occur in the Project area, including five bird species (Henslow's Sparrow, loggerhead shrike, Wilson's phalarope, short-eared owl, and northern harrier). In addition, bald eagles can occur in the region year-round and golden eagles may occur on rare occasions during migration or winter.

Eight bat species may occur in the Project area, including the northern long-eared bat which is federally listed as threatened. Several bat species are considered Species of Special Concern in Minnesota, including the little brown bat, big brown bat, and tri-colored bat. Three migratory tree bat species are likely to occur in the Project area, including the eastern red bat, hoary bat, and silver-haired bat. These migratory tree bat species are considered Species of Greatest Conservation Need in Minnesota and are often more vulnerable to collisions with wind turbines.

The potential impacts and concerns highlighted in this report are typical for wind energy projects in this area. Tier 3 biological surveys will help further assess the potential for adverse impacts to species of concern. Throughout the development process, coordination with the USFWS, the Minnesota Department of Natural Resources, and the Iowa Department of Natural Resources should continue regarding the scope, protocols, and results of any studies conducted for the Project.

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INTRODUCTION

Three Waters Wind Farm, LLC (Three Waters) contracted Western EcoSystems Technology, Inc. (WEST) to conduct a Tier 2 Site Characterization Study (SCS) and Stage 1 Site Assessment for the proposed Three Waters Wind Farm (Project) in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa. This report follows guidelines for a Tier 2 SCS described in the US Fish and Wildlife Service's (USFWS) *Land-Based Wind Energy Guidelines* (WEG; USFWS 2012) and guidelines for a Stage 1 Site Assessment described in the USFWS's *Eagle Conservation Plan Guidance* (ECPG; USFWS 2013). The purpose of this SCS is to describe biological resources present within and near the Project, and identify potential risks to biological resources due to construction and operation of the Project. The objective of the Stage 1 Site Assessment is to evaluate the extent that the Project may pose risk to eagles.

PROJECT AREA

The Project area includes 23,832 hectares (ha; 58,890 acres [ac]) in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa (Figure 1). The Project is within the Des Moines Lobe Level IV Ecoregion of the Western Corn Belt Plains Level III Ecoregion (US Environmental Protection Agency [USEPA] 2016). The Western Corn Belt Plains Level III Ecoregion is comprised of glaciated till plains and undulating loess plains. Much of the region was originally dominated by tallgrass prairie, riparian forest, oak-prairie savannahs, and woody and herbaceous wetlands. Today, most of the area has been cleared for agricultural cropland. Topography within the Project area is relatively flat, ranging from approximately 1,383 to 1,600 feet (ft; 421–487 meters [m]) above mean sea level (Figure 2; US Geological Survey [USGS] Digital Elevation Model 2016).

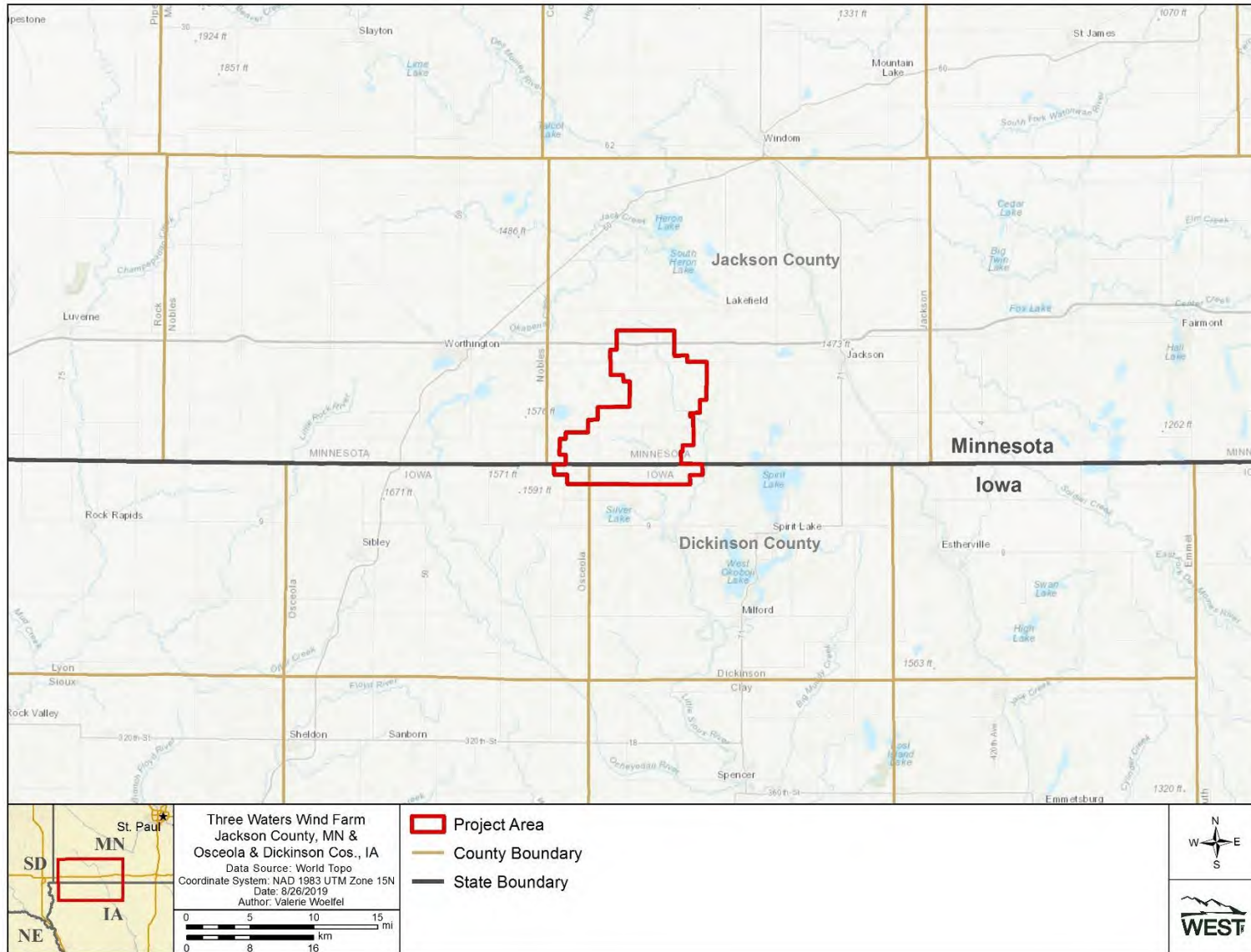


Figure 1. Location of the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

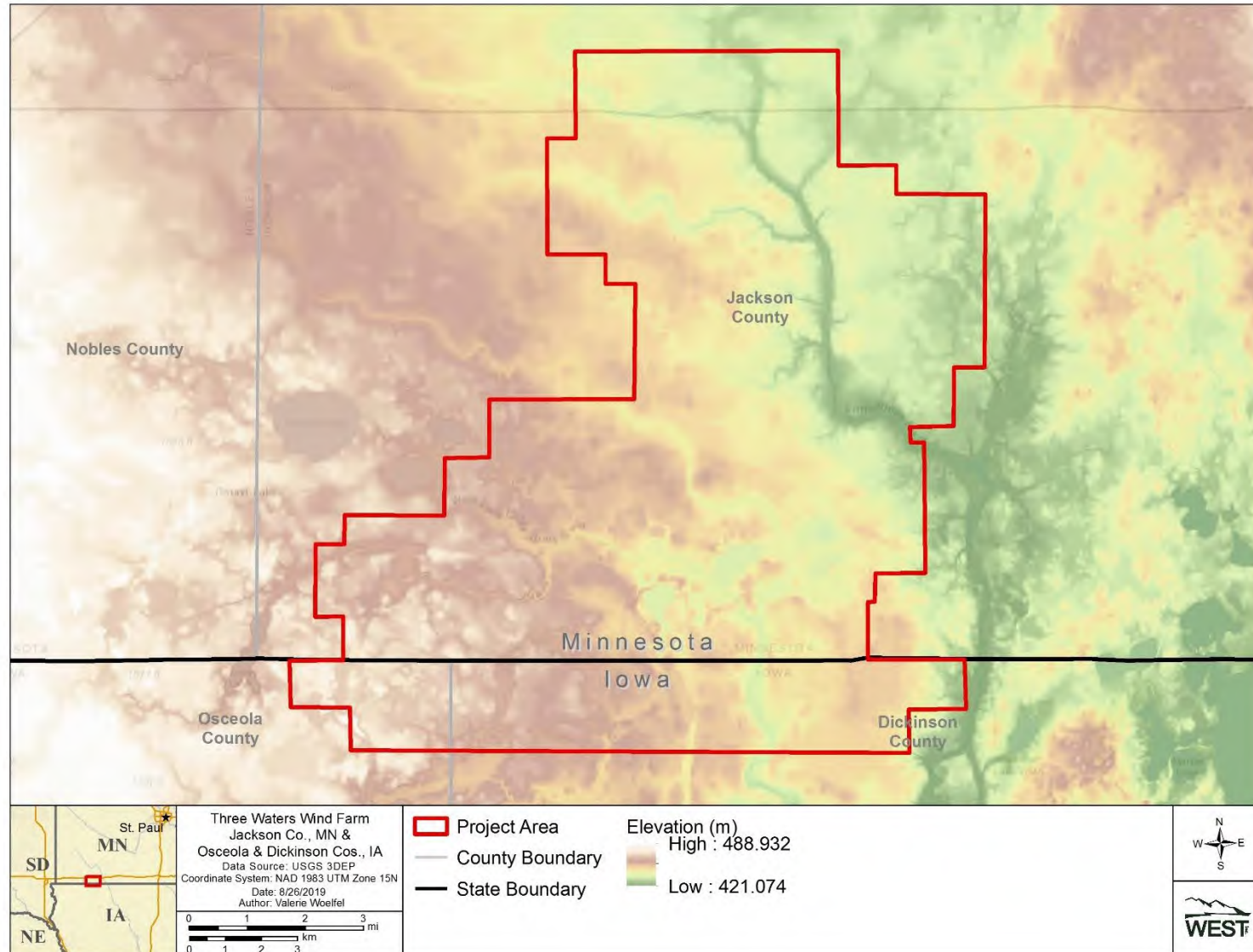


Figure 2. Elevation in the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

METHODS

Biological resources within the Project were evaluated through a comprehensive desktop review of publically available data. Sources included published technical literature, field guides, available datasets from the Minnesota Department of Natural Resources (MNDNR), Iowa Department of Natural Resources (IADNR), NatureServe, USFWS Information for Planning and Consultation (IPaC), USGS Breeding Bird Survey (BBS) database, Bat Conservation International (BCI), and WEST's cumulative database of wind facility related fatality information. A reconnaissance field review was conducted on November 15, 2017, to evaluate current land cover/use in the Project area and to identify environmentally sensitive areas or areas that may provide suitable habitat for species of concern. Requests for information on biological resources that may be impacted by the Project were placed through the USFWS IPaC (Appendix A), Minnesota's Natural Heritage Information System (NHIS; Appendix B), and the IADNR (Appendix C).

SITE CHARACTERIZATION

Land Cover

According to the National Land Cover Database (Yang et al. 2018, Multi-Resolution Land Characteristics 2019), the Project area is mostly cultivated crops (89.9%), with small areas of emergent herbaceous wetlands (3.2%); developed, open space (3.1%); and herbaceous (1.4%) land cover (Figure 3). All other land cover types each cover less than 1% of the Project area (Table 1).

Table 1. Land cover types, coverage, and composition within the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Habitat	Hectares	Acres	% Composition
Cultivated Crops	21,411.7	52,910.4	89.9
Emergent Herbaceous Wetlands	764.1	1,888.1	3.2
Developed, Open Space	735.9	1,818.5	3.1
Herbaceous	335.5	829.0	1.4
Open Water	160.8	397.3	0.7
Hay/Pasture	128.3	317.0	0.5
Developed, Low Intensity	119.7	295.9	0.5
Mixed Forest	107.2	264.8	0.5
Developed, Medium Intensity	33.9	83.9	0.1
Deciduous Forest	10.4	25.6	<0.1
Shrub/Scrub	9.5	23.6	<0.1
Barren Land	6.1	15.1	<0.1
Woody Wetlands	5.6	13.8	<0.1
Developed, High Intensity	2.7	6.7	<0.1
Total¹	23,832	58,890	100

Data from the National Land Cover Database (Yang et al. 2018, Multi-Resolution Land Characteristics 2019).

¹ Sums of values may not add to total value shown due to rounding.

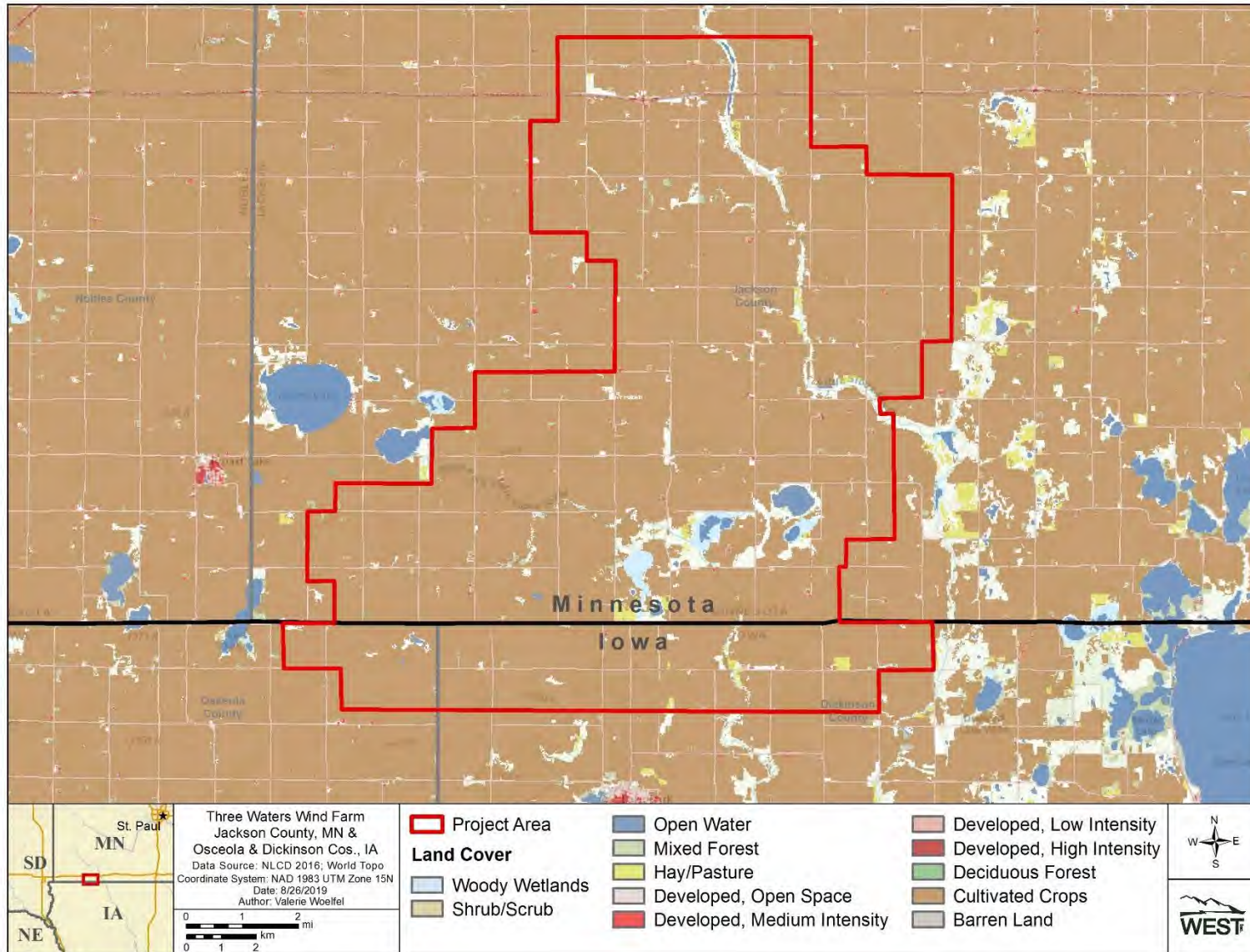


Figure 3. National Land Cover Database land cover types within the Three Waters Wind Farm in Jackson County, Minnesota, and Dickinson and Osceola counties, Iowa.

Wetlands and Riparian Areas

According to the USFWS National Wetland Inventory (NWI), wetland features represent approximately 1,229.2 ha (3,037.3 ac) of the Project area (Table 2; USFWS NWI 2017). Freshwater emergent wetlands accounted for most (75.0%) wetlands, followed by lake (11.2%), riverine (8.6%), freshwater pond (3.9%), and freshwater forested/shrub wetlands (1.3%). The Little Sioux River, running through the north and eastern portions of the Project, and the West Fork Little Sioux River are associated with most of the freshwater emergent wetlands and riverine areas in the Project area (Figure 4). The largest lakes in the Project area are Skunk Lake and Rush Lake, located in the southeastern portions of the Project area (Figure 4).

Table 2. Wetland types, acreage, and percent composition within the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Wetland Type	Hectares	Acres	% Composition
Freshwater Emergent Wetland	921.4	2,276.8	75.0
Lake	137.5	339.8	11.2
Riverine	106.3	262.6	8.6
Freshwater Pond	48.2	119.1	3.9
Freshwater Forested/Shrub Wetland	15.8	38.9	1.3
Total	1,229.2	3,037.3	100

Source: US Fish and Wildlife Service National Wetland Inventory 2017

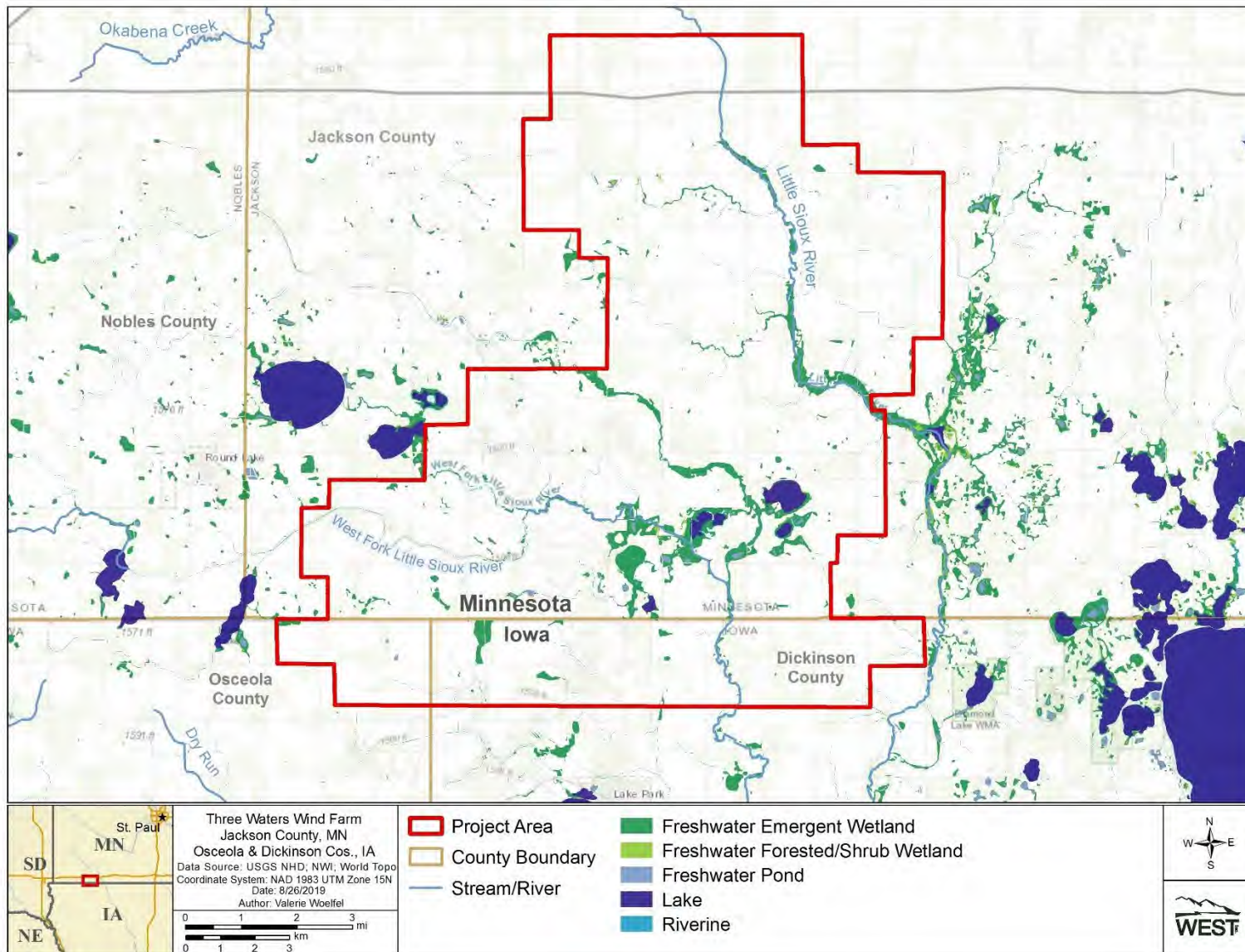


Figure 4. Wetland features within the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa..

Federal and State Lands

The Project area includes several protected areas (Figure 5). Federally managed lands within the Project area include the Jackson County Waterfowl Production Area (WPA). State-managed lands within the Project area include the Illinois Lake, Sioux Valley, and Skunk Lake Wildlife Management Areas (WMA). These areas provide wetland habitats that support nesting and migrating waterfowl and waterbird populations. Other bird types may also be attracted to these areas, including eagles.

Important Bird Areas

The National Audubon Society (Audubon) has identified Important Bird Areas (IBAs) that provide essential bird habitat (Audubon 2019a). Three state-priority IBAs are located near the Project area (Figure 6).

The closest IBA to the Project is Spirit Lake/Kettleson Wildlife Area, located approximately 4 mi (7 km) from the Project boundary. The Spirit Lake/Kettleson Wildlife Area IBA covers 2,400 ac (971 ha), and contains Grover Lake, West Hottes Lake, Welch Lake, East Hottes Lake, Sunken Lake and Little Spirit Lake (Audubon 2019d). The Spirit Lake/Kettleson Wildlife Area IBA provides important habitat for a variety of bird species, especially during migration (Audubon 2019d).

Heron Lake IBA is located 6 mi (10 km) north of the Project area. The Heron Lake IBA contains 175,321 ac (70,950 ha), including Heron Lake and Talcot Lake WMA (Audubon 2019c). Heron Lake IBA provides important habitat for many migrating and nesting species (Audubon 2019c).

The Des Moines River IBA is located approximately 10 mi (16 km) west of the Project (Figure 6). This IBA covers 15,469 ha (38,225 ac) and includes 38 mi (61 km) of the Des Moines River (Audubon 2019b). The Des Moines River IBA is considered to have ornithological significance as it provides a corridor of native habitat throughout highly cultivated areas and supports a high diversity of bird species (Audubon 2019b).

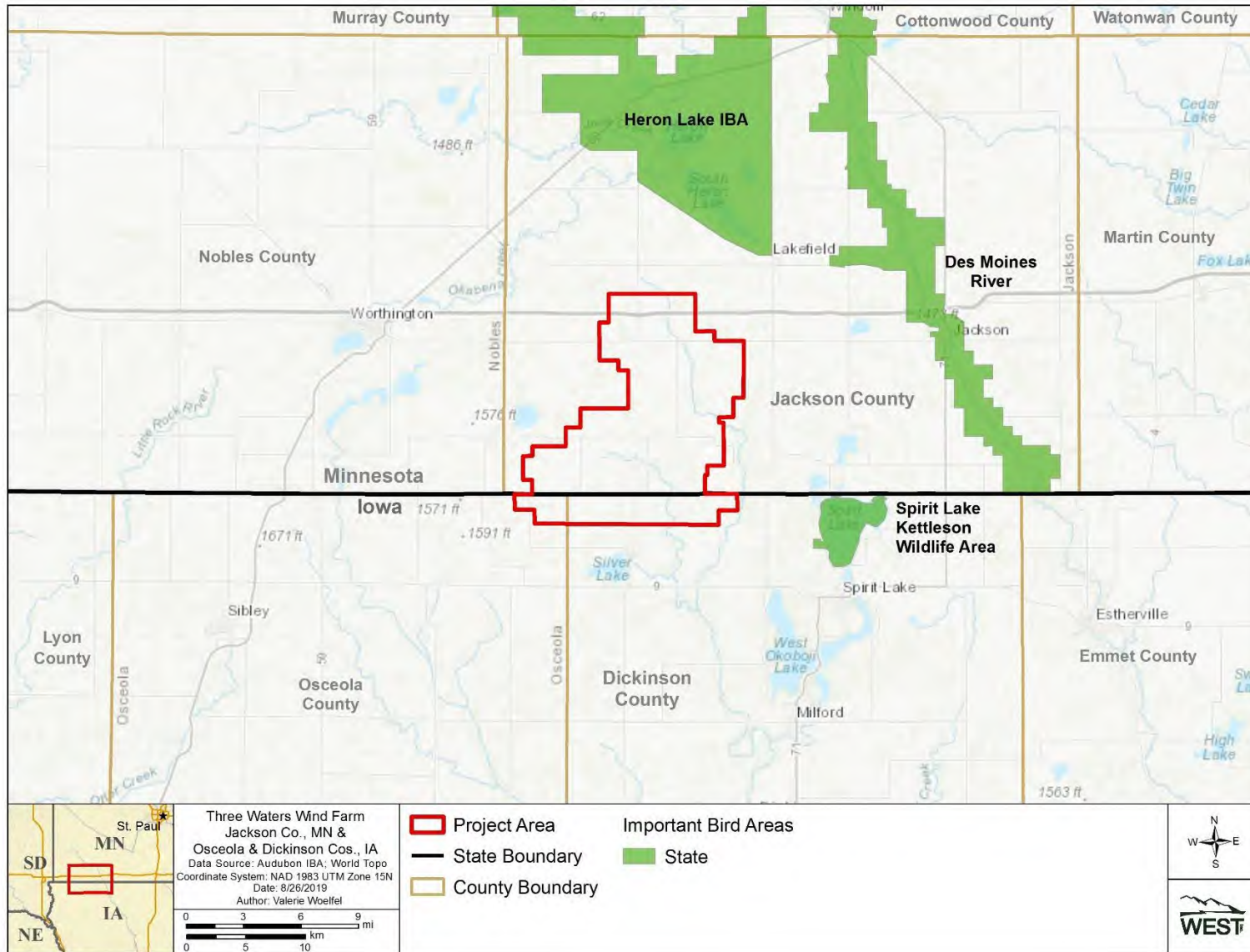


Figure 6. Important Bird Areas (IBA) near the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

SPECIES OF CONCERN

Threatened and Endangered Species

The USFWS county distribution list of federally endangered, threatened, proposed, and candidate species and the IPaC report (Appendix A) were reviewed to determine if any federally listed species may occur within the Project area. The MNDNR NHIS database and the IADNR Natural Areas Inventory database were reviewed to identify state-listed species that may occur in the Project area (MNDNR 2018a, IADNR 2019). In addition, an official environmental review was requested from the NHIS (Appendix B) and the IADNR (Appendix C) to determine any known occurrences of threatened or endangered species or sensitive habitats in the Project area.

Five federally listed species were identified as having potential occurrence in Jackson County, Minnesota or Dickinson and Osceola counties, Iowa (Table 3). Fourteen state-listed species were identified as having potential to occur in Jackson County, Minnesota, eight state-listed species were identified as having potential to occur in Osceola County, Iowa, and 41 state-listed species were identified as having potential to occur in Dickinson County, Iowa (Table 3). Critical habitat for the federally endangered and state-threatened Topeka shiner (*Notropis topeka*) was identified in the southwestern corner of the Project area (Appendix A).

In addition, official environmental reviews identified no federally or state listed threatened or endangered species as having the potential to be impacted by the Project (Appendix B, Appendix C). The official environmental reviews identified two species of concern that have been documented within the Project area, including, Forester's tern (*Sterna forsteri*) and trumpeter swan (*Cygnus buccinator*). If Project construction and activities are anticipated to impact any federally or state listed threatened or endangered species, further coordination with the USFWS, MNDNR, and IADNR is recommended.

Table 3. Federally and state-listed threatened and endangered species with potential to occur in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Species	Status ¹	Preferred Habitat	Potential Occurrence in the Project Area
Birds			
Henslow's Sparrow <i>Ammodramus henslowii</i>	ST ³ , SE ²	Large, tall uncultivated grasslands (> 247 acres [100 hectares])	Moderate potential to occur due to the limited availability of suitable habitat.
King Rail <i>Rallus elegans</i>	SE ²	Wetland and grassland areas	Low potential to occur within the Project area due to general rarity in the region.
Loggerhead Shrike <i>Lanius ludovicianus</i>	SE ²	Upland prairie; agricultural areas	Moderate potential to occur due to the availability of suitable habitat.
Wilson's Phalarope <i>Phalaropus tricolor</i>	ST ²	Wet prairie; flooded pasture	Moderate potential to occur due to the availability of suitable habitat.
Barn Owl <i>Tyto alba</i>	SE ³	Savannahs, grassland habitats, dark, secluded roosts	Low potential to occur due to general rarity in the region.
Short-eared Owl <i>Asio flammeus</i>	SE ³	Large tracts of undisturbed open grassland and herbaceous wetland	Moderate potential to occur due to the availability of suitable habitat.
Norther Harrier <i>Circus cyaneus</i>	SE ³	Undisturbed, open grassland	High potential to occur during migration.
Fishes			
Topeka Shiner <i>Notropis topeka</i>	FE ⁵ , ST ^{3,4}	Small to medium slow moving prairie rivers and streams	Moderate potential to occur due to availability of suitable habitat.
Blacknose Shiner <i>Notropis heterolepis</i>	ST ^{3,4}	Clear, shallow creeks and streams with vegetation	Moderate potential to occur due to the availability of suitable habitat and distribution in the region.
Pugnose Shiner <i>Notropis anogenus</i>	SE ³	Clear slow-moving, large streams and natural lakes with abundant vegetation	Low potential to occur due to general rarity in the region
Weed Shiner <i>Notropis texanus</i>	SE ³	Creeks and streams with little to no current	Low potential to occur due to general rarity in the region
Insects			
Ottoo Skipper <i>Hesperia ottoe</i>	SE ²	Upland prairie	Low potential to occur due to the limited availability of suitable habitat and rarity of the species in the region.
Poweshiek Skipperling <i>Oarisma poweshiek</i>	FE ⁵ , SE ² , ST ^{3,4}	Upland prairie and lowland prairie	Low potential to occur due to the limited availability of suitable habitat and rarity of the species in the region.
Ringlet <i>Coenonympha tullia</i>	SE ⁴	Grassy fields and meadows	Low potential to occur due to the limited availability of suitable habitat and rarity of the species in the region.

Table 3. Federally and state-listed threatened and endangered species with potential to occur in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Species	Status ¹	Preferred Habitat	Potential Occurrence in the Project Area
Byssus Skipper <i>Problema byssus</i>	ST ³	Wet areas of prairie and oak savannah	Low potential to occur due to the limited availability of suitable habitat and rarity of the species in the region.
Dakota Skipper <i>Hesperia dacotae</i>	SE ³	Native bluestream and upland prairie	Low potential to occur due to the limited availability of suitable habitat and rarity of the species in the region.
Mulberry Wing <i>Poanes massasoit</i>	ST ³	Wetlands	Low-moderate potential to occur due to small amount of suitable habitat and rarity of the species in the region.
Silvery Blue <i>Glaucopsyche lygdamus</i>	ST ³	Tallgrass prairie	Low potential to occur due to the limited availability of suitable habitat.
Mammals			
Eastern Spotted Skunk <i>Spilogale putorius</i>	ST ²	Upland prairie, savanna, and mesic hardwood forest	Low potential to occur within the Project area due to general rarity in the region.
Northern Long-Eared Bat <i>Myotis septentrionalis</i>	FT ⁵	Caves, mines, and forests	Low potential to occur due to the limited availability of suitable habitat.
Mussels			
Mucket <i>Actinonaias ligamentina</i>	ST ²	Medium to large rivers and streams	Moderate potential to occur due to availability of suitable habitat.
Spike <i>Elliptio dilatata</i>	ST ²	Small to large rivers; larger lakes and reservoirs	Moderate potential to occur due to availability of suitable habitat.
Monkeyface <i>Quadrula metanevra</i>	ST ²	Medium to large rivers and streams	Moderate potential to occur due to availability of suitable habitat.
Cylindrical Papershell <i>Anodontoidea ferussacianus</i>	ST ⁴	Small creeks and headwaters of larger streams	Moderate potential to occur due to availability of suitable habitat.
Yellow Sandshell <i>Lampsilis teres</i>	SE ³	Medium to large rivers	Low potential to occur within the Project area due to general rarity in the region.
Plants			
Prairie Bush-Clover* <i>Lespedeza leptostachya</i>	FT ⁵ , ST ^{2,3,4}	Upland prairie	Low-moderate potential to occur due to availability of suitable habitat.
Western Prairie Fringed Orchid <i>Platanthera praeclara</i>	FT ⁵ , ST ³	Lowland prairie	Low potential to occur due to the limited availability of suitable habitat.
Hair-Like Beak Rush <i>Rhynchospora capillacea</i>	ST ²	Calcareous fens	Low potential to occur due to limited availability of suitable habitat.

Table 3. Federally and state-listed threatened and endangered species with potential to occur in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Species	Status ¹	Preferred Habitat	Potential Occurrence in the Project Area
Sullivant's Milkweed <i>Asclepias sullivantii</i>	ST ²	Undisturbed mesic tallgrass prairie and remnant prairie along railroad right-of-ways	Low potential to occur due to the limited availability of suitable habitat.
Whorled Nutrush <i>Scleria verticillata</i>	ST ²	Calcareous fens	Low potential to occur due to general rarity in the region.
Slender Arrow Grass <i>Triglochin palustris</i>	ST ^{3,4}	Fens, marshes, and bogs	Low potential to occur due to general rarity in the region.
Arrow Grass <i>Triglochin maritimum</i>	ST ³	Fens, marshes, and bogs	Low potential to occur due to general rarity in the region.
Blue Giant Hyssop <i>Agastache foeniculum</i>	SE ³	Prairies and dry deciduous woods	Low potential to occur due to the limited availability of suitable habitat.
Buckbean <i>Menyanthes trifoliata</i>	ST ³	Bogs, wetlands	Low potential to occur due to general rarity in the region.
Clustered Broomrape <i>Orobanche fasciculata</i>	SE ³	Dry shrub land and prairies	Low potential to occur due to the limited availability of suitable habitat.
Clustered Poppy-mallow <i>Callirhoe alcaeoides</i>	ST ³	Dry, sandy prairies	Low potential to occur due to the limited availability of suitable habitat.
Fragrant False Indigo <i>Amorpha nana</i>	ST ³	Dry, open prairies and rocky hillsides	Low potential to occur due to the limited availability of suitable habitat.
Golden Corydalis <i>Corydalis aurea</i>	ST ³	open prairies and woodlands; along streams, shorelines, and hillsides	Low potential to occur due to the limited availability of suitable habitat.
Kitten Tails <i>Besseyia bullii</i>	ST ³	Prairies, open woods, bluffs, and hillsides	Low potential to occur due to the limited availability of suitable habitat.
Rush Aster <i>Aster junciformis</i>	ST ³	Wet fens and meadows; swamps and bogs	Low potential to occur due to general rarity in the region.
Shining Willow <i>Salix lucida</i>	ST ³	Swamps and wet meadows	Low potential to occur due to general rarity in the region.
Showy Milkweed <i>Asclepias speciosa</i>	ST ³	Pastures, meadows, forest clearings, untilled fields	Low potential to occur due to the limited availability of suitable habitat.
Silverweed <i>Potentilla anserina</i>	ST ³	Sandy shores and wet meadows	Low potential to occur due to the limited availability of suitable habitat.
Water Marigold <i>Megalodonta beckii</i>	SE ³	Shallow ponds and lakes	Low potential to occur due to general rarity in the region.

Table 3. Federally and state-listed threatened and endangered species with potential to occur in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Species	Status ¹	Preferred Habitat	Potential Occurrence in the Project Area
Water Parsnip <i>Berula erecta</i>	ST ³	Swamps, shallow water, and streams	Low potential to occur due to general rarity in the region.
Western Parsley <i>Lomatium orientale</i>	ST ³	Dry prairie and rocky outcrops	Low potential to occur due to the limited availability of suitable habitat.
Wooley Milkweed <i>Asclepias lanuginosa</i>	ST ³	Dry prairies with rocky soils and open woods	Low potential to occur due to the limited availability of suitable habitat.
Yellow Monkey Flower <i>Mimulus glabratus</i>	ST ³	Shallow water, springs, and calcareous fens	Low potential to occur due to general rarity in the region.
Beakrush <i>Rhynchospora capillacea</i>	ST ³	Wet, sandy soil and fens	Low potential to occur due to general rarity in the region.
Hooded Ladies'-tresses <i>Spiranthes romanzoffiana</i>	ST ³	Wet meadows and fens	Low potential to occur due to general rarity in the region.
Leafy Northern Green Orchid <i>Platanthera hyperborea</i>	ST ³	Wetlands, sedge meadows, and floodplains	Low potential to occur due to general rarity in the region.
Philadelphia Panic Grass <i>Panicum philadelphicum</i>	ST ³	Sandy and rocky soils	Low potential to occur due to the limited availability of suitable habitat.
Slender Cotton Grass <i>Eriophorum gracile</i>	ST ³	Wet meadows, bogs, fens, and swamps	Low potential to occur due to general rarity in the region.
Slim-leaved Panic Grass <i>Dichantherium linearifolium</i>	ST ³	Dry, sandy, gravelly Prairies	Low potential to occur due to the limited availability of suitable habitat.
Reptiles			
Blanding's Turtle <i>Emydoidea blandingii</i>	ST ^{3,4}	Wetlands and adjacent uplands	Moderate potential to occur due to the limited availability of suitable habitat.

¹FE = Federally Endangered, FT = Federally Threatened, ST = State Threatened, SE = State Endangered

Sources: ²MNDNR 2018a (Jackson County, MN); ³IADNR 2019a (Dickinson County, IA), ⁴IADNR 2019b (Osceola County, IA), ⁵USFWS IPaC Report 2019 (Appendix A); NatureServe (2019); US Department of Agriculture PLANTS Database (2018); Bat Conservation International (2018)

Federally Listed Species

Northern Long-eared Bat

The Project area is within the range of the federally threatened northern long-eared bat. While northern long-eared bats are generally widely distributed throughout many counties of Minnesota and Iowa (MNDNR 2018a, IADNR 2019d), there is limited suitable habitat within the Project area. The northern long-eared bat is a forest-dependent species that tends to avoid open habitats (Owen et al. 2003), generally relying on specific forest features such as adequate canopy closure for both roosting and foraging (Lausen 2009, USFWS 2014). Northern long-eared bats mainly use intact forested habitat, rarely travelling more than 255 ft (78 m) from the edge of intact forest structures (Henderson and Broders 2008). In agricultural areas where forests have been highly fragmented, small woodlots may also provide important habitat (Owen et al. 2003). Abundance of northern long-eared bat prey, particularly beetles and moths, is typically higher in more closed forest stands than in openings. While northern long-eared bats are mainly associated with forested habitats and riparian corridors, they can occur in agricultural areas where forests have been highly fragmented (USFWS 2014). During summer, northern long-eared bats roost singly or in colonies underneath bark, or in cavities or crevices of both live and dead trees (USFWS 2014). Northern long-eared bats may also roost and hibernate in caves, mines, or man-made structures (USFWS 2014). Northern long-eared bats are not expected to hibernate in the Project area. The nearest known northern long-eared bat hibernaculum is approximately 168 mi (270 km) northeast of the Project, in La Sueur County, Minnesota (MNDNR 2018b). Outside the hibernation period, northern long-eared bats have low potential to occur in the Project area based on the general lack of suitable habitat in the Project area and the absence of known hibernacula or maternity roosts near the Project area.

Poweshiek Skipperling

The Poweshiek skipperling (*Oarisma poweshiek*) is a federally endangered species. It is state-listed as an endangered species in Minnesota and state-listed as a threatened species in Iowa. The Poweshiek skipperling typically inhabits upland and lowland native prairies, but their numbers in Minnesota and Iowa have declined drastically due to habitat loss, with no confirmed sightings having occurred in Minnesota or Iowa since 2007 (MNDNR 2018a; USFWS 2018b; IOI 2018). The Poweshiek skipperling has also experienced habitat loss throughout Iowa but has known distributions in northern Iowa, including in Dickinson and Osceola counties (IADNR 2019d). Due to the overall rarity of this species in the region and the lack of suitable habitat in the Project area, the Poweshiek skipperling has low potential to occur in the Project area.

Topeka Shiner

The Topeka shiner is a small minnow that is federally listed as endangered and state-listed as threatened in Iowa. The Topeka shiner is not known to occur in Jackson County, Minnesota, but has known distributions in both Dickinson and Osceola counties, Iowa. The southwestern portion of the Project area includes critical Topeka shiner habitat designated by the USFWS (USFWS 2009, Appendix C). The Topeka shiner inhabits slow-moving streams, oxbow lakes, and pools with sandy or gravel bottoms, and patches of vegetation (MNDNR 2018a). Projects or land practices can cause declines in Topeka shiner populations by increasing the amount of silt and

sand buildup in streams (Platts 1979). Due to known distribution and suitable habitat within the Project, the Topeka shiner is expected to have moderate potential to occur in the Project area.

Prairie Bush-Clover

The prairie bush-clover (*Lespedeza leptostachya*) is federally listed as threatened and state-listed as threatened in both Minnesota and Iowa. The prairie bush clover is found only in the native tallgrass prairie region of four Midwestern states, including Iowa and Minnesota, and has the potential to occur in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa (MNDNR 2018a, IADNR 2019a, and IADNR 2019b). The prairie bush-clover has declined rapidly due to native prairie being converted to agricultural land, and now only remains in small patches, mostly on steeper slopes where conversion of the habitat to agriculture is unfeasible (USFWS 2015, MNDNR 2018a). The ESA prohibits the removal or destruction of prairie bush clover on federal lands or in knowing violation of any state law protecting the species (USFWS 2015). Although the prairie bush-clover is present in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa, no known populations occur within five mi (eight km) of the Project. Due to the limited amount of native prairie known to occur in the Project area, this species is considered to have a low-moderate potential to occur within the Project area.

Western Prairie Fringed Orchid

The western prairie fringed orchid (*Platanthera praeclara*) is federally listed as threatened and state listed as threatened in Iowa. The species has been extirpated throughout most of its former range due to loss of native prairie habitat for conversion to cultivated grounds, roads, and development (IADNR 2019e). The Western prairie fringed orchid has the potential to occur in Dickinson County, Iowa, but due to overall rarity and lack of suitable habitat within the Project area, it is considered to have a low potential to occur in the Project (IADNR 2019e, IADNR 2019a).

State-Listed Animals

Sixty-three state-listed threatened or endangered animal species have known or potential occurrence in Jackson County, Minnesota or Dickinson and Osceola counties, Iowa (Table 4). State-listed species with high potential to occur in the Project include endangered northern harrier (*Circus cyaneus*). Northern harrier prefer undisturbed grassland habitat, but will use a variety of open habitats during migration periods, including agricultural lands. Henslow's sparrow prefer long tracks of undisturbed grasslands. State-listed animal species with moderate potential to occur in the Project area include the endangered Henslow's sparrow (*Ammodramus henslowii*), the endangered loggerhead shrike (*Lanius ludivicianus*), the endangered short-eared owl (*Asio flammeus*), the threatened Wilson's phalarope (*Phalaropus tricolor*), and the threatened Blanding's turtle (*Emydoidea blandingii*). Although Henslow's sparrow are uncommon in the region, they may use the Project area during migration. Loggerhead shrike can occur in upland prairie and agricultural areas (MNDNR 2018a). Short-eared owl prefer long tracks of undisturbed grasslands and wetlands (IADNR 2019c). Wilson's phalarope can occur in wetland areas, but may also be found in flooded pastures or agricultural fields (MNDNR 2018a). Blanding's turtle utilize wetland habitat and adjacent upland areas, including agricultural lands (MNDNR 2018). Four state-listed mussel species (mucket [*Actinonaias ligamentina*], spike [*Elliptio dilatata*], monkeyface [*Quadrula metanevra*], and cylindrical sandshell [*Anodontooides ferussacianus*]) are also considered to have moderate potential to occur in the Project area due to the availability of

suitable habitat. The remaining state-listed species are all considered to have low or low-moderate potential to occur due primarily to the limited availability of suitable habitat or general rarity in the region.

State-Listed Plants

Twenty-nine state-listed threatened and endangered plant species have potential to occur in Jackson County, Minnesota (Table 5). All species have low or low to moderate potential to occur in the Project area, but are unlikely to be impacted by development in agricultural fields.

Eagles

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act (1940) and Migratory Bird Treaty Act (1918). Bald eagles are a Species of Special Concern in Minnesota (Gehring 2006). Based on eBird records and habitat availability, bald eagles are likely to occur in low–moderate numbers in the Project area. Golden eagles are unlikely to occur in the Project area due to a lack of suitable habitat and general rarity in the region.

Bald Eagle

Impacts to bald eagles from wind energy development and operations may result from collision with wind turbines and associated transmission lines or from disturbance of nesting, roosting, and foraging areas. Suitable nesting, foraging, and roosting bald eagle habitat is typically found near large lakes or rivers where their primary food source (i.e., fish) are readily available. Bald eagles may also hunt waterfowl and eat carrion, especially during the migration or winter (Mojica et al. 2008). Preferred perch sites include tall trees and snags located near nesting and foraging areas that provide good vantage points (NatureServe 2018). Bald eagles are also known to breed throughout Iowa and Minnesota. The IADNR's formal bald eagle nest monitoring program found 379 active bald eagle nests throughout the state during 2018, with a few nests reported in Dickinson and Osceola counties, Iowa southeast and southwest the Project area (Shepard 2018).

Bald eagle winter roosts are typically located in deciduous and coniferous trees in close proximity to open water for foraging (Buehler 2000). In winter, bald eagle movement patterns are associated with available open water; if these resources are not available, eagles are opportunistic scavengers (e.g., roadkill, livestock operations; Buehler 2000). Overall, the Project is lacking ideal suitable habitat for bald eagle breeding, but is likely to provide adequate foraging opportunities during migration periods, when bald eagle use is expected to be the highest.

Bald eagles have been documented along the USGS Breeding Bird Survey (BBS) Worthington Route, the closest BBS Route to the Project (Pardieck et al. 2018). A bald eagle nest in the Kettleson Hogsback Wetlands Complex, in Dickinson County, Iowa, was reported by the IADNR (Appendix C). There have also been several observations of bald eagles in wetland and open water habitats within or near the Project at Illinois Lake, Iowa Lake, Rush Lake, Silver Lake, and Round Lake (eBird 2019).

Golden Eagle

Minnesota is outside of the golden eagle's breeding range, but a small number of individuals are found during migration and over winter (Kochert et al. 2002). Winter habitat in the Midwest includes reservoirs and wildlife refuges. Golden eagles may also utilize riparian corridors associated with wetland complexes east of the Mississippi River (Kochert 2002). Golden eagles occur in Iowa during the winter in small numbers (NatureServe 2018). A small winter population (approximately 130 golden eagles) occurs from November through March in the bluff country of southeastern Minnesota, northeastern Iowa, western Wisconsin, and northern Illinois (Goetzman 2014) and individual birds may migrate through the region (Kochert et al. 2002). According to eBird.org, there have been no sightings of golden eagles within the Project area (eBird 2019). Overall, golden eagle use within the Project area is likely limited to rare occurrences during migration or winter due to a lack of suitable habitat.

US Fish and Wildlife Service Birds of Conservation Concern

The USFWS lists 27 species as Birds of Conservation Concern (BCC) within the Prairie Potholes Bird Conservation Region 11, where the Project is located (USFWS 2008). These species do not receive special protection (unless they are listed by the USFWS or MNDNR), but have been identified as vulnerable to population declines in the area by the USFWS (2008). The IPaC report identified 13 of these BCC species that may occur within the Project area (Table 4, Appendix A).

Table 4. Birds of Conservation Concern (BCC) for Bird Conservation Region 11 located near the Three Waters Wind Farm.

Common Name	Scientific Name
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Black Tern	<i>Chlidonias niger</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Dunlin	<i>Calidris alpina</i>
Franklin's Gull	<i>Leucophaeus pipixcan</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Marbled Godwit	<i>Limosa fedoa</i>
Red-Headed Woodpecker	<i>Melanerpes erythrocephalus</i>
Ruddy Turnstone	<i>Arenaria interpres morinella</i>
Semipalmated Sandpiper	<i>Calidris pusilla</i>
Short-Billed Dowitcher	<i>Limnodromus griseus</i>
Willet	<i>Tringa semipalmata</i>

Source: US Fish and Wildlife Service BCC (USFWS 2008) and Information for Planning and Consultation (2019; Appendix A).

Minnesota Species of Special Concern

In addition to threatened or endangered species, the NHIS database includes several species of special concern that are not protected legally, but are a concern due to their declining population status. Special concern species identified by the NHIS as likely to occur or known to occur in Jackson County include two avian species (Table 5; Figure 7).

Table 5. Species of Special Concern in Jackson County, Minnesota.

Common Name	Scientific Name
Amphibians	
Great Plains Toad	<i>Anaxyrus cognatus</i>
Birds	
Common Gallinule	<i>Gallinula galeata</i>
Forster's Tern	<i>Sterna forsteri</i>
Franklin's Gull	<i>Leucophaeus pipixcan</i>
Lark Sparrow	<i>Chondestes grammacus</i>
Purple Martin	<i>Progne subis</i>
Trumpeter Swan	<i>Cygnus buccinator</i>
Insects	
Abbreviated Underwing	<i>Catocala abbreviatella</i>
Iowa Skipper	<i>Atrytone arogos iowa</i>
Leadplant Flower Moth	<i>Schinia lucens</i>
Regal Fritillary	<i>Speyeria idalia</i>
Mammals	
Northern Grasshopper Mouse	<i>Onychomys leucogaster</i>
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>
Mussels	
Black Sandshell	<i>Ligumia recta</i>
Round Pigtoe	<i>Pleurobema sintoxia</i>
Plants	
American Ginseng	<i>Panax quinquefolius</i>
Hairy-Jointed Meadow-Parsonip	<i>Thaspium barbinode</i>
Prairie Moonwort	<i>Botrychium campestre</i>
Rattlesnake Master	<i>Eryngium yuccifolium</i>
Small White Lady's-Slipper	<i>Cypripedium candidum</i>
Snow Trillium	<i>Trillium nivale</i>

Iowa Species of Special Concern

The IADNR Species of Special Concern includes plant and animal species with concerns regarding their status or distribution (Table 6; IADNR 2019a, IADNR 2019b). These species are not protected by the Iowa Threatened and Endangered Species law, but are protected under state and federal laws that address hunting, fishing, and collecting.

Table 6. Species of Special Concern in Dickinson and Osceola counties, Iowa.

Common Name	Scientific Name
Birds	
Bald Eagle ¹	<i>Haliaeetus leucocephalus</i>
Black Tern ¹	<i>Chlidonias niger</i>
Forster's Tern ¹	<i>Sterna forsteri</i>
Insects	
Arogos Skipper ^{1, 2}	<i>Atrytone arogos</i>
Broad-winged Skipper ¹	<i>Poanes viator</i>
Dion Skipper ^{1, 2}	<i>Euphyes dion</i>
Dusted Skipper ¹	<i>Atrytonopsis hianna</i>
Edwards' Hairstreak ¹	<i>Satyrium edwardsii</i>
Leonard's Skipper ²	<i>Hesperia leonardus</i>
Ottoe Skipper ¹	<i>Hesperia ottoe</i>
Regal Fritillary ^{1, 2}	<i>Speyeria idalia</i>

Table 6. Species of Special Concern in Dickinson and Osceola counties, Iowa.

Common Name	Scientific Name
Wild Indigo Dusky Wing ¹	<i>Erynnis baptisiae</i>
Plants (Dicots)	
Broadleaf Water-milfoil ¹	<i>Myriophyllum heterophyllum</i>
Brook Lobelia ¹	<i>Lobelia kalmii</i>
Coast-blite Goosefoot ¹	<i>Chenopodium rubrum</i>
Common Mare's-tail ¹	<i>Hippuris vulgaris</i>
Crowfoot ¹	<i>Ranunculus gmelinii</i>
Earleaf Foxglove ¹	<i>Tomanthera auriculata</i>
Fineberry Hawthorn ²	<i>Crataegus chrysoarpa</i>
Flat Top White Aster ¹	<i>Aster pubentior</i>
Hawksbeard ²	<i>Crepis runcinata</i>
Lesser Bladderwort ¹	<i>Utricularia minor</i>
Nodding Thistle ¹	<i>Cirsium undulatum</i>
Ragwort ¹	<i>Senecio pseud aureus</i>
Rattle Milk-vetch ^{1, 2}	<i>Astragalus adsurgens</i>
Sand Cherry ¹	<i>Sand Cherry</i>
Saskatoon Service-berry ¹	<i>Saskatoon Service-berry</i>
Shadbush ¹	<i>Shadbush</i>
Small Fringed Gentian ^{1, 2}	<i>Small Fringed Gentian</i>
Water Milfoil ¹	<i>Water Milfoil</i>
Water Starwort ¹	<i>Water Starwort</i>
Waterwort ¹	<i>Waterwort</i>
Plants (Monocots)	
Alkali Muhly ¹	<i>Alkali Muhly</i>
Alpine Rush ¹	<i>Alpine Rush</i>
Fewflower Spikerush ¹	<i>Fewflower Spikerush</i>
Glomerate Sedge ¹	<i>Carex aggregata</i>
Interrupted Wildrye ¹	<i>Elymus diversiglumis</i>
Large-leaf Pondweed ¹	<i>Potamogeton amplifolius</i>
Panic-grass ¹	<i>Panicum gattereri</i>
Prairie Bulrush ¹	<i>Scirpus maritimus</i>
Richardson Sedge ^{1, 2}	<i>Carex richardsonii</i>
Slender Sedge ¹	<i>Carex tenera</i>
Small White Lady's Slipper ¹	<i>Cypripedium candidum</i>
Spear Needlegrass ^{1, 2}	<i>Stipa comata</i>
Straight-leaf Pondweed ¹	<i>Potamogeton strictifolius</i>
Tall Cotton Grass ^{1, 2}	<i>Eriophorum angustifolium</i>
Toad Rush ¹	<i>Juncus bufonius</i>
Tuckerman Sedge ¹	<i>Carex tuckermanii</i>
White-stem Pondweed ¹	<i>Potamogeton praelongus</i>
Widgeon-grass ¹	<i>Ruppia cirrhosa</i>
Plants (Pteridophytes)	
Prairie Moonwort ¹	<i>Botrychium campestre</i>
¹ IADNR 2019a (Dickinson County, IA)	
² IADNR 2019b (Osceola County, IA)	

General Wildlife

Potential Impacts to Birds

Development of a wind energy facility may result in direct or indirect impact to birds. Direct impacts primarily refer to fatality due to collision with wind turbines. Based on publicly available data, bird fatality rates at wind energy facilities in the US generally range from 3–5 fatalities per megawatt (MW) per year, and are considered unlikely to affect current population trends for most North American songbird species (National Wind Coordinating Collaborative 2010, Erickson et al. 2014). Indirect impacts primarily refer to habitat loss, habitat fragmentation, disturbance, or displacement. In Minnesota, displacement has been observed to impact some grassland songbird species at Buffalo Ridge (Leddy et al. 1999; Johnson et al. 2000). Elsewhere, displacement due to the construction of wind turbines has been found to impact waterfowl (Loesch et al. 2013), shorebirds (Pearce-Higgins et al. 2009), and raptors (Pearce-Higgins et al. 2009; Campedelli et al. 2013). The direct and indirect impacts of a project vary among bird types and depend on their behaviors and habitat preferences (Strickland et al. 2011a). The following sections provide a more comprehensive discussion on the potential risks to raptors, migrating birds, and breeding birds that could result from development of the Project.

Raptors

Potential impacts to raptors are a concern for most land-based wind energy facilities in the US because raptors are generally long-lived species with relatively low reproductive rates and therefore more susceptible to population decline. Furthermore, many raptor species use a variety of habitats for foraging, including agricultural areas where wind turbines are often placed, and spend significant portions of time flying at heights that fall within the rotor swept areas of commercial wind turbines, increasing their exposure to collision risk (Strickland et al. 2011a; Strickland et al. 2011b).

Collision risk for raptors may also increase during migration when raptors tend to concentrate along migratory routes. Migratory routes used by raptors are largely influenced by geographical features, such as ridgelines and shorelines (Liguori 2005). Ridgelines create favorable wind conditions for orographic lift that support soaring raptors and allow for energy-efficient travel during migration. Shorelines may funnel raptors that avoid crossing large bodies of water. While the Project area lacks these geographical features, concentrations of raptors can also occur due to thermal uplift or rising air caused by solar radiation warming the ground. Thermal uplifts could result in small to moderate sized concentrations of raptors passing through the Project area, most likely during migration.

Several diurnal raptor species have been observed in Jackson County, Minnesota (Table 7; eBird 2019). Raptor species with the highest potential to occur in the Project area, based on the availability of suitable habitat, include red-tailed hawks, rough-legged hawks, American kestrels, and northern harriers. Breeding raptors could nest in small woodlots, shelterbelts, isolated trees, or on man-made structures (e.g., power poles) within the Project. Ground-nesting diurnal raptors, such as the northern harrier, may nest in herbaceous areas present in the Project.

Because large concentrations of raptors are unlikely to occur within the Project area, raptor collision fatality rates at the Project are expected to be within the range of fatalities reported in the Midwest (0.03–0.47 fatalities/MW/year; Derby et al. 2013, Johnson et al. 2000). Raptors that nest in the Project could experience some adverse indirect impacts related to disturbance (Pearce Higgins et al. 2009; Campedelli et al. 2013), but raptor nesting habitat is limited and significant indirect impacts are unexpected.

Table 7. Diurnal raptor species reported in Jackson County, Minnesota and Osceola and Dickinson counties, Iowa.

Common Name	Scientific Name	Seasonal Occurrence ¹	Potential to Occur in the Project area ²
Cooper's Hawk	<i>Accipiter cooperii</i>	year-round	moderate
Northern Goshawk	<i>Accipiter gentilis</i>	winter	low
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	year-round	moderate
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	year-round	high
Rough-Legged Hawk	<i>Buteo lagopus</i>	winter, migration	high
Red-Shouldered Hawk	<i>Buteo lineatus</i>	migration	low
Broad-Winged Hawk	<i>Buteo platypterus</i>	migration	low
Swainson's Hawk	<i>Buteo swainsoni</i>	migration	low
Northern Harrier	<i>Circus hudsonius</i>	year-round	high
Merlin	<i>Falco columbarius</i>	migration	low
Peregrine Falcon	<i>Falco peregrinus</i>	migration	low
American Kestrel	<i>Falco sparverius</i>	year-round	high
Bald Eagle	<i>Haliaeetus leucocephalus</i>	year-round	moderate
Golden Eagle	<i>Aquila chrysaetos</i>	migration	low
Osprey	<i>Pandion haliaetus</i>	summer, migration	moderate

¹Seasonal occurrence is based on timing of observations reported to eBird.org (data accessed: March 15, 2019).

²Potential occurrence is based on the availability of suitable habitat.

Breeding Birds

The Project area includes suitable breeding habitat for many bird species. Breeding birds may be at greater risk for indirect impacts related to the loss of nesting habitat or disturbance of nesting territories. Some bird species have shown reduced nesting success near wind turbines. Birds that regularly nest in the region have been identified during BBSs. The objective of BBS is to monitor the status and trends of North American bird populations using a standardized protocol collected by participants along thousands of randomly established roadside routes (USGS 1998).

The closest USGS BBS route to the Project is the Worthington route in Nobles County (Figure 7). This route was surveyed annually between 2004 and 2017 (Pardieck et al. 2018). Of the 83 species recorded along this route, several state-listed species have been observed, including the following Species of Special Concern: purple martin (*Progne subis*; 10 observations), Forster's tern (one observation), Franklin's gull (*Leucophaeus pipixcan*; 561 observations), and American white pelican (*Pelecanus erythrorhynchos*; 668 observations). Only two bald eagles have been observed along the Worthington route. The most abundant species observed during surveys along this route were common grackle (*Quiscalus quiscula*), red-winged blackbird (*Agelaius phoeniceus*), American robin (*Turdus migratorius*) and barn swallow (*Hirundo rustica*).

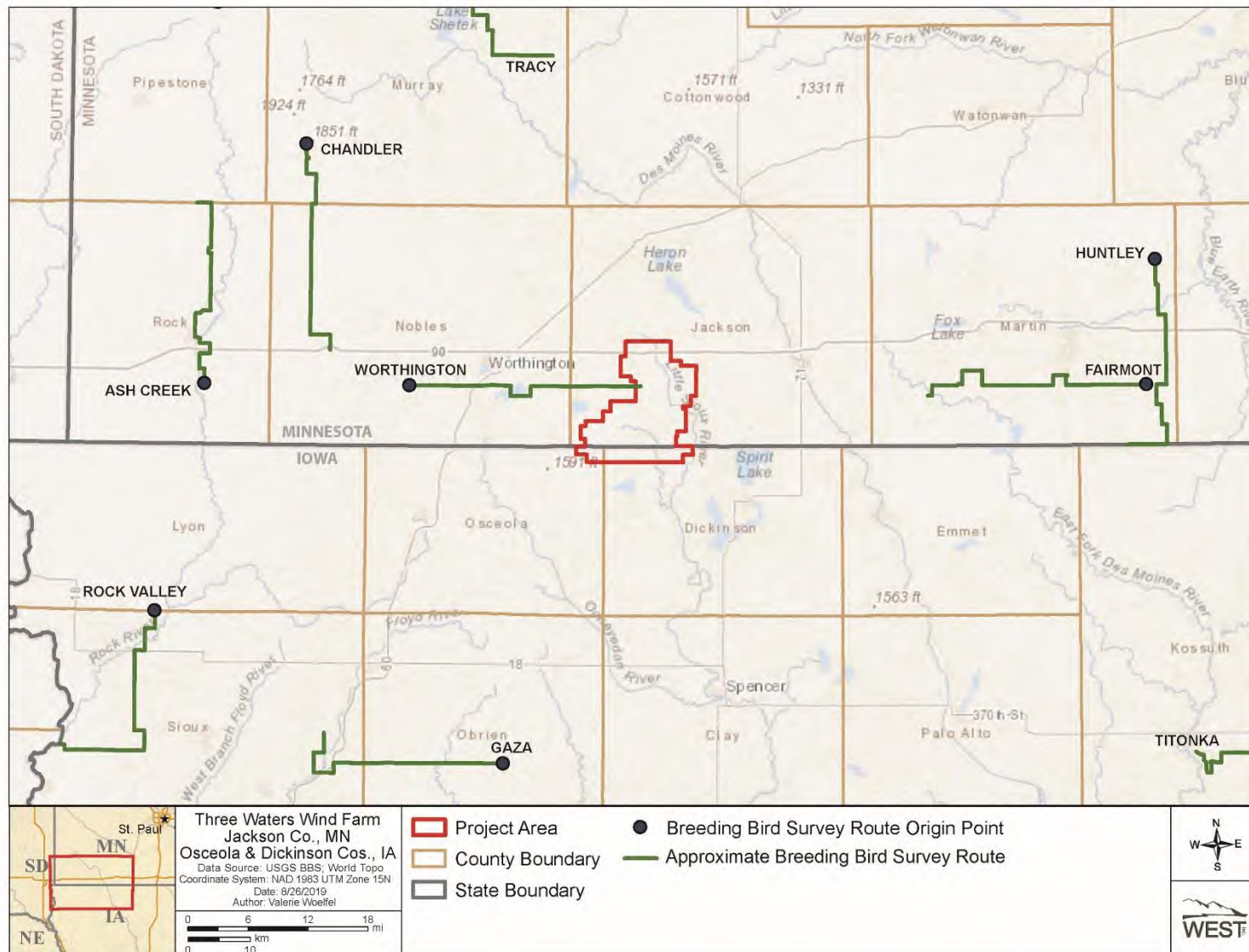


Figure 7. Breeding Bird Survey (BBS) Routes near the Three Waters Wind Farm in Jackson County, Minnesota and Dickinson and Osceola counties, Iowa.

Migratory Birds

The timing of small-passerine fatalities reported at wind energy facilities in the US suggests higher collision risk during migration (Erickson et al. 2014). The Project lies along both the Mississippi and Central Flyways, which are major migratory routes used by many species of waterfowl, waterbirds, shorebirds, songbirds, and raptors (USFWS 2018a). Wetlands, open waters, and cultivated croplands within and near the Project may provide suitable stopover areas for migrating waterfowl and shorebirds.

Potential Impacts to Bats

Eight bat species have potential to occur in the Project area (Bat Conservation International 2017; Table 8). Most bat fatalities at wind energy facilities are migratory tree bats (e.g., hoary bat [*Lasiurus cinereus*], eastern red bat [*Lasiurus borealis*], silver-haired bat [*Lasionycteris noctivagans*]), which conduct long fall migrations between summer roosts and winter areas (Gruver 2002, Johnson et al. 2003). Migratory tree bats that may occur in the Project area include the eastern red bat, the hoary bat, and the silver-haired bat.

The Project area is not known to include caves, mines, or other structures that may be used as hibernacula for cave-dwelling bats. Cave-dwelling bats may utilize forest habitat in the Project area when breeding or migrating. While cave-dwelling bats are found less frequently at wind energy facilities, impacts to cave-dwelling bat species are a concern because many cave-dwelling bat populations are already at risk or suffering considerable declines due to the spread of white-nose syndrome.

Predicting impacts at the Project is difficult given the broad range of fatality rates observed at other wind energy facilities in the Midwest, and the lack of a direct link between pre-construction bat activity and post-construction fatality rates (Hein et al. 2013). Bat fatality rates are relatively low at most facilities and considerably higher at some facilities. Migratory tree-roosting species (e.g., eastern red bat, hoary bat, and silver-haired bat) compose approximately 75% of reported bats killed in the Midwest and nationally (Arnett et al. 2008). Thus, fatality risk at the Project is expected to be greatest for tree-roosting bat species that are migrating through the Project during the late summer or early fall.

Indirect impacts to bats are poorly understood due to the complex ecology of bats and the inherent difficulty in monitoring bat populations. Indirect effects of wind energy facilities on bats largely occur from loss of habitat, such as clearing of forests or degradation of wetlands and riparian habitats. Indirect impacts could be reduced by selective siting of turbine locations and the preservation of forest and wetland habitat in the Project area (Figure 3).

Table 8. Potential bat species within the Three Waters Wind Farm.

Common Name	Scientific Name
Eastern Red Bat	<i>Lasiurus borealis</i>
Little Brown Bat ²	<i>Myotis lucifugus</i>
Northern Long-Eared Bat ^{1,2}	<i>Myotis septentrionalis</i>
Tri-Colored Bat ²	<i>Perimyotis subflavus</i>
Big Brown Bat ²	<i>Eptesicus fuscus</i>
Silver-Haired Bat	<i>Lasionycteris noctivagans</i>
Hoary Bat	<i>Lasiurus cinereus</i>
Evening Bat ³	<i>Nycticeius humeralis</i>

¹ Federally threatened species

² State-listed as special concern species

³ Range and distribution within Minnesota is unknown

WIND ENERGY GUIDELINES TIER 1 AND 2 QUESTIONS

As described in the WEG (USFWS 2012), Tier 2 studies help to identify potential issues that may need to be addressed before further actions can be taken with the development or operations of a project. The following discussion provides answers to the WEG's Tier 2 questions for the Project.

1. *Are known species of concern present on the proposed site, or is habitat (including designated critical habitat) present for these species?*

Yes, there are federally and state-listed threatened or endangered species (Table 3), as well as several Species of Special Concern, with ranges that overlap with the Project area (Table 5; Table 6). The NHIS database contains records of two special concern species within 5.0 mi (8.0 km) of the Project area (Appendices B). Designated critical habitat for Topeka shiner overlaps with a small portion of the Project area (Appendix A).

2. *Does the landscape contain areas where development is precluded by law or designated as sensitive according to scientifically credible information? Examples of designated areas include, but are not limited to: federally designated critical habitat; high-priority conservation areas for NGOs; or other local, state, regional, federal, tribal, or international categorizations.*

The Project area includes some protected areas where development may be precluded by law, including federally and state-managed WPAs and WMAs (Figure 5). The Project area also overlaps with federally designated critical habitat for the Topeka shiner (Appendix A).

3. *Are there plant communities of concern present or likely to be present at the site?*

No plant communities of concern are known to be present within the Project area. Although not known to occur in the Project area, small remnant patches of upland prairie may support the federally threatened Prairie bush-clover or other plant species of concern (Table 3; Table 5; Table 6).

4. *Are there known critical areas of congregation of species of concern, including, but not limited to: maternity roosts, hibernacula, staging areas, winter ranges, nesting sites, migration stopovers or corridors, leks, or other areas of seasonal importance?*

There are no known critical areas of congregation of species of concern in the Project. Waterbodies in the Project could provide staging areas, nesting sites, or migration stopovers for waterfowl and shorebirds, as well as breeding habitat for amphibians. Treed areas and homesteads could provide roost sites for bat species, and nest sites for bird species. Surveys have not been conducted to confirm critical areas of congregation, so there remains potential for these areas to exist in the Project. While suitable habitat exists for sensitive bat species, no hibernacula or maternity roosts are known in Jackson County or Dickinson and Osceola counties.

5. *Using best available scientific information, has the developer or relevant federal, state, tribal, and/or local agency identified the potential presence of a population of a species of habitat fragmentation concern?*

Species of habitat fragmentation concern that may occur in the Project include grassland-dependent bird species (e.g., northern harrier, grasshopper sparrow) and forest-dependent bat species (e.g., northern long-eared bat). Herbaceous habitat within the Project is already highly fragmented, but further fragmentation could impact grassland-dependent bird species.

6. *Which species of birds and bats, especially those known to be at risk by wind energy facilities, are likely to use the proposed site based on an assessment of site attributes?*

The Project is likely to be used by a variety of raptor species, including bald eagles. Based on its location in the Central and Mississippi Flyways, the Project is also likely to support waterfowl, waterbirds, and passerines, especially during migration. Eight bat species have the potential to occur in the Project area, including the federally threatened northern long-eared bat and three state listed species of special concern (little brown bat, big brown bat, and tri-colored bat). In addition, three migratory tree bat species (eastern red bat, hoary bat, and silver-haired bat) that are known to be at risk by wind energy facilities are likely to use the site.

7. *Is there potential for significant adverse impacts to species of concern based on the answers to the questions above, and considering the design of the proposed project?*

The potential for significant adverse impacts to species of concern is low for the Project. Direct impacts are most likely to affect migrating songbirds and migratory tree bats.

EAGLE CONSERVATION PLAN GUIDANCE STAGE 1 ASSESSMENT

The ECPG (USFWS 2013) provides questions that should be considered to help place a prospective project site into an appropriate risk category. These questions are answered below based on the information compiled during this desktop assessment.

1. *Does existing or historical information indicate that eagles or eagle habitat may be present within the geographic region under development consideration?*

The Project area contains some suitable habitat that may be used by bald eagles throughout the year and, to a lesser extent, golden eagles during migration or winter. The large waterbodies in the Project could provide foraging habitat for bald eagles. Although uncommon, forested areas within the Project could provide nesting habitat for bald eagles (Buehler 2000).

2. *Within a prospective project site, are there areas of habitat known to be or potentially valuable to eagles that would be destroyed or degraded due to the project?*

Potentially valuable habitat includes areas of forested habitat that could be used for roosting or nesting, as well as areas of open water that provide foraging habitat. The federally and state managed WPAs and WMAs in the Project could provide valuable habitat to bald eagles (Figure 5).

3. *Are there important eagle use areas or migration concentration sites documented or thought to occur in the project area?*

No important eagle use areas or migration concentration sites are known or thought to occur in the Project area. Suitable nesting habitat is limited within the Project Area. Wetland areas and agricultural fields in the Project could be used as staging areas for migrating waterfowl and provide valuable foraging opportunities for bald eagles.

4. *Does existing or historical information indicate that habitat supporting abundant prey for eagles may be present within the geographic region under development consideration?*

Areas that might support abundant prey for eagles exist within the general region where the Project is located, but would likely be concentrated in the larger lakes within and outside the Project area. There are smaller creeks, wetlands, herbaceous areas, and agricultural areas within the Project area that might provide limited foraging opportunities for eagles. Livestock carcasses and compost piles may also attract foraging eagles, particularly when rivers and lake are frozen preventing access to more preferred prey.

5. *For a given prospective site, is there potential for significant adverse impacts to eagles based on answers to above questions and considering the design of the proposed project?*

The potential for significant adverse impacts to eagles from construction and operation of the Project appears to be low. Bald eagles may occur in the Project during all seasons, but with seasonal fluctuations in abundance. Golden eagles have not been observed in Jackson County, but have been reported nearby in the Kettleton Hogsback WMA (eBird 2019).

SUMMARY AND RECOMMENDATIONS

The proposed Project is located in an area dominated by agricultural land. Wetland and forested areas scattered throughout the Project area may support a diversity of species, including federally or state-listed threatened and endangered species or other species of concern. However, most species of concern are unlikely to occur within the Project area in high numbers. Small patches of habitat, mostly herbaceous and emergent herbaceous wetlands (Table 1), could support low numbers of some species of concern. Birds of concern most likely to occur in the Project area include the state-endangered loggerhead shrike, the state-threatened Wilson's phalarope, and the federally protected bald eagle. Bat species most likely to be impacted by the Project include three species of migratory tree bat (hoary bat, eastern red bat, and silver-haired bat). Impacts to the federally threatened northern-long eared bat are unlikely due to lack of suitable habitat and the absence of known hibernacula in or near the Project area. Other bats of special concern with potential to be impacted include the little brown bat, the big brown bat, and the tri-colored bat.

The potential impacts and concerns highlighted in this report are not unexpected for wind energy projects in this area. Tier 3 biological surveys will help to identify the potential for adverse impacts to the species of concern highlighted in this report. Additional studies may be warranted based on changes in the Project boundary or other concerns identified by federal or state agencies. Additional studies, which should also take into consideration the MNDNR and Minnesota Department of Commerce (MNDOC) *Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems in Minnesota* (Mixon et al. 2014), may include: 1) eagle and other large bird use surveys; 2) raptor nest surveys; 3) acoustic bat surveys; and 4) native prairie surveys. State and federal agencies (i.e., the MNDOC, MNDNR, IADNR and USFWS) should be consulted regarding these surveys as well as the proposed Project.

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**Appendix A. US Fish and Wildlife Service Information for Planning and Conservation
Reports**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Iowa and Minnesota



Local offices

Illinois-Iowa Ecological Services Field Office

☎ (309) 757-5800

📠 (309) 757-5807

Illinois & Iowa Ecological Services Field Office
1511 47th Ave
Moline, IL 61265-7022

Minnesota-Wisconsin Ecological Services Field Office

☎ (952) 252-0092

📠 (952) 646-2873

MAILING ADDRESS

4101 American Blvd E
Bloomington, MN 55425-1665

PHYSICAL ADDRESS

4101 American Blvd E

-

Bloomington, MN 55425-1665

<http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html>

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME

STATUS

Northern Long-eared Bat <i>Myotis septentrionalis</i>	Threatened
No critical habitat has been designated for this species.	
https://ecos.fws.gov/ecp/species/9045	

Fishes

NAME	STATUS
Topeka Shiner <i>Notropis topeka</i> (=tristis)	Endangered
There is final critical habitat for this species. Your location overlaps the critical habitat.	
https://ecos.fws.gov/ecp/species/4122	

Insects

NAME	STATUS
Poweshiek Skipperling <i>Oarisma poweshiek</i>	Endangered
There is final critical habitat for this species. Your location is outside the critical habitat.	
https://ecos.fws.gov/ecp/species/9161	

Flowering Plants

NAME	STATUS
Prairie Bush-clover <i>Lespedeza leptostachya</i>	Threatened
No critical habitat has been designated for this species.	
https://ecos.fws.gov/ecp/species/4458	
Western Prairie Fringed Orchid <i>Platanthera praeclara</i>	Threatened
No critical habitat has been designated for this species.	
https://ecos.fws.gov/ecp/species/1669	

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Topeka Shiner <i>Notropis topeka</i> (=tristis)	Final
https://ecos.fws.gov/ecp/species/4122#crithab	

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES

THAT THE BIRD DOES NOT LIKELY
BREED IN YOUR PROJECT AREA.)

Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern <i>Chlidonias niger</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Dunlin <i>Calidris alpina arctica</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Franklin's Gull <i>Leucophaeus pipixcan</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Hudsonian Godwit <i>Limosa haemastica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Marbled Godwit <i>Limosa fedoa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds May 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Ruddy Turnstone <i>Arenaria interpres morinella</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere

Semipalmated Sandpiper *Calidris pusilla* Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Short-billed Dowitcher *Limnodromus griseus* Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
<https://ecos.fws.gov/ecp/species/9480>

Willet *Tringa semipalmata* Breeds Apr 20 to Aug 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (-)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.







Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to

confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
Windom Wetland Management District	932.62 acres

☎ (507) 831-2220

📅 (507) 831-5524

MAILING ADDRESS

49663 County Road Number 17

Windom, MN 56101-3026

PHYSICAL ADDRESS

49663 County Road Number 17

Windom, MN 56101-3026

<https://www.fws.gov/refuges/profiles/index.cfm?id=32587>

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the [NWI map](#) for a full list.

FRESHWATER EMERGENT WETLAND

[PEM1A](#)
[PEM1C](#)
[PEM1Af](#)
[PEM1F](#)
[PEM1B](#)
[PEM1Cd](#)
[PEM1Ch](#)
[PEM1Ah](#)
[PEM1Cx](#)
[PEM1Ad](#)
[PEM1Ax](#)

FRESHWATER FORESTED/SHRUB WETLAND

[PFO1C](#)

FRESHWATER POND

[PABF](#)
[PUBG](#)
[PABH](#)
[PUBF](#)
[PABFh](#)
[PUBFx](#)
[PABFx](#)
[PUBGx](#)

LAKE

[L2UBH](#)
[L2ABHh](#)
[L2UBHh](#)
[L2ABH](#)

RIVERINE

[R4SBC](#)
[R2UBGx](#)
[R2UBH](#)
[R5UBH](#)
[R2UBHx](#)

A full description for each wetland code can be found at the [National Wetlands Inventory website](#)

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix B. Minnesota Natural Heritage Information System Request Response

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of
Three Waters Wind Project
Multiple TRS, Jackson County

Rare Features Database

Element Name and Occurrence Number	Federal Status	MN Status	SGCN Status	State Rank	Global Rank	Last Obs Date	EO ID #
Vertebrate Animal							
<u><i>Sterna forsteri</i></u> (Forster's Tern) #7 101N037W 21,101N037W 28,101N037W 20,101N037W 29	none	SPC	SGCN	S3B	G5	5/8/1905	25176
<u><i>Cygnus buccinator</i></u> (Trumpeter Swan) #69 104N037W 26,106N036W 13,106N036W 12,104N037W 7, [...]	none	SPC	SGCN	S3B	G4	7/27/2009	32160

Minnesota endangered species law (*Minnesota Statutes*, section 84.0995) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6154) prohibit the taking of threatened or endangered species without a permit. For plants, taking includes digging or destroying. For animals, taking includes pursuing, capturing, or killing.

Explanation of Fields:

Element Name and Occurrence Number: The Element is the name of the rare feature. For plant and animal species records, this field holds the scientific name followed by the common name in parentheses; for all other elements it is solely the element name. Native plant community names correspond to Minnesota's Native Plant Community Classification (Version 2.0). The Occurrence Number, in combination with the Element Name, uniquely identifies each record.

Federal Status: The status of the species under the U.S. Endangered Species Act: CE = endangered; LT = threatened; LE, LT = listed endangered in part of its range; listed threatened in another part of its range; LT,PDL = listed threatened, proposed for delisting; C = candidate for listing. If null or "No Status," the species has no federal status.

MN Status: The legal status of the plant or animal species under the Minnesota Endangered Species Law: END = endangered; THR = threatened; SPC = special concern; NCM = tracked, but no legal status. Native plant communities, geological features, and colonial waterbird nesting sites do not have any legal status under the Endangered Species Law and are represented by a "X".

SGCN Status: SGCN = The species is a Species in Greatest Conservation Need as identified in Minnesota's State Wildlife Action Plan (<http://www.dnr.state.mn.us/cwsp/index.htm>). This designation applies to animals only.

Confidential Business Information

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
Three Waters Wind Project
Multiple TRS, Jackson County

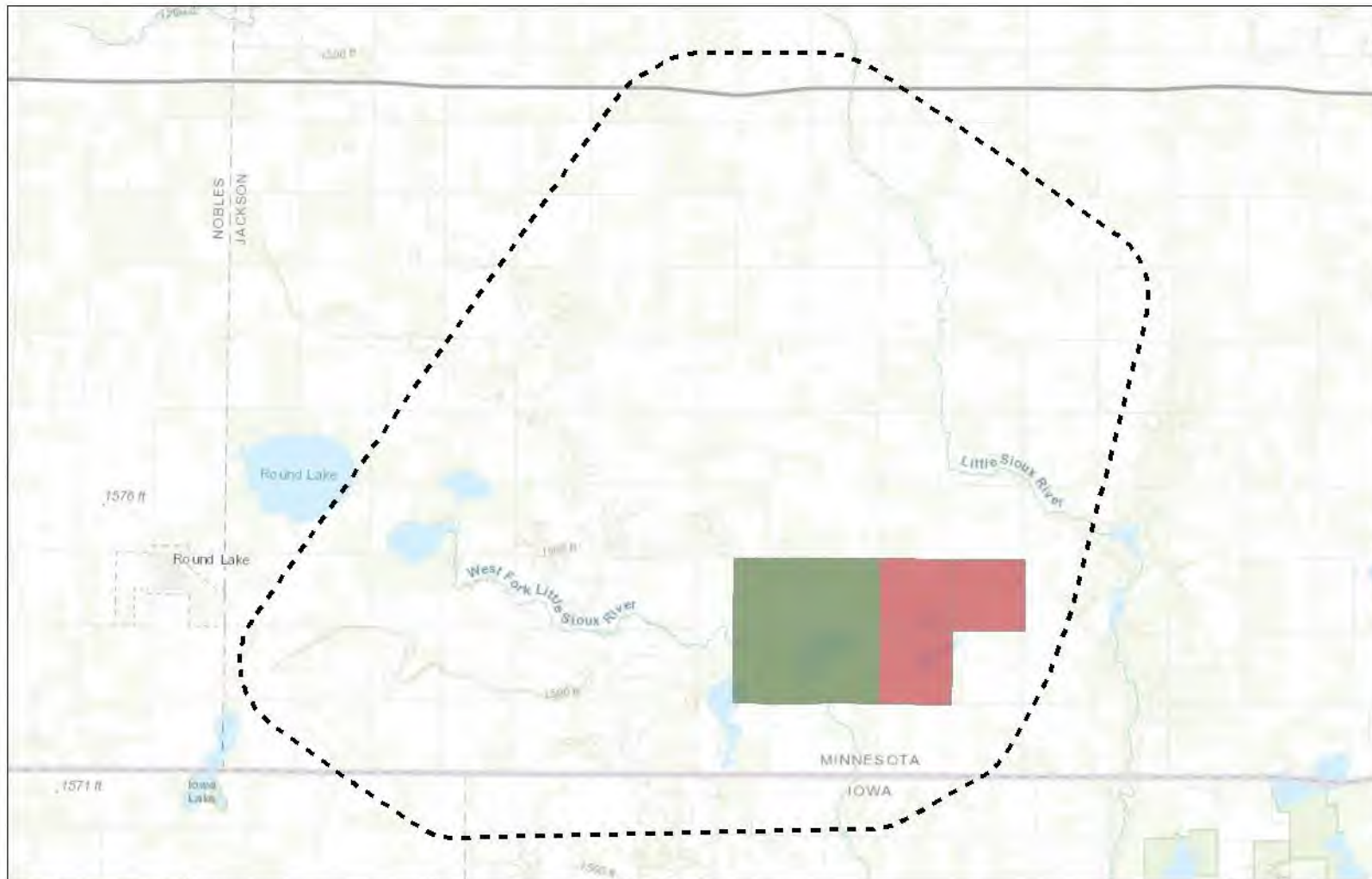
State Rank: Rank that best characterizes the relative rarity or endangerment of the taxon or plant community in Minnesota. The ranks do not represent a legal status. They are used by the Minnesota Department of Natural Resources to set priorities for research, inventory and conservation planning. The state ranks are updated as inventory information becomes available. S1 = Critically imperiled in Minnesota because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from the state. S2 = Imperiled in Minnesota because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state. S3 = Vulnerable in Minnesota either because rare or uncommon, or found in a restricted range, or because of other factors making it vulnerable to extirpation. S4 = Apparently secure in Minnesota, usually widespread. S5 = Demonstrably secure in Minnesota, essentially invulnerable under present conditions. SH = (Historical occurrence in the state, perhaps having not been verified in the past 20 years, but suspected to be still extant. An element would become SH without the 20-year delay if the only known occurrences in the state were destroyed or if it had been extensively and unsuccessfully looked for. SNR = Rank not yet assessed. SU = Unable to rank. SX = Presumed extant in Minnesota. SNA = Rank not applicable. S/SN = Range Rank, a numeric range rank (e.g., S2S3) used to indicate the range of uncertainty about the exact status of the element. S/B, S/N = Used only for migratory animals, whereby B refers to the breeding population of the element in Minnesota and N refers to the nonbreeding population of the element in Minnesota.

Global Rank: The global (i.e., range-wide) assessment of the relative rarity or imperilment of the species or community. Ranges from G1 (critically imperiled due to extreme rarity on a world-wide basis) to G5 (demonstrably secure, though perhaps rare in parts of its range). Global ranks are determined by NatureServe, an international network of natural heritage programs and conservation data centers.

Last Observed Date: Date that the Element Occurrence was last observed to be extant at the site in format MM/DD/YYYY.

EO ID #: Unique identifier for each Element Occurrence record.

Element Occurrence: An area of land and/or water in which an Element (i.e., a rare species or community) is, or was, present, and which has positive conservation value for the Element as evidenced by potential continued (or historical) presence and/or regular recurrence at a given location. Specifications for each species determine whether multiple observations should be considered 1 Element Occurrence or 2, based on minimum separation distance and barriers to movement.



Three Waters Wind Project
 Jackson County, MN
 Data Source: World Topo
 Coordinate System: NAD 1983 UTM Zone 15N
 Date: 2/26/2019
 Author: Adam Kreger

1-mile Buffer of Project Area

Sections Containing Minnesota Natural Heritage Information System Records

Forster's Tern (*Sterna forsteri*)

Trumpeter Swan (*Cygnus buccinator*)

WEST

Appendix C. Iowa Department of Environmental Resources Environmental Review



January 24, 2019

WEST, INC.
ATTN: RYAN MCDONALD
415 W. 17TH STREET, SUITE 200
CHEYENNE, WY 82001

RE: Environmental Review for Natural Resources
Potential Wind Energy Facility Project: Three Waters
Dickinson and Osceola Counties

Dear Mr. McDonald:

Thank you for inviting the Department's comments on the impact of this project. The Department has searched records for state- and federal-listed endangered or threatened species, rare natural communities, sensitive habitat, and state lands and waters in a proposed project area. Recommendations based on the Department's review of records and data available at the time of this request follow.

The Proposed Wind Energy Project is in close proximity to multiple protected natural resource areas, including the Diamond Lake Wetlands Complex. The Department strongly recommends that turbines are sited a minimum of two miles from the Diamond Lake Wetlands Complex and one mile from other state and county-owned areas or complexes. Statewide GIS information about public conservation lands and Bird Conservation Areas is available on the Department's website at <https://geodata.iowa.gov/> under Administrative and Political Boundaries and Biologic and Ecologic headings, respectively.

The Department has searched Natural Areas Inventory records for the project area and found no site-specific records of rare species or significant natural communities that could be impacted by this project. However, Department data are not the result of thorough field surveys. These species are associated with several habitats, including wooded river and stream corridors, prairie remnants, and wetlands. If listed species or rare communities are found during the planning or construction phases, additional studies and/or mitigation may be required.

The Iowa Lake watershed shared along the state line is critical for water quality and recreational use. All these natural lakes are critical habitat for migratory game and non-game bird species annually. Additional consideration should be given to all these watersheds for any potential development of additional wetland restoration projects in the future to improve water quality.

The project area comes in proximity to the Little Sioux River and the West Branch of the Little Sioux as it crosses the state line. These are critical migratory bird routes. They are also locations that contain areas of remnant prairie. The Department recommends that wind turbines be sited at least one mile from the Little Sioux River and the West Branch of the Little Sioux River as well as any associated habitat.

Natural Lakes in the prairie pothole region are critical for migratory bird use annually. Consideration for buffering should be a high priority resource concern as a large project could impact not only habitat use by migratory birds but recreational use in Iowa on these public resources. Natural Iowa Lakes in two mile proximity of project boundary include: Diamond Lake, and Iowa Lake. Natural Iowa Lakes in a 5 -mile proximity of the project boundary include: Silver Lake, Big Spirit Lake, Little Spirit Lake, West Hottes Lake, East Hottes Lake, North Hottes Lake, Grovers Lake, Marble Lake, Welch Lake and Rush Lake.

The Department has records of an active eagle nest in the vicinity of this project. There is a known eagle nest located in the Kettleston Hogsback Wetlands Complex in Dickinson County (T100NR36W Sec. 18). Bald eagles (*Haliaeetus leucocephalus*) were removed from the federal list of threatened and endangered species in 2007, and are no longer protected under the Endangered Species Act. However, bald eagles remain protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Please contact the US Fish and Wildlife Service - Rock Island Field Office, 1511 47th Avenue, Moline, IL 61265 regarding the proposed project.

It is in the Project developer's interest to avoid potential conflict with federal and state-listed threatened and endangered animal species; allow a one mile buffer from natural areas as described above would minimize interaction between threatened and endangered species and the proposed wind energy Project. Although turbine locations are currently unknown, locations might exceed the minimum recommended buffer of one mile. The Department strongly urges the developer to consider sites for these turbines beyond the one mile buffer.

Although the Department does not regulate wind farms, there are concerns regarding potential adverse impacts to bird and bat populations associated with wind farms beyond mortality associated with turbine collisions. Given the possibility of habitat avoidance, the Department strongly recommends a one mile buffer between turbines and natural resource areas, including riparian corridors.

The Department also recommends bird and bat use and interactions with wind turbines and supporting facilities are monitored for an adequate period. The Department recommends one season of pre-construction surveys to assess bird and bat use (including spring and fall migration times) of the Project area. Presence of bat habitats should also be noted and an evaluation made of bat foraging activity in and around the proposed site. Pre-construction survey methodology was developed by Natural Resource Consulting, Incorporated, and accepted by the Department in May, 2008. The methodology is included here as an attachment.

The Department recommends completion of at least two years of post-construction surveys using accepted standard methods. The post-construction monitoring should evaluate collisions and mortality that occur to determine whether the facility can be modified to prevent future collisions, or if mitigation is needed. Wildlife avoidance and other behavioral changes should also be evaluated. An adaptive management approach to planning, design, construction and operations is highly recommended. Additional information titled *Wind Energy and Wildlife Resource Management in Iowa: Avoiding Potential Conflicts* is available here as an attachment

and from the Department website at <http://www.iowadnr.gov/Environment/WildlifeStewardship/NonGameWildlife/Conservation/WindandWildlife.aspx>.

This letter is a record of review for protected species, rare natural communities, state lands and waters in the project area, including review by personnel representing state parks, preserves, recreation areas, fisheries and wildlife but does not include comment from the Environmental Services Division of this Department. This letter does not constitute a permit. Other permits may be required from the Department or other state or federal agencies before work begins on this project.

Please reference the following DNR Environmental Review/Sovereign Land Program tracking number assigned to this project in all future correspondence related to this project: 16312.

If you have questions about this letter or require further information, please contact me at (515) 725-8464.

Sincerely,

A handwritten signature in blue ink that reads "Seth Moore". The signature is written in a cursive style.

Seth Moore
Environmental Specialist
Conservation and Recreation Division

Enclosures

Suggested References

Anderson, R., M. Morrison, K. Sinclair, D. Strickland, H. Davis, and W. Kendall. 1999. Studying wind energy/bird interactions: a guidance document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites. Avian Subcommittee, National Wind Coordinating Committee, Washington, DC. 87 pp.

Jain, A.A. 2005. Bird and bat behavior and mortality at a northern Iowa windfarm. M.S. Thesis, Iowa State Univ., Ames. 108pp.

Kerns, J., W. P. Erickson, and E. B. Arnett. 2005. Bat and bird fatality at wind energy facilities in Pennsylvania and West Virginia. Pages 24–95 in E. B. Arnett, editor. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International, Austin, Texas, USA.

CC: Chris LaRue, Wildlife Bureau, Iowa DNR
Amber Schrog, US Fish and Wildlife Service, Rock Island Field Office

Natural Resources Consulting, Inc. Pre-Construction Avian Survey Methods for Wind Projects, May 2008

Pre-construction bird surveys consist of one year of standardized pre-construction roadside point count surveys conducted within the project area. Four surveys are conducted during each of four seasons (16 total surveys), including fall migration, winter, spring migration, and the breeding season. These surveys are considered screening level bird surveys and the optimal survey period within each of the four seasons is targeted.

Point count stations are selected using a random sampling design stratified by dominant landcover types within the project area. Station locations are then adjusted for road locations, traffic volume, and residence locations.

Individual point count periods are five minutes long, and all birds detected by sight or sound (singing/calling) are identified to species and tallied on standardized data forms at each point count station. Because the landscape is open at most wind projects, bird detections are recorded relative to a point count radius of 100 meters (i.e. bird within 100 m and birds beyond 100 m are recorded separately at each point count station). Notes on general habitat types within each 100 m radius point count station are recorded.

Surveys begin around sunrise and continue until all point count stations within the project area are covered. The survey order of point count stations (i.e. beginning and ending points) is alternated on each visit so that all points are surveyed during the most optimal time of day (i.e. early morning). Weather conditions (e.g., temperature, cloud cover, wind) are recorded at the beginning and end of the survey route for each survey day. Surveys are not completed when it is raining or when winds are more than a Category 3 on Beaufort Wind Scale (> 12 mph).

Additional behavioral observations of special status species (i.e., endangered, threatened, or species of special concern), waterbirds (i.e., waterfowl, grebes, cormorants, cranes, herons, egrets, rails, plovers, shorebirds, and gulls) and raptors (i.e. hawks, owls, eagles) are recorded. These species tend to be at a higher risk of collision with wind turbine blades; therefore, behavior (e.g., flying, perching, hunting, displaying, vocalizing) of these species are observed and recorded. When individuals from these bird groups are observed flying, an estimate of flight height is recorded in relation to proposed wind turbine design (i.e. below, within, or above the rotor swept area).

Natural Resources Consulting, Inc. Pre-Construction Bat Survey Methods for Wind Projects, May 2008

Pre-construction bat surveys incorporate stationary and mobile *Anabat* echolocation detectors, which have been proven to be acceptable methodology for bat/wind farm screening. The use and orientation of these detectors depend on the stationary and mobile locations selected. Stationary detectors are mounted upon one (1) meteorological (MET) tower.

Three detectors are deployed on the tower, at varying heights (50 m MET = 6.5 ft, 72 ft (tree canopy), and ~160 ft (within the turbine rotor-swept area); 80 m MET = 6.5 ft, 72 ft (tree canopy), and ~262 ft (within the turbine rotor-swept area)), in a vertical transect to capture information about bat species flying at higher altitudes. These will be deployed and active sun-down to sun-up from April through October (~214 days). Data are downloaded weekly from the detectors.

Surveys with mobile hand-held *Anabat* detectors are used to supplement stationary surveys. Mobile surveys will be conducted; specified transects are walked or driven by surveyors, while holding the mobile bat call detector or mounting it on the vehicle.

Mobile units are accompanied by a geographic positioning system (GPS) that records geographic location each time a bat call is detected. Although the limited range of the hand-held units only detects bats in the lower altitudes of the project area, it allows the presence of species in other portions of the project area

(not captured by detectors on MET towers) to be surveyed. Hand-held surveys are conducted five times per season (spring, summer, fall), resulting in a total of 15 surveys.

Iowa Department of Natural Resources Post Construction Bat and Bird Mortality Survey Methods, September 2010

The Department recommends post construction mortality surveys be conducted at 20% of the turbines selected randomly and at 5% of randomly selected turbines located nearest forest or riparian habitats. If there are no forest or riparian habits within 3 miles of the Project area the survey should be done on 25% of randomly selected turbines.

The surveys will be conducted daily for two week periods in spring, summer, and fall for a total of six weeks. Survey periods are as follows:

- Spring – between April 5 and 25
- Summer – between June 5 and 30
- Fall – between August 20 and September 15

Searcher efficiency will be quantified to adjust the estimate of total fatalities for observer detection bias according to methods described by Kerns et al. (2006).