Appendix I

Updated Bird and Bat Conservation Strategy

Northern States Power Company
Pleasant Valley Wind Farm Repower Project
Docket No. IP-6828/WS-09-1197
April 2022

Pleasant Valley Wind Farm

Bird and Bat Conservation Strategy

Dodge and Mower Counties, Minnesota

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DRAFT

Updated March 2022

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Revision Number	Document Date	Comments
1	April 2014	Original pre-construction document filed by RES (WEST 2014)
2	March 2018	Xcel Energy updated BBCS
3	March 2022	Xcel Energy updated BBCS for Repower Project

1.0 INTRODUCTION

Northern States Power Company (NSP), a Minnesota corporation, doing business as Xcel Energy (Xcel Energy), currently owns and operates the 200-megawatt (MW) Pleasant Valley Wind Farm (PVW) located approximately 10 miles northeast of Austin, Minnesota. The PVW footprint contains approximately 45,499 acres of land in Dodge and Mower Counties, Minnesota (Project Area). PVW interconnects to the Great River Energy Pleasant Valley 161/345 kilovolt (kV) substation, located approximately 6 miles north of Dexter, Minnesota via an approximately 5-mile-long overhead transmission line. PVW transmits power into the Midcontinent Independent System Operator (MISO) grid.

PVW was developed by Renewable Energy Systems-Americas, Inc. (RES) beginning in 2008. RES oversaw construction of PVW in 2014 and 2015 (original Project), and ownership of PVW was transferred to Xcel Energy upon completion of construction. Xcel Energy began commercial operation of PVW in 2015.

The original Project consists of 100 Vestas V100 2.0 MW wind turbines with a rotor size of 100 meters (328.1 feet) in diameter. Xcel Energy is requesting an amendment to the 2014 Site Permit to repower all 100 turbines (Repower) with 110-meter (360.9 feet) rotors, which will increase energy production from the facility, improve overall reliability, and extend the service life of the turbines. The current turbines are otherwise operating as planned.

The purpose of the repowering project is to improve turbine technology, maximize energy yield, and extend service life of the turbines. New blades provide an increase in the rotor swept area, which, when coupled with the upgraded generators, results in a corresponding increase in the nominal production capacity of the Project from 200 MW to roughly 220 MW, a 10 percent increase.

1.1 Purpose

The MPUC issued a LWECS Site Permit for the original Project on October 27, 2010. On February 10, 2014, the site permit was further amended by the MPUC to specify use of an alternative wind turbine model, to reduce the project nameplate capacity from 301 MW to 200 MW, to reduce the total number of turbines, and for a different preliminary turbine layout. The amended permit also included a permit condition requiring that an Avian and Bat Protection Plan (ABPP) be prepared for the project and filed prior to construction. Therefore, RES developed a Bird and Bat Conservation Strategy (BBCS) for PVW in 2014[1]. The original BBCS documented the steps RES took during development and construction to identify and mitigate impacts to avian and bat species. The BBCS generally followed the tiered approach outlined in the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (the WEGs; USFWS, 2012) and

[1] RES's 2014 Bird and Bat Conservation Strategy can be found on the MN DOC eDockets Search (https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&linkId=114) by entering Document ID number 20145-99388-01.

incorporated agency recommendations. The BBCS was updated again in March 2018[2] in response to recommendations from the DOC-EERA that Xcel Energy implement operational changes to reduce risks to bat species from turbine collision. As of April 1, 2018, all turbines have been programmed to be feathered at wind speeds up to the manufacturer's standard cut-in speed, from one-half hour before sunset to one-half hour after sunrise, from April 1 to October 31 of each year of operation through the life of the project.

Since acquisition of PVW in 2015, Xcel Energy has continued to evaluate wildlife impacts from operation of the facility in accordance with the WEGs. One year of Tier 4 post-construction avian and bat fatality monitoring was completed at PVW in 2017. Findings of the study indicated relatively low levels of avian and bat mortality at PVW compared to fatality levels reported at other operating wind farms in the region. Xcel Energy understands that both human and wildlife use of the project landscape is not static, however, and as such, the BBCS will be adaptively managed in response to changing conditions.

This updated BBCS has been developed for the Repower Project to ensure compliance with the regulatory framework outlined in Section 1.3 of this document. This BBCS document for the Repower Project includes a summary of measures taken to protect birds and bats under the original Project BBCS and provides a framework for future actions to be taken for the life of the Repower Project.

This BBCS document specifically provides: (1) guidance on mitigating the risks to birds and bats during construction and operation of the Repower Project; and (2) incorporates a framework for complying with federal and state laws and meeting the requirements described in Section 6.7 of the Minnesota Public Utilities Commission's (Commission's or MPUC's) 2014 Large Wind Energy Conversion System (LWECS) Site Permit for the Project. The processes and procedures set forth are designed to ensure:

- Avian and bat fatalities and secondary effects on wildlife are minimized at the Repower Project.
- Project-related actions comply with federal and state wildlife regulations.
- Fulfillment of wildlife-related conditions in the LWECS Site Permit.
- Ongoing surveys, monitoring, and management efforts are undertaken to avoid and minimize adverse wildlife impacts throughout all phases of the Project.
- Bird and bat injuries and fatalities are effectively documented to provide a basis for ongoing development of avian and bat protection procedures.
- Adequate implementation training is provided to the Construction Contractor and Operations and Maintenance staff.

[2] Xcel's 2018 Bird and Bat Conservation Strategy can be found on the MN DOC eDockets Search (https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&linkId=114) by entering Document ID number 20183-141006-01.

- Coordination between Xcel Energy, wildlife agencies, Minnesota Department of Commerce, Energy Environmental Review & Analysis (DOC-EERA) staff and the Commission is effective and continuous.

1.2 Project Description

1.2.1 Original Project

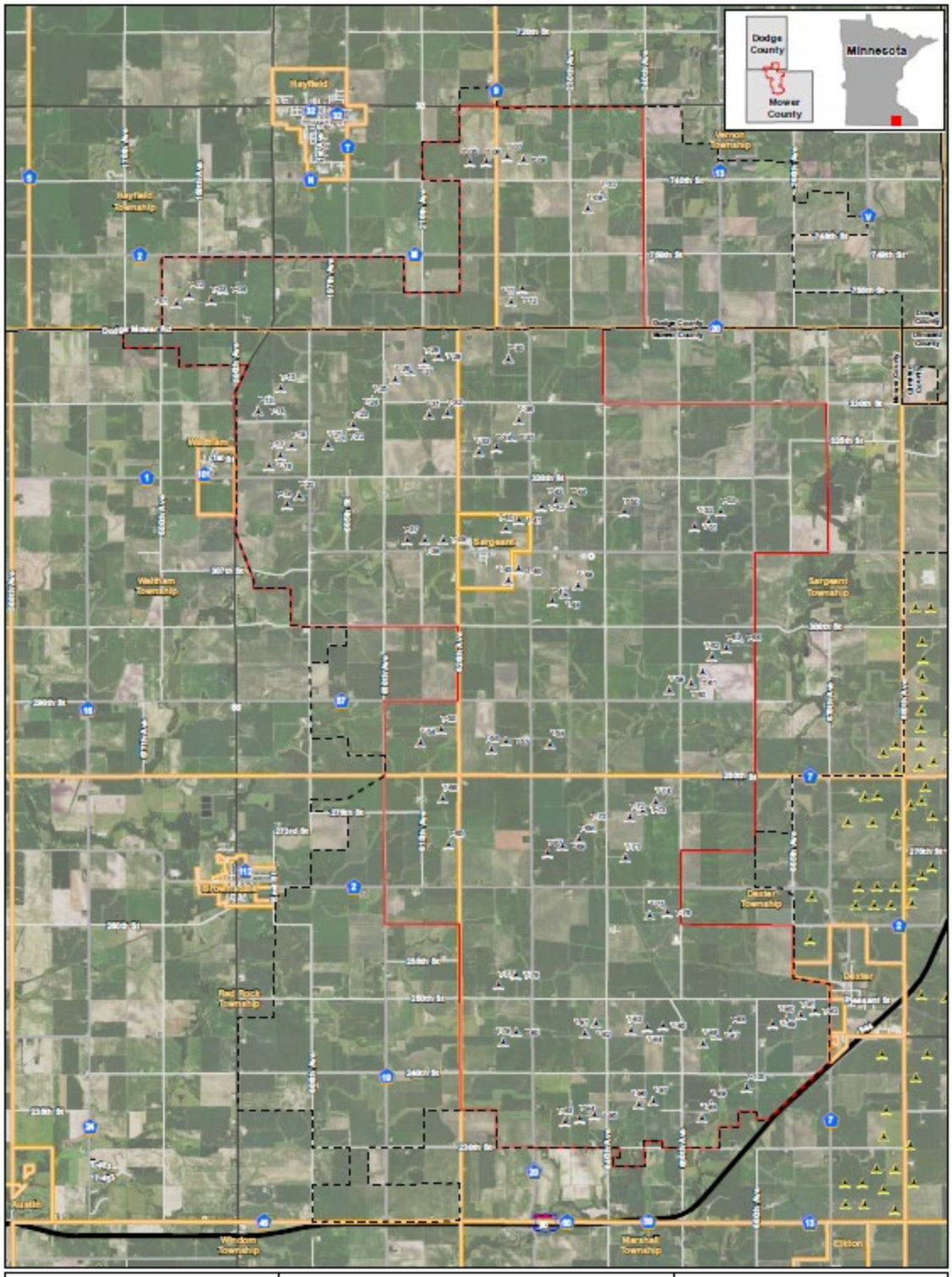
Xcel Energy is currently operating PVW, which is located approximately 10 miles northeast of Austin in Dodge and Mower Counties, Minnesota. PVW has a capacity of 200 MW of wind energy. The original PVW footprint contained approximately 70,000 acres of land. PVW's facilities include: (1) 100 Vesta V100 2.0 MW wind turbines; (2) gravel access roads; (3) underground electrical collection lines; (4) an operations and maintenance (O&M) building; (5) a collector substation; and (6) one permanent meteorological tower. PVW interconnects to the Great River Energy Pleasant Valley 161/345 kV substation, located approximately 6 miles north of Dexter via an approximately 5-mile-long overhead transmission line, and transmits power into the MISO grid. All of the PVW facilities are located on privately owned land.

1.2.2 Repower Project

Xcel Energy is requesting modification of the Project boundary permitted in 2014, which consisted of approximately 70,000 acres. The Repower Project infrastructure is physically located on approximately 45,449 acres of privately owned and mostly leased land in Dodge and Mower Counties, generally northwest of Interstate 90, northeast of Austin, and south/southeast of the Town of Hayfield (see Project Boundary Modification figure below). All of these acres are located within the previously evaluated and permitted boundary for the original Project. Typical landscapes within the reduced PVW area consist largely of agricultural fields and wind energy infrastructure.

Previously permitted turbine access roads for PVW will remain in the same locations and temporarily be widened during construction. A large construction crane will be used to install upgraded nacelle components (or replace the existing nacelle) and install larger rotors. Repowering of the existing turbines generally will require a temporary 400-foot radius workspace around each turbine and an approximately 300-foot by 60-foot crane assembly area adjacent to the existing access road.

Repowering will consist of the following general construction steps: completing temporary turning radius improvements to existing gravel access roads and public road intersections to accommodate truck deliveries, preparing crane assembly areas, preparing laydown and staging areas, offloading new turbine components near operating turbines, removing and replacing existing blades and hub or removing and replacing the nacelle with a construction crane, performing engineering inspections on new components, returning turbines to operation, and restoring temporarily disturbed areas to pre-construction conditions.


Dodge County
Mower County
Minnesota
Hayfield
Hayfield Township
Vernon Township
Waltham
Waltham Township
Sargeant
Sargeant Township
Dexter
Dexter Township
Red Rock Township
Austin
Windom Township
Marshall Township
Elkton
Xcel Energy
0 1 2 Miles
1:75,000
Project Boundary Modification
Pleasant Valley Wind Farm
Repower Project
Mower and Dodge Counties, Minnesota
Turbine (110m rotor diameter)
Existing Wind Project
Permanent Met Tower
Project Boundary
2014 Project Boundary
City/Township
County Boundary

1.3 Regulatory Framework

1.3.1 Federal Endangered Species Act

The Endangered Species Act (ESA) directs the USFWS to identify and protect endangered and threatened species and their critical habitat, and to provide a means to conserve their ecosystems. Among its other provisions, the ESA requires the USFWS to assess civil and criminal penalties for violations of the Act or its regulations. Section 9 of the ESA prohibits take of federally-listed species. Take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" 16 U.S.C. 1532. The term "harm" includes significant habitat alteration which kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering, 50 CFR 17.3. Projects involving federal lands, funding or authorizations will require consultation between the federal agency and the USFWS, pursuant to section 7 of the ESA. Projects without a federal nexus should work directly with USFWS to avoid adversely impacting listed species and their critical habitats.

1.3.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) makes it unlawful to pursue, capture, kill, or possess any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and Russia (and other countries of the former Soviet Union; MBTA, 1918). Most birds (except for introduced species and non-migratory game birds) within the U.S. and the Project Area are protected under the MBTA. The birds, occupied nests, and the contents of the nest (eggs or chicks) within the Project Area are afforded protection pursuant to the MBTA. Due to the potential for resident and migratory birds within the Project Area, compliance with the MBTA has been considered in the development of this BBCS.

1.3.3 Bald and Golden Eagle Protection Act

Under authority of the Eagle Act, 16 U.S.C. 668–668d, bald eagles and golden eagles are afforded additional legal protection. The Eagle Act prohibits the take, sale, purchase, barter, offer of sale, purchase, or barter, transport, export or import, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof, 16 U.S.C. 668. The Eagle Act also defines take to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," 16 U.S.C. 668c, and includes criminal and civil penalties for violating the statute. See 16 U.S.C. 668. The term "disturb" is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury to an eagle, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior, 50 CFR 22.3.

The Bald and Golden Eagle Protection Act (BGEPA) authorizes the Secretary of the Interior to permit the take of bald or golden eagles for several defined purposes, including when "necessary to permit the taking of such eagles for the protection of wildlife or of agricultural or other interests in any particular locality." Based on this authority, the USFWS published a final rule (Eagle Permit Rule) on September 11, 2009 (see 50 C.F.R. Parts 13 and 22; USFWS, 2009) establishing two new permit types: 1) individual permits that can be authorized in limited instances of disturbance

and in certain situations where other forms of take may occur, such as human or eagle health and safety; and 2) programmatic permits that may authorize incidental take that occurs over a longer period of time or across a larger area (USFWS, 2009). On December 16, 2016, the USFWS published a final rule (Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests) which included changes to permit issuance criteria and duration, definitions, compensatory mitigation standards, criteria for eagle nest removal permits, permit application requirements, and fees; with the intent to add clarity to the eagle permit regulations, improve their implementation, and increase compliance, while maintaining strong protection for eagles.

The Eagle Permit Rule authorizes take of bald eagles and golden eagles where take: (1) is compatible with the preservation of the bald and golden eagle; (2) is associated with and not the purpose of an otherwise lawful activity; and (3) cannot practicably be avoided (50 CFR. § 22.26). Specific to wind energy operations, the USFWS issued its Eagle Conservation Plan Guidance (ECPG) to provide specific recommendations on assessing eagle risk and taking steps to avoid, minimize, and mitigate potential impacts to eagles consistent with the BGEPA (USFWS, 2013).

1.3.4 Minnesota Threatened and Endangered Species Laws

The Minnesota Statutes, specifically the Protection of Threatened and Endangered Species (Minn. Stat. 84.0895), includes the language “Notwithstanding any other law, a person may not take, import, transport, or sell any portion of an endangered species of wild animal or plant, or sell or possess with intent to sell an article made with any part of the skin, hide, or parts of an endangered species of wild animal or plant, except as provided in subdivisions 2 and 7.” The Statute directs the Commissioner of the Minnesota Department of Natural Resources (MNDNR) to develop lists of endangered species, threatened species, and species of concern. MNDNR defines endangered, threatened, and special concern species as follows:

- Endangered (E) – a plant or animal species that is threatened with extinction throughout all or a significant portion of its range in Minnesota.
- Threatened (T) – a plant or animal species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range in Minnesota.
- Special Concern (SC) – species that are not endangered or threatened, but are extremely uncommon in Minnesota, or have unique or highly specific habitat requirements and deserve careful monitoring of their status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

1.3.5 USFWS Wind Energy Guidelines and Eagle Conservation Plan Guidance

Prior to 2012, the USFWS had been recommending, and many wind energy companies had been developing, ABPP for wind projects. In Minnesota, it is now a standard requirement of the LWECS Site Permit to develop an ABPP for the operation of wind energy projects. With publication of the final 2012 Land-Based Wind Energy Guidelines (WEG), the USFWS began recommending development of a BBCS instead of an ABPP (USFWS, 2012). While the components may be

generally the same, the BBCS is a mechanism by which wind energy companies document the studies, analyses, agency input, and decisions in navigating through the WEG to help avoid and minimize impacts to environmental resources.

The WEG outlines a tiered approach to assessing suitability and risks to wildlife at a potential wind resource area. The "tiered" approach ensures that sufficient data are collected to enable project proponents to make informed decisions about continued development of a proposed project (USFWS, 2012).

This BBCS briefly describes the efforts completed during pre-construction of the original Project (generally corresponding to Tiers 1 – 3 of the WEG). The bulk of the BBCS focuses on what the Project has done in Tier 4 as well as adaptive management measures that will occur throughout operation of the Repower Project.

As described in Section 1.3.3, the USFWS issued its ECPG in April 2013 to assist developers with addressing eagle concerns associated with wind energy projects. Xcel Energy conducted eagle-specific studies as part of post-construction studies (see Section 5.1). Xcel Energy developed an Eagle Conservation Plan (ECP) for PVW to support an eagle take permit (ETP; see Section 5.1.3).

2.0 SITE CHARACTERIZATION: TIER 1 & 2

2.1 Original Project

PVW was developed and permitted prior to USFWS issuance of the final WEGs; however, the efforts completed in siting, studying, analyzing, reviewing, and coordinating with state and federal officials align with the WEG-tiered approach. Tier 1 and 2 efforts are summarized below and are described in more detail in Section 2.1 of the 2014 BBCS.

A Fatal Flaw Analysis was performed by RES at PVW in January 2009 (RES, 2009). The Fatal Flaw Analysis included a field reconnaissance to evaluate in greater detail the habitats existing and resources available in the project area. The Fatal Flaw Analysis also included a more detailed view of onsite vegetation and habitat mapping, rare and unique natural resources, and permitting processes for the project. The Fatal Flaw Analysis concluded that the project site was well-suited for a LWECS, with a low risk of physical or environmental constraints to development (RES, 2009). Avian and bat surveys conducted for similar wind energy projects in the area (including the Buffalo Ridge study and Top of Iowa study) concluded minimal impacts to bird and bat populations (RES, 2009). The information from databases, agency communications, and field review was used to identify environmental constraints for siting of the project facilities, and to develop a scope for further field studies.

In 2010, a desktop analysis was completed for PVW that identified existing wildlife and rare animals within and adjacent to the project (RES, 2010). The preliminary desktop analysis was based on available datasets, maps, and correspondence documents with both the MNDNR and USFWS (RES, 2010). Through their desktop review, RES determined that use of the area by migratory birds was limited due to the dominance of row crops and the lack of suitable foraging

and breeding habitat (RES, 2010). RES also stated that, due to the existing agricultural practices at the project, minimal wildlife habitat was present and impacts to these areas were expected to be minimal (RES, 2010).

2.2 Repower Project

In a letter dated February 1, 2022, Xcel Energy requested comments on the Project from the USFWS and MNDNR. The MNDNR provided early coordination comments on March 7, 2022 and recommended the following in regard to the Project: (1) preparation of a BBCS, (2) avoidance of rare species, communities, and features, (3) all turbines are locked or feathered up to the manufacturer's standard cut-in speed from one-half hour before sunset to one-half hour after sunrise from April 1 to October 31 of each year of operation, and (4) operating turbines must be equipped with operational software capable of adjusting turbine cut-in speeds. Xcel Energy also submitted a Natural Heritage Review Request to the MNDNR for the Project on March 7, 2022. To date, a response has not been received.

Based on review of aerial photographs and land use/land cover database information, the majority of the land area in the Project Area is cultivated crops. Corn and soybeans are the dominant agricultural crops by acreage in Mower and Dodge counties, followed by vegetables harvested for sale in Mower County and forage crops in Dodge County (USDA, 2019). The land cover types in the Project Area are shown in Table 1.

Table 1
Land Cover Types and their Relative Abundance in the Project Area

Land Cover	Acres	Percent of Project Area
Cultivated Crops	42,562.0	93.6
Herbaceous	231.1	0.5
Hay/Pasture	385.9	0.8
Developed	1,929.1	4.2
Emergent Herbaceous Wetlands	89.7	0.2
Deciduous/Mixed/Evergreen Forest	235.5	0.5
Barren Land	13.6	<0.1
Open Water	1.8	<0.1
Total	**45,448.7**	**100**

Source: 2019 National Land Cover Database (Wickham, et al., 2021; Homer, et al., 2001-2016; Jin, et al., 2019; Yang, et al., 2018)
Note: The totals shown in this table may not equal the sum of addends due to rounding.

Within the Project Area forested lands are primarily windbreaks around residences and riparian areas along waterbodies. Wetlands are largely associated with creeks and unnamed intermittent streams within the Project Area.

Development of the Project, including the construction and operation, is expected to produce a minimal impact to wildlife. Based on studies of existing wind power projects in the United States and Europe, the impact to wildlife would primarily occur to avian and bat populations. It can be

expected that, similar to the existing wind farm and at other wind developments, there is a high likelihood that individual bird and bat fatalities will occur at the Project. Repowering the Project with longer rotors will increase the rotor-swept-area, and therefore, may increase collision risk to birds and bats. Similarly, construction activities will introduce risk to primarily birds from construction equipment and vehicles traveling around the Project Area. However, it is unlikely that the Project will affect species at the population level.

In accordance with the Xcel Energy's BBCS, Post-Construction Mortality Monitoring (PCMM) for birds and bats has been conducted for PVW. The first year of standardized monitoring was initiated in May 2016 and completed in May 2017 and included all turbines within the wind farm. Fatality estimates from those surveys are discussed in greater detail in Section 5.1 below. In addition, although standardized bird and bat fatality monitoring ended at the facility in 2017, incidental monitoring for bird and bat fatalities will continue for the life of the facility.

In addition to post-construction data from PVW, recent post-construction data are available from the following wind facilities in southern Minnesota with comparable landscapes to PVW from which to draw correlative inferences about potential impacts on birds and bats from Project operations:

- Odell Wind Farm (Odell) in Cottonwood, Jackson, Martin and Watonwan Counties, Minnesota;
- Red Pine Wind Energy Facility (Red Pine) in Lincoln County, Minnesota;
- Lakefield Wind Project (Lakefield) in Jackson County, Minnesota;
- Elm Creek I Wind Project (Elm Creek I) in Jackson County, Minnesota;
- Elm Creek II Wind Project (Elm Creek II), in Jackson and Martin Counties, Minnesota;
- Prairie Rose Wind Energy Facility (Prairie Rose) in Rock County, Minnesota;
- Big Blue Wind Farm (Big Blue) in Faribault County, Minnesota;
- Oak Glen Wind Farm (Oak Glen) in Steele County, Minnesota; and
- Grand Meadow Wind Farm (Grand Meadow) in Mower County, Minnesota.

Data from post-construction avian and bat studies at these facilities suggest the types and levels of impacts that may be occurring at PVW and may be realized at the Repower Project (Table 2):

Table 2
Recent Bird and Bat Post-Construction Fatality Estimates at Wind Facilities in Southern Minnesota

Facility	Survey Timeframe (month/year)	Bird (#/MW)	Bat (#/MW)	Comments
Odell[1]	12/2016-12/2017	4.69	6.74	• Most avian fatalities were in September and October • Bat fatalities were primarily July through September • Seasonality suggests most fatalities were fall migrants

Table 2
Recent Bird and Bat Post-Construction Fatality Estimates at Wind Facilities in Southern Minnesota

Facility	Survey Timeframe (month/year)	Bird (#/MW)	Bat (#/MW)	Comments
				• Most common bat species was hoary bat
Red Pine[2]	3/2018-11/2018 (cleared plot)	4.47	11.35	• Most common bird species were ruby-crowned kinglet, marsh wren, red-eyed vireo, and sedge wren • Bat species were hoary, big brown, eastern red, and silver-haired
	3/2018 – 11/2018 (road & pad)	2.68	18.74	
Lakefield[3]	4/2012-11/2012	2.75	19.97	• Fifteen species of birds documented • Documented bat species were hoary, big brown, eastern red, and little brown • No fatalities were federal- or state-listed
	6/2014-10/2014	1.07	20.19	• Most of the bat fatalities (65 percent) were solitary tree roosting bats (eastern red bat, hoary bat) • Bat fatalities were during fall migration (last week of July through mid-September)
Elm Creek I	2009-2010	2.32	1.49	• This report is not publicly available
Elm Creek II	2011-2012	8.73	2.81	• This report is not publicly available
Prairie Rose[4]	4/2014-6/2014	0.44	0.41	• Estimates provided are per study period (i.e., 8 weeks during spring migration and 10 weeks during fall migration) • An operational shut-down from August 18 through August 28, 2014 may have affected fatality rates
	8/2014-10/2014			
Big Blue[5]	7/2013-10/2013	--	6.33	• Systematic avian surveys were not conducted • Bat fatalities peaked twice: in late July/early August and in late August/early September. • Bat fatalities were primarily tree-roosting bats
Oak Glen[5]	2013	--	3.09	• Systematic avian surveys were not conducted • Bat fatalities peaked twice: in late July/early August and in late August/early September. • Bat fatalities were primarily tree-roosting bats
Grand Meadow[5]	2013	0.53-0.80	3.11	• Bat fatalities peaked twice: in late July/early August and in late August/early September. • Bat fatalities were primarily tree-roosting bats • Surveys focused on bat fatalities, conclusions for birds only apply to period between July

Table 2
Recent Bird and Bat Post-Construction Fatality Estimates at Wind Facilities in Southern Minnesota

Facility	Survey Timeframe (month/year)	Bird (#/MW)	Bat (#/MW)	Comments
	2014	0.0	1.05	and October; avian fatalities were only observed as incidental observations • 2013 bird fatality estimate is for small birds; no large birds were documented • In 2014, no small or large birds were documented in the standardized searches
Pleasant Valley[6]	2016 - 2017	0.68	1.80	• Bat fatalities were detected in late summer and early fall. • Documented bat species were eastern red bat, little brown bat, hoary bat, big brown bat, and silver-haired bat. • No eagle or large bird fatalities were detected.

1 Chodachek and Gustafson, 2018
2 Trana et al., 2019
3 Westwood Professional Services, 2015
4 Chodachek et. al, 2015
5 Chodachek et al., 2014
6 Tetra Tech, 2017a

Overall, adjusted fatality rates for all bird species vary between three to six birds/MW/year for the majority of post-construction fatality studies nationwide. Fatality estimates are relatively constant across the country except for in the Great Plains, where there appears to be lower avian fatality rates, and the Pacific region, where there may be slightly higher fatality rates. Most avian fatalities due to wind turbines are small passerines, about 60 percent of avian fatalities in publicly available reports in the United States. Fatality rates of migratory passerines increase in the spring and fall during migration (AWWI, 2020). The majority of avian species have a low risk of impacts at the population level (Allison et al., 2019). Based on the post-construction fatality studies outlined above, national averages for post-construction fatalities, and AWWI's conclusions about geographic trends, Xcel Energy anticipates that avian fatalities due to collision will be at or below the national average and may result in limited localized impacts to some groups of birds, such as small passerines.

Potential unavoidable impacts from the Project on bats are expected to be similar to the post-construction fatality rates at the above wind facilities, based on the similar land uses within the Project Area, geographic proximity of the projects, and similarities in species composition. Migratory tree-roosting bats (e.g., hoary bat, silver-haired bat, and eastern red bat), which were detected during the Project's pre-construction studies, may have the highest risk of collision based on previous bat fatality studies (AWWI, 2020). Unlike birds, wind facilities may present a risk to populations of migratory tree-roosting bats; in addition, although impacts from wind facilities on

cave-roosting bats are typically low, even a small impact can be a risk to populations already impacted by white-nose syndrome (Allison et al., 2019). Overall, risk of mortality to bats in the Project Area is likely to be greatest on nights during fall migration, when the number of bats moving through the area are the highest. During the fall migration, weather conditions that are most conducive to higher mortality rates occur with warm temperatures (greater than 50 degrees Fahrenheit) and low wind speeds (less than 6.5 m/s or 14 miles per hour) (Baerwald and Barclay, 2009; Arnett et al., 2011; Good et al., 2011; Cryan and Brown, 2007). In addition, risk may be higher on the first night following the passage of a low-pressure system when the prevailing wind shifts from a southerly to a northerly direction (Cryan and Brown, 2007; Good et al., 2011). Additional impacts may include a small reduction in the available habitat that some wildlife uses for forage or cover; however, operation of the Project will not significantly change the existing land use.

3.0 FIELD STUDIES: TIER 3

3.1 Original Project

RES obtained input on the PVW project early in the development process from MNDNR, USFWS, and DOC-EERA staff concerning avian, bat, and other wildlife impacts. A summary of agency coordination during development of PVW is provided in Section 2.3 of the 2014 BBCS.

Pre-construction studies at PVW were conducted by Western EcoSystems Technology, Inc. (WEST) and included acoustic bat surveys, avian use surveys, and aerial and ground-based raptor nest surveys (Table 3). Pre-construction surveys were conducted at PVW in general accordance with the WEGs. A more detailed summary of these surveys, along with the full study reports, can be found in the 2014 BBCS.

Table 3
Pre-construction Surveys at the Pleasant Valley Wind Farm

Study	Taxa	Survey Dates	2014 BBCS Section Reference	Results Summary
Avian Point Count Use Surveys (WEST, 2011)	All Birds	September 2009- October 2010	Section 2.2.1; Appendix B	Fifty-six unique species observed fora total of 3,414 individual bird observations. Four bald eagles and one golden eagle observed; no other sensitive species observed.
Acoustic Bat Surveys (WEST, 2012)	All Bats	June 2010 – October 2010; August – October 2011	Section 2.2.3; Appendix B	Relatively high bat activity levels relative to other Midwestern studies.
Raptor Nest Survey (WEST, 2013; 2014a)	Raptors	March 2013	Section 2.2.2; Appendix B	Three occupied bald eagle nests, one occupied red-tailed hawk nest, and 10 unoccupied inactive raptor nests within the survey area (project area plus two-mile buffer). All three bald eagle nests were located outside the project area).

Table 3
Pre-construction Surveys at the Pleasant Valley Wind Farm

Study	Taxa	Survey Dates	2014 BBCS Section Reference	Results Summary
Northern Long-eared Bat (NLEB) Presence/Absence Surveys (WEST, 2014b)	Northern Long- Eared Bat	July 2014	N/A; completed after 2014 BBCS; see Appendix C	Eight turbines identified within 1,000 of potential NLEB habitat. Potential NLEB presence at three of four acoustic detector stations. Most probable NLEB calls reclassified as little brown bats.

Based on the results of pre-construction wildlife surveys and PVW's location in an agricultural area, the project developer anticipated that any impacts to bats and birds would fall within the range of other wind energy projects in southern Minnesota and the Midwest region. A more detailed discussion of the anticipated risks to avian and bat species at the time of completion of pre-construction surveys at PVW is presented within Sections 2.2.4 and 2.2.5 of the 2014 BBCS.

Bird species diversity at the project site was typical of an intensive agricultural landscape with small patches of grassland, woodlands, and wetlands; and impacts to migratory birds and raptors were anticipated to be low, similar to other projects in southern Minnesota and elsewhere in the Midwest. Impacts to eagles were not anticipated at that time, since turbines were sited over two miles from the bald eagle nests identified during the 2013 nest surveys.

Based on the Project's location in an agricultural area, the project developer anticipated that any impact to bats would fall within the range of other wind energy projects in southern Minnesota and the Midwest region. Some uncertainty remained, however, concerning the actual level of bat mortality due to high levels of bat activity documented during pre-construction acoustic surveys. Additionally, 2014 acoustic surveys indicated the potential presence of NLEB, which was listed as a federal proposed threatened species at that time3. Based on the location of the Project Area, lack of high-quality foraging and roosting habitat within the Project Area, fatality data from facilities close to the Project Area, and the MNDNR recommendations, the project developer anticipated that overall moderate levels of bat mortality could occur from the Project, but significant adverse impacts were not anticipated.

3.2 Repower Project

Tier 3 avian and bat studies are intended to document baseline preconstruction avian/bat use of a project area prior to construction. Because the original Project is operational, Tier 3 studies of avian and bat use of the Repower Project boundary are unlikely to provide useful information and are therefore not planned. However, Xcel Energy will conduct field studies for wetlands and native

[3] On April 1, 2015, the USFWS listed the NLEB as threatened under ESA and on January 14, 2016, the USFWS posted the final Endangered Species Act 4(d) rule for NLEB in the Federal Register. This rule largely establishes an exemption for development and operation of wind energy facilities from needing to obtain any take coverage for NLEB, unlessthe project would directly impact a known hibernation or maternity roost site (USFWS, 2016).

prairie, as necessary, prior to construction of the Repower Project so impacts to these features can be avoided or minimized during construction.

4.0 AVOIDANCE AND MINIMIZATION MEASURES

4.1 Original Project

4.1.1 Project Siting, Design, and Construction Measures Used to Reduce Impacts

RES began construction planning activities in 2013, and onsite construction work occurred in 2014 and 2015. The 2014 BBCS laid out specific measures taken during pre-construction siting and design to minimize impacts to wildlife. Most notably, the project turbines were all located within agricultural land, and there were no impacts to native habitats. All construction personnel were trained to identify potential wildlife conflict situations and proper responses. This training included sensitivity to nesting birds and other wildlife that had potential to be encountered.

4.1.2 Operational Procedures to Minimize Impacts

This section identifies wildlife impact avoidance and minimization measures in the form of best management practices (BMPs) that Xcel Energy has and will incorporate during operation of the Project.

- All unnecessary lighting, except those required for safety by the Federal Aviation Administration (FAA) and other lights needed for safety and security purposes, will be turned off, and the use of high-intensity lights such as spotlights, steadily-burning bright lights, and sodium vapor lights will be minimized.

- Avian Power Line Interaction Committee (2006; APLIC, 2012) recommendations for overhead utilities maintenance will be followed to reduce risk of avian electrocution and collision with electrical components.

- Roadkill or other large carcasses within the public right-of-way at wind farms will be cleared by site personnel within 24 hours of discovery to avoid attracting bald eagles because bald eagles scavenge road-killed animals. Site personnel have developed guidelines for disposal of animal carcasses that are used at the wind farm.

- Hazardous materials will be handled in accordance with federal and state regulations.

- To reduce the collision risk of bald eagles, guyed temporary meteorological towers were removed and replaced with a non-guyed permanent lattice tower for meteorological monitoring. In the event that temporary towers may be installed as part of an operational assessment of a wind farm, guy wires will be marked with marker balls to improve visibility to birds and reduce collision risk for bald eagles.

- Rock and brush piles that could create prey habitat located adjacent to wind turbines will be removed to reduce prey sources for eagles and other raptors, including golden eagles in risk areas. Creation of these features will be prevented, to the extent practicable.

4.2 Repower Project

Xcel Energy is proposing to repower the 100 existing Vestas V100 turbines with Vestas V110 turbines. The previously permitted locations of turbines, access roads, collection lines, and other supporting infrastructure will remain the same. A large construction crane will be used to install upgraded nacelle components (or replace the existing nacelle) and install larger rotors. Some minor upgrading of public roadways and intersections will likely be required to allow for delivery of materials to each turbine location.

4.2.1 Project Siting Measures Used to Reduce Impacts

Temporary workspaces (crane assembly areas, temporarily widened access roads, and staging/workspaces at turbines) that will be utilized will not require tree clearing and will avoid temporary construction impacts to MNDNR designated native plant communities, native prairie, and Minnesota Biological Survey Sites of Biodiversity Significance (MBS SOBS).

4.2.2 Project Design Used to Reduce Impacts

- Per MNDNR's recommendation, turbines will be equipped with software capable of adjusting cut-in speeds.

- Xcel Energy will coordinate with the FAA on potential implementation of an Aircraft Detection Lighting System. If approved by the FAA, this will mitigate the impact of nighttime lights by deploying a radar-based system for the Project, turning lights on only when low-flying aircraft are detected nearby and then turning lights off after the aircraft is a safe distance from the Project.

- Turbines will be illuminated only as necessary to meet the minimum FAA requirements. FAA-approved lighting uses the shortest allowable flash duration, the minimum allowed flashes per minute, and all lights flash at the same time so that nocturnal migrating birds are not disoriented by lights.

4.2.3 Construction and Operational Procedures to Minimize Impacts

- Cross-county crane paths will not be used for the Project. Instead, cranes will be broken down, moved between turbine sites via carrier outriggers, and reassembled at the following turbine site.

- A Soil Erosion and Sediment Control Plan will be developed and adhered to during construction.

- All waste and scrap will be removed from the site at the completion of each stage of construction; litter and trash will be removed on a daily basis to prevent attraction of wildlife.

- Temporary impacts at the site will be restored after completion of construction to pre-construction conditions.

- As part of pre-construction and operation activities, Xcel Energy will conduct environmental training with employees and contractors, providing them information regarding this BBCS as well as well as policies regarding disturbance and harassment of wildlife. Employees and contractors will also be trained on the protocol for reporting bird and bat fatalities and injuries.

- Employees and contractors will be prohibited from bringing firearms or pets to the Project Area.

- All carrion observed onsite during construction and operation activities, with the exception of bird and bat carcasses, will be disposed of in an appropriate manner to prevent the attraction of eagles and other raptors. Discoveries of bird and bat carcasses will be documented in accordance with this BBCS and federal and state permits.

- Per MNDNR's recommendation, turbines will be locked or feathered up to the manufacturer's standard cut-in speed from one-half hour before sunset to one-half hour after sunrise from April 1 to October 31 of each year of operation.

- A preconstruction meeting will be held with the DOC-EERA to ensure all permit conditions will be met, a field representative will be designated and responsible for permit compliance throughout construction and reclamation activities, and all employees and contractors will be informed of all permit conditions, including those designed to avoid and minimize impacts to wildlife and wildlife habitats.

5.0 POST-CONSTRUCTION: TIER 4

The WEG recognize that projects can be in various states of development and/or operations. This includes projects operating prior to finalization of the WEG. The WEG specify that "for projects initiated prior to publication, the developer should consider where they are in the planning process relative to the appropriate tier and inform the Service of what actions they will take to apply the Guidelines" (USFWS, 2012).

According to the WEG, "during post-construction tiers (including Tier 4), developers are assessing whether actions taken in earlier tiers to avoid and minimize impacts are successfully achieving the goals and, when necessary, taking additional steps to compensate for impacts" (USFWS 2012). The specific questions to be investigated in Tier 4 are:

1. What are the bird and bat fatality rates for the project?
2. What are the fatality rates of species of concern?

3. How do the estimated fatality rates compare to the predicted fatality rates?
4. Do bird and bat fatalities vary within the project site in relation to site characteristics?
5. How do the fatality rates compare to the fatality rates from existing projects in similar landscapes with similar species composition and use?
6. What is the composition of fatalities in relation to migrating and resident birds and bats at the site?
7. Do fatality data suggest the need for measures to reduce impacts?

Post-construction fatality surveys were conducted for the original Project[4], and are summarized below.

5.1 Original Project

5.1.1 Formal Post-Construction Fatality Monitoring

To better understand the potential impacts to birds and bats at PVW, Xcel Energy contracted Tetra Tech, Inc. (Tetra Tech) to execute a PCMM study using methods developed in conjunction with USFWS and MNDNR as part of the 2014 BBCS. The BBCS called for conducting a post-construction mortality monitoring study with the primary objectives of providing a summary of documented fatalities, presenting estimates of searcher efficiency and carcass persistence, and calculating fatality rates adjusted for bias at PVW during the study. The secondary objective was to monitor all PVW turbines specifically for eagle and other large bird fatalities. In accordance with the BBCS, the PCMM study included: 1) standardized carcass searches to monitor avian and bat fatalities associated with wind farm operation, 2) searcher efficiency trials to assess observer efficiency in finding carcasses, and 3) carcass persistence trials to assess seasonal, project-specific times that a carcass remains detectable.

PCMM was conducted from May 16, 2016 to May 11, 2017, and 100 percent of the turbines were included in the study. Standardized carcass searches were conducted weekly over 35 survey periods (excluding clearance surveys and Survey Period 30) in spring, summer, and fall, and monthly in winter for a total of 3,549 turbine searches. Sixty-three fatalities (12 birds and 51 bats) were found during these searches. The avian species group with the most fatalities was songbirds (n=9); the most abundant bat species detected as a fatality was eastern red bat (n=16). Eagle and other large bird-specific fatality monitoring also occurred monthly at all 100 turbines and was conducted concurrently with standardized carcass searches. There were 1,138 eagle and other large-bird specific searches conducted between May 23, 2016 and April 21, 2017. No eagle or other large bird fatalities were detected during these surveys.

Searcher efficiency conducted during general fatality searches ranged from 0.84 (90 percent CI= 0.77 – 0.92; bat surrogates in spring) to 1.00 (90 percent CI=1.00 – 1.00; all size classes in fall).

[4] Xcel's 2016-2017 Post-Construction Mortality Monitoring Report can be found on the MN DOC eDockets Search (https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showeDocketsSearch&showEdocket=true&linkId=114) by entering Document ID number 20178-134856-01.

Carcass persistence ranged from 2.00 days (90 percent CI= 1.35 – 2.82; small birds in fall) to 9.06 days (90 percent CI= 5 – 15.26; large birds in winter).

The estimated annual fatality rate for all birds was 1.36 bird fatalities per turbine per year (0.68 bird fatalities per MW per year). This fatality rate is within the range of publicly reported fatality estimates for Midwest wind facilities located in similar habitats to PVW (0.44 to 11.83 bird fatalities per turbine per year). This fatality rate is also less than the regional mean of 2.92 fatalities per turbine per year at 10 facilities across the Great Plains region (which, in this particular study, includes Minnesota). Fatalities at PVW are not expected to have population-level consequences based on population size and low numbers of fatalities detected.

The estimated annual fatality rate for bats was 3.59 bat fatalities per turbine per year (1.80 bat fatalities per MW per year). This fatality rate is below the mean annual bat fatality rates estimated from 122 projects in the Midwestern deciduous forest-agriculture region (7.94 bat fatalities per MW per year).

Five bat species were detected: eastern red bat, little brown bat, hoary bat, big brown bat, and silver- haired bat. Bat fatalities were detected in summer and early fall, corresponding with the period of greatest migration activity and indicating the presence of summer resident bats.

No federally or state-listed bird or bat species were found as fatalities during the course of the study. Two Minnesota Department of Natural Resources Species of Special Concern were detected: little brown bat and big brown bat.

5.1.2 Incidental Fatality Monitoring

Although standardized bird and bat fatality monitoring ended at the facility in 2017, incidental monitoring for bird and bat fatalities will continue for the life of the facility. Xcel Energy Operations and Maintenance staff are trained to incidentally monitor for injured and dead birds and bats during their normal work activities. Additionally, an Xcel Energy consultant conducting eagle fatality monitoring beginning in 2020 (see Section 5.1.5), has documented incidental finds of other birds and bats at PVW. Xcel Energy is required to maintain records of and report these incidental finds under a Special Purpose Utilities Permit (SPUT) from the USFWS (see Section 5.4) and as a condition of the 2014 Site Permit. Table 4 below lists the incidental finds of birds and bats at PVW to date, as reported under the SPUT permit.

Table 4
Incidental Bird/Bat Fatalities at the Pleasant Valley Wind Farm

Species	Date
Bald eagle	5/29/2018 [1]
Killdeer	8/4/2020
Mallard	8/12/2020 [2]
Red-tailed hawk	11/1/2020
Red-tailed hawk	5/12/2021

Table 4
Incidental Bird/Bat Fatalities at the Pleasant Valley Wind Farm

Species	Date
Mourning dove	7/5/2021
Gray partridge	8/30/2021
Hoary bat	9/1/2021

[1] This eagle fatality was found over 100 meters from nearest turbine; however, according to USFWS, results of analysis showed injuries to the bird consistent with collision with a wind turbine. The bird also had high levels of rodenticide in its tissues, which may have contributed to its death.
[2] This fatality was found near the facility's substation.

5.1.3 Post-Construction Eagle Nest Surveys

In accordance with adaptive management response measures prescribed in the 2014 BBCS for PVW, Xcel Energy carried out several eagle-specific surveys at the facility in response to an eagle nest discovered in close proximity to PVW turbines (see Section 7.1). These surveys are summarized in Table 5 below.

Table 5
Post-construction Eagle Surveys at the Pleasant Valley Wind Farm

Study	Taxa	Survey Dates	Results Summary
Eagle Use Surveys (Tetra Tech, 2017b)	Eagles	March 2016-February 2017	24 eagle use minutes recorded out of 13,680 (228 hrs.) minutes surveyed during eagle use surveys
Ground-based Eagle Nest Monitoring (TetraTech, 2016a)	Eagles	March 2016-September 2016	The eagle nest located near Turbines 16, 17, and 18 (Nest 2016-01) produced one eaglet that fledged the nest in June 2016.
Aerial Eagle Nest Survey(Tetra Tech, 2016b)	Eagles	April 2016	Two occupied active bald eagle nests (Nests 2016-01 and 2016-02) were identified within one mile of PVW turbines. Six occupied, active bald eagle nestsand two occupied inactive nests were identified within a 10-mile buffer of the wind farm footprint
Ground-based Eagle Nest Observations (Tetra Tech, 2016c)	Eagles	June 2016	Nests 2016-01 and 2016-02 were both observed tobe occupied and active.

In coordination with the USFWS, Xcel Energy also developed an ECP for PVW, which has been implemented since 2017 and prescribes measures to minimize risk to eagles, eagle-specific fatality monitoring procedures, and adaptive management in response to changes in eagle use at the facility (see also section 7.1).

5.1.4 Post-Construction Eagle Use Surveys

In addition to the eagle nest surveys, Xcel Energy conducted eagle use surveys at PVW beginning in March 2016 in order to estimate the seasonal, spatial, and temporal use of the wind farm and a 1-kilometer [km] buffer around the existing turbines by bald eagles, and to provide data input sufficient for an eagle risk assessment consistent with the ECP Guidance. Eagle use survey

locations (8 at Grand Meadow Wind Farm and 19 at PVW) were distributed throughout the wind farms and 1km buffer at each wind farm, providing spatial coverage of over 30 percent of each wind farm footprint as recommended in the ECP Guidance. Surveys were conducted at each location once per month and were distributed across daylight hours, with the survey schedule varying between visits so that each survey location was surveyed at all periods of the day. Each survey location consisted of an 800-meter radius circular plot, and individual surveys were conducted for 60 minutes at each survey location. Observations of 12 individual bald eagles were made at PVW during the surveys.

5.1.5 Eagle Take Permit Compliance Monitoring

Based on the risk to bald eagles from operation of PVW, Xcel Energy elected to develop a combined Eagle Conservation Plan in support of an application for an incidental Eagle Take Permit (ETP) for both the Pleasant Valley and Grand Meadow Wind Farm facilities. The ETP application was submitted in 2019, and the USFWS issued an ETP in April 2020 authorizing the incidental take of up to a maximum of six bald eagles in five years of operation of the Pleasant Valley and Grand Meadow Wind Farms. The ETP requires that Xcel Energy undertake standardized eagle injury/fatality monitoring and nest surveys at the facilities for at least two years following the issuance of the ETP. Xcel Energy initiated eagle fatality monitoring in June 2020, with fatality searches of each turbine occurring once every 28 days. The study design also includes bias correction trials (carcass persistence and searcher efficiency). To date, no eagle fatalities have been recorded at the PVW, aside from the one fatality identified during incidental fatality monitoring discussed above in Section 5.1.2. Aerial eagle nest surveys of the project and a two-mile buffer were conducted in spring 2021. Two occupied active bald eagle nests (Nests 2017-01 and 2016-02) were identified within one mile of PVW turbines. The second year of eagle nest surveys required by the ETP are planned for spring 2022.

5.2 Repower Project

5.2.1 Formal Post-Construction Fatality Monitoring

Xcel Energy proposes to conduct standardized post-construction fatality monitoring for two years following commissioning of the repowered turbines, in accordance with the WEG and MNDNR protocols (MNDNR, 2014). The Repower Project is considered low risk. An overview of the fatality monitoring protocol is below. A more detailed study plan for post-construction fatality monitoring will be developed in coordination with MNDNR and DOC-EERA staff prior to operation of the Repower Project.

As the protocol is further developed with MNDNR, USFWS, and DOC-EERA prior to construction, the protocol will be moved to an appendix.

Search Methods

Based on the minimal number of incidental fatalities reported at the original Pleasant Valley Wind Farm, Xcel proposes to conduct a hybrid of full-plot post-construction fatality monitoring at a minimum of 10 turbines and road and pad fatality monitoring at a minimum of 40 turbines. This

protocol is consistent with a low-risk site described in the MNDNR protocol (MNDNR, 2014). Full search plots will be cleared of vegetation and will be searched by walking transects of a 120-meter square plot centered on the turbine. Road and pad searches will be conducted on the turbine pad and associated access road.

Searches for birds and bats will be conducted at the same survey turbines for the entire study period. Survey turbines will be chosen to provide relatively even coverage of the entire facility and to represent different Project area and turbine characteristics (e.g., edge versus mid-string turbines, lit versus unlit turbines, different surrounding land uses). During the spring, summer, and fall survey periods (March 15 – November 15), searches will be conducted once a week. The frequency of searches may be updated if carcass persistence trials indicate that a significant number of carcasses are being removed from plots in fewer than seven days.

Recording Data

In accordance with the WEG, personnel trained in proper search techniques will look for bird and bat carcasses within the plots/transects identified in Section 3.1.1 above, and record and collect all carcasses located in the searchable areas. Data to be recorded include date, start time, end time, observer, which turbine area was searched (including GPS coordinates), and weather data for each search. When a dead bat or bird is found, the searcher will place a flag near the carcass and continue the search. After searching the entire plot, the searcher will return to each carcass and record information on a fatality data sheet, including date, species, sex, and age (when possible), observer name, turbine number, distance from turbine, azimuth from turbine (including GPS coordinates), habitat surrounding carcass, condition of carcass (entire, partial, scavenged), and estimated time of death (e.g., <1 day, 2 days).

5.3 Incidental Monitoring

5.3.1 Training of On-Site Staff

All operations personnel are trained to identify potential wildlife conflicts and the proper response. This training includes sensitivity to birds and other wildlife. An incidental reporting process has been developed for operations personnel ensuring they can document bird or bat casualties that are discovered during routine maintenance work and at other times that personnel are within the Project area.

In addition to incidental fatality reporting, operations personnel are trained to identify bald eagles and to be sensitive to relative use rates of bald eagles and to look for eagle casualties while driving between turbines and conducting turbine maintenance. Staff are also trained to identify eagle nests and are directed to report any bald eagle nesting activity in the Project vicinity. This information will be used for the life of the LWECS Site Permit to continually maintain a relative sense of bald eagle use in the Project Area so that modifications can be implemented as necessary.

5.3.2 Injured Wildlife Handling and Reporting Protocol

Any injured wildlife observed during operations of the Project will be left in place until Xcel Energy's primary biological/ecological representative has been contacted. Xcel Energy will then decide the most appropriate course of action depending on the condition and species of injured animal discovered. All injured raptors, waterfowl, waterbirds, federally- or state-listed bird species, and federally- or state-listed bats will be promptly delivered to the appropriate rehabilitation center or other approved facility as specified in state and federal permits, if provided; or as directed as necessary by law enforcement personnel.

5.4 Reporting

Bird and bat fatalities discovered at the facility are reported according to the 2014 LWECS Site Permit requirements for the life of the Project LWECS Site Permit. The LWECS Site Permit for PVW includes several reporting requirements related to this BBCS that have been met since commercial operation began and will be met for the duration of the permit:

1. *Annual ABPP Audit:*

   The Permittee shall, by March 15 following each complete or partial year of operation, filewith the Commission an annual report detailing the findings of its annual audit of ABPP practices. The annual report shall include summarized and raw data of bird fatalities and injuries and shall include bird and bat fatality estimates for the Project using agreed upon estimators from the prior calendar year.

   The annual report shall also identify any deficiencies or recommended changes in the operation of the project or in the ABPP to reduce avian and bat fatalities and shall provide a schedule for implementing the corrective or modified actions. The Permittee shall provide a copy of the report to MNDNR and to the USFWS at the time of filing with the Commission.

2. *Quarterly Incident Reports:*

   The Permittee shall submit quarterly avian and bat reports to the Commission. Quarterly reports are due by the 15th of each January, April, July, and October commencing the day following commercial operation and terminating upon the expiration of this permit. Each report shall identify any dead or injured avian and bat species, location of find by turbine number, and date of find for the reporting period in accordance with the reporting protocols. If a dead or injured avian or bat species is found, the report shall describe the potential cause of the occurrence (if known) and the steps taken to address future occurrences. The Permittee shall provide a copy of the report to the MNDNR and to the USFWS at the time of filing with the Commission.

3. *Immediate Incident Reports*

The Permittee shall notify the Commission, USFWS, and MNDNR within twenty-four (24) hours of the discovery of any of the following:

(a) Five or more dead or injured non-protected or migratory avian or bat species within a five-day period;

(b) An incident of one or more dead or injured state threatened, endangered, or species of special concern;

(c) One or more dead or injured federal listed species; or

(d) One or more bald eagles.

Xcel Energy has received a SPUT from the USFWS, which allows operational staff to collect, transport and temporarily possess migratory bird carcasses and injured migratory birds. This permit is necessary for the company to legally possess any dead migratory birds, excluding eagles and federally listed species, including any collected and removed from the project site or used in bias trials as part of the post-construction eagle fatality monitoring. This permit requires Xcel Energy to notify USFWS of any fatalities of migratory birds on an annual basis in a specified USFWS format.

Xcel Energy also holds a MNDNR Salvage Permit for its Minnesota wind facilities that allows collection of migratory birds and bats. Xcel Energy will report fatalities according to both SPUT and MNDNR salvage permit requirements.

Xcel Energy anticipates that additional or modified LWECS reporting requirements will be included in the amended site permit, and Xcel Energy will comply with these reporting requirements in accordance with the amended site permit.

6.0 RESEARCH: TIER 5

In addition to the Tiers 1-4 described above, the WEG contain a Tier 5 Other Post-Construction Studies. In general, the studies identified in Tier 5 are research-related and “will not be necessary for most wind energy projects”. Given that the Project’s pre-construction and post-construction studies indicate that the Project is not likely to cause significant adverse impacts, no Tier 5 studies are planned.

7.0 ADAPTIVE MANAGEMENT AND OPERATIONS MEASURES

Within the WEG, the USFWS defines adaptive management as “an iterative decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Comprehensively applying the tiered approach embodies the adaptive management process” (USFWS, 2012).

7.1 Original Project

7.1.1 Eagles

In March 2016, PVW O&M staff observed an active bald eagle nest located within 800 meters of turbines 16, 17, and 18, and immediately notified USFWS. This nest was not observed during an April 2014 aerial nest survey, nor was it observed during construction of the turbines. Upon discovery, Xcel Energy curtailed the three turbines nearest the nest and began weekly nest monitoring. Xcel Energy met with USFWS, DOC-EERA, and MNDNR to discuss the eagle nest and curtailment and monitoring plan. Xcel Energy committed to maintain curtailment of the three turbines until six weeks after the juvenile eagle from the nest had fledged.

In May 2016, MNDNR provided guidance to DOC EERA and Xcel Energy concerning a revision in PCMM study protocol as a result of curtailment of turbines 16, 17, and 18 in response to discovery of the active eagle nest. MNDNR recommended excluding these three turbines from fatality searches while the turbines were not operational. Fatality searches resumed at these turbines when curtailment ended in August 2016.

As a result of internal discussions and coordination with the USFWS and MNDNR, Xcel Energy voluntarily elected to pursue an incidental ETP and began the development of an ECP in accordance with USFWS ECP Guidance (USFWS, 2013). The ECP provides a structured assessment of site conditions and risk and response actions under the BGEPA and includes long-term approaches to avoidance and minimization of eagle risk, as well as monitoring and adaptive management to changing circumstances. Several post-construction monitoring studies to assess eagle use of facility have been conducted and are briefly discussed in Section 5.1. Development of the ECP and the broader ETP application process involved extensive agency coordination, which is described in detail in PVW's ECP (Tetra Tech, 2019). Adaptive management of nesting eagles near the facility is ongoing.

7.1.2 Bats

Agency Coordination

Avian and bat PCMM was initiated in early May 2016 at PVW in accordance with the survey protocol presented within the 2014 BBCS (see Section 5.1). MNDNR, DOC-EERA, and USFWS provided input regarding the survey protocol and were kept apprised of survey status. In early 2017, Xcel Energy provided an interim PCMM study memo to MNDNR and DOC-EERA staff summarizing the results of summer and fall 2016 avian and bat fatality monitoring. At that time, the agencies indicated no major concerns with the interim results; however, MNDNR staff communicated concerns about little brown bat and big brown bat, state species of special concern, and requested that they be allowed to review and discuss the final survey results with Xcel Energy and DOC-EERA.

The first year of avian and bat PCMM was completed at PVW in May 2017. A conference call was held on August 8, 2017 with DOC-EERA staff, MNDNR staff, and Xcel Energy, prior to the study report formally being filed in eDockets to discuss monitoring results and anticipated next steps.

Although the agencies communicated no major concerns about the results of the PCMM study, DOC-EERA staff and MNDNR staff both indicated to Xcel Energy that both agencies would prefer have either (a) an additional year of fatality monitoring, or (b) turbine operation modifications to reduce bat fatality levels.

In compliance with the site permit condition requiring filing of an annual report with bird and bat fatality estimates, Xcel Energy filed the final PCMM report on August 18, 2017. In internal discussions and in coordination with agency staff, Xcel Energy elected to pursue turbine operational modifications rather than additional study efforts (see Section 6.1.2.2). A turbine feathering program was determined to have a low impact on energy production, to likely be more economical than additional fatality monitoring, and to be a proven effective measure to reduce bat fatalities related to turbine operation. An additional meeting between DOC-EERA staff and Xcel Energy held on September 25, 2017 at PVW to further discuss and clarify what the turbine operation modifications would entail. DOC-EERA staff had additional correspondence with MNDNR staff on December 6, 2017 to confirm that MNDNR was still in agreement with DOC-EERA's recommendation to implement turbine operational modifications at PVW, and MNDNR indicated continued support for DOC-EERA's recommendation.

On January 3, 2018, DOC-EERA staff filed a Site Permit Compliance Filing Review as a formal response to Xcel Energy's filing of the final survey report. DOC-EERA's review included a summary of the coordination between Xcel Energy, DOC-EERA, and MNDNR and included the following recommendation for turbine operational modifications at PVW:

> *"The Permittee should operate all facility turbines so that all turbines are programmed to be locked or feathered at wind speeds up to the manufacturer's standard cut-in speed, from one- half hour before sunset to one-half hour after sunrise, from April 1 to October 31 of each yearof operation through the life of the project."*

DOC-EERA stated that the recommended operational modifications reflect condition language specific in the two most recent LWECS site permits issued by the MPUC. DOC-EERA recommended that the PUC issue a letter to Xcel Energy acknowledging the submittal and completion of the compliance review of the Pleasant Valley Wind Farm 2016-2017 Post-Construction Mortality Monitoring Report.

On January 18, 2018, the MPUC filed a letter acknowledging completion of the compliance review and supporting DOC-EERA's recommendations for turbine operational modifications. The MPUC letter also agreed with an DOC-EERA recommendation that Xcel Energy should file, by March 15, 2018, an updated ABPP providing additional detail on any planned turbine operational modifications.

Bat Mitigation

The five bat species observed during the 2016-2017 PCMM study at PVW are similar to those reported in PCMM studies at other wind facilities. Bat fatality rates at PVW were highest during late summer and early fall. A similar temporal and species pattern has been observed at other

North American wind energy facilities. At PVW, Eastern red bat had the highest number of fatalities (n=16), followed by little brown bat (n=14), hoary bat (n=12), big brown bat (n=3), and silver-haired bat (n=3). As of 2017, all five species detected are ranked Least Concern by IUCN Red List of Threatened Species. Little brown bat and big brown bat are MNDNR Species of Special Concern, however, and due to sharp population declines caused by WNS in other parts of their range, little brown bat may be assessed for listing in the future (USFWS, 2021). Little brown bat fatalities at PVW are similar to or less than those reported at nearby wind facilities and wind facilities in the Midwest. Insufficient information on population size and status throughout the species' ranges makes it challenging to determine the impacts that PVW fatalities may have on regional populations of these species.

As a precautionary measure in response to the uncertainty surrounding potential impacts to bat species of concern, Xcel Energy elected to implement the turbine operational modifications recommended by DOC-EERA, MNDNR, and the MPUC. All turbines at PVW are programmed to be locked or feathered at wind speeds up to the manufacturer's standard cut-in speed, from one-half hour before sunset to one-half hour after sunrise, from April 1 to October 31 of each year of operation through the life of the project. Turbine feathering (i.e., adjusting the angle of the rotor blade parallel to the wind) the blades has been shown to significantly reduce collision fatality to bats (Hein and Schirmacher, 2016). This operational change was implemented through installation of Vestas Bat Mitigation Option software at PVW in early March 2018.

7.2 Repower Project

Based on the general location of the Project (highly impacted agriculture landscape), pre-construction siting actions (turbines sited away from sensitive habitat), and results to date of fatality surveys, no significant adverse impacts are anticipated from the Project. The estimated adjusted fatality rates for bats are within the lower portion of the overall range for other projects in the region and the fatality rates for birds are within the range of publicly reported fatality estimates for Midwest wind facilities located in similar habitats to PVW.

Based on the results of the Tier 4 monitoring program described in in Section 5.1, bird and bat fatality rates do not appear to be significant at a population level, and no listed or federally protected species have been documented as fatalities. However, adaptive management measures may be considered in the future to further avoid, minimize, or compensate for unanticipated and significant project impacts to wildlife. Thresholds for considering a future adaptive response will include:

- significant levels of mortality of unlisted species of birds or bats (i.e., an extraordinary event as defined in the LWECS Site Permit). Significance will be determined by qualified biologists and will be based on the latest information available, including the most recent data on species' population sizes and trends. For example, even relatively high levels of mortality of the most common species may not be significant. Conversely, lower levels of mortalities of less common species may be of more concern, particularly if these species are of conservation concern (e.g., MNDNR Special Concern Species, USFWS Birds of Conservation Concern); or

- mortality of an eagle or mortality of a species listed as endangered/threatened under the federal Endangered Species Act or Minnesota's Endangered Species Statute. Note that the final 4(d) ruling for the NLEB currently exempts wind energy projects from incidental take of this species during operation, and there are no known hibernacula within the Project boundaries (USFWS, 2016). Any documented NLEB mortality will be reported to the USFWS and MDOC but no adaptive management measures are proposed under the current 4(d) rule. If either the NLEB's status or the 4(d) rule is changed, Xcel Energy will update this BBCS and adaptive management measures as appropriate.

If one of these triggering events occurs, Xcel Energy will report the event as required by state and federal permits, and will initiate an investigation into potential causes of the event. In coordination with MNDNR, USFWS, and DOC-EERA, Xcel Energy will: (1) evaluate monitoring data to determine whether the data are indicative of a pattern of fatalities at the Project that should be addressed through additional measures; (2) Identify practicable measures to address the impact and minimize fatalities; and (3) determine corrective actions, to the extent possible, to ensure long-term solutions are implemented for the life of the Project.

As described above in Section 5.2.1, operations staff are trained to identify and internally report the presence of suspected bald eagle nests in the vicinity of the Project. If a new bald eagle nest is discovered within 0.5 mile of a Project turbine, Xcel Energy will coordinate with the USFWS to determine the need for nest monitoring and/or operational changes in response to the nest. In addition, in accordance with the ETP, Xcel Energy will conduct permit compliance monitoring, including 2 years of systemic monitoring and 5 years of incidental monitoring, and two additional years of aerial eagle nest surveys. In the event that an eagle nest is identified within two miles of a turbine location, Xcel Energy will actively monitor the nest during the nesting season until the eaglets (if any) have fledged. Xcel Energy will communicate the results of such monitoring to the USFWS and any further decisions regarding the scope of additional survey efforts, (if needed) will be coordinated with the USFWS, DOC-EERA, and MNDNR.

Another potential event that could trigger the need for adaptive management action is the listing of a new species by USFWS or MNDNR. Should a new species be listed that has the potential to occur at the facility, Xcel Energy will meet and confer with USFWS to determine if changes to the turbine operation plan are warranted based on results of monitoring at the Project.

8.0 KEY RESOURCES

This BBCS identifies key resources to address avian protection issues, including area USFWS and MNDNR biologists, engineers, planners, Xcel Energy Environmental Services staff, and operation personnel who have been trained on avian interaction problems. External organizations such as the National Wind Coordination Committee and Avian Power Line Interaction Committee can also serve as helpful resources by providing guidance, workshops, materials, and contacts. An understanding of bald eagles, other sensitive bird species, and bat behavior can influence how and when avian and bat protection should be utilized. Xcel Energy Environmental Services staff will coordinate with regulators and wildlife to reduce avian and bat injury or mortality and maintain Project reliability. The Site Manager will be responsible for enforcement of BMPs that focus on

reducing impacts to birds and bats, as well as the implementation of this document. Operations and maintenance staff will be trained on this document and on avian protection planning.

Table 6 lists contacts that will serve as key resources for the Project.

Table 6
List of Key BBCS Resources

Organization Type	Name	Address	Phone
Rehabilitation Center	The Raptor Center College of Veterinary Medicine, University of Minnesota	1920 Fitch Avenue St. Paul, Minnesota 55108	612-624-4745
Rehabilitation Center	Wildlife Science Center	5463 West Broadway Avenue Forest Lake, Minnesota 55025	651-464-3993
Government Agency	Minnesota Department of Natural Resources	500 Lafayette Road St. Paul, Minnesota 55155	651-296-5484
Government Agency	U.S. Fish and Wildlife Service Twin Cities Field Office	4101 American Boulevard East Bloomington, Minnesota 55425	612-725-3548
Government Agency	Minnesota Department of Commerce Energy Environmental Review and Analysis	85 7th Place East, Suite 500 St. Paul, Minnesota 55101	800-657-3794
Owner/Operator	Northern States Power, a Minnesota corporation, d/b/a Xcel Energy	228 Industrial Park Drive, Dexter, Minnesota	612-321-3292

9.0 REFERENCES

Allison T D et al. 2019. Impacts to wildlife of wind energy siting and operation in the United States Issues Ecol. 21 1–23.

American Wind Wildlife Institute (AWWI). 2020. 2nd Edition: Summary of Bird Fatality Monitoring Data Contained in AWWIC. November 24, 2020. Available online at https://awwi.org/wp-content/uploads/2020/11/2nd-Edition-AWWIC-Bird-Report-11-24-2020.pdf.

Arnett, E.B., M.M.P. Huso, J.P. Hayes and M. Schirmacher. 2011. Changing wind turbine cut-in speed to reduces bat fatalities at wind facilities. Frontiers in Ecology and the Environment 9:209-214.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for raptor protection on power Lines; the State of the Art in 2006. Edison Electric Institute, APLIC and the California Energy Commission Washington, D.C and Sacramento, CA.

APLIC. 2012. Reducing avian collisions with power lines: the state of the art in 2012. Edison Electric Institute and APLIC. Washington, D.C.Baerwald, E.F. and R.M.R. Barclay. 2009. Geographic variation in activity and fatality of migratory bats at wind energy facilities. Journal of Mammalogy 90:1341-1349.

Baerwald, E.F. and R.M.R. Barclay. 2009. Geographic variation in activity and fatality of migratory bats at wind energy facilities. Journal of Mammalogy 90:1341-1349.

Chodachek, K., C. Derby, D. Bruns Stockrahm, P. Rabie, K. Adachi, and T. Thorn. 2014. Bat Fatality Rates and Effects of Changes in Operational Cut-in Speeds at Commercial Wind Farms in Southern Minnesota - Year 1: July 9 - October 31, 2013. Prepared for Minnesota Department of Commerce, St. Paul, Minnesota. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota, and Minnesota State University Moorhead, Moorhead, Minnesota. May 23, 2014. Available online at: http://mn.gov/commerce/energyfacilities/documents/MNDOC,%20Bat%20Fatality%20Study%20Year%201,%205.23.14.pdf.

Chodachek, K., K. Adachi, and G. DiDonata. 2015. Post-Construction fatality surveys for the Prairie Rose Wind Energy Facility, Rock County, Minnesota. Final Report: April 15 to June 13, 2014 and August 15 to October 29, 2014. Prepared for Enel Green Power, North America, Andover, Massachusetts. Prepared by WEST, Bismarck, North Dakota. Available online at https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={F38C2FEC-ED84-4813-AF3E-5A397A954A34}&documentTitle=20152-107006-01

Chodachek, K., and Z. Gustafson. 2018. Tier 4 Post-Construction Mortality Monitoring Study for the Odell Wind Energy Project, Cottonwood and Jackson Counties, Minnesota. Final Fatality Report: December 2016 – December 2017. Prepared for Odell Wind Farm, LLC, Oakville, Ontario. Prepared by WEST, Bismarck, North Dakota. 34 pp. March 15, 2018.

Cryan, P.M. and A.C. Brown. 2007. Migration of bats past a remote island offers clues toward the problem of bat fatalities at wind turbines. Biological Conservation 139:1-11.

Good, R.E., W. Erickson, A. Merrill, S. Simon, K. Murray, K. Bay, and C. Fritchman. 2011. Bat monitoring studies at the Fowler Ridge Wind Energy Facility, Benton County, Indiana. Prepared by WEST, Cheyenne, Wyoming.

Hein and Schirmacher. 2016. Impact of wind energy on bats: a summary of our current knowledge. Human-Wildlife Interactions 10(1): 19-27, Spring 2016.

Homer, Collin G., Dewitz, Jon A., Jin, Suming, Xian, George, Costello, C., Danielson, Patrick, Gass, L., Funk, M., Wickham, J., Stehman, S., Auch, Roger F., Riitters, K. H., Conterminous United States land cover change patterns 2001–2016 from the 2016 National Land Cover Database: ISPRS Journal of Photogrammetry and Remote Sensing, v. 162, p. 184–199, at https://doi.org/10.1016/j.isprsjprs.2020.02.019

Jin, Suming, Homer, Collin, Yang, Limin, Danielson, Patrick, Dewitz, Jon, Li, Congcong, Zhu, Z., Xian, George, Howard, Danny, Overall methodology design for the United States National Land Cover Database 2016 products: Remote Sensing, v. 11, no. 24, at https://doi.org/10.3390/rs11242971

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

Minnesota Department of Natural Resoruces (MNDNR). 2014. Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems in Minnesota. June 2014. Available online at: https://files.dnr.state.mn.us/eco/ereview/avian-bat-protocols.pdf

Renewable Energy Systems Americas, Inc. (RES). 2009. Fatal Flaw Analysis. Pleasant Valley Project, Dodge and Mower Counties, Minnesota. Prepared by McGhie & Betts Environmental Services, Inc., Rochester, Minnesota for Renewable Energy Systems Americas Inc., Broomfield, Colorado.

RES. 2010. Application for Large Wind Energy Conversion System Site Permit. MPUC Docket No. IP6828/WS-09-1197. Pleasant Valley Wind, LLC., Dodge and Mower Counties, Minnesota. Prepared by McGhie & Betts Environmental Services, Inc., Rochester, Minnesota for Renewable Energy Systems Americas Inc., Broomfield, Colorado.

Tetra Tech. 2016a. 2016 Ground-based Eagle Nest Survey. Pleasant Valley Wind Farm, Dodge and Mower County, Minnesota. June.

Tetra Tech. 2016b. 2016 Aerial Eagle Nest Survey. Pleasant Valley Wind Farm, Dodge and Mower County, Minnesota. April.

Tetra Tech. 2016c. 2016 Ground-based Eagle Nest Monitoring. Pleasant Valley Wind Farm, Dodge and Mower County, Minnesota. March-September.

Tetra Tech. 2017a. 2016-2017 Post-Construction Mortality Monitoring Annual Report. Pleasant Valley Wind Farm, Mower and Dodge Counties, Minnesota. Prepared for Northern States Power Company Minnesota. Prepared by Tetra Tech, Bloomington, Minnesota June 2017.

Tetra Tech. 2017b. Eagle Use Survey Report. Grand Meadow Wind Farm, Mower County, Minnesota. March 2017.

Tetra Tech. 2019. Final Draft Eagle Conservation Plan for the Grand Meadow and Pleasant Valley Wind Farms, Dodge and Mower County, Minnesota. November 2019.

Trana, M., B. Hyzy, J. Pickle, and Z. Gustafson. 2019. 2018 Post-Construction Monitoring Study, Red Pine Wind Energy Facility, Lincoln County, Minnesota, March 18 – November 15, 2018. Prepared for Red Pine Wind Farm, LLC. Prepared For: Red Pine Wind Farm, LLC. Prepared by WEST, Golden Valley, Minnesota. March 12, 2019.

U.S. Department of Agriculture (USDA). 2019. 2017 Census of Agriculture Publications, Minnesota. Available online at: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Census_by_State/Minnesota/

US Fish and Wildlife Service (USFWS). 2009. United States Fish and Wildlife Service, Department of the Interior. 50 CFR 13 and 22. Eagle Permits; Take Necessary to Protect Interests in Particular Localities. 74 Federal Register (FR) 46836-46879. September 11, 2009.

USFWS. 2012. Final Land-Based Wind Energy Guidelines. March 23, 2012. 82 pp. Available online at: https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf

USFWS. 2013. Eagle Conservation Plan Guidance. Module 1 - Land-Based Wind Energy. Version 2. Division of Migratory Bird Management, USFWS. April 2013. Available online at: https://www.fws.gov/midwest/endangered/permits/hcp/r3wind/pdf/DraftHCPandEIS/MSHCPDraftAppE_EagleGuidance.pdf

USFWS. 2016. Final 4(d) Rule for the Northern Long-Eared Bat. Federal Register (FR) Vol. 81, No. 9, 1900-1922. January 14, 2016. Available online at: http://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf

USFWS. 2021. National Listing Workplan; 5-Year Workplan (January 2021 Version). Available online at https://www.fws.gov/endangered/esa-library/pdf/National-Listing-Workplan-FY21-FY25.pdf.

Western EcoSystems Technology, Inc (WEST). 2011. Wildlife Baseline Studies for the Pleasant Valley Wind Project Area, Mower, Dodge, and Olmstead Counties, Minnesota. Final Report September 2009 – October 2010.

WEST. 2012. Bat Acoustic Survey for the Pleasant Valley Wind Resource Area, Mower, Dodge, and Olmsted Counties, Minnesota. Final Report August – October 2011.

WEST. 2013. Raptor and Bald Eagle Nest Survey Results for the Pleasant Valley Wind Resource Area, Mower, Dodge, and Olmsted Counties, Minnesota. Final Report: May 2013. Prepared by Kristen Chodachek and Ann Dahl, May 23.

WEST. 2014a. Raptor and Bald Eagle Nest Survey Results for the Pleasant Valley Wind Resource Area, Mower, Dodge, and Olmstead Counties, Minnesota. Final Report: June 2014. Prepared by Todd Matson, Kristen Klaphake, and Joyce Pickle, June 9.

WEST 2014b. Acoustic Survey Final report. Northern Long-eared Bat Presence/Absence Surveys, Pleasant Valley Wind Energy Project. July 10-22, 2014.

Westwood Professional Services. 2015. 2014 Avian and Bat Fatality Monitoring - Lakefield Wind Project, Jackson County, Minnesota.

Wickham, J., Stehman, S.V., Sorenson, D.G., Gass, L., and Dewitz, J.A., 2021, Thematic accuracy assessment of the NLCD 2016 land cover for the conterminous United States: Remote Sensing of Environment, v. 257, art. no. 112357, at https://doi.org/10.1016/j.rse.2021.112357

Yang, L., Jin, S., Danielson, P., Homer, C., Gass, L., Case, A., Costello, C., Dewitz, J., Fry, J., Funk, M., Grannemann, B., Rigge, M. and G. Xian. 2018. A New Generation of the United States National Land Cover Database: Requirements, Research Priorities, Design, and Implementation Strategies, ISPRS Journal of Photogrammetry and Remote Sensing, 146, pp.108-123.

Appendix A - Placeholder for Post-Construction Mortality Monitoring Protocol