Appendix F

Plum Creek Wind Farm: Site Characterization Study (Tier I/Tier II Study)

Plum Creek Wind Farm, LLC
Docket No. IP6997 / WS-18-700
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Site Characterization Study–Tier 1/Tier 2
Plum Creek Wind Project
Cottonwood, Murray, and Redwood Counties, Minnesota

Prepared for:

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INTRODUCTION

Plum Creek Wind Farm, LLC is considering the development of the Plum Creek Wind Project (Project) in Cottonwood, Murray, and Redwood counties, Minnesota. Based on a request from Plum Creek Wind Farm, LLC, Western EcoSystems Technology, Inc. (WEST) has prepared a Tier 1/Tier 2 Site Characterization Study (SCS) for the potential Project. The principal objective of this SCS is to review and summarize potential wildlife issues consistent with the US Fish and Wildlife Service (USFWS) guidance, including the *Land-Based Wind Energy Guidelines* (USFWS 2012) Tier 1/Tier 2 site characterization, the *Eagle Conservation Plan Guidance* (ECPG; USFWS 2013a) Stage 1 site assessment, and the *Indiana Bat Range-Wide Summer Survey Guidelines* (which also includes recommendations relevant to northern long-eared bats [NLEB; *Myotis septentrionalis*]) Phase 1 initial project screening (USFWS 2017).

The primary purpose of Tier 1 and Tier 2 analyses as described within the USFWS land-based wind energy guidelines include: 1) identifying regions where wind energy development poses significant risks to species of concern or their habitats, including the fragmentation of large-scale habitats and threats to regional populations of federal- or state-listed species; 2) "screening" a landscape or set of multiple potential sites to avoid those with the highest habitat values; and 3) determining if a single identified potential site poses serious risk to species of concern or their habitats. This report summarizes potential biological resources associated with a single site: the Plum Creek Wind Project.

PROJECT AREA

The Project boundary currently encompasses approximately 72,958 acres (ac; 29,525 hectares [ha]) and is located in southwestern Minnesota in Cottonwood, Murray, and Redwood counties, east of the South Dakota border (Figure 1).

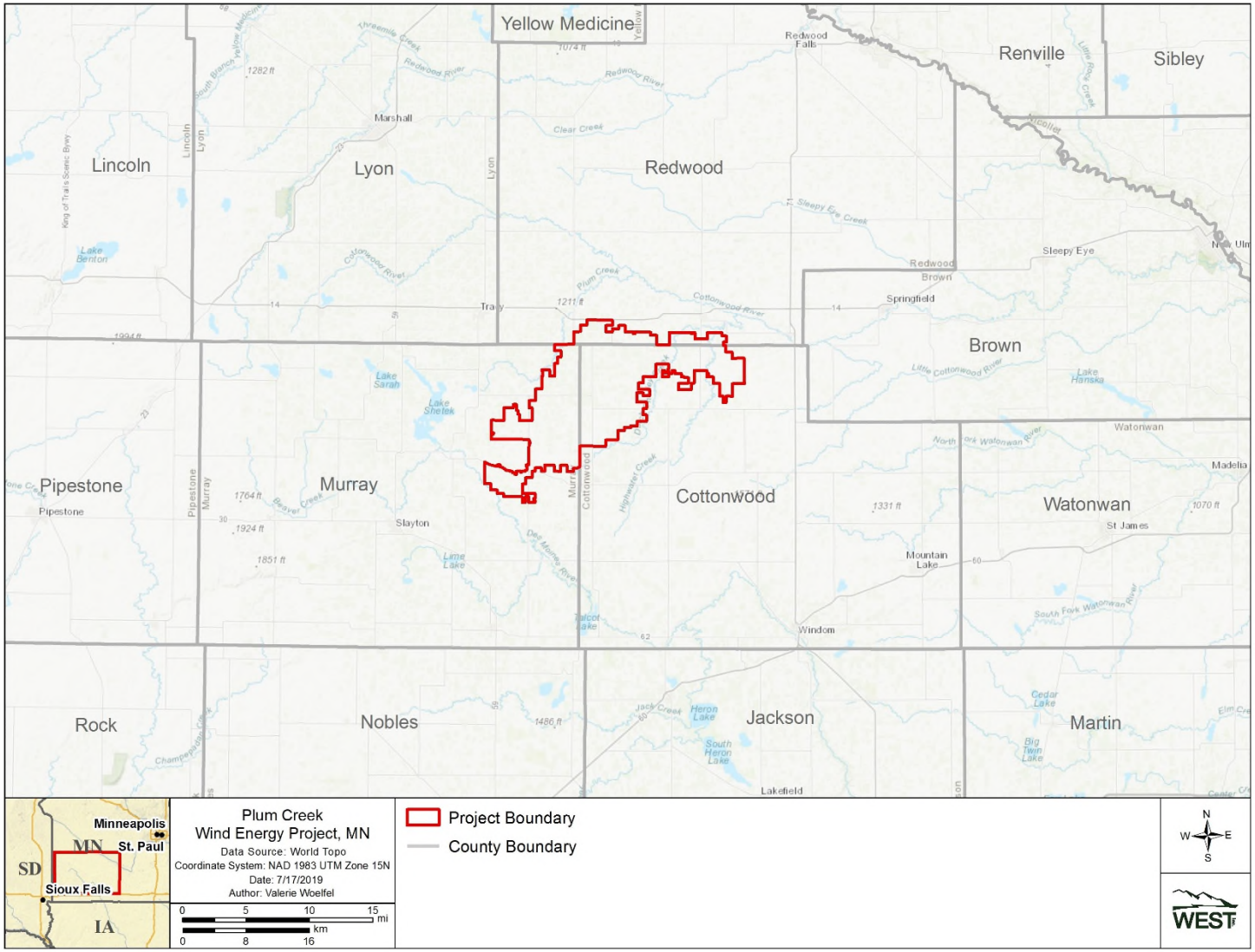


Figure 1. Location of the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

METHODS

A desktop review of the following data sources was completed to determine if the Project poses significant risks to species of concern or their habitats:

- Published or available literature and data regarding wind energy impacts to wildlife, with an emphasis on projects in Minnesota.
- The Minnesota Department of Natural Resources (MNDNR) – Natural Heritage Information System (NHIS) database (Appendix A).
- Available location information for wetlands and protected ground water sources from the National Wetlands Inventory (NWI) and Minnesota state databases.
- Maps of topography, land use and land cover.
- Sensitive plant distribution available from the USFWS and MNDNR.
- Known bird migration routes available from the USFWS.
- Threatened or endangered species distribution from the USFWS and MNDNR.
- Bat Distribution and Locations of Hibernacula from the MNDNR, Bat Conservation International (BCI), and the USFWS.
- Locations of critical habitat protected by the endangered species act from the USFWS.
- Audubon Important Bird Area (IBA) Databases.
- State or federally protected nature preserves, including the Minnesota Sites of Biodiversity Significance database and Minnesota Native Plant Communities database.
- Lands protected by The Nature Conservancy (TNC).
- eBird data on bald and golden eagle observations in the area.
- The USFWS Information for Planning and Conservation (IPaC) tool (Appendix A).

A WEST biologist conducted a site visit on July 19, 2018 to document general site attributes and inform the site characterization analysis (Appendix B).

CRITICAL ISSUES

Land Cover

The Project is located between several towns including Revere, Walnut Grove, and Lamberton to the north, Garvin and Currie to the west, Dovray, Westbrook, and Storden to the south, and Jeffers and Sandorn to the east. The Project is in the Western Corn Belt Plains (47) Level III ecoregion and the Des Moines Lobe (47b) Level IV ecoregion (US Environmental Protection Agency 2017). The Western Corn Belt Plains ecoregion is a flat to gently rolling landscape of glacial till. The

region is characterized by tallgrass prairie, riparian forests, oak-prairie savanna, and wetlands. Recent wetland and tallgrass prairie restoration efforts offer suitable habitat for waterfowl nesting and migration. The Des Moines Lobe is a geologically young landscape with gentle rolling till plains and poorly defined drainage. A few scattered lakes and a mix of row crops are present in this region and within the Project itself (Table 1; Figure 2).

According to the National Land Cover Database (NLCD), land cover within the Project is primarily cultivated crops (90.9%; Table 1, Figure 2; US Geological Survey [USGS] NLCD 2011, Homer et al. 2015). Other land cover types within the Project include developed space, primarily in the form of roads, which accounts for approximately 4.5% of the Project, emergent herbaceous wetlands (1.6%), and herbaceous land (1.4%). The remaining land cover types within the Project (hay/pasture, deciduous forest, open water, woody wetlands, and barren land) each compose less than 1% of the Project (Table 1, Figure 2).

Table 1. Land cover types, coverage, and percent (%) composition present within the Plum Creek Wind Project.

Land Cover Types	Coverage (Acres)	% Composition
Cultivated Crops	66,310	90.9%
Develop-Classes Merged	3,299	4.5%
Emergent Herbaceous Wetlands	1,190	1.6%
Herbaceous	1,029	1.4%
Hay/Pasture	535	0.7%
Deciduous Forest	473	0.7%
Open Water	52	0.1%
Woody Wetlands	50	0.1%
Barren Land	20	<0.1%
Total	**72,958**	**100**

Source: US Geological Survey National Land Cover Database 2011, Homer et al. 2015.

Topography

The region is characterized by flat to rolling topography with an elevation range from 1,099 to 1,630 feet (ft; 335 to 497 meters [m]) above sea level. The southwest portion of the Project is higher in elevation and slopes towards lower elevations associated with stream valleys in the northern and eastern portions of the Project (Figure 3).

Wetlands and Riparian Areas

Formal wetland delineations have not been completed at the Project; however, based on the NWI data from the USFWS, there are approximately 2,504 total ac (1,013 ha) of wetland within the Project (3.4%; Tables 1 and 2; USFWS NWI 2018). NWI data shows almost twice the acreage when compared to the NLCD estimate of emergent wetlands, open water, and woody wetlands land cover types (1.8% of the Project area; Table 1).

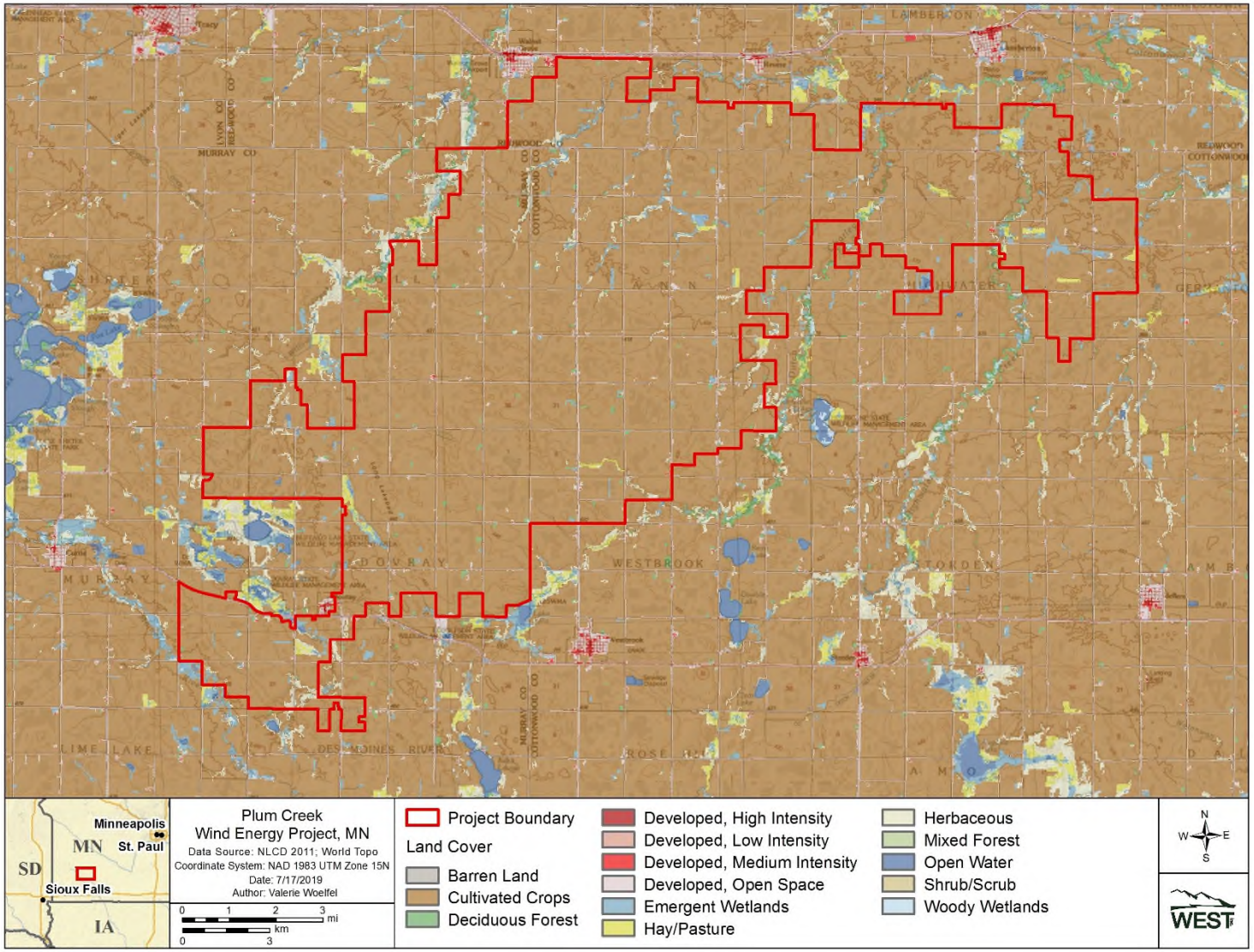


Figure 2. Land cover types and coverage within the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

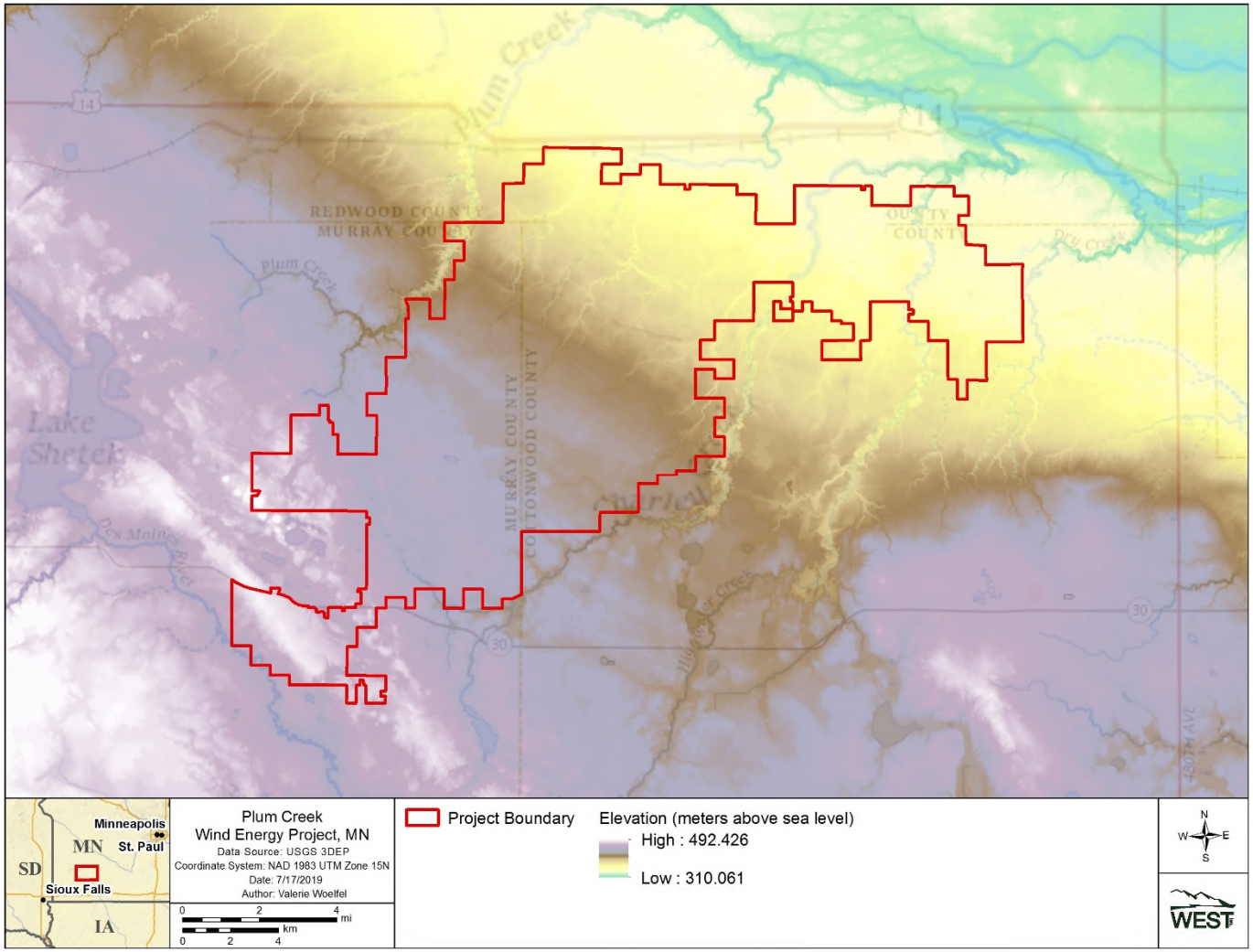


Figure 3. Elevation gradients within the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

Based on information available from the NWI, wetland resources within the Project appear to be typical of Minnesota agricultural landscapes in this part of the state. Water features near the Project include freshwater emergent wetland, rivers, freshwater forested/shrub wetlands, freshwater ponds, and lakes (Table 2, Figure 4). The National Hydrography Database (NHD; 2016) and Minnesota Public Waters Inventory (PWI; 2017) show several streams flow through the Project including Plum Creek, Pell Creek, Dutch Charley Creek, and Highwater Creek. In the southwest corner of the Project, the boundary runs parallel to a portion of the Des Moines River. No PWI designated lakes appear to be within the Project, but there are several just outside the Project boundary. The Water Permit Programs Unit of the MNDNR oversees the administration of the PWI program and any impacts to or crossings of PWI require permits or licenses from the MNDNR.

Table 2. National Wetlands Inventory mapped wetlands within the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

Wetlands	Project Acres	% Total
Freshwater Emergent Wetland	1726	68.9%
Riverine	429	17.1%
Freshwater Forested/Shrub Wetland	257	10.2%
Freshwater Pond	92	3.7%
Lake	<1	<1.0%
Total	**2,504**	**100%**

Source: US Fish and Wildlife Service National Wetlands Inventory 2018

Protected and Sensitive Areas

Protected Areas Database of the United States

Based on the USGS Protected Areas Database of the US (PADUS v1.4) and the National Conservation Easement Database (2018) there are several protected areas and conservation easements within the Project. These include A USFWS-managed National Wildlife Refuge, and Reinvest in Minnesota conservation easements (Figure 5). Some of these protected lands overlap with parcels identified by the MDNR as designated native plant communities or Minnesota Biological Survey-identified Sites of Biodiversity Significance (Figure 6), which can be designated on either protected (regulated/managed) lands or private lands, and are discussed further below.

The MNDNR's *Guidance for Commercial Wind Energy Projects* contains information on MNDNR-regulated and MNDNR-managed resources that may be impacted by wind energy development, including recommended and potential setbacks for wind turbine placement near these resources (MNDNR 2011).

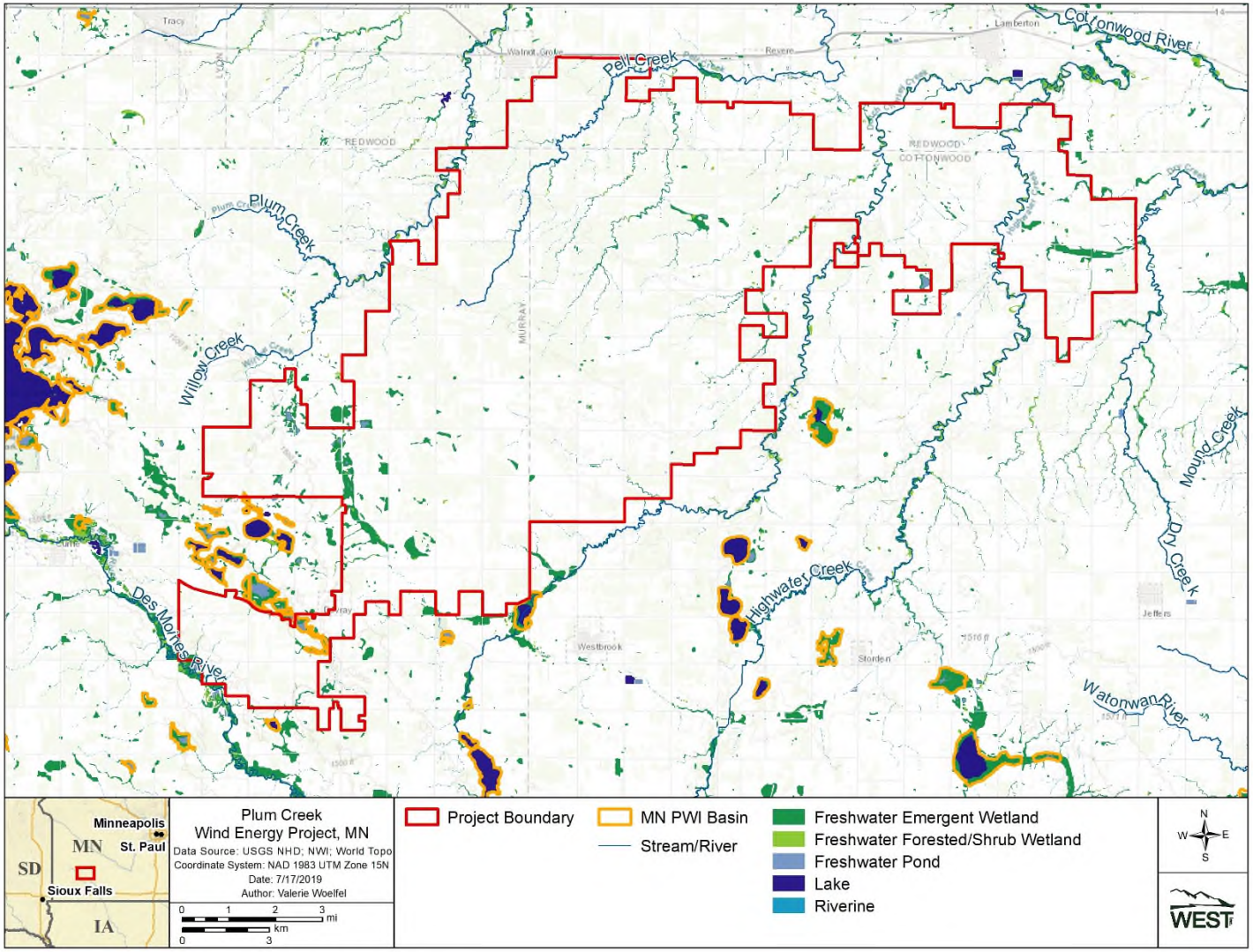


Figure 4. Surface waters within the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

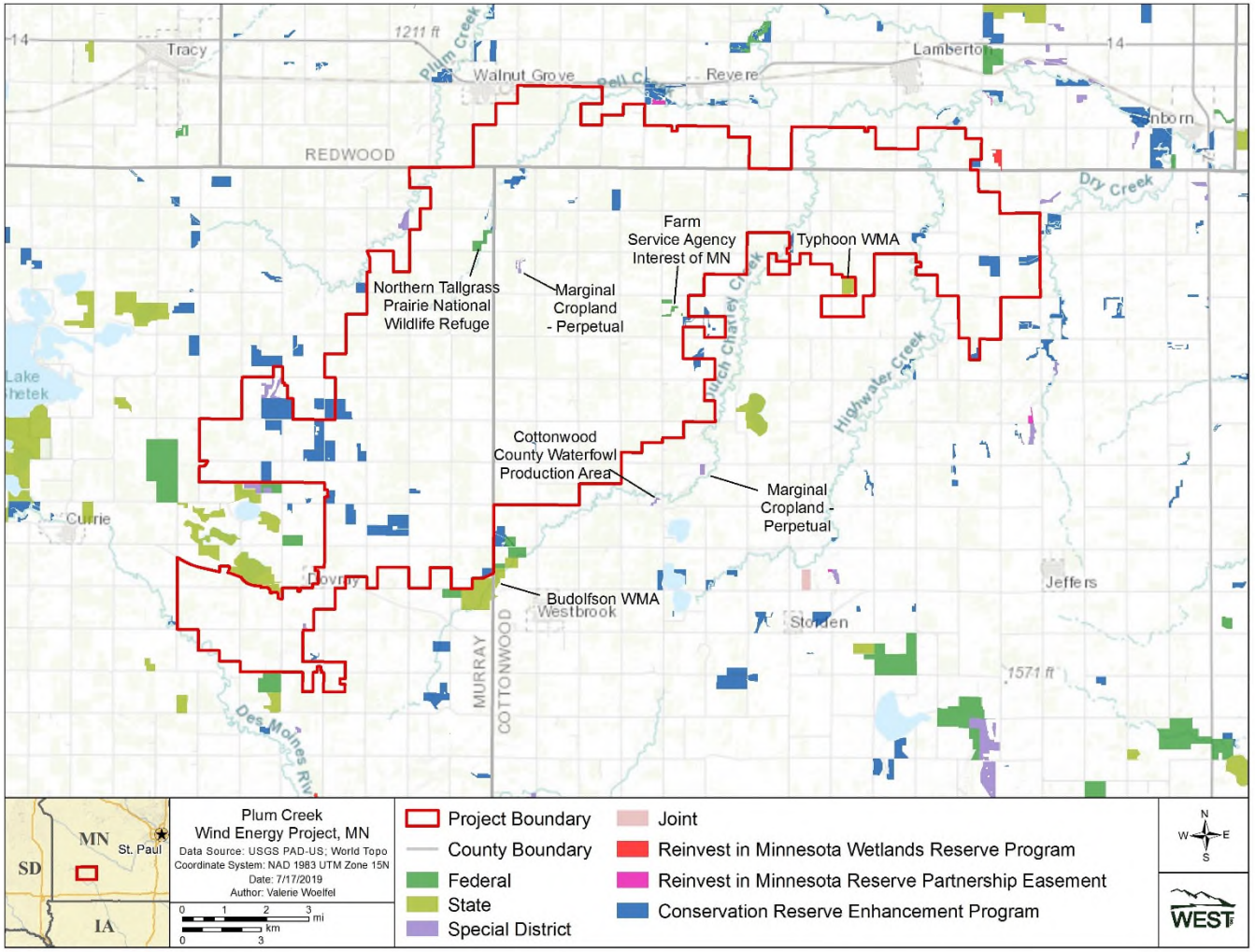


Figure 5. Protected lands in the vicinity of the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

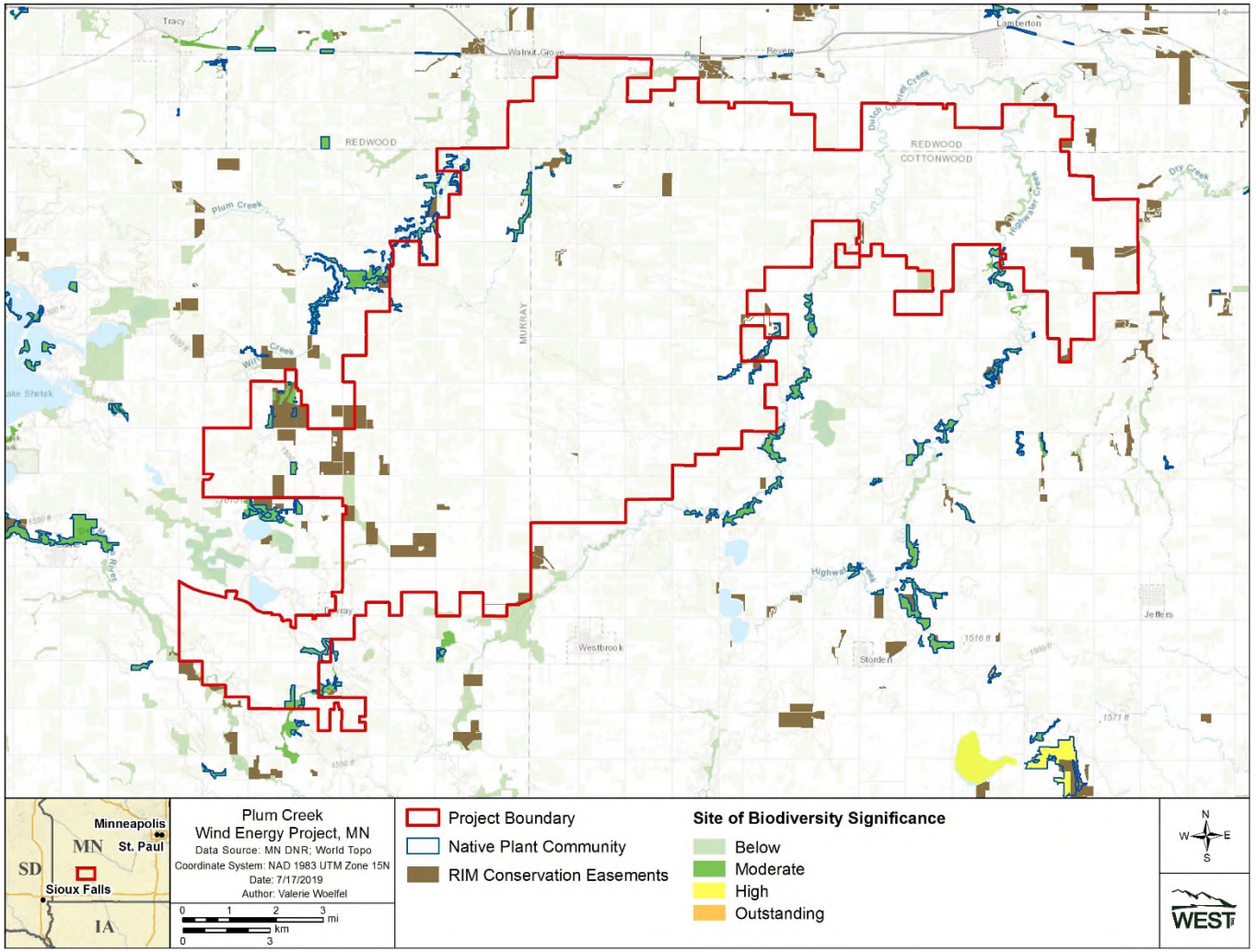


Figure 6. Minnesota Sites of Biodiversity Significance and Native Plant Communities at the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

Federal and State Protected Species

To determine which state- or federally listed endangered, threatened, proposed, or candidate species may occur in Cottonwood, Murray, and Redwood counties, Minnesota, WEST consulted the USFWS and MNDNR county distribution lists (MNDNR 2018c, USFWS 2018b). The eBird database, natureserve.org database, and data from the North American Breeding Bird Survey and the Minnesota Breeding Bird Atlas were also consulted for evidence of sensitive bird species near the Project and habitat descriptions. Table 3 shows species listed as endangered, threatened or protected under the Endangered Species Act (ESA; 1973) and the Bald and Golden Eagle Protection Act (BGEPA; 1940) with ranges that overlap the Project based on MNDNR and USFWS county distribution lists. WEST also has access to and included data from the MNDNR NHIS database for this Project, including listed species, native plant communities, and other rare features within a 1-mile (mi) buffer around the Project. State-listed species of concern were not listed here unless other criteria (i.e., critical habitat or NHIS records of occurrence) indicated a special significance within the Project.

Table 3. State and federally listed endangered and threatened species with records of occurrence or the potential to occur in Cottonwood, Murray, and Redwood counties, Minnesota.

Common Name	Status	Habitat
Mammals		
northern long-eared bat *Myotis septentrionalis*	FT, SC	Mature forest interior and riparian areas. May roost in old buildings. Typically avoids open habitats. Hibernates in caves. Project may provide suitable summer habitat for this species. Northern long-eared bats may also migrate through the Project.
eastern spotted skunk *Spilogale putorius*	ST	Open lands with fencerows, shelterbelts, thickets, brush, and riparian woodlands used as cover. They use buildings, corncribs, trash piles, rock piles, and haystacks for den sites and cover in agricultural areas. They are not likely to occur within the Project as they are suspected to have been largely extirpated from the state.
northern grasshopper mouse *Onychomys leucogaster*	SC	Grasslands, prairies, sagebrush deserts, overgrazed pastures, weedy roadside ditches, and semi-stabilized sand dunes. They use sandy areas with sparse vegetation that can be dug and burrowed into. Potential habitat is located northwest of the Project boundary but the Project does not appear to have suitable (dune) habitat for this species.
Birds		
burrowing owl *Athene cunicularia*	SE	Open, grazed pastures or native, mixed-grass prairies populated by burrowing mammals. American badgers (*Taxidea taxus*) and Richardson's ground squirrels (*Urocitellus richardsonii*) are thought to be the primary nest excavators for this species in Minnesota. They are not likely to occur within the Project as they are suspected to have been largely extirpated from Cottonwood, Murray, and Redwood counties.

Table 3. State and federally listed endangered and threatened species with records of occurrence or the potential to occur in Cottonwood, Murray, and Redwood counties, Minnesota.

Common Name	Status	Habitat
Henslow's sparrow *Ammodramus henslowii*	SE	Prefers natural grasslands over 100 acres (40 hectares) and old fields with stalks for singing perches and a thick litter layer. Due to the dominance of cultivated crops and the overall lack of grassland habitat, this species is unlikely to occur within the Project.
loggerhead shrike *Lanius ludovicianus*	SE	Upland grasslands and sometimes agricultural areas with short-grass vegetation, and perching sites such as small trees, hedgerows, and shrubs. Occurs in both native and non-native grasslands. The Project may contain suitable habitat for this species.
Wilson's phalarope *Phalaropus tricolor*	ST	Wet prairies and other grassy wetlands with short vegetation and shallow ponds. Flooded pastures and wastewater ponds may provide some habitat. The NHIS search showed records of occurrence in the west-central portion of the Project as recent as 2006 (Figure 7). The Project may contain suitable habitat for this species.
trumpeter swan *Cygnus buccinator*	SC	Herbaceous wetlands, ponds, lakes, and marshes. Areas with reeds, sedges, or similar emergent vegetation provide breeding habitat for this species. They winter on open lakes, ponds, and sheltered bays and estuaries. The NHIS search showed records of occurrence in the southwest portion of the Project as recent as 2006 (Figure 7). The Project area likely provides suitable habitat for this species.
upland sandpiper *Bartramia longicauda*	State Watchlist	Often found perched on fence posts or rocks in open fields including grasslands, prairies, and agricultural areas. The NHIS search showed records of occurrence in the northeast corner of the Project as recent as 2007. The Project area likely contains suitable habitat for this species.
bald eagle *Haliaeetus leucocephalus*	BGEPA	Found in a variety of habitats that provide suitable nest sites close to open water. Some potential suitable habitat is present within the Project, but bald eagles are more likely to utilize more forested areas around large lakes and prominent rivers.
golden eagle *Aquila chrysaetos*	BGEPA	Most common in the western half of North America where they are found in a wide range of habitats. Unlikely transient species in the Project.
Reptiles		
Blanding's turtle *Emydoidea blandingii*	ST	Wetland complexes and nearby sandy uplands are required. Calm, shallow waters with rich aquatic vegetation are preferred. Females often nest in agricultural fields. The Project may contain suitable habitat for this species.
Amphibians		
Great Plains toad *Anaxyrus cognatus*	SC	Damp areas of grasslands and farm fields, rainwater pools, stream valleys, small reservoirs and stock ponds. The NHIS search showed records of occurrence in the northeast portion of the Project as recent as 2008 (Figure 7). The Project may contain suitable habitat for this species.
Fish		

Table 3. State and federally listed endangered and threatened species with records of occurrence or the potential to occur in Cottonwood, Murray, and Redwood counties, Minnesota.

Common Name	Status	Habitat
Topeka shiner *Notropis topeka*	FE, SC	Slow moving, small to mid-size prairie streams with sand, gravel, or rubble bottoms within the Missouri River watershed. Prefer pool and oxbow areas outside main river channels. The closest designated critical habitat is approximately 16 miles (26 kilometers) south of the Project (Chanarambie Creek) and is isolated to the Missouri River watershed; however, the Project is in the Minnesota River watershed and therefore the species is not likely to occur.
Insects		
Dakota skipper *Hesperia docatae*	FT, SE	Native dry-mesic to dry prairie with mid-height grasses such as little bluestem *(Schizachyrium scoparium)*, prairie dropseed *(Sporobolus heterolepis)*, and side-oats grama grass *(Bouteloua curtipendula)*. Due to the dominance of cultivated crops and the overall lack of grassland habitat, this species is unlikely to occur within the Project.
Ottoe skipper *Hesperia ottoe*	SE	Native dry-mesic to dry prairie with mid-height grasses such as little bluestem *(Schizachyrium scoparium)*, prairie dropseed *(Sporobolus heterolepis)*, and side-oats grama grass *(Bouteloua curtipendula)*. This includes prairies on deep sands, steep bedrock-controlled slopes, and slopes and hills in unsorted glacial till. Due to the dominance of cultivated crops and the overall lack of grassland habitat, this species is unlikely to occur within the Project.
Poweshiek skipperling *Oarisma powesheik*	FE, SE	Wet to dry native prairie, but not sand prairie, dominated by native grass. The NHIS search showed records of occurrence in the southwest portion of the Project from 1975 (Figure 7). The Project may contain suitable habitat for this species. Due to the dominance of cultivated crops and the overall lack of grassland habitat, this species is expected to occur in low abundance within the Project
Mussels		
elktoe *Alasmidonta marginata*	ST	Medium to large rivers in sand or gravel substrates in areas with fast current. Due to the lack of suitable habitat and extreme rarity in the Minnesota River system, this species is unlikely to occur within the Project.
mucket *Actinonaias ligamentina*	ST	Medium to large rivers in sand and gravel substrates. They are not likely to occur within the Project as they are suspected to have been largely extirpated from the Minnesota River system.
fluted-shell *Lasmigona costata*	ST	Medium to large rivers dominated by gravel substrates with swift currents. They are not likely to occur within the Project as they are suspected to have been largely extirpated from the Minnesota River system.
spike *Elliptio dilatata*	ST	Small to large rivers, and is also known to inhabit larger lakes and reservoirs. They are not likely to occur within the Project as they are suspected to have been largely extirpated from the Minnesota River system.

Table 3. State and federally listed endangered and threatened species with records of occurrence or the potential to occur in Cottonwood, Murray, and Redwood counties, Minnesota.

Common Name	Status	Habitat
wartyback *Quadrula nodulata*	ST	Large rivers and fine or course substrates with slow to moderate current. Due to the lack of suitable habitat, this species is unlikely to occur in the Project.
Plants		
prairie bush clover *Lespedeza leptostachya*	FT, ST	Tallgrass prairie near the Des Moines River Valley. Often grows on steep slopes where cultivation is not possible. During the site visit, slopes with native prairie grasses were observed; therefore, it is possible that this species occurs in the Project.
hair-like beak rush *Rhynchospora capillacea*	ST	Calcareous fens at the margins of calcareous fen pools and marl flats where competition is minimal. May also be found in spring fens. No calcareous fens have been documented near the Project; the species is therefore unlikely to occur within the Project.
short-pointed umbrella-sedge *Cyperus acuminatus*	ST	Edges of shallow rock pools and in the muddy margins of ponds and lakes. The Project may contain suitable habitat for this species.
Sullivant's milkweed *Asclepias sullivantii*	ST	Frequently occurs with other declining prairie species such as tuberous Indian-plantain *(Arnoglossum plantagineum)* and wild quinine *(Parthenium integrifolium)*. Restricted to undisturbed mesic tallgrass prairies in Minnesota. Due to the dominance of cultivated crops and the overall lack of grassland habitat, this species is unlikely to occur within the Project.
eared false foxglove *Agalinis auriculata*	SE	Prairies and prairie remnants along railroads and rights-of way. The Project may contain suitable habitat for this species.
hooded arrowhead *Sagittaria calycina var. calycina*	ST	Found in fluctuating water levels of seasonal flooding in the backwaters of the Minnesota and Mississippi Rivers. Very specific habitat is thought to be required for this species, much of which has been lost, Due to the lack of suitable habitat, this species is unlikely to occur within the Project.
kitten-tails *Besseya bullii*	ST	Oak savanna communities, dry prairies, oak woodlands, and dry-mesic pine-oak woodlands. Largely restricted to bluffs and terraces over river valleys in Minnesota. Due to the lack of suitable habitat, the species is unlikely to occur within the Project.
Louisiana broomrape *Orobanche ludoviciana var. ludoviciana*	ST	Northern and southern dry prairie and northern and southern dry savanna. Areas with excessively drained, loose, and sandy soils including sand dunes and beach ridges. Due to the lack of suitable habitat, the species is unlikely to occur within the Project.
waterhyssop *Bacopa rotundifolia*	ST	Rainwater pools on bedrock outcrops and occasionally along margins of shallow prairie ponds. The Project may contain suitable habitat for this species.
Wolf's spikerush *Eleocharis wolfii*	SE	Little is known regarding the habitat of this species. Locations where it has been identified have been wet areas such as marshes, margins of water bodies and bedrock pools. The Project may contain suitable habitat for this species.

Table 3. State and federally listed endangered and threatened species with records of occurrence or the potential to occur in Cottonwood, Murray, and Redwood counties, Minnesota.

Common Name	Status	Habitat
hairy fimbry *Fimbristylis puberula var. interior*	SE	Calcareous fens. No calcareous fens have been documented near the Project. The species is therefore unlikely to occur within the Project.
slender-leaved scurfpea *Psoralidium tenuiflorum*	SE	Dry to dry-mesic bluff prairies in shallow soil over bedrock or dry rocky and sandy soils on lower portions of slopes. Only three populations are known to exist in Minnesota. Due to the lack of bluffs and extreme rarity in Minnesota, this species is unlikely to occur within the Project.
whorled nutrush *Scleria verticillata*	ST	Calcareous fens of high quality. No calcareous fens have been documented near the Project. Because of this restrictive habitat, this species is unlikely to occur within the Project.

Sources: eBird 2018, NatureServe 2018, MNBBA 2018a-b, MNDNR 2018c, Pardieck et al. 2017, USFWS 2018a

FE=federal endangered; FT=federal threatened; FC=Federal Candidate; SE=state endangered; ST=state threatened; SC = state species of concern; BGEPA=Bald and Golden Eagle Protection Act.

The land cover types present within the Project may support some of the species in Table 3. The Project is dominated by cultivated crops but also contains substantial areas of herbaceous grassland and freshwater emergent wetlands. Forested areas, including woody wetlands, are relatively scarce within the Project. There are several areas within the Project designated as native plant communities or sites of biodiversity significance by the MNDNR, although they are restricted to areas around Plum, Pell, Dutch Charley, and Highwater creeks (Figure 6).

The Minnesota Biological Survey (MBS) is an effort by the MNDNR that "systematically collects, interprets, and delivers baseline data on the distribution and ecology of rare plants, rare animals, native plant communities, and functional landscapes needed to guide decision making" (MNDNR 2018a). The survey has led to the development of geospatial databases that represent the highest quality native plant communities remaining in surveyed counties, and sites of biodiversity significance within Minnesota that can help with decision making when planning development and conservation efforts. Biodiversity significance ranks include *outstanding*, *high*, *moderate*, and *below*. Sites with a rank of "outstanding" contain the rarest species and outstanding examples of the rarest native plant communities and/or the largest, most ecologically intact or functional landscapes. Sites with a rank of "high" contain very good quality occurrences of the rarest species, high-quality native plant communities, or important functional landscapes. Sites with a rank of "moderate" contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes. Sites ranked "below" lack occurrences of rare species or do not meet MBS standards for other rankings (MNDNR 2018a).

Within the Project boundary, several small areas have been evaluated for their biodiversity significance by the MBS. All MBS sites within the Project boundary are ranked as "below" or "moderate" and there are no sites of "high" or "outstanding" biodiversity significance within the Project. There also are areas of MBS-mapped native plant communities within the Project

including dry hill prairie, southern west mesic hardwood forest, basswood-bur oak forest, prairie wetland complexes, and mesic prairie, all of which are associated with sites identified as moderate biodiversity. The MNDNR NHIS database search identified a record of southern dry hill prairie in the northwest portion of the Project near the confluence of Willow and Plum Creeks (Figure 7, Appendix A). As development continues, WEST recommends coordination with MNDNR to seek advice from department personnel on survey recommendations and/or permit requirements related to listed species, native plant communities, and areas of biodiversity significance.

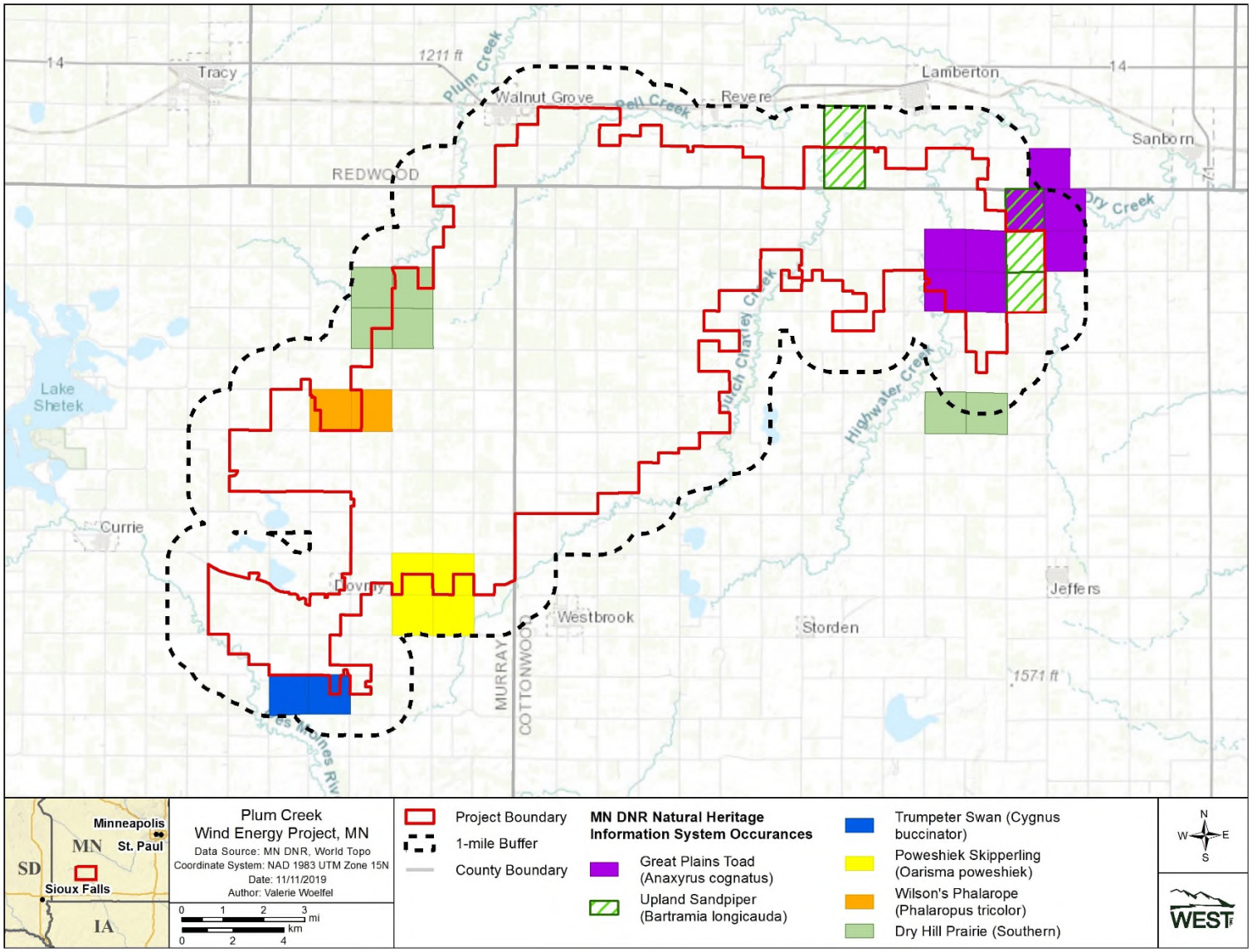


Figure 7. Sections within and adjacent to the Project containing Minnesota Natural Heritage Information Systems Records for the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

Federally Listed Species

Northern Long-eared Bat

On January 14, 2016, the USFWS posted the final Endangered Species Act 4(d) rule for NLEB in the Federal Register (FR; USFWS 2016; 81 FR 1900). This rule largely establishes an exemption for development and operation of wind energy facilities from needing to obtain any take coverage for NLEB (unless the project would directly impact a known hibernation or maternity roost site). Still, the NLEB is a federally listed threatened species, and a detailed species overview is provided below in the event that NLEB becomes protected as endangered or the 4(d) rule is modified during the operational life of the Project.

NLEB are a forest dependent species, generally relying on forest features for both foraging and roosting during the summer months (USFWS 2007, 2013b). In particular, NLEB appear to be a forest interior species that require adequate canopy closure for both roost and foraging habitat (Lausen 2009). Additionally, riparian areas are considered critical resource areas for many species of bats because they support higher concentrations of prey, provide drinking areas, and act as unobstructed commuting corridors (Grindal et al. 1999). While NLEB are associated with forest habitats, they also occur in agricultural settings where forest habitats have been highly fragmented (Foster and Kurta 1999, Henderson and Broders 2008).

During the summer, NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (USFWS 2007, 2013b). Males and non-reproductive females also may roost in cooler places, like caves and mines (MNDNR 2019c). NLEB seem opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices and they have also been found, rarely, roosting in structures like barns and sheds (USFWS 2013b). The NLEB is expected to be closely tied to intact forested habitats. Henderson and Broders (2008) found that NLEB did not travel more than 255 ft (78 m) from the edge of intact forest structure, however, the USFWS Range-Wide Indiana Bat Survey Guidelines consider any tree with characteristics of a suitable roost and within 1,000 ft of intact forest structure to be suitable habitat for NLEB (USFWS 2018c). During the winter, NLEB hibernate in caves or occasionally in abandoned mines (MNDNR 2019c).

The period between the summer maternity season and the winter hibernation season is referred to as “fall swarming.” The fall migration is likely between mid-August and mid-October. During this period, NLEB will migrate to hibernacula and congregate in the area around caves and mines; generally, this swarming behavior is located within 5 mi (8 kilometers [km]) of the hibernaculum (USFWS 2014). Little is known about NLEB roost selection during this period; however, Lowe (2012) documented NLEB roosting in both coniferous and deciduous trees and stumps as far away as 3 mi (4.8 km) from the swarming site. The potential risk to NLEB and other bats during the spring and fall is increased as bats migrate across the landscape from summer foraging and roosting habitats to suitable hibernacula. During this migration period, habitat associations are not as strong and bats tend to exhibit an increased risk of turbine collision as they move in a more broad front fashion from summer foraging areas to hibernacula (USFWS 2016). Overall, NLEB is

not considered a long-distance migrant and typically will only travel 40-50 mi (72-80 km) between summer maternity habitats and winter hibernation sites (USFWS 2016).

In order to evaluate the potential presence of NLEB during the summer maternity season at the Project, WEST will follow the USFWS's Northern Long-Eared Bat Interim Conference and Planning Guidance (USFWS 2014) and the 2018 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS 2018c). Per the USFWS guidance, the first step is a desktop habitat assessment. West will complete a NLEB habitat evaluation by: 1) quantifying the percent coverage of forest habitat types within the Project and a 2.5-mi buffer zone; and 2) identifying potential foraging, roosting, and commuting habitats – this will exclude consideration of woodland patches (smaller than 10 ac and separated from other habitats by at least 1,000 ft) that are unlikely to be suitable given their isolation (Figure 8). Forested areas will be derived from a machine learning classification algorithm used to delineate mature forest patches. The classifier was built using imagery from the Landsat 8 and Sentinel-2 satellites, as well as aerial imagery from the National Agriculture Imagery Program (NAIP) and used in a Random Forests model which uses a decision tree method to predict forest presence. The results from the model will be filtered and visually assessed for accuracy, whereby false positives will be removed and forest boundaries will be adjusted, if necessary. The results of the habitat assessment can be used to better inform potential acoustical survey locations. The USFWS recommends sampling at least two acoustic detector locations per 123 ac (50 ha) of suitable habitat for at least eight total detector nights (USFWS 2018c).

Potential foraging or roosting habitat within the Project boundary is fairly limited, with relatively few areas where shelterbelts and larger forested patches are separated by less than 1,000 ft (305 m); this connected habitat totaled approximately 840 ac (340 ha; 1.1%) of the Project with a mean patch size of approximately 6.0 ac (2.4 ha). The patches of suitable habitat were concentrated around Highwater, Dutch Charley, Pell, and Plum creeks. The limited suitable foraging and roosting habitat for NLEB within the Project suggests that risk to NLEB during the summer maternity period is likely relatively low for the majority of the Project area. However, the Project may pose some risk to NLEB as they migrate across the landscape from summer foraging and roosting habitats to swarming areas near hibernacula. Siting turbines 1,000 ft outside of potential foraging areas is likely to minimize this risk (Figure 8). Additional site-specific surveys to assess the presence or absence of NLEB will further inform the level of risk to this species at the Project.

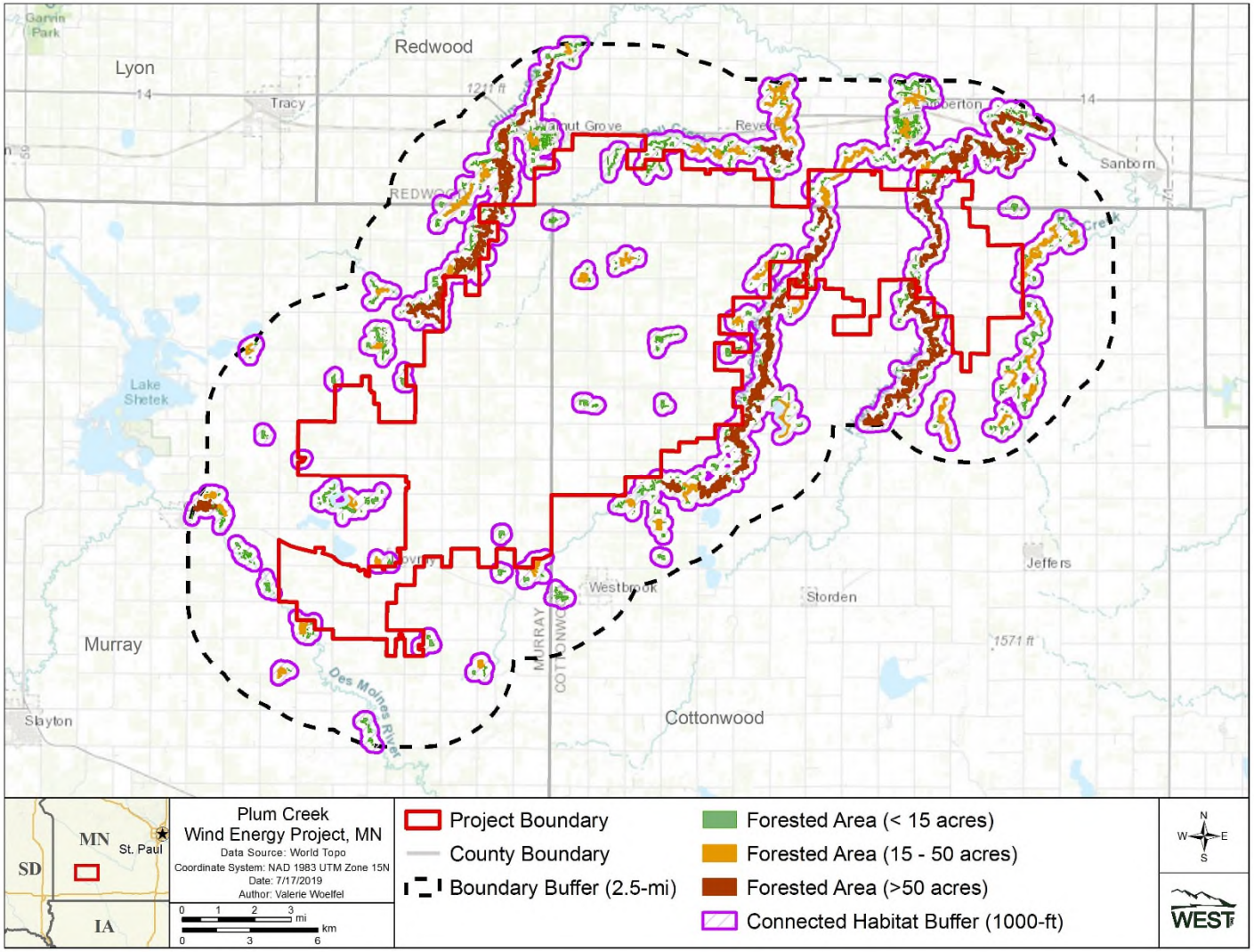


Figure 8. Potential suitable habitat and foraging range of northern long-eared bats in the vicinity of the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

Poweshiek Skipperling

The Poweshiek skipperling (*Oarisma poweshiek*) is a federally and state-listed endangered insect species confined almost entirely to the northern tallgrass prairies of Manitoba, Minnesota, the Dakotas, Iowa, Illinois, and Indiana, with a few isolated patches in Michigan. This species was previously one of the most abundant butterflies in the Minnesota prairies but habitat reduction has caused the population to decline to a small fraction of its previous size. The last confirmed sighting in Minnesota was in 2007 (MNDNR 2018b) and according to the NHIS database the last observation made near the Project was in 1975 (Figure 7; See Appendix A). In Minnesota, the Poweshiek skipperling prefers wet or dry prairie but not sand prairie (MNDNR 2018b; USFWS 2018a). According to the MBS ranking and characterization of habitat (MNDNR 2018a) and confirmations of suitable habitat made during the site visit (Appendix B), there is potential for this species to be found within the Project, likely within the small areas designated as native prairie along the Plum, Pell, Dutch Charley, and Highwater creeks (Figure 6).

Dakota Skipper

The Dakota skipper (*Hesperia docatae)* is a federally threatened and state-endangered butterfly species confined to remnants of mixed and tallgrass prairie remnants in Minnesota, the Dakotas, and southern Canada (USFWS 2018a). Prior to agriculture in Minnesota, this species was widespread and abundant across prairie dominated landscapes, but recent surveys have found that only one Dakota skipper population remains in Minnesota (MNDNR 2019g). No designated critical habitat for the Dakota skipper occurs within the Project. According to the MBS ranking and characterization of habitat and NHIS records of prairie (Figure 10; Appendix A) there is low potential for this species to be found within the Project, in the small tracts of native prairie in the southernmost portion of the Project.

Prairie Bush Clover

The prairie bush clover (*Lespedeza leptostachya*) is a federally listed threatened plant species that is only found in the tallgrass prairie region of four Midwestern states, including Minnesota. This species is in decline due to widespread conversion of native tallgrass prairie to agriculture. Prairie bush clover prefers dry to mesic prairies with gravelly soils (USFWS 2018b) and surviving populations are often found on steep slopes where agriculture is not feasible. According to the USFWS, the majority of surviving individuals are found in the Des Moines River Valley (USFWS 2018b). Because there were remnants of native prairie on slopes observed in the Project area during the site visit, there is the potential for prairie bush-clover to occur within the Project, specifically on slopes within the native prairie along the Plum, Pell, Dutch Charley, and Highwater creeks (Figure 6).

Topeka Shiner

The federally listed endangered Topeka shiner (*Notropis topeka*) is a small minnow less than three inches (eight centimeters) in total length (MNDNR 2018d). This species is restricted to small prairie streams that are tributaries to the Missouri River and inhabits less than 10% of its historic range (MNDNR 2018d). Populations in Minnesota appear stable, but populations in Iowa, Nebraska, Kansas, and Missouri have declined severely due to water contamination and are

absent from 80% of their historic range (MNDNR 2018d). The species was listed in 1998 and critical habitat was established in June 2004 (MNDNR 2018d). Murray County is designated as critical habitat for this species (Figure 9; MNDNR 2018d). However, the Project is located entirely in the Minnesota River watershed, not the Missouri River watershed and therefore, this species would not be anticipated to occur in waterbodies within the Project. The closest designated critical habitat for this species is in southwest Murray County along Chanarambie Creek and one of its tributaries, approximately 16 mi (26 km) south of the Project.

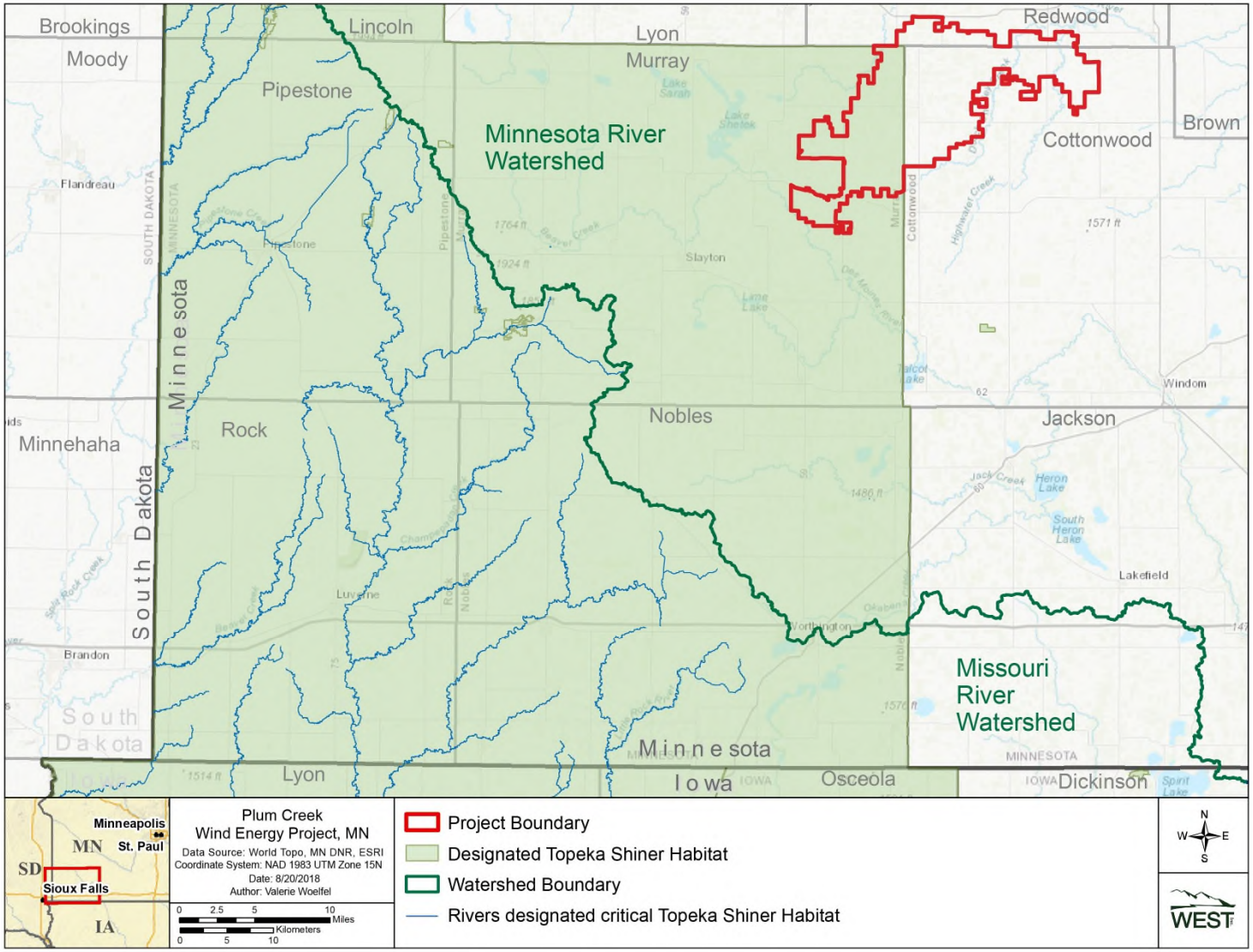


Figure 9. Designated Critical Habitat for the Topeka Shiner near Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

State-listed Species

Blanding's Turtle

The Blanding's turtle (*Emydoidea blandingii*) is a state-listed threatened species with a characteristic domed upper shell and bright yellow chin and throat (MNDNR 2018e). Wetland complexes and adjacent sandy uplands are necessary to support populations of this species, and suitable habitat is likely present within the Project. The Project is located at the western edge of the species range in the US. Calm, shallow waters and wetlands with rich aquatic vegetation are preferred, but the species appears adaptable in Minnesota, utilizing a wide variety of wetland types and riverine habitats (MNDNR 2018e). In southwestern Minnesota, meandering streams and rivers, fens, prairie marshes, backwaters, and oxbows are important aquatic habitats (MNDNR 2018e). Adjacent upland agricultural lands may also provide suitable habitat and female Blanding's turtles often nest in agricultural fields (MNDNR 2018e).

Great Plains Toad

The Great Plains toad (*Anaxyrus cognatus)* is a state species of special concern. This species is widespread throughout western states, with a range that encompasses most of the Great Plains and extends from Canada into central Mexico (MNDNR 2018f). The Project is located at the western extent of the species range. The Great Plains toad inhabits a variety of habitats including grasslands and agricultural areas (MNDNR 2018f), which are present in the Project. Breeding typically occurs in flooded areas or near the edges of rain pools, ponds, or reservoirs (IUCN 2015). According to the MNDNR NHIS, the Great Plains toad has been observed within the eastern edge of the Project as recently as 2008 (Figure 7).

Trumpeter Swan

The trumpeter swan (*Cygnus buccinators*) was a common inhabitant of Minnesota until the mid-1800s and was extirpated from the state in the mid-1900s (MNDNR 2019b). Trumpeter swan reintroduction efforts occurred from 1966-2012 in Minnesota and in 2015 the breeding population was estimated at over 17,000 individuals (Herwig and Giudice 2015; MNDNR 2019b). Trumpeter swans use ponds, lakes, and sheltered bays with emergent vegetation and muskrat or beaver lodges for nesting platforms (MNDNR 2019b). The MNDNR NHIS records indicate that the most recent trumpeter swan observation within the Project occurred in 2006 in the southwest corner of the Project along the Des Moines River (Figure 7).

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is an avian species that is state-listed as endangered. It inhabits grasslands, native prairies, pastures with fence rows and agricultural fields (MNDNR 2018g). Because there is some suitable habitat for these species within the Project, there is potential for it to occur. However, sightings in southwest Minnesota are rare (eBird 2018), and the Minnesota Breeding Bird Atlas (MNBBA) has only recorded breeding in seven counties in Minnesota, none of which are Cottonwood, Murray, or Redwood counties (MNBBA 2018b).

Wilson's Phalarope

Wilson's phalarope (*Phalaropus tricolor*) is an avian species that is state-listed as threatened (MNDNR 2018h). This species is primarily associated with wetlands. In Minnesota, they are most frequently observed in wet prairie, rich fen, and grass- or sedge-dominated wetlands (MNDNR 2018h). Suitable habitat likely occurs within the Project surrounding Plum, Pell, Dutch Charley, and Highwater creeks. The MNDNR NHIS includes a sighting of Wilson's phalarope within the west-central portion of the Project in 2006 (Figure 7; See Appendix A). According to eBird (2018), several more recent observations have been made near the Project, including a record approximately 8.5 mi (13.7 km) east of the Project in May 2018.

State-listed Plants

Three state-listed threatened plants have the potential to occur within the Project. Short-pointed umbrella-sedge (*Cyperus acuminatus*), waterhyssop (*Bacopa rotundifolia*), and wolf's spikerush (*Eleocharis wolfii*) are water associated plants that may occur on the margins of small ponds or bedrock pools within the Project (MNDNR 2018i-k). Proper siting of turbines and infrastructure, which avoids impacts to streams, jurisdictional wetlands, and native plant communities should avoid or minimize disturbance to listed plants and the sensitive aquatic habitats required by these species.

Eared false foxglove is a state-listed endangered plant (MNDNR 2018l). Because it is associated with disturbed prairie along railroads and in rights-of-ways (MNDNR 2018l), this species has a potential to occur within the Project; however, fewer than 50 plants have been observed in Minnesota (MNDNR 2018i).

Eagles and Other Raptors

Eagle Occurrence

Eagles may occur within the Project throughout the year. The Project lies within the Mississippi and Central Flyways, which are two of the four major migration corridors in North America. The Project is located on the periphery of these migration corridors and migrating birds may use the lakes and wetlands in and around the Project as stopover habitat. Additionally, the Project is within the Prairie Pothole Region which contains an abundance of native grassland and wetland habitats suitable for migratory birds. There are few wooded areas within the Project that would be likely to support raptor nests, and more suitable nesting habitat is present outside the Project. No dramatic topographic features such as rim and bluff edges that may increase raptor use and migration are present within the Project. The Upper Minnesota River Valley IBA is a known raptor migration corridor approximately 25 mi (40 km) northeast of the Project.

Small populations of golden eagles (*Aquila chrysaetos*) winter in southeast Minnesota but observations are rare in the vicinity of the Project. The closest observation of a golden eagle recorded by eBird in the vicinity of the Project was recorded near Augusta Lake in April 2018 (eBird 2018), approximately 9.4 mi (15.1 km) southeast of the Project. This data suggests that golden eagles are most likely to occur within the Project as rare passing migrants.

Bald eagles (*Haliaeetus leucocephalus*) occur more often in the vicinity of the Project. There are multiple lakes within and adjacent to the Project that may provide suitable nesting and wintering habitat for bald eagles. WEST has documented several active bald eagle nests south and southwest of the Project in areas within one mi of the Project boundary, and despite the relative scarcity of forests within the Project, bald eagles may nest and breed in the general area. Bald eagles also may occur within the Project during spring and fall migrations, likely moving through the area in a broad-front fashion. The eBird database shows several bald eagle observations in Murray, Cottonwood, and Redwood counties in 2017 and 2018. Observations of bald eagles near the Project in 2017 and 2018 include one observation in a corn field along County Road 11, one observation along Dry Creek, southeast of the town of Sanborn, and several sightings near Lake Shetek and its associated islands and smaller lakes (eBird 2018).

The eBird database is housed and managed by the Cornell Laboratory of Ornithology and is currently the largest compendium of geospatial data on birds in the world, receiving over 3 million records per month for North America, and providing an unparalleled resource for the analysis of bird distributional patterns over time and space for most of North America (Sullivan et al. 2009). Data is gathered by birdwatchers that also use the database to track their own personal history of bird observations, and it is quality controlled by regional editors who review and evaluate unusual records on an individual basis. The utility of the eBird database for analyzing bird occurrence patterns within a given region is purely a function of the extent of eBird data submission within the region, and coverage is a function of birdwatcher activity. eBird was created in 2002, and although it is possible for users to submit older historical records, the vast majority of records within this database are from 2008 to the present, due to the recent rise in usage of this database.

Bald Eagle Nesting and Seasonal Occurrence

In Minnesota, bald eagles have historically been most abundant during late fall and early spring, when eagles are migrating through the state. Some areas of the state host resident populations as well, and the breeding population of bald eagles has been increasing steadily in the last twenty years, including in the southwest portion of the state where the Project is located. Bald eagles prefer nesting, roosting, and foraging in areas with mature trees near permanent water bodies in undisturbed areas with abundant prey species such as fish and waterfowl (Swenson et al. 1986, Mojica et al. 2008). Aerial eagle nest surveys conducted by WEST have documented multiple active bald eagle nests within 10 mi (16 km) of the Project, although no active bald eagle nests have been documented within the Project itself (WEST unpublished data). Though Minnesota has experienced an increase in the number of nesting bald eagles over the past twenty years, challenges and threats to bald eagles remain. Major threats to bald eagles include loss or alteration of nesting and roosting habitat, exposure to poisons and environmental contaminants (e.g., lead, pesticides, pollution), electrocution and collision with power lines, and collision with wind turbines (Kochert and Steenhof 2002). Potential impacts to bald eagles from wind energy development and operations include collision with wind turbines and associated transmission lines as well as disturbance of nests, roosting sites, and foraging areas.

A review of all years of bald eagle year-round data in the eBird database for Cottonwood, Murray, and Redwood counties and all surrounding counties indicates a strongly seasonal occurrence pattern, with bald eagle abundance peaking during the late winter (February and early March; eBird 2018). It should be noted that eBird data are a citizen-science database and comprises reported observations collected without a systematic sampling structure. These data should be interpreted with caution as observation locations are often skewed toward birding hotspots and looking at all historical data in one dataset may not reflect recent seasonal trends.

Bald Eagle and Raptor Migration

The Project is located on gently rolling hills dominated by cultivated cropland. Streams and open water are present, but the Project is largely lacking in forested areas. The Project lacks defined topographic edges and does not contain features that are likely to concentrate migrating raptors.

Bald eagle migration patterns depend primarily on the age of the bird (immature or adult), location of the breeding site, breeding site climate, and food availability (Buehler 2000). Bald eagle migration is not as regular as with other migratory birds, as movements are often opportunistic, somewhat unpredictable, and widely dispersed in time (Buehler 2000). Bald eagles typically do not migrate in kettles or flocks, but concentrations of migrants may occur at communal feeding and roost sites (Buehler 2000). Fall migration occurs during August through January. In the Great Lakes region and adjacent areas in Canada, bald eagles often migrate south along major river systems like the Mississippi and Minnesota Rivers in search of food (Buehler et al. 1991). In the spring, bald eagles may return to their breeding grounds as soon as the weather improves and food is available, again using major river valleys as migration corridors. The spring migratory period is generally considered to occur from January to March. Migration occurs during the day when thermals provide for opportunities to soar with limited energetic expense.

Eagles may pass through the Project in a broad-front fashion during migration, especially if there are food sources such as carrion available. Little information is available regarding the characteristics of stopover habitat used during migration. It is likely that the suitability of stopover habitat is most related to food availability rather than vegetative composition or structural characteristics as stopover sites are usually areas with consistent fish-kills, concentrations of fish and waterfowl, or the presence of large mammals as carrion (McClelland et al. 1996). Roosts that most commonly see repeated use as stopover sites consist of clumps of mature deciduous trees in riparian areas protected from human disturbance and proximate to foraging opportunities. Locations within the Project that may serve as stopover sites for eagles are limited to the tree-lined shores of water bodies with foraging opportunities. Pastureland may attract bald eagles if carrion or small game is present.

Bald Eagle Seasonal Concentration Areas

The Project does not contain areas that are likely to concentrate large numbers of migrating bald eagles or other raptors. The rivers and ponds within the Project may provide habitat and foraging opportunities that would attract eagles during migration or may be used for foraging by resident eagles; however, these are small areas with relatively few trees and would not be expected to concentrate large numbers of eagles. The majority of the Project is composed of cultivated

cropland with very little deciduous forest (approximately 0.9% of the Project). While there is likely to be increased bald eagle use associated with forested riparian habitats, bald eagle use throughout the rest of the site will likely be much lower. Ephemeral foraging opportunities in the form of livestock carcasses and road kill may temporarily attract eagles to the more agricultural areas within the Project, especially during the winter.

Bald Eagle Physical Landscape Features

Physical features of the landscape that may attract or concentrate eagles are limited within the Project. The general topography within the Project is flat or rolling with a slight decrease in elevation when moving from the southwest portion to the northeast portion of the Project. It is likely that bald eagles will migrate through the Project in a broad front fashion. The closest major known migration corridor for bald eagles is the Minnesota River, which is approximately 25 mi (40 km) northeast of the Project. The Project lacks prominent north/south ridges or valleys that would be likely to funnel migrants through Project (Figure 3). Trees, shrubs, and open water sources within the Project may provide some stopover habitat for migrating bald eagles. Additional wetlands, forested areas, and open water are present in the surrounding landscape and may attract eagles to the region; however, these features are less abundant within the Project.

Stage 1 Eagle Conservation Plan Guidance Questions

The ECPG (USFWS 2013a) suggest that specific questions 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 the Stage 1 Initial Site Assessment.

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

   Yes, eagles and eagle habitat are present within the geographic region under development consideration. The wildlife refuge and forested patches and riparian areas surrounding small creeks within the Project may provide limited suitable eagle habitat. Tier 3 avian use studies are currently underway at the Project (raptor nest survey and avian/eagle use surveys).

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?*

   There are some potentially valuable habitat for eagles within or directly adjacent to the Project, but relatively higher eagle use areas can likely be avoided during construction and operation of the Project. Land cover within the Project is predominantly cultivated cropland. Tier 3 avian use studies are currently underway at the Project (raptor nest survey and avian/eagle use surveys).

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

   There are no known important use areas or migration concentration sites within the Project. Tier 3 avian use studies are currently underway at the Project (raptor nest survey and avian/eagle use surveys).

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

   The wildlife refuges and creeks within the Project may provide habitat that supports prey for eagles. These resources compose a relatively small percentage of the total Project; the Project boundary also excludes some of the larger open water lakes in the vicinity.

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?*

   Bald eagles have the potential to occur in the Project during all seasons. The areas at highest risk of eagle occurrence within the Project are the creeks and wildlife refuge, as well as areas within proximity of active nests. Avoiding or minimizing turbine siting in proximity to these features will reduce the potential for significant adverse impacts to eagles.

General Avian Migration

General avian migration through the Project is likely to occur in a broad-front fashion. Migrating birds passing through the Project may use the forested areas, grasslands, riparian corridors, and wetlands as stopover habitat.

Important Bird Areas

The closest IBA to the Project is the Heron Lake State IBA, which is located approximately 5 mi (8 km) south of the Project (Figure 10). This IBA encompasses North and South Heron Lake as well as Talcot Lake Wildlife Management Area and surrounding small lakes and wetlands. Heron Lake State IBA focuses on water and marsh birds and hosts a number of species of conservation concern. Some of these birds include Henslow's sparrow (*Ammodramus henslowii)*; Sprague's pipit (*Anthus spragueii*; state-listed endangered); Wilson's phalarope (state-listed threatened); and trumpeter swan, Franklin's gull (*Leucophaeus pipixcan*), American white pelican (*Pelecanus erythrorhynchos*), and Forster's tern (*Sterna forsteri*), which are state species of special concern (MNDNR 2018c; eBird 2018).

The Des Moines River IBA is located to the east of the Heron Lake State IBA approximately 20 mi (32 km) southeast of the Project near the town of Windom (Figure 10). This IBA provides an important corridor of native habitat within a heavily cultivated portion of Minnesota. The IBA includes 38 mi (61 km) of the Des Moines River. There are several lakes within this IBA including Boot, Cottonwood, Wolf, and Summit lakes. Habitat consists of a variety of grasslands, wetlands, forests. Approximately 4,700 ac (1902 ha) of native plant communities have been mapped within this IBA. Birds present in this area include bobolink (*Dolichonyx oryzivorus*), dickcissel (*Spiza americana*), eastern wood pewee (*Contopus virens*), field sparrow (*Spizella pusilla*), grasshopper sparrow (*Ammodramus savannarum*), northern rough-winged swallow (*Stelgidopteryx serripennis*), ovenbird (*Seiurus aurocapilla*), rose-breasted grosbeak (*Pheucticus ludovicianus*), sedge wren (*Cistothorus platensis*), and yellow-bellied sapsucker (*Sphyrapicus varius*). This IBA encompasses a variety of grassland, wetland, and forest habitat resulting in high bird species diversity.

The Prairie Coteau Complex State IBA is approximately 15 mi (24 km) west of the Project near the town of Pipestone (Figure 10). This IBA focuses on prairie, grassland, and marsh birds and hosts a number of species of conservation concern. Some of these birds include: Henslow's sparrow, burrowing owl (*Athene cunicularia*) and chestnut-collared longspur (*Calcarius ornatus*; state-listed endangered); horned grebe (*Podiceps auritus*), Wilson's phalarope, and loggerhead shrike (state-listed threatened); and marbled godwit (*Limosa fedoa*), Franklin's gull, Forster's tern, short-eared owl (*Asio flammeus*), and Nelson's sparrow (*Ammodramus nelson*; state species of special concern). In total, 251 species have been observed here including 71 designated as species of greatest conservation need.

The Upper Minnesota River Valley IBA, is approximately 25 mi (40 km) northeast of the Project. This global priority IBA is comprised of a mix of high quality habitat that offers suitable nesting and stopover sites for many birds along the Minnesota River valley. The Minnesota River Valley IBA runs along the Minnesota River and is a major migration route for eagles and other raptors (Figure 10).

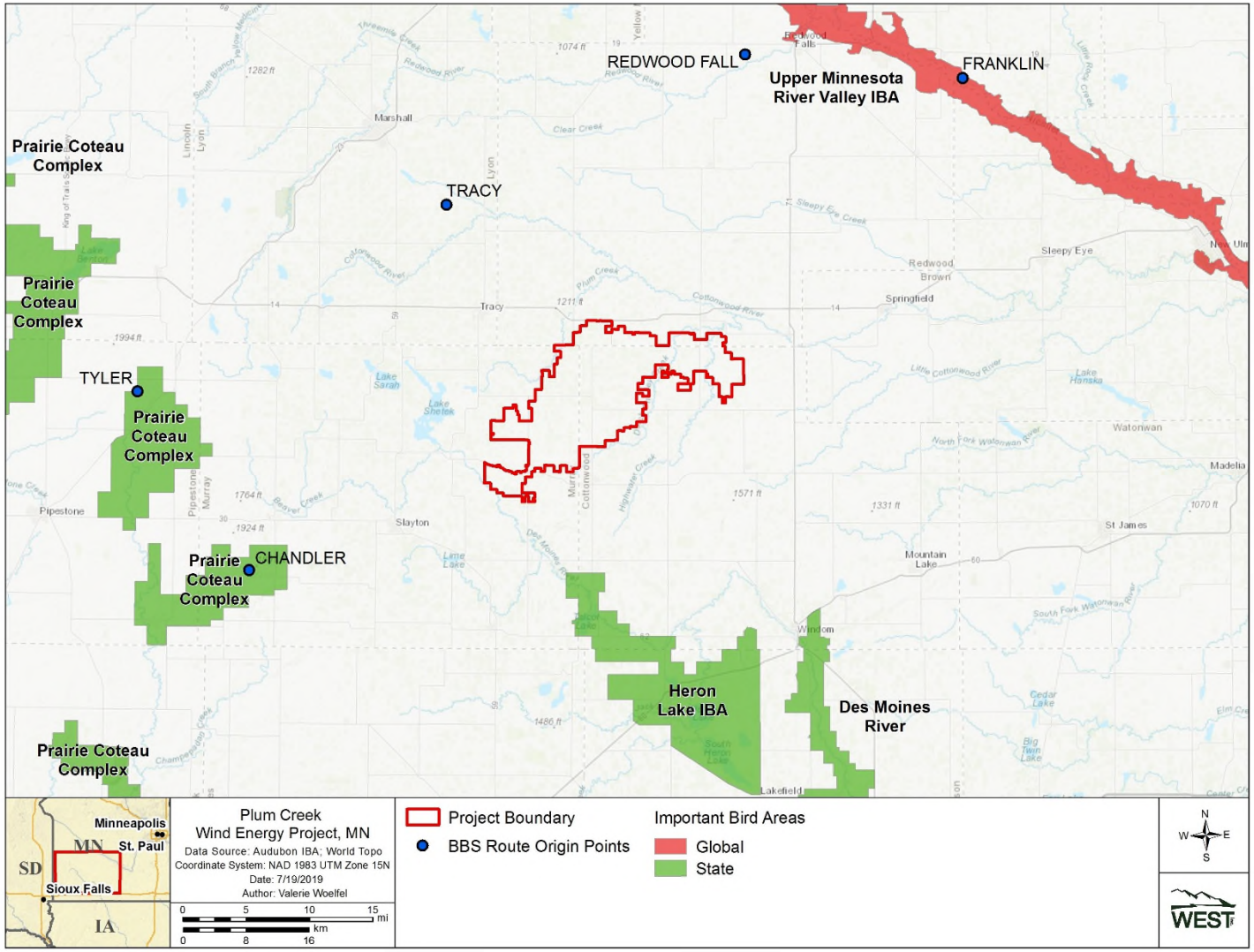


Figure 10. Important Bird Areas and BBS route origins in the vicinity of Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota.

USGS Breeding Bird Survey

The USGS North American Breeding Bird Survey (BBS) is a collaborative effort between the USGS Patuxent Wildlife Research Center and Environment Canada's Canadian Wildlife Service. The objective of the survey is to monitor the status and trends of North American bird populations via a standardized protocol collected by participants along thousands of randomly established roadside routes throughout the continent. The closest BBS route to the Project is the Tracy route. The origin of the Tracy Route is located northwest of the Project, and has entered the western edge of the project during some years (Figure 10). The Tracy route was monitored six times between 2004 and 2017. A total of 89 species have been observed over that time period, including four raptors (red-tailed hawk [*Buteo jamaicensis*], broad-winged hawk [*Buteo platypterus*], northern harrier [*Circus cyaneus*], and American kestrel [*Falco sparverius*]; Pardieck et al. 2017). The most common species recorded were red-winged blackbird (*Agelaius phoeniceus*), common grackle (*Quiscalus quiscula*), western meadowlark (*Sturnella neglecta*), and European starling (*Sturnus vulgaris*; USGS 2019).

USFWS Birds of Conservation Concern

Although not listed under the ESA, many species of bird have been identified by the USFWS as Birds of Conservation Concern (BCC; USFWS 2008). These are "species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973" (USFWS 2008). Virtually all birds listed as BCC are protected under the Migratory Bird Treaty Act (MBTA) 1918), and eagle species are protected by the BGEPA (1940). The Project is in the Prairie Potholes Bird Conservation Region (BCR 11), which includes 39 BCC species (USFWS 2008). The USFWS lists 27 species as birds of conservation concern within this region (USFWS 2008). The mosaic of habitat and land cover types present within the Project has the potential to support several of these species. According to the 2004–2017 USGS North American BBS data, five of the 27 BCC species for this region have been recorded along the Tracey route (Table 10). These species include American bittern (*Botaurus lentiginosus*), upland sandpiper (*Bartramia longicauda*), red-headed woodpecker (*Melanerpes erythrocephalus*), grasshopper sparrow, and dickcissel. Additionally, a number of these species may migrate through, or overwinter in the Project, although the extent cannot be predicted (USGS 2019).

Bats

Seven species of bats could potentially occur at the Project; three are listed by the MNDNR as species of special concern, including the federally listed threatened NLEB (Table 4). Not included in this list, but listed as a species found within Minnesota, is the evening bat (*Nycticeius humeralis*). The evening bat was not previously known to occur in Minnesota but was documented in July 2016 by the MNDNR in Arden Hills, near Minneapolis, Minnesota. Evening bats have been regularly expanding their range including recent expansions within South Dakota, New York, Nebraska, Michigan, Kansas, and Texas (Mulnzer 2008). Based on the desktop habitat review, the Project has approximately 1.1% coverage of woodland habitat for tree-roosting bats, with the majority of habitat associated with isolated woodlots and shelterbelts, and located along semi-forested corridors of Plum, Pell, Dutch Charley, and Highwater creeks. Also, the presence of

wetlands, ponds, and cultivated cropland may attract bats for foraging and drinking opportunities. There is potential for spring, summer, and fall use at the Project for these seven bat species. There are no known NLEB hibernacula in Cottonwood, Lincoln and Redwood counties, and the closest known hibernacula is near the border of Nicollet and Le Sueur counties, approximately 96 mi (154 km) to the east of the Project (MNDNR and USFWS 2018c). Tier 3 studies can provide more information on use levels and seasonal patterns as well as species composition within the Project.

Table 4. Bat species with potential to occur within the Plum Creek Wind Project in Cottonwood, Murray, and Redwood counties, Minnesota (Bat Conservation International 2018.

Common Name	Scientific Name
eastern red bat	*Lasiurus borealis*
little brown bat[2]	*Myotis lucifugus*
northern long-eared bat[1, 2]	*Myotis septentrionalis*
tri-colored bat[2]	*Perimyotis subflavus*
big brown bat	*Eptesicus fuscus*
silver-haired bat	*Lasionycteris noctivagans*
hoary bat	*Lasiurus cinereus*

[1] Federally threatened species (USFWS 2016).

[2] State species of special concern.

Tier 1 and Tier 2 Questions

As described in the *Final Land-based Wind Energy Guidelines* (USFWS 2012), Tier 1 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 objective of the Tier 1 & 2 study is to assist the developer in further identifying a potential wind site by providing a preliminary evaluation or screening of public data from federal, state, and tribal entities and offering early guidance about the sensitivity of the site in regards to flora and fauna. The following discussion provides answers to the Tier 1 and 2 questions for the Plum Creek Project.

1. *Are there species of concern, or habitat for that species, present in the proposed Project area?*

   There are a few small areas designated by the Minnesota Biological Survey as native plant communities within the Project which may provide limited suitable habitat for listed species such as the Dakota skipper, Ottoe skipper (*Hesperia ottoe*), and Poweshiek skipperling. All of these native plant communities overlap areas designated as sites of moderate biodiversity significance by the MNDNR. These areas, along with freshwater emergent wetlands, riverine areas, and freshwater forested/shrub wetlands and ponds may provide suitable habitat for several of the species listed in Table 3, including NLEB, loggerhead shrike, Wilson's phalarope, bald eagles, trumpeter swan, Blanding's turtle, great plains toad, prairie bush clover, short-pointed umbrella-sedge, waterhyssop, and Wolf's spikerush. Other species included in Table 3 are listed within the three counties that overlap the Project boundary but there is little to no suitable habitat within the Project.

2. *Does the landscape contain areas where development is precluded by law or designated as sensitive according to scientifically credible information?*

   There are a few protected areas within the Project including a federally managed wildlife refuge and privately owned conservation areas (Figure 5).

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

   Within the Project, several small areas have been evaluated for biodiversity significance by the MBS. These sites within the Project are ranked as either "below" or "moderate;" there are no sites of "high" or "outstanding" biodiversity significance within the Project. Small sites of MBS-mapped native plant communities exist in the Project including dry hill prairie, southern west mesic hardwood forest, basswood-bur oak forest, prairie wetland complexes, and mesic prairie, all of which are associated with sites identified as moderate biodiversity. Proper siting of turbines and infrastructure to avoid these areas, particularly the moderate biodiversity sites, should minimize the potential impacts to plant communities of concern.

4. *Are there known critical areas of wildlife congregation in the proposed Project area?*

   There is low potential for species of wildlife to congregate within the Project based on publicly available data. Areas where congregation would be most likely are within the state wildlife management areas present within the Project or in and around creeks and small wetlands during peaks in avian migration through the area. The site visit did not observe areas of congregation within the Project.

5. *Are there large areas of intact habitat with the potential for fragmentation, with respect to species of habitat fragmentation concern needing large contiguous blocks of habitat?*

   Most of the Project is fragmented and is a mosaic of cultivated cropland, developed areas, emergent herbaceous wetlands, herbaceous areas, and deciduous forests. NLCD data and aerial imagery indicate that relatively small areas of intact mixed herbaceous grasslands and wooded areas exist within the Project. The relatively small areas of intact grasslands do not appear contiguous, thus species requiring larger tracts of connected prairie are unlikely to occur within the Project. The intact contiguous forested areas may be suitable for some sensitive bat species such as NLEB as well as other tree bat species. Avoidance of these forested tracts would help reduce potential impacts to this species should it occur within the Project.

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 highly fragmented and 91% cultivated crops, which provide limited habitat to avian species. Pre-construction avian surveys have identified several species of birds, one of which is state-listed (Henslow's sparrow; state-listed endangered and observed incidentally). The Project occurs within the known range of the northern long-eared bat, and occurrence is possible within the forested areas of the Project during the summer months as well as more generally during early fall migration throughout the area. Bald and golden eagles may also occur within the Project Area. Initial studies indicate that there are bald eagle nests

outside of, but within one mile of, the Project, and bald eagles may occur as nesting pairs or as passing migrants within the Project boundary. Golden eagles are much less common in this area and are expected to occur, if at all, as uncommon migrants passing through in a broad-front fashion.

7. *Is there a potential for significant adverse impacts to species of concern based on the answers to the questions above?*

   Based on available information the potential for significant adverse impacts to species of concern from development of the Project is relatively low. There is one species (Topeka shiner) with designated critical habitat in Murray County; however, the closest designated critical habitat for this species is in southwest Murray County along Chanarambie Creek and one of its tributaries within the Missouri River watershed, approximately 169 mi (2631 km) south of the Project. Figure 9 shows details that support the unlikelihood of this species presence or impact on its habitat with the development of this Project specifically. Habitats within the Project are already largely fragmented.

DISCUSSION

The Project is located in Cottonwood, Murray, and Redwood counties in southwestern Minnesota. Land cover within the Project consists of a mosaic of cultivated cropland, developed open space, emergent herbaceous wetlands, and herbaceous land. Freshwater emergent wetlands are contained mostly within the protected lands within the Project boundary. Rivers present within the project include five creeks located mostly in the northern portions and along the eastern edge of the Project boundary. There are very few freshwater ponds and lakes within the Project, those present are associated with the wildlife refuge and easements. Forested and riparian areas are limited within the Project and are fragmented. Several areas within the Project are designated as native plant communities or sites of moderate biodiversity significance by the MNDNR.

Land cover types within the Project may provide suitable habitat for both federal- and state-listed species. Critical habitat for the Topeka shiner has been designated within the streams in the Missouri River watershed in the western portion of Murray County, and it is unlikely that streams in the Minnesota River watershed, where the Project is located, would contain this species. NHIS designates areas within the boundary as locations potentially containing Poweshiek skipperling, Great Plains toad, trumpeter swan, and Wilson's phalarope. A few areas designated as Minnesota native plant communities and sites of moderate biodiversity significance are present within the Project. Impacts to these areas should be avoided and minimized to the extent possible. The Project does not contain any areas mapped as high or outstanding biodiversity significance.

There is some potential for the NLEB to occur within the Project, and similar to other wind energy projects in this species' range, development within the Project area may impact NLEB. However, given the amount of forest areas within the Project, the spring migration to foraging areas (mid-March to mid-May) and the fall migration and swarming period (mid-August to mid-October) near hibernacula are the times when NLEB are most likely to be present within the Project. If NLEB occur in the Project during the summer months, they will likely occur within or nearby (within 1,000

ft) larger patches of forested habitats (USFWS 2011). Desktop analysis shows that potential summer roosting and foraging areas are generally limited within the Project, although some suitable foraging and roosting habitat does occur (approximately 840 ac [340 ha; 1.1% of the Project) and is concentrated around Plum, Pell, Dutch Charley, and Highwater creeks (Figure 8). Further consultation with the USFWS regarding risk and additional site-specific assessments for NLEB are recommended.

Similar to other wind-energy projects in the Midwest region, bird and bat species will likely utilize the Project. Available information indicates that raptors and eagles may occur within the Project. WEST has documented active bald eagle nests in the surrounding counties within one mi of the Project boundary, and despite the relative scarcity of forests within the Project, bald eagles may nest and breed in the area. Results available from initial surveys conducted at the Project indicate there are bald eagle nests within one mi of the Project, Golden eagles are not common in this area and are expected to occur in the Project only as rare migrants.

The limited areas of herbaceous grassland within the Project are unlikely to support state-listed grassland bird species. Several IBAs are located within the same counties as the Project, but all are located several miles from the Project boundary. Heron Lake IBA is the closest, about five mi (eight km) south of the Project; this IBA complex focuses on water and marsh birds. The July 19, 2018, site visit indicated that in general the grassland habitats within the Project (particularly those outside of state or federal management land) are fragmented and are limited to steeper terrain not capable of being cultivated. Additional Tier 3 studies would help to further assess risk. Consultation with the USFWS and MNDNR regarding the type and extent of additional surveys is recommended.

The Project contains some wetland habitats (desktop sources indicate that between 1.8 to 3.4% of the Project is wetlands or open water, based on the NLCD and NWI databases, respectively) and multiple stream features. WEST recommends that field delineation be conducted to confirm the location and boundaries of jurisdictional wetlands and waters within the Project in the vicinity of proposed construction impacts in order to avoid and minimize impacts. In particular, the state often recommends setbacks from larger, deeper wetlands, especially PWI lakes and streams. A field assessment to determine if suitable habitat is present for the sensitive reptiles and amphibians species is also recommended if impacts to waterways are anticipated. The closest designated critical habitat for the federally listed endangered Topeka shiner species is approximately 16 mi (26 km) south of the Project (Chanarambie Creek) and is isolated to the Missouri River watershed. However, the Project is entirely within the Minnesota River watershed, not the Missouri River watershed and therefore this species would not be anticipated to occur in waterbodies within the Project boundary.

The Project contains a few areas of state and federally owned land. A wildlife refuge and several private conservation easements are scattered throughout the Project. Minnesota statutes require setbacks from these areas to help avoid and minimize risk to wildlife and maintain their conservation and recreational value. Additionally, the state requires that any native prairie (grassland that has not previously been tilled, regardless of quality) be avoided if possible and a prairie mitigation plan must be developed and approved by the MNDNR.

REFERENCES

81 Federal Register (FR) 9: 1900-1922. 2016. Endangered and Threatened Wildlife and Plants; 4(D) Rule for the Northern Long-Eared Bat; Final Rule. 50 CFR 17. Department of the Interior, Fish and Wildlife Service. 81 FR 1900. January 14, 2016. Available online: http://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf

Bald and Golden Eagle Protection Act (Eagle Act). 1940. 16 United States Code (USC) § 668-668d. Bald Eagle Protection Act of 1940, June 8, 1940, Chapter 278, § 2, 54 Statute (Stat.) 251; Expanded to include the related species of the golden eagle October 24, 1962, Public Law (PL) 87-884, 76 Stat. 1246. As amended: October 23, 1972, PL 92-535, § 2, 86 Stat. 1065; November 8, 1978, PL 95-616, § 9, 92 Stat. 3114.

Bat Conservation International, Inc. (BCI). 2018. Bat Species: US and Canada. Accessed June 2018. Information online: http://www.batcon.org/resources/media-education/species-profiles

Buehler, D. A., T. J. Mersmann, J. D. Fraser, and J. K. D. Seegar. 1991. Nonbreeding Bald Eagle Communal and Solitary Roosting Behavior and Roost Habitat on the Northern Chesapeake Bay. Journal of Wildlife Management 55(2): 273-281.

Buehler, D. A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), Version 2.0. P. G. Rodewald, ed. *In:* The Birds of North America Online. Cornell Lab of Ornithology, Ithaca, New York. doi: 10.2173/bna.506. Retrieved from the Birds of North America Online: https://birdsna.org/Species-Account/bna/species/baleag

eBird. 2018. eBird: An Online Database of Bird Distribution and Abundance. eBird, Cornell Lab of Ornithology, Ithaca, New York. Accessed September 2018. Information online: http://ebird.org/content/ebird/

Endangered Species Act (ESA). 1973. 16 United States Code (USC) §§ 1531-1544, Public Law (PL) 93-205, December 28, 1973, as amended, PL 100-478 [16 USC 1531 *et seq.*]; 50 Code of Federal Regulations (CFR) 402.

ESRI. 2018. World Imagery and Aerial Photos. ArcGIS Resource Center. Environmental Systems Research Institute (ESRI), producers of ArcGIS software. Redlands, California. Information online: http://www.arcgis.com/home/webmap/viewer.html?useExisting=1

Foster, R. W. and A. Kurta. 1999. Roosting Ecology of the Northern Bat (Myotis septentrionalis) and Comparisons with the Endangered Indiana Bat (Myotis Sodalis). Journal of Mammalogy 80(2): 659-672.

Grindal, S. D., J. L. Morissette, and R. M. Brigham. 1999. Concentration of Bat Activity in Riparian Habitats over an Elevational Gradient. Canadian Journal of Zoology 77(6): 972-977. doi: 10.1139/z99-062.

Henderson, L. E. and H. G. Broders. 2008. Movements and Resource Selection of the Northern Long-Eared Myotis (*Myotis Septentrionalis*) in a Forest-Agriculture Landscape. Journal of Mammalogy 89: 952-963.

Herwig, C., and J. Giudice. 2015. North American Trumpeter Swan Survey 2015, Minnesota. Minnesota Department of Natural Resources, St. Paul, unpublished report. 17 pp.

Homer, C. G., J. A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N. D. Herold, J. D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the Conterminous United States-Representing a Decade of Land Cover Change Information. Photogrammetric Engineering and Remote Sensing 81(5): 345-354. Available online: http://www.mrlc.gov/nlcd2011.php

International Union for Conservation of Nature (IUCN). 2015. The IUCN Red List of Threatened Species. Version 2015-3. Accessed September 2015. Information available online from: www.iucnredlist.org

Kochert, M. N. and K. Steenhof. 2002. Golden Eagles in the U.S. And Canada: Status, Trends, and Conservation Challenges. Journal of Raptor Research 36: 32-40.

Lausen, C. 2009. Status of the Northern Myotis (*Myotis Septentrionalis*) in Alberta: Update 2009. Alberta Wildlife Status Report No. 3 (Update 2009). Government of Alberta - Fish and Wildlife Division; Alberta Conservation Association and Alberta Sustainable Resource Development, Available online: https://www.ab-conservation.com/downloads/AWSR/Mammal%20Reports/Status%20of%20Northern%20Myotis%20in%20Alberta_udpate%202009.pdf

Lowe, A. J. 2012. Swarming Behaviour and Fall Roost-Use of Little Brown (*Myotis Lucifugus*), and Northern Long-Eared Bats (*Myotis Septentrionalis*) in Nova Scotia, Canada. St. Mary's University, Halifax, Nova Scotia.

McClelland, B. R., P. T. McClelland, R. E. Yates, E. L. Caton, and M. E. McFadzen. 1996. Fledging and Migration of Juvenile Bald Eagles from Glacier National Park, Montana. Journal of Raptor Research 30: 79-89.

Migratory Bird Treaty Act (MBTA). 1918. 16 United States Code (USC) §§ 703-712. July 13, 1918.

Minnesota Breeding Bird Atlas (MNBBA). 2018a. Interactive Map. A collaborative project led by Audubon Minnesota and the University of Minnesota, Natural Resources Research Institute. Information online: https://mnbirdatlas.org/explore-the-atlas/interactive-map/

Minnesota Breeding Bird Atlas (MNBBA). 2018b. Interactive Map - Loggerhead Shrike. A collaborative project led by Audubon Minnesota and the University of Minnesota, Natural Resources Research Institute. Information online: https://mnbirdatlas.org/species/loggerhead-shrike/

Minnesota Department of Natural Resources (MNDNR). 2011. Guidance for Commercial Wind Energy Projects. October 1, 2011. (Updated July 2018). 20 pp. Information available at: http://files.dnr.state.mn.us/publications/ewr/dnr_wind_energy_project_guidance_2011.pdf

Minnesota Department of Natural Resources (MNDNR). 2014. Minnesota Public Waters Inventory. Information available online at: https://gisdata.mn.gov/dataset/water-mn-public-waters

Minnesota Department of Natural Resources (MNDNR). 2017. Minnesota Scientific and Natural Areas. Accessed August 2017. Available online: http://www.dnr.state.mn.us/snas/index.html

Minnesota Department of Natural Resources (MNDNR). 2018a. Biodiversity Significance Ranks. Minnesota Biological Survey, MNDNR, St. Paul, Minnesota. Accessed September 2018. Information online: https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html

Minnesota Department of Natural Resources (MNDNR). 2018b. Oarisma Poweshiek (Parker, 1870). Rare Species Guide. Available online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IILEP57010

Minnesota Department of Natural Resources (MNDNR). 2018c. Rare Species Guide. Federal Endangered, Threatened, and Candidate Species, and State Endangered, Threatened, and Special Concern Species. Accessed September 2018. Information online: http://www.dnr.state.mn.us/rsg/filter_search.html

Minnesota Department of Natural Resources (MNDNR). 2018d. Notropis Topeka (Gilbert, 1884). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AFCJB28960

Minnesota Department of Natural Resources (MNDNR). 2018e. Emydoidea Blandingii (Holbrook, 1838). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ARAAD04010

Minnesota Department of Natural Resources (MNDNR). 2018f. Anaxyrus Cognatus (Say in James, 1823). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AAABB01050

Minnesota Department of Natural Resources (MNDNR). 2018g. Lanius Ludovicianus (Linnaeus, 1766). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBR01030

Minnesota Department of Natural Resources (MNDNR). 2018h. Phalaropus Tricolor (Vieillot, 1819). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNNF20010

Minnesota Department of Natural Resources (MNDNR). 2018i. Cyperus Acuminatus (Torr. & Hook. ex Torr.). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMCYP06010

Minnesota Department of Natural Resources (MNDNR). 2018j. Bacopa Rotundifolia (Michx. Wettst.). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDSCR06080

Minnesota Department of Natural Resources (MNDNR). 2018k. Eleocharis Wolfii ([Gray] Gray ex Britt.). Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMCYP091Z0

Minnesota Department of Natural Resources (MNDNR). 2018l. Agalinis Auriculata (Michx.) Blake. Rare Species Guide. Availible online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDSCR01130

Minnesota Department of Natural Resources (MNDNR). 2019a. Onychomys leucogaster (Wied-Neuwied, 1841). Rare Species Guide. Available online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMAFF06010

Minnesota Department of Natural Resources (MNDNR). 2019b. Cygnus buccinator (Richardson, 1831). Rare Species Guide. Available online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNJB02030

Minnesota Department of Natural Resources (MNDNR). 2019c. Myotis septentrionalis (Trovessart, 1897). Rare Species Guide. Available online: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMACC01150

Minnesota Department of Natural Resources (MNDNR) and the U.S. Fish and Wildlife Service (USFWS). 2018, Townships containing documented Northern Long-Eared Bat (NLEB) maternity roost trees and/or hibernacular entrances in Minnesota. April 1, 2018. Available online: https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf

Minnesota Statutes 103G.201. 2017. Public Waters Inventory. Available online at: https://www.revisor.mn.gov/statutes/?id=103G.201

Mojica, E. K., J. M. Meyers, B. A. Millsap, and K. T. Haley. 2008. Migration of Sub-Adult Florida Bald Eagles. Wilson Journal of Ornithology 120: 304-310.

Mulnzer, O. M. 2008. Ecology of the Evening Bat (*Nycticeius Humeralis*) at the Northern Edge of the Range. Thesis. Eastern Michigan University, Ypsilanti, Michigan. Available online: http://commons.emich.edu/theses/166

National Conservation Easement Database (NCED). 2018. National Conservation Easement Database. Ducks Unlimited, and The Trust for Public Land, Information online: http://www.conservationeasement.us/

NatureServe. 2018. Natureserve Explorer: An Online Encyclopedia of Life [Web Application]. Version 7.1. Natureserve, Arlington, Virginia. Accessed September 2018. Information online: http://explorer.natureserve.org

North American Datum (NAD). 1983. Nad83 Geodetic Datum.

Pardieck, K. L., D. J. Ziolkowski, Jr., M. Lutmerding, K. Campbell, and M.-A. R. Hudson. 2017. North American Breeding Bird Survey Dataset 1966 - 2016, Version 2016.0. US Geological Survey, Patuxent Wildlife Research Center. doi: 10.5066/F7W0944J. Information online: www.pwrc.usgs.gov/BBS/RawData/

Sullivan, B. L., C. L. Wood, M. J. Iliff, R. E. Bonney, D. Fink, and S. Kelling. 2009. eBird: A Citizen-Based Bird Observation Network in the Biological Sciences. Biological Conservation 142(10): 2282-2292. doi: 10.1016/j.biocon.2009.05.006.

Swenson, J. E., K. L. Alt, and R. L. Eng. 1986. Ecology of Bald Eagles in the Greater Yellowstone Ecosystem. Wildlife Monographs 94: 3-46.

US Environmental Protection Agency (USEPA). 2017. Ecoregion Download Files by State - Region 5: Minnesota. Ecoregions of the United States, Ecosystems Research, USEPA. Last updated February 8, 2017. Accessed December 2018. Information and maps online: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-5#pane-21

US Fish and Wildlife Service (USFWS). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. US Department of Interior, Fish and Wildlife Service, Region 3. April 2007. USFWS, Fort Snelling, Minnesota. 260 pp. Available online: http://ecos.fws.gov/docs/recovery_plan/070416.pdf

US Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. December 2008. Division of Migratory Bird Management, Arlington, Virginia. Available online: https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf

US Fish and Wildlife Service (USFWS). 2011. Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects. Revised October 26, 2011. Available online: http://www.fws.gov/midwest/endangered/mammals/inba/pdf/inbaS7and10WindGuidanceFinal26Oct2011.pdf

US Fish and Wildlife Service (USFWS). 2012. Land-Based Wind Energy Guidelines. March 23, 2012. 82 pp. Available online: http://www.fws.gov/cno/pdf/Energy/2012_Wind_Energy_Guidelines_final.pdf

US Fish and Wildlife Service (USFWS). 2013a. Eagle Conservation Plan Guidance: Module 1 - Land-Based Wind Energy, Version 2. US Department of the Interior, Fish and Wildlife Service, Division of Migratory Bird Management. April 2013. 103 pp. + frontmatter. Available online: https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf

US Fish and Wildlife Service (USFWS). 2013b. Northern Long-Eared Bat (*Myotis Septentrionalis*). USFWS Environmental Conservation Online System (ECOS) Species Profile. Updated November 11, 2013. ECOS available at: http://ecos.fws.gov/ecos/indexPublic.do; Northern long-eared bat species profile available online at: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0JE

US Fish and Wildlife Service (USFWS). 2014. Northern Long-Eared Bat Interim Conference and Planning Guidance. USFWS Regions 2, 3, 4, 5, and 6. January 6, 2014. Available online: http://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf

US Fish and Wildlife Service (USFWS). 2016. Endangered and Threatened Wildlife and Plants; 4(D) Rule for the Northern Long-Eared Bat; Final Rule. 50 CFR Part 17. Department of the Interior Fish and Wildlife Service. 81 Federal Register (FR) 9: 1900-1922. January 14, 2016. Available online: http://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf

US Fish and Wildlife Service (USFWS). 2018a. Birds of Management Concern. Migratory Bird Program. Conserving America's Birds. 2018. Accessed: July 2018. Available online: https://www.fws.gov/birds/management/managed-species/birds-of-management-concern.php

US Fish and Wildlife Service (USFWS). 2018b. ECOS Environmental Conservation Online System. Endangered Species Act Petitions Received by Fish and Wildlife Service. Accessed 2018. Available online: https://ecos.fws.gov/ecp/report/table/petitions-received.html

US Fish and Wildlife Service (USFWS). 2018c. 2018 Range-Wide Indiana Bat Summer Survey Guidelines. April 2018. Available online: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf

US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI). 2018. Seamless Wetlands Data by State. Last updated May 1, 2018. Accessed November 2018. Geodatabase and Shapefile data available online: http://www.fws.gov/wetlands/data/State-Downloads.html

US Geological Survey (USGS). 2018. 3dep Products and Services. The National Map, 3D Elevation Program webpage. Information online: http://nationalmap.gov/3DEP/3dep_prodserv.html

US Geological Survey (USGS) National Hydrography Dataset (NHD). 2016. USGS NHD Extracts: Iowa and Minnesota. Last accessed October 2016. Information available online at: http://nhd.usgs.gov/; State data available online at: ftp://nhdftp.usgs.gov/DataSets/Staged/States/FileGDB/HighResolution/

US Geological Survey (USGS) National Land Cover Data (NLCD). 2011. National Land Cover Database NLCD, Muti-Resolution Land Characteristics Consortium (Mrlc). USGS Earth Resources Observation and Science (Eros) Center, Sioux Falls, South Dakota. Information available online at: http://www.mrlc.gov/nlcd11_leg.php

US Geological Survey (USGS) National Land Cover Database (NLCD). 2011. National Land Cover Database 2011 (NLCD 2011). Multi-Resolution Land Characteristics Consortium (MRLC), National Land Cover Database (NLCD). USGS Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota. Available online: http://www.mrlc.gov/nlcd2011.php; Legend: http://www.mrlc.gov/nlcd11_leg.php

US Geological Survey (USGS) Protected Areas Database of the United States (PAD-US). 2018. Protected Areas Data. USGS National Gap Analysis Program (GAP) - Protected Areas Data Portal. Accessed June 2018. Information online: http://gapanalysis.usgs.gov/padus/data/

US Geological Survey (USGS) North American Breeding Bird Survey Database. 2019. Patuxent Wildlfie Research Center. Accessed July 2019. Information online: https://www.pwrc.usgs.gov/BBS/

Appendix A. Agency Environmental Review Reports.

IPaC **U.S. Fish & Wildlife Service**

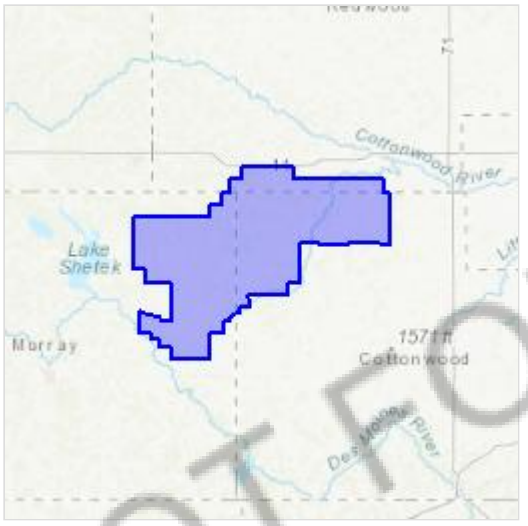
IPaC resource list

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

Cottonwood, Murray and Redwood counties, Minnesota



Local office

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

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 species[1] 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 Fisheries[2]).

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 Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS
Dakota Skipper Hesperia dacotae There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1028	Threatened

Flowering Plants

NAME	STATUS
Prairie Bush-clover Lespedeza leptostachya No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4458	Threatened

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 Notropis topeka (=tristis) For information on why this critical habitat appears for your project, even though Topeka Shiner is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/4122#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

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 *Haliaeetus leucocephalus* 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 *Chlidonias niger* 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 *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31

Franklin's Gull Leucophaeus pipixcan — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lesser Yellowlegs Tringa flavipes — 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/9679

Red-headed Woodpecker Melanerpes erythrocephalus — Breeds May 10 to Sep 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

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

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.

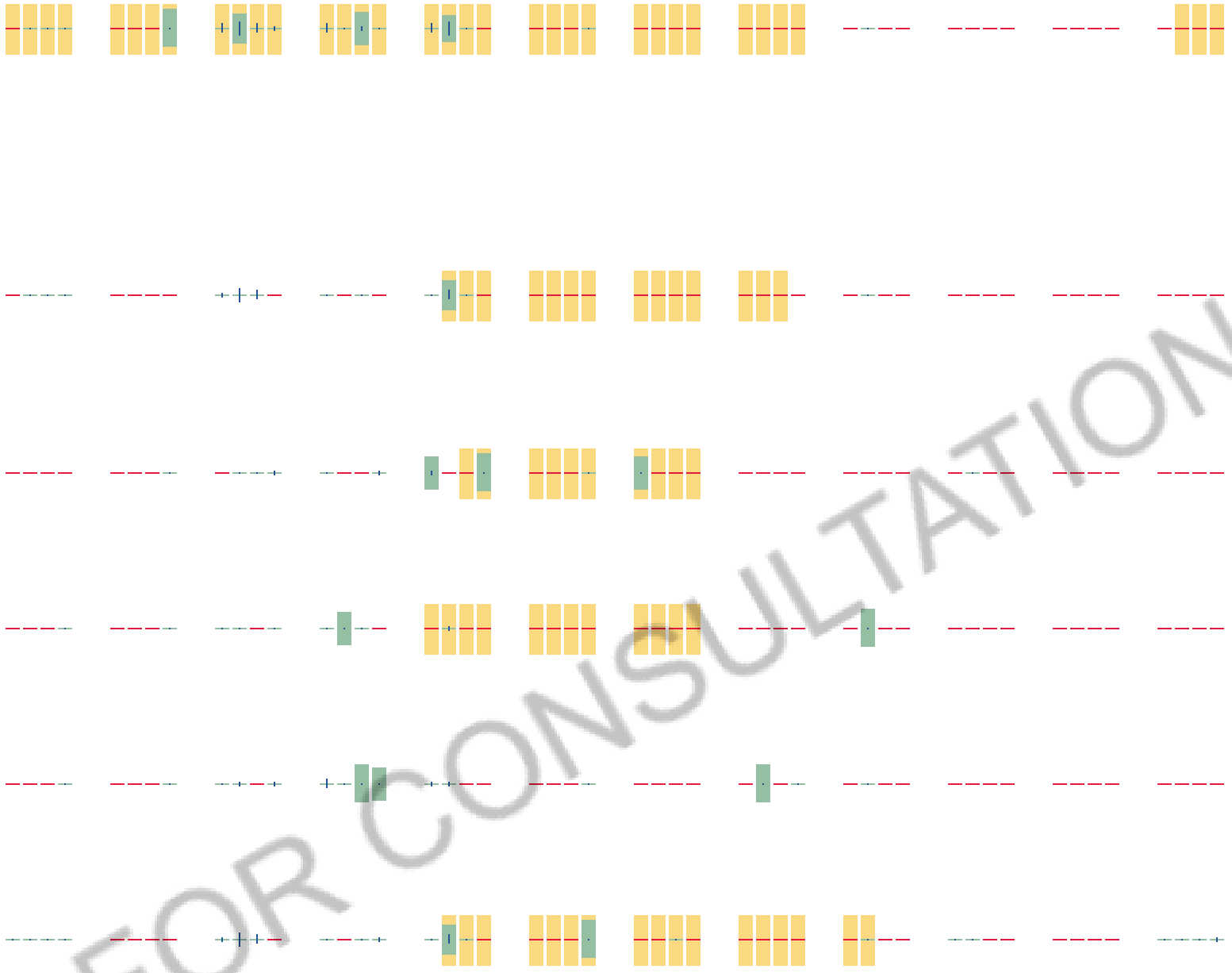
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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.

▪ probability of presence ▪ breeding season | survey effort – no data



Bald Eagle
Non-BCC Vulnerable (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.)

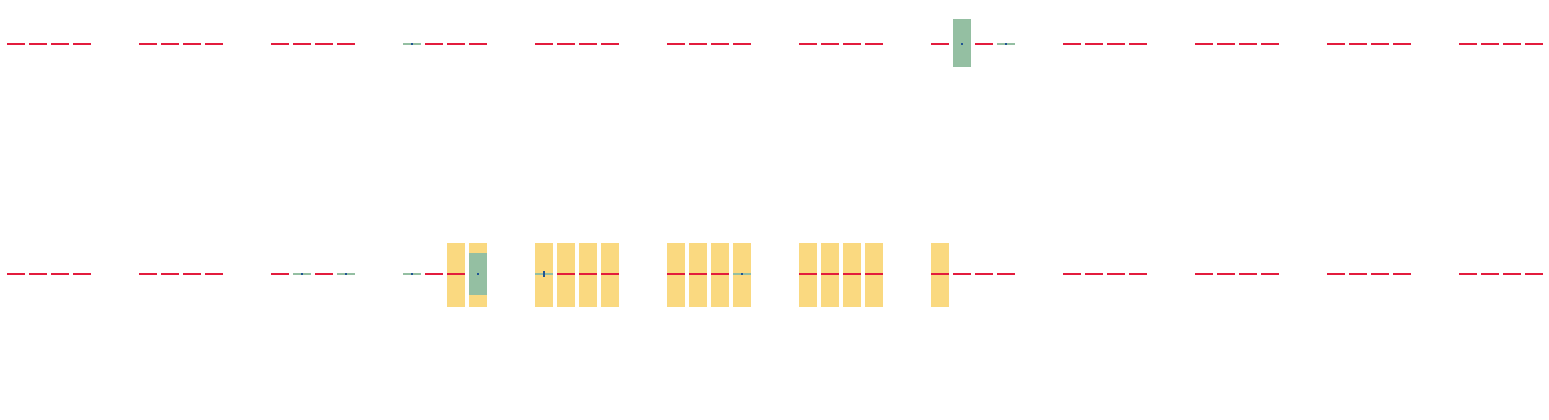
Black Tern
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Franklin's Gull
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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 E-bird Explore Data 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 898.21 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
- PEM1Af
- PEM1B
- PEM1Ax
- PEM1Ah
- PEM1C

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1Cx
- PFO1A
- PFO1B

FRESHWATER POND

- PABH
- PABF
- PABFh
- PABFx

RIVERINE

- R2UBH

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 tuberficid 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.

Minnesota Department of Natural Resources

Division of Ecological and Water Resources, Box 25

500 Lafayette Road

St. Paul, Minnesota 55155-4025

Phone: (651) 259-5091 E-mail: samantha.bump@state.mn.us

February 15, 2017 **Correspondence # ERDB 20170252**

Ms. Kara Bakke
Geronimo Energy
7650 Edinborough Way, Suite #725
Edina, MN 55435

RE: Natural Heritage Review of the proposed Plum Creek Wind Farm & Transmission Line, Redwood & Cottonwood County

Dear Ms. Bakke,

The Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. For the results of this query, please refer to the enclosed database reports (please visit the Rare Species Guide at http://www.dnr.state.mn.us/rsg/index.html for more information on the biology, habitat use, and conservation measures of these rare species). Given the preliminary project layout is not available at this time, I am providing the database reports only and have not evaluated the potential for the proposed project to adversely affect these rare features.

Please note that the enclosed reports include records from the Rare Features Database only. For your information, the DNR Native Plant Communities and the MBS Sites of Biodiversity Significance are two other databases available from the Natural Heritage Information System that you may find useful in your conservation planning efforts considering both are found within the project area. GIS shapefiles of these databases can be downloaded from the MN Geospatial Commons website at https://gisdata.mn.gov/. Please refer to the below links for Guidelines for help interpreting this data. We recommend that the project be designed to avoid impacts to these ecologically significant sites.

It should be noted that many SGCN are not tracked in the Natural Heritage Information System (NHIS), and the NHIS does not include records of migrating birds. Wind farms can affect birds due to collision mortality, displacement due to disturbance, habitat fragmentation, and habitat loss. Even if collision mortality rates are low, the additional mortality may be significant for rare species. In addition, the results from some studies suggest that grassland birds are deterred from nesting in otherwise appropriate habitat by the presence of tall structures in the vicinity. We recommend post-construction avian mortality monitoring to provide information regarding unexpected impacts, if any, to rare birds. Knowledge of these types of extraordinary events would allow for the implementation of additional measures to minimize disturbance, such as the curtailment of turbine operations during certain conditions. Regional DNR staff may have more recommendations regarding avian surveys based on local knowledge of the project site.

The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Although there are no NHIS records for bats in the vicinity of the proposed project, all seven of Minnesota's bats can be found throughout Minnesota. The northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), big brown bat

(*Eptesicus fuscus*), and little brown bat (*Myotis lucifugus*) are all state-listed species of special concern. River corridors and forested areas provide bat habitat and the potential for turbines to cause bat fatalities. Therefore, turbines should be placed an adequate distance from these areas. Actions, such as feather turbine blades below cut-in speeds, can minimize impacts to these species. We recommend conducting pre-construction acoustic bat surveys and post-construction bat fatality monitoring to provide useful information on the impacts to these species. As the U.S. Fish and Wildlife Service (USFWS) has listed the northern long-eared bat as threatened under the Endangered Species Act (ESA), please coordinate with the USFWS regarding this species.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. **If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.**

The enclosed results include two Index Reports and two Detailed Reports of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location information, which might result in the destruction of a rare feature, both reports are copyrighted.

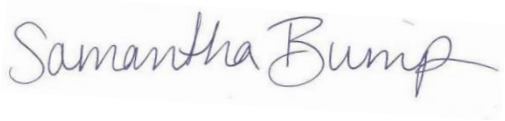
The Index Report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index report for any other purpose, please contact me to request written permission. **The Detailed Report is for your personal use only as it may include specific location information that is considered nonpublic data under *Minnesota Statutes*, section 84.0872, subd. 2. If you wish to reprint or publish the Detailed Report for any purpose, please contact me to request written permission.**

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or for an updated review if construction has not occurred within one year.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. To determine whether there are other natural resource concerns associated with the proposed project, please contact your DNR Regional Environmental Assessment Ecologist (contact information available at http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. Please include a copy of this letter in any state or local license or permit application. An invoice will be mailed to you under separate cover.

Sincerely,



Samantha Bump
Natural Heritage Review Specialist

enc. Rare Features Database: Index Report (2)
Rare Features Database: Detailed Report (2)
Rare Features Database Reports: An Explanation of Fields

Links: MBS Sites of Biodiversity Significance
http://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html
DNR Native Plant Communities
http://www.dnr.state.mn.us/npc/index.html

Cc: Cynthia Warzecha
Kevin Mixon

Printed January 2017
Data valid for one year

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
ERDB #20170252 - Plum Creek Transmission Line
Multiple TRS
Redwood & Cottonwood Counties

Rare Features Database:

Element Name and Occurrence Number	Federal Status	MN Status	Draft Status	SGCN Status	State Rank	Global Rank	Last Obs Date	EO ID #
Vertebrate Animal								
Anaxyrus cognatus (Great Plains Toad) #8 T104N R34W S3, T104N R36W S5, T107N R37W S35, T107N R37W S4, T [...]; Watonwan, Brown, Jackson, [...] County		SPC		SGCN	S3	G5	1944-07-19	39444
Haliaeetus leucocephalus (Bald Eagle) #2675 T110N R38W S34, T110N R38W S35; Redwood County		Watchlist			S3B,S3N	G5	2007-FA	34473
Invertebrate Animal								
Actinonaias ligamentina (Mucket) #233 T109N R38W S2, T109N R38W S1; Redwood County		THR		SGCN	S2	G5	2002-PRE	31760
Alasmidonta marginata (Elktoe) #99 T109N R38W S2, T109N R38W S1; Redwood County		THR		SGCN	S2	G4	2002-PRE	31498
Speyeria idalia (Regal Fritillary) #7 T110N R38W S30, T110N R38W S29; Redwood County		SPC		SGCN	S3	G3	1996-07-13	22490
Native Plant Community (This may not represent a complete list. Also see MCBS Native Plant Communities at http://deli.dnr.state.mn.us.)								
Mesic Prairie (Southern) Type #209 (NPC Code: UPs23a) T110N R38W S29; Redwood County		N/A			S2	GNR	1998-08-26	1306
Wet Prairie (Southern) Type #48 (NPC Code: WPs54b) T110N R38W S29; Redwood County		N/A			S2	GNR	1998-08-26	423

Records Printed = 7

Minnesota's endangered species law (*Minnesota Statutes*, section 84.0895) and associated rules (*Minnesota Rules*, part 6212.1800 to 6212.2300 and 6134) 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.

An 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.

Printed January 2017
Data valid for one year

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
ERDB #20170252 - Plum Creek Transmission Line
Multiple TRS
Redwood & Cottonwood Counties

Federal Status: The status of the species under the U.S. Endangered Species Act: LE = 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.

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Draft Status: Proposed change to the legal status of the plant or animal species under the Minnesota Endangered Species Law: END = endangered; THR = threatened; SPC = special concern; Watchlist = tracked, but no legal status.

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/cwcs/index.html). This designation applies to animals only.

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 ineradicable under present conditions. SH = Of 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 extinct in Minnesota. SNA = Rank not applicable. S#S# = Range Rank: a numeric range rank (e.g., S2S3) is 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 non-breeding population of the element in Minnesota.

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Printed January 2017
Data valid for one year

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
ERDB #20170252 - Plum Creek Wind Farm
Multiple TRS
Redwood & Cottonwood Counties

Rare Features Database:

Element Name and Occurrence Number	Federal Status	MN Status	Draft Status	SGCN Status	State Rank	Global Rank	Last Obs Date	EO ID #
Vertebrate Animal								
Anaxyrus cognatus (Great Plains Toad) #2 T108N R36W S5, T109N R36W S16, T109N R36W S3, T109N R36W S4, T [...]; Cottonwood, Redwood County		SPC		SGCN	S3	G5	2008-08-10	38435
Anaxyrus cognatus (Great Plains Toad) #8 T104N R34W S3, T104N R36W S5, T107N R37W S35, T107N R37W S4, T [...]; Watonwan, Brown, Jackson, [...] County		SPC		SGCN	S3	G5	1944-07-19	39444
Anaxyrus cognatus (Great Plains Toad) #22 T105N R40W S26, T105N R40W S7, T105N R41W S11, T105N R41W S12, T [...]; Lyon, Cottonwood, Nobles, Redwood, [...] County		SPC		SGCN	S3	G5	1937-10-17	39458
Bartramia longicauda (Upland Sandpiper) #434 T109N R37W S32, T109N R37W S33, T109N R37W S28; Redwood County		Watchlist		SGCN	S4B	G5	1998-06-12	24258
Phalaropus tricolor (Wilson's Phalarope) #107 T108N R39W S32, T108N R39W S33; Murray County		THR		SGCN	S2B	G5	2006-06-20	33978
Invertebrate Animal								
Oarisma poweshiek (Poweshiek Skipperling) #10 T107N R39W S22, T107N R39W S23, T107N R39W S26, T107N R39W S27; Murray County	LE	END		SGCN	S1	G1	1975-07-05	2680
Native Plant Community (This may not represent a complete list. Also see MCBS Native Plant Communities at http://deli.dnr.state.mn.us.)								
Dry Hill Prairie (Southern) Type #8 (NPC Code: UPs13d) T108N R39W S16, T108N R39W S21, T108N R39W S15, T108N R39W S22; Murray County		N/A			S2	GNR	1977-09	403

Records Printed = 7

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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 ineradicable under present conditions. SH = Of 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 extinct in Minnesota. SNA = Rank not applicable. S#S# = Range Rank: a numeric range rank (e.g., S2S3) is 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 non-breeding population of the element in Minnesota.

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

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 practical 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.

Rare Features Database Reports: An Explanation of Fields

The Rare Features Database is part of the Natural Heritage Information System, and is maintained by the Division of Ecological and Water Resources, Minnesota Department of Natural Resources (DNR).

Field Name: [Full (non-abbreviated) field name, if different]. Further explanation of field.

-E-

Element Name and Occ #: [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 (such as native plant communities, which have no scientific name) 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.

EO Data: [Element Occurrence Data]. For species elements, this field contains data collected on the biology of the Element Occurrence* (EO), including the number of individuals, vigor, habitat, soils, associated species, peculiar characteristics, etc. For native plant community elements, this field is a summary text description of the vegetation of the EO, including structure (strata) and composition (dominant/characteristic species), heterogeneity, successional stage/dynamics, any unique aspects of the community or additional noteworthy species (including animals). Note that this is a new field and it has not been filled out for many of the records that were collected prior to conversion to the new database system. Some of the information meeting the field definition may be found in the General Description field.

EO ID#: [Element Occurrence Identification Number]. Unique identifier for each Element Occurrence record.

EO Rank: [Element Occurrence Rank]. An evaluation of the quality and condition of an Element Occurrence (EO) from A (highest) to D (lowest). Represents a comparative evaluation of: 1) quality as determined by representativeness of the occurrence especially as compared to EO specifications and including maturity, size, numbers, etc. 2) condition (how much has the site and the EO itself been damaged or altered from its optimal condition and character). 3) viability (the long-term prospects for continued existence of this occurrence - used in ranking species only). EO Ranks are assigned based on recent fieldwork by knowledgeable individuals.

Extent Known?: A value that indicates whether the full extent of the Element is known (i.e., it has been determined through field survey) at that location. If null, the value has not been determined.

-F-

Federal Status: Status of species under the U.S. Endangered Species Act: LE = 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.

First Observed Date: Date that the Element Occurrence was first reported at the site in format YYYY-MM-DD. A year followed by "Pre" indicates that the observed date was sometime prior to the date listed, but the exact date is unknown.

-G-

General Description: General description or word picture of the area where the Element Occurrence (EO) is located (i.e., the physical setting/context surrounding the EO), including a list of adjacent communities. When available, information on surrounding land use may be included. Note that the information tracked in this field is now more narrowly defined than it was in the old database system, and some of the information still in this field more accurately meets the definition of the new EO Data field. We are working to clean up the records so that the information in the two fields corresponds to the current field explanations described herein. Also note that the use of uppercase in sentences in this field is not significant but rather an artifact of transferring data from the old database system to the new system.

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.

-L-

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

Last Survey Date: Date of the most recent field survey for the Element Occurrence, regardless of whether it was found during the visit. If the field is blank, assume the date is the same as the Last Observed Date.

Location Description: County or Counties in which the Element Occurrence was documented followed by Township, Range, and Section information (not listed in any particular order). Each unique Township, Range, and Section combination is separated by a comma. In some cases, there are too many Township, Range, and Section combinations to list in the field, in which case, the information will be replaced with, "Legal description is too lengthy to fit in allotted space".

-M-

Managed Area(s): Name of the federally, state, locally, or privately managed park, forest, refuge, preserve, etc., containing the occurrence, if any. If this field is blank, the element probably occurs on private land. If "(Statutory Boundary)" occurs after the name of a managed area, the location may be a private inholding within the statutory boundary of a state forest or park.

MN Status: [Minnesota Status]. Legal status of plant and animal species under the Minnesota Endangered Species Law: END = endangered; THR = threatened; SPC = special concern; NON = 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 N/A.

-N-

NPC Classification (v1.5): Native plant community name in Minnesota's Native Vegetation: A Key to Natural Communities (Version 1.5). This earlier classification has been replaced by Minnesota's Native Plant Community Classification (Version 2.0).

-O-

Observed Area: The total area of the Element Occurrence, in acres, which is measured or estimated during fieldwork. If null, the value has not been determined.

Ownership Type: Indicates whether the land on which the Element Occurrence was located was publicly or privately owned; for publicly owned land, the agency with management responsibility is listed, if known.

-S-

Site Name: The name of the site(s) where the Element Occurrence is located. Sites are natural areas of land with boundaries determined and mapped according to biological and ecological considerations.

Survey Site #/Name: The name of the survey site, if applicable, where the Element Occurrence is located. Survey sites are sites that provide a geographic framework for recording and storing data, but their boundaries are not based on biological and ecological considerations. Minnesota County Biological Survey site numbers, if applicable, are also listed in this field.

Survey Type: Information on the type of survey used to collect information on the Element Occurrence.

Surveyor(s): Name(s) of the person(s) that collected survey information on the Element Occurrence.

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 ineradicable under present conditions. SH = Of 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 extinct in Minnesota. SNA = Rank not applicable. S#S# = Range Rank: a numeric range rank (e.g., S2S3) is 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 non-breeding population of the element in Minnesota.

-V-

Vegetation Plot: Code(s) for any vegetation plot data that have been collected within this Element Occurrence (i.e., either Releve Number or the word "RELEVE" indicates that a releve has been collected).

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Data Security

Locations of some rare features must be treated as sensitive information because widespread knowledge of these locations could result in harm to the rare features. For example, wildflowers such as orchids and economically valuable plants such as ginseng are vulnerable to exploitation by collectors; other species, such as bald eagles, are sensitive to disturbance by observers. For this reason, we prefer that publications not identify the precise locations of vulnerable species. We suggest describing the location only to the nearest section. If this is not acceptable for your purposes, please call and discuss this issue with the Natural Heritage Review Coordinator at 651- 259-5109.

Minnesota Natural Heritage Information System
Index Report of records within 1 mile radius of:
Plum Creek Wind Project
Multiple TRS, Cottonwood, Murray, and Redwood Counties

Rare Features Database

Element Name and Occurrence Number	Federal Status	MN Status	SGCN Status	State Rank	Global Rank	Last Obs Date	EO ID #
Vertebrate Animals							
Onychomys leucogaster (Northern Grasshopper Mouse) #2 108N040W 14,108N040W 15	no status	SPC	SGCN	S3	G5	9/1/1967	2746
Anaxyrus cognatus (Great Plans Toad) #2 108N036W 5,109N036W 16,109N036W 3,109N036W 4, [...]	no status	SPC	SGCN	S3	G5	8/10/2008	38435
Phalaropus tricolor (Wilson's Phalarope) #107 108N039W 32,108N039W 33	no status	THR	SGCN	S2B	G5	6/20/2006	33978
Cygnus buccinator (Trumpeter Swan) #104 106N039W 5,106N039W 6,106N041W 25,106N041W 26	no status	SPC	SGCN	S3B	G4	6/30/2009	35978
Bartramia longicauda (Upland Sandpiper) #434 109N037W 32,109N037W 33,109N037W 28	no status	watchlist	SGCN	S4B	G5	6/12/1998	24258
Bartramia longicauda (Upland Sandpiper) #509 108N036W 18,108N036W 6,108N036W 7	no status	watchlist	SGCN	S4B	G5	7/19/2007	35476
Invertebrate Animals							
Oarisma poweshiek (Poweshiek Skipperling) #10 107N039W 22,107N039W 23,107N039W 26,107N039W 27	LE	END	SGCN	S1	G1	7/5/1975	2680
Terrestrial Community							
Dry Hill Prairie (Southern) #8 108N039W 16,108N039W 21,108N039W 15,108N039W 22	no status	no status	no status	S2	GNR	9/1/1977	403

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Appendix B. Plum Creek Wind Energy Project Site Photographs in Cottonwood, Murray, and Redwood Counties, Minnesota.

Appendix B1. Facing south; landscape view over field (UTM coordinates: 0307703, 4896442)

Appendix B2. CREP near creek with potential eagle habitat along creek (UTM coordinates: 0319260, 4893658)

Appendix B4. Facing northwest; riparian habitat near creek (UTM coordinates: 0316383, 4891320)

Appendix B5. Facing north; CREP lowlands holding water, Temporary wetlands (UTM coordinates: 0297906, 4885467)

Appendix B6. Facing north; landscape overview from southern boundary (UTM coordinates: 0297344, 4882251)

Appendix B9. Facing east; Waterfowl Production Area southern boundary (UTM coordinates: 0301134, 4880527)