DRAFT

Red Pine Wind Project
Eagle Conservation Plan

Lincoln County, Minnesota

Prepared by

Red Pine Wind Project, LLC

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CONFIDENTIAL BUSINESS INFORMATION

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1 INTRODUCTION AND PURPOSE

1.1 Project Overview

Red Pine Wind Project, LLC (Project Owner) developed and is operating the Red Pine Wind Project (Project), in Lincoln County, Minnesota. The Project covers an area of approximately 44,600 acres and has a generating capacity of 200 megawatts (MW); the Project started commercial operations in December 2017. The Project Owner has prepared this draft Eagle Conservation Plan (ECP), with the assistance of Western EcoSystems Technology, Inc. (WEST), to document compliance with the requirements of the Bald and Golden Eagle Protection Act (BGEPA) as described in the Code of Regulations (CFR; Part 50, Part 22.26), as well as support application to the U.S. Fish and Wildlife Service (USFWS) for a bald eagle incidental take permit (ITP). The Project Owner is applying for a 24-year permit term, for coverage until December 31, 2044.

In accordance with the 2013 USFWS *Eagle Conservation Plan Guidance, Version 2* (ECPG; USFWS 2013), this ECP provides information on background eagle studies and agency coordination as well as Project siting, design, construction, and operation measures that avoid and minimize the take of eagles to the point where remaining take is unavoidable. It includes detailed analyses of risk, including estimation of anticipated levels of eagle take, and discusses conservation measures, mitigation measures, and adaptive management measures to ensure permit compliance. The ECP supports an application for a take permit for the non-purposeful (incidental) take of eagles as a result of the Project.

The Project Owner has collaborated with the USFWS throughout Project development. One year of avian use studies was conducted from March 2013 to March 2014. An additional full year of surveys was conducted from December 2015 through November 2016. Raptor nest surveys were conducted in 2013, 2015, 2016, and 2017 within one-mile, two-mile, 10-mile, and two-mile buffers, respectively. Monitoring of two bald eagle nests found within two miles of potential turbines occurred each month from May to August 2015, and monitoring of an additional bald eagle nest found within two miles of potential turbines in 2016 occurred in the 2016 breeding season.

The Project Owner is committed to siting, constructing, operating, and decommissioning the Project in a manner consistent with the company's firm commitment to sustainability and conservation. To support this effort, the Project Owner has adhered to the "staged" and "tiered" decision frameworks outlined in the ECPG and the *Land-Based Wind Energy Guidelines* (WEG, USFWS 2012) respectively. Following these frameworks has been useful in assessing Project risk and designing the Project to avoid and minimize impacts to natural resources, including bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), and their associated habitats.

1.2 Regulatory and Permit Compliance

1.2.1 Federal Laws and Regulations

1.2.1.1 Bald and Golden Eagle Protection Act (BGEPA)

Bald and golden eagles are afforded legal protection under authority of BGEPA, 16 United States Code (USC) 668–668d. BGEPA 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. Take is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," 16 USC 668c, and includes criminal and civil penalties for violating the statute. Disturb is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior.

In 2009, the USFWS promulgated a final rule on two new permit regulations that specifically authorize under BGEPA the non-purposeful (i.e., incidental) take of eagles and removal of eagle nests in certain situations (see 50 CFR 22.26 & 22.27). The permits authorize limited take of bald and golden eagles, authorizing individuals, companies, government agencies and other organizations to disturb or otherwise take eagles in the course of conducting lawful activities. To facilitate issuance of these permits for wind energy facilities, the USFWS finalized the ECPG. If eagle risk is identified at a project site, developers are strongly encouraged to follow the ECPG. The ECPG describes specific actions that are recommended to achieve compliance with the regulatory requirements for a take permit, as described in 50 CFR 22.26 and 22.27. The ECPG provides a framework for assessing and mitigating risk specific to eagles through development of ECPs and issuance of take permits for eagles at wind facilities. In coordination with USFWS, the Project Owner has developed this ECP to avoid and minimize potential impacts to eagles, predict levels of fatality associated with the Project, and apply for take authorization under BGEPA.

On December 9, 2013, the USFWS issued a rule extending the maximum term for programmatic eagle permits from five to 30 years if wind farms adopt measures to minimize harm to eagles. This rule went into effect on January 8, 2014 (Eagle Rule; USFWS 2013b). On August 11, 2015, a federal court (northern district of California) set aside the 30-year Eagle Permit Rule, finding that the USFWS failed to show an adequate basis in the record for deciding not to prepare a NEPA document prior to increasing the maximum eagle take permit duration. On December 16, 2016, the USFWS issued a revised rule that includes changes to the regulations for eagle incidental take permits and eagle nest take permits. The USFWS also issued a final Programmatic Environmental Impact Statement (PEIS) analyzing the revisions. The revisions to the Eagle Rule went into effect on January 17, 2017, and include changes to permit issuance criteria, duration (including a maximum permit term of 30 years), compensatory mitigation standards, and permit application requirements. Additionally, the revised Eagle Rule further defines the USFWS-approved protocols for pre-construction eagle use surveys (referencing the ECPG) and post-permit fatality monitoring requirements.

To assist wind project proponents in meeting the requirements of 50 CFR 22.26, the ECPG outlines a five-stage approach to developing successful ECPs. These five stages are:

1. Initial landscape-scale site assessment;
2. Site-specific surveys and assessment;
3. Fatality prediction;
4. Application of conservation measures that avoid and minimize risk to the maximum extent practicable, and application of compensatory mitigation for remaining unavoidable take (for bald eagles, if take is over designated thresholds); and
5. Post-construction monitoring.

These five stages build upon one another and in conjunction are used to predict the annual eagle fatalities using a USFWS-developed model that employs a mix of project-specific and existing

information regarding eagle behavior. The overall goal of this five-stage approach is to use project-specific information and modeling to minimize the number of predicted annual eagle fatalities to the maximum extent practicable.

The Project Owner is applying for a 24-year ITP for bald eagle take during the remaining operating life (2020-2044) of the Project.

The Project Owner has been in consultation with USFWS regarding golden eagle risk at the Project, and while the Project Owner is currently not seeking take coverage of golden eagles, the presence of golden eagles in Minnesota will be evaluated in this ECP as well as USFWS's NEPA analysis. Pursuant to the 2016 eagle regulation revisions, permits for take of eastern golden eagles are available, if appropriate in the future.

1.2.1.2 Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) is an important component of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. The statute states:

> "Unless and except as permitted by regulations…it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill…possess, offer for sale, sell…purchase…ship, export, import…transport or cause to be transported…any migratory bird, any part, nest, or eggs of any such bird….[The Act] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior…" (16 USC 703).

The word "take" is defined by regulation as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect…" (see 50 CFR 10.12). Bald and golden eagles are protected by both the MBTA and BGEPA.

The USFWS has provided, and continues to provide, wind power developers with guidance in making a good-faith effort to avoid and minimize impacts to migratory birds. The USFWS finalized their Land-Based WEG (USFWS 2012a), which include recommendations that are advisory in nature and do not, in and of themselves, represent or reflect agency law or policy. The WEG describe how the USFWS exercises its law enforcement discretion in the absence of an explicit incidental permit program:

> The USFWS urges voluntary adherence to the [Land-Based Wind Energy] Guidelines and communication with the USFWS when planning and operating a facility. While it is not possible to absolve individuals or companies from MBTA or BGEPA liability, the Office of Law Enforcement focuses its resources on investigating and prosecuting those who take migratory birds without identifying and implementing reasonable and effective measures to avoid the take. The USFWS will regard a developer's or operator's adherence to these Guidelines, including communication with the Service, as appropriate means of identifying and implementing reasonable and effective measures to avoid the take of species protected under the MBTA and BGEPA. The Chief of Law Enforcement or more senior official of the Service will make any decision whether to refer for prosecution any alleged take of such species, and will take such adherence and

> communication fully into account when exercising discretion with respect to such potential referral. Each developer or operator will be responsible for maintaining internal records sufficient to demonstrate adherence to the Guidelines and response to communications from the USFWS. Examples of these records could include: studies performed in the implementation of the tiered approach; an internal or external review or audit process; a BBCS [Bird and Bat Conservation Strategy]; or a wildlife management plan.

The Project Owner has developed an Avian and Bat Protection Plan (ABPP) for the Project. This ABPP is similar to the BBCS identified in the WEG.

1.2.1.3 Endangered Species Act (ESA)

Federally listed threatened and endangered species and designated critical habitat are governed by the Endangered Species Act (ESA) of 1973, as amended (16 USC §§ 1531–1544) and the USFWS's implementing regulations at 50 CFR Parts 13 and 17. The USFWS is authorized to identify species in danger of extinction and provide for their management and protection. The USFWS also maintains a list of species that are candidates for listing pursuant to the ESA.

Section 9 of the ESA makes it unlawful for a person to "take" a listed species. "Take" is defined as "…to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The U.S. Secretary of the Interior, through regulations, defined the term "harm" as "an act which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." However, permits for "incidental take" can be obtained from USFWS for take of an endangered species that would occur as a result of an otherwise legal activity.

Section 10 of the ESA, among other things, authorizes the USFWS to issue permits to incidentally take ESA-listed species and allows for the development of "Habitat Conservation Plans" for endangered species on private lands or for the maintenance of facilities on private lands.

Sections 2.1 and 2.3 of the ABPP provide more information on ESA-listed species with the potential to occur in the Project area.

The 2016 Eagle Rule revision clarified that site-specific Section 7 consultation (in this case, intraservice Section 7 consultation) if the proposed action of issuing a permit for eagle take, in and of itself, affect ESA-listed species or critical habitat (91548 Federal Register / Vol. 81, No. 242 / Friday, December 16, 2016 / Rules and Regulations).

1.2.1.4 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) [42 U.S.C. 4321 et seq.] establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment and provides a process for implementing these goals by federal agencies. NEPA requires federal agencies to incorporate environmental considerations into their planning and decision-making through a systematic approach. Issuance of an ITP by the USFWS constitutes a federal action, and thus requires an assessment of the potential environmental impacts associated with the action and alternatives under NEPA. The Project Owner anticipates that the USFWS will evaluate the effects of granting an ITP for the Project in an Environmental Assessment (EA) and has expressed an interest in developing an applicant-prepared EA. The USFWS prepared a PEIS in conjunction with the 2016 Eagle Rule regulations. We anticipate the

NEPA review for this Project can largely be tiered to the USFWS's PEIS and incorporated by reference, with additional detail added for site-specific analysis, as discussed further in Section 7.2.

1.2.2 Minnesota Laws and Regulations

The 2010 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. The bald eagle was delisted from the MNDNR's list in 2007.

2 PROJECT DESCRIPTION

The Project produces 200 MW, and includes 100 utility scale 2.0-MW wind turbines and their associated infrastructure (turbine pads, access roads (both creation of new roads and modification of existing roads), and underground electric collection system), a Project substation, operations and maintenance (O&M) building, and approximately 700 feet of 345 kilovolt (kV) overhead line from the Project substation to the Project's interconnection point to the electric grid at the Hawk's Nest Lake substation. All of these facilities were planned for, built by, and are owned, operated, and controlled by the Project Owner and, as such, comprise the Project Owner's Project scope for purposes of environmental evaluation and permit applications.

The Project is located on about 44,600 acres in Lincoln County in southwest Minnesota, approximately thirteen miles west of the town of Marshall, Minnesota (Figure 1). The Project is located in the Northern Glaciated Plains Level III Ecoregion, with portions in the Prairie Coteau and Prairie Coteau Escarpment Level IV Ecoregions (U.S. Environmental Protection Agency [USEPA] 2013a). This region, previously dominated by shortgrass and tallgrass prairies, seasonal and semi-permanent wetlands, mixed tall shrubs, and riparian and oak-aspen groves, has been extensively converted to farmland and cropland, livestock production, and pasture lands (USEPA 2013b). Topography in the region is flat to gently rolling.

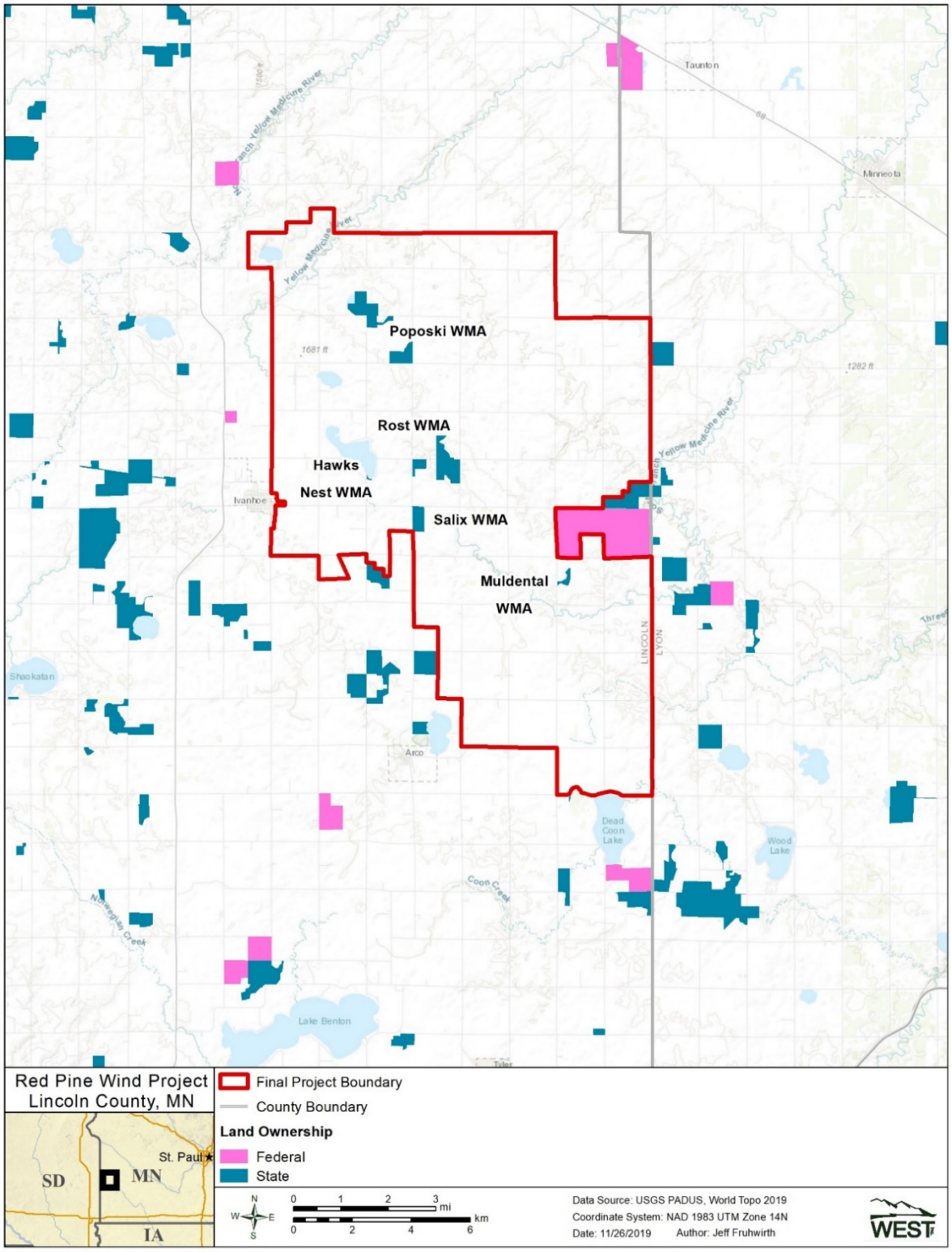

Figure 1. General location map for the Red Pine Wind Project, MN, including nearby Wildlife Management Areas (WMAs) and Waterfowl Production Areas (WPAs).

The land cover in the Project is primarily cropland (71.9%), followed by herbaceous lands (10.8%) and hay/pasture (9.4%). Developed land uses constitute approximately 4.6% of the Project, and all other land cover types constitute less than 4% of the Project area (Table 1, Figure 3). There are relatively few wooded areas within the Project, including trees and shrubs around farmsteads, shelter belts, and along creeks and drainages. (Table 1, Figure 2).

Several MNDNR Wildlife Management Areas (WMAs; Figure 1) are present in the Project area (although are considered non-participating landowners), as well as several USDA Farm Service Agency Conservation Reserve Enhancement Program parcels. A unit of the Northern Tallgrass Prairie National Wildlife Refuge (NWR) is located adjacent to the Project boundary, USFWS Waterfowl Production Areas (WPAs) are located to the east and south, and Camden State Park is about eight miles southeast of the Project.

Table 1. Land use and cover types present within the Project boundary.

Land Use/Cover	Cover (Acres)	Percent Cover (%)
Cultivated Crops	32,096.3	71.9%
Herbaceous	4,806.7	10.8%
Hay/Pasture	4,203.6	9.4%
Developed	2,006.7	4.5%
Open Water	943.7	2.1%
Emergent Herbaceous Wetlands	360.0	0.8%
Deciduous Forest	176.1	0.4%
Barren Land	41.8	0.1%
Woody Wetlands	15.8	0.0%
Shrub/Scrub	1.1	0.0%
Total	**44,651.7**	**100**

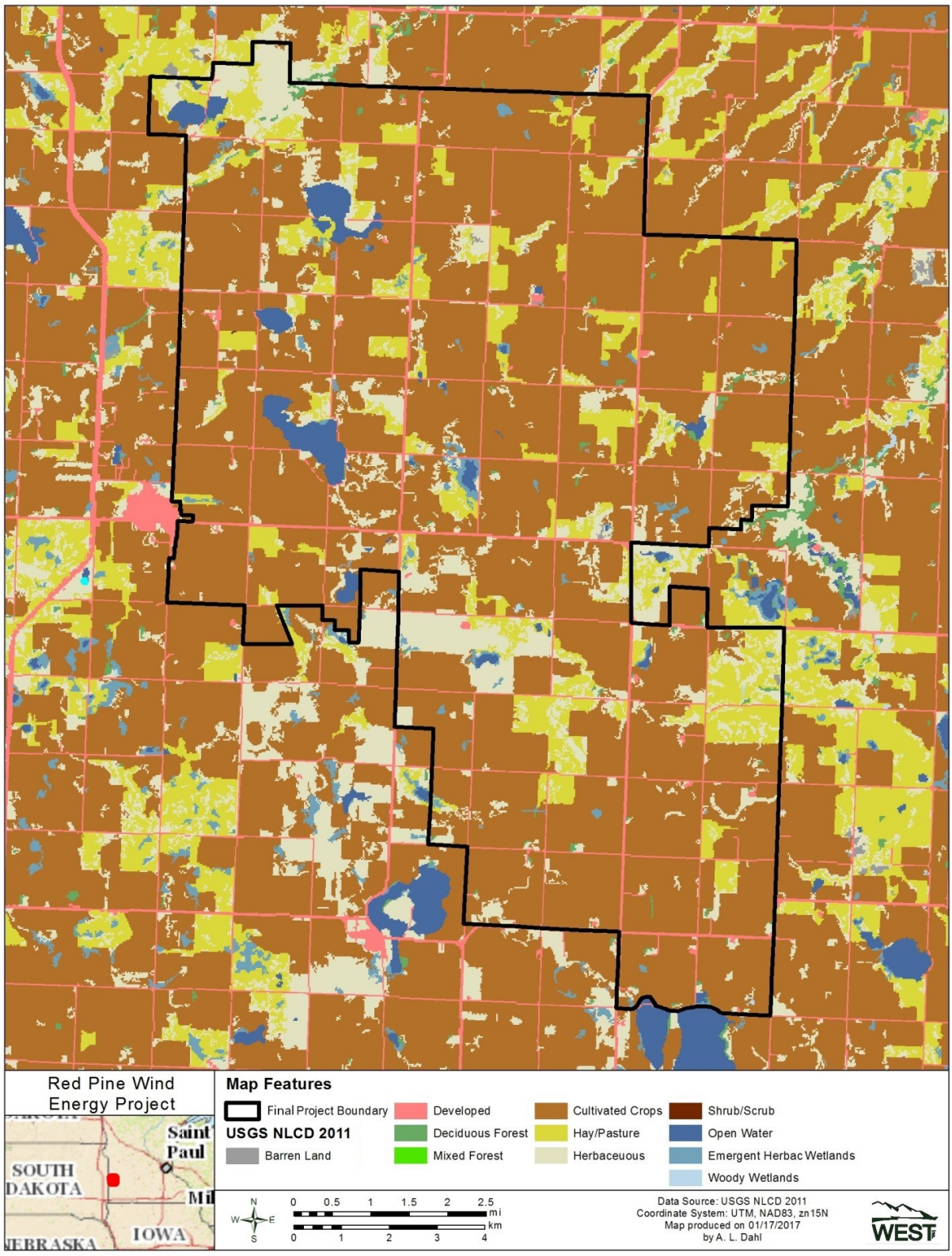

Figure 2. Land cover at the Red Pine Wind Project (NLCD 2011).

3 CONSULTATION HISTORY

Consistent with the ECPG, the Project Owner has communicated on a regular basis with the USFWS and the MNDNR regarding studies and impact avoidance measures since acquiring the Project. Prior to the Project Owner's acquisition in 2015, the original developer for the Project, Red Pine Wind Project, LLC, also coordinated with the agencies. In-person meetings, phone calls and emails between the Project developers (Red Pine Wind Project, LLC, or the Project Owner), technical consultants, USFWS, and MNDNR have guided Project development studies and impact avoidance decisions. Initial meetings in 2013 focused on development and implementation of the WEG Tier 1, 2, and 3 studies, ECPG Stage 1 and 2 studies, and expansion of the initial survey effort. Meetings, monitoring report submittals, and regular conference calls in 2015, 2016, 2018, 2019, 2020, and 2021 focused on continued sharing of study results, as well as discussion of the ECP content and ITP process. The Project Owner will continue to coordinate with the agencies during the permit application and review process, as well as for the life of the Project as described in this ECP.

4 STAGE 1 – INITIAL SITE ASSESSMENT

The USFWS released the ECPG in 2013 to provide specific in-depth guidance for conserving bald and golden eagles in the course of siting, construction, and operating wind energy facilities (USFWS 2013). Stage 1 of the ECPG includes the preliminary site evaluation, based on publicly available literature and desktop review, to identify important use areas to resident breeding and non-breeding eagles and to migrant and wintering eagles.

An initial Critical Issues Analysis (CIA) was prepared for the Project by Red Pine Wind Project, LLC's consultant CH2MHILL in June 2009. The initial area that was examined in this analysis encompassed approximately 15,000 acres in Lincoln and Lyon Counties. The assessment indicated that based on a cursory review of previously permitted Projects in the vicinity and the agricultural nature of the site, wildlife, and avian impacts, are not likely to pose a significant constraint to site development.

A subsequent Ecological Risk Assessment was prepared by Westwood Professional Services for the initial area being considered for wind development in December 2010. It included a desktop assessment of avian and bat risk, potential presence of and impacts to special status species, and a review of conservation lands and sensitive habitats. The desktop assessment of avian risk examined the Minnesota Ornithologists' Union (MOU) County Checklists for Lincoln and Lyon Counties and found songbirds, shorebirds, and waterfowl to be the most species-rich orders occurring within the Project. The study indicated that sensitive bird and bat species and important habitats for these species had the potential to occur within the Project area and the vicinity (particularly in WMAs and WPAs), but that in general there was relatively limited potential for foraging or roosting bat habitat. In addition, the general agricultural nature of the Project would provide limited habitat for special concern avian species.

The Project area lies on the periphery of the Mississippi and Central Flyways which are two of the four major migration corridors in North America. Thus, migrating birds may use the lakes and wetlands in and around the Project area as stopover habitat, as well as ephemeral sheet water that may collect in agricultural fields in the spring. Additionally, the Project is within the Prairie Pothole ecoregion which contains an abundance of native grassland and wetland habitats suitable for migratory birds. Although the majority of land cover within the Project boundary is cultivated

crops and hay/pasture, a small percentage of the upland areas within the Project boundary contain unbroken tracts of native prairie remnants and large blocks of grassland which may be used by breeding birds and nesting waterfowl. There are also a few wooded areas within the Project that could support bald eagle nests (especially as the population increases and nests are built on more variable substrates/habitat than in the past), but more suitable nesting habitat is present outside the Project along the Redwood River. No dramatic topographic features such as rim and bluff edges that may increase raptor use and migration are present within the Project.

Based on this initial site assessment, it was concluded that the rate of bird fatality due to turbine collisions at the Project is expected to be similar to bird fatality rates at other wind energy facilities in southwestern Minnesota, and fatality rates may be reduced if habitat features such as prairies, wetlands, and open water areas are avoided during siting. Post-construction fatality studies of bird and eagle fatalities in southwestern Minnesota wind Projects have shown that although fatalities are documented, significant impacts to raptor, waterfowl and passerine populations do not appear to occur. The initial site assessment therefore did not indicate a significant risk to eagles at a regional or population level.

4.1 Golden Eagles

A small population of golden eagles winter in southeast Minnesota but are rare occurrences in the vicinity of this Project in southwestern Minnesota. According to the eBird database, the closest recent observation of a golden eagle in the vicinity of the Project was recorded approximately 13 miles east of the Project, near the town of Marshall in Lyon County in November 2003 (eBird 2017). Additionally, due to the Project's proximity to the eastern edge of the Western Golden eagle's range, vagrant western golden eagles may occasionally occur on site over the life of the Project. However, no golden eagle observations were recorded at the Project during the two years of pre-construction eagle use surveys (see Section 5.2 below).

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.

In addition, during surveys from 1971 through 2015 (the latest year that data is available), one golden eagle was reported in 1979 at the Marshall Audubon Christmas Bird Count (CBC), suggesting that golden eagles may occur near the Project but only in very low numbers (MOU 2016). The Marshall CBC Circle is closest to the Project (held at multiple locations in the vicinity of the town of Marshall, which is approximately 13 miles east of the Project) and has had surveys completed every year since 1971 (except in 1974). Audubon CBCs are a valuable resource for evaluating avian use and wintering activity. The CBC is the longest-running citizen science bird project. The CBC is administered by the National Audubon Society (NAS) and provides information on wintering bird abundance throughout the United States. Bird occurrence data is

gathered annually by volunteer observers at a series of 15-mile diameter circles on a single day within 2 weeks of Christmas. CBC data are generally regarded as a useful source of wintertime geospatial data for birds in much of the U.S. (e.g., Paprocki et al. 2014) because of the very large spatiotemporal extent of this database, with the program originating in 1900, and currently being conducted at over 2,300 circles across the U.S., Canada, and Latin America. The desktop Stage 1 evaluation therefore concluded that the Project would pose a low risk to golden eagles. If additional information becomes available on golden eagle presence in or near the site area, the Project proponent and USFWS will discuss appropriate action, if necessary. Nevertheless, avoidance and minimization measures designed to lessen risk to bald eagles will likely also benefit golden eagles.

4.2 Bald Eagles

There are multiple lakes and several WMAs and WPAs within and adjacent to the Project that provide suitable nesting and wintering habitat for bald eagles. These include Poposki WMA, Rost WMA, Hawks Nest WMA, Salix WMA, and Muldental WMA within the Project (Figure 1), all of which are state-managed areas. As such, no Project infrastructure is sited on these lands. Additionally, temporary standing water may occur in cropfields during the spring time and waterfowl that stopover in these temporary features may attract foraging eagles. Furthermore, the Project is approximately 33 miles southwest of the Minnesota River which serves as a major migration corridor and provides suitable nesting and wintering habitat for bald eagles. The eBird database shows several bald eagle observations in Lyon County, Minnesota through 2017. Sightings of bald eagles are common within Camden State Park approximately 8 miles east of the Project and along the Redwood River approximately 9 miles southeast of the Project (eBird 2017). As of April 2017, no bald eagle sightings have been documented within the Red Pine Project boundary in eBird. Bald eagles are a commonly occurring species in the area according to existing datasets that evaluate eagle use; however, it is the expectation of the Project Owner, USFWS, and MNDNR that avoidance measures (landscape level siting and turbine siting, along with other measures) will reduce the predicted eagle take for the Project to a level that can be permitted and will meet the USFWS' goal of resulting in stable or increasing bald eagle populations in the eagle management unit (the Mississippi Flyway), as well as maintaining a permitted take level of below 5% of the Local Area Population (LAP).

Bald eagles have been reported at the Marshall CBC circle in 1992, 1993, 1996 – 1999, 2002, 2003, 2005, and 2008 – 2015 (the latest year that data is available). Between 2008 and 2015, there was an annual average of 2.3 bald eagles seen during each count, showing that bald eagles regularly occur during the winter within the Project vicinity.

Give the habitat at the Project and public records of bald eagle observations, the Stage 1 desktop assessment concluded that there is potential for a moderate risk to bald eagles.

4.3 Conclusions and Recommendations

Results from the preliminary Stage 1 evaluation determined a low level of risk to golden eagles. The Stage 1 review also noted the potential for a moderate level of bald eagle use and the potential for bald eagle nesting within the vicinity of the Project boundary. This information has been used to inform the raptor/avian use survey effort to ensure an accurate and thorough representation of eagle and raptor use within the final Project boundary.

The information gathered from available datasets and initial site assessment indicated that studies to further define potential eagle impacts and inform siting and impact avoidance measures, per the ECPG, should be conducted. In 2013 – 2014, these surveys included weekly avian use surveys in the spring and fall, and bi-weekly avian use surveys during winter and summer with half the points surveyed during each visit. In 2015 – 2016, additional surveys were conducted consisting of eagle-use only surveys where points were surveyed once a month (spread out to a weekly or bi-weekly visits to the site with a subset of points surveyed at each visit). Additionally, a road-based eagle nest survey out to 1 mile from the Project was conducted in spring of 2013 and an additional road-based eagle nest survey out to 2 miles from the Project was conducted in spring of 2015. In 2016, an aerial-based eagle nest survey was conducted out to 10 miles from the Project. In 2017, an aerial-based eagle nest survey was conducted out to 2 miles from proposed turbine locations. These surveys were implemented in coordination with USFWS, following the protocols identified in the ECPG (USFWS 2013) and are further discussed below.

5 STAGE 2 – SITE-SPECIFIC SURVEYS AND ASSESSMENT

Based on the results of the initial Stage 1 site assessment and consultation with the USFWS, ECPG Stage 2 studies were conducted including raptor nest surveys and eagle use studies. The initial area that was examined in the 2009 Tier 1/Critical Issues Analysis encompassed approximately 15,000 acres in Lincoln and Lyon Counties. Tier 2 and Tier 3 studies conducted in 2013 and 2014 focused on a larger, 38,800 acre boundary. After the Project Owner purchased the Project in 2015, the boundary increased to approximately 46,000 acres in Lincoln and Lyon Counties; this boundary was used for Tier 2 and Tier 3 studies conducted in 2015. In 2016, the Project Owner modified the boundary to encompass approximately 42,000 acres, dropping all areas in Lyon County and overlapping the western portion of the 2015 boundary and extending west. Finally, after layout micrositing and land acquisition was completed in late 2016, the Project boundary was adjusted to the current, 44,651-acre 2017 Project boundary (Figure 2). Figure 3 illustrates the progression of Project boundaries that were used in the Stage 2 surveys from 2013 through 2017.

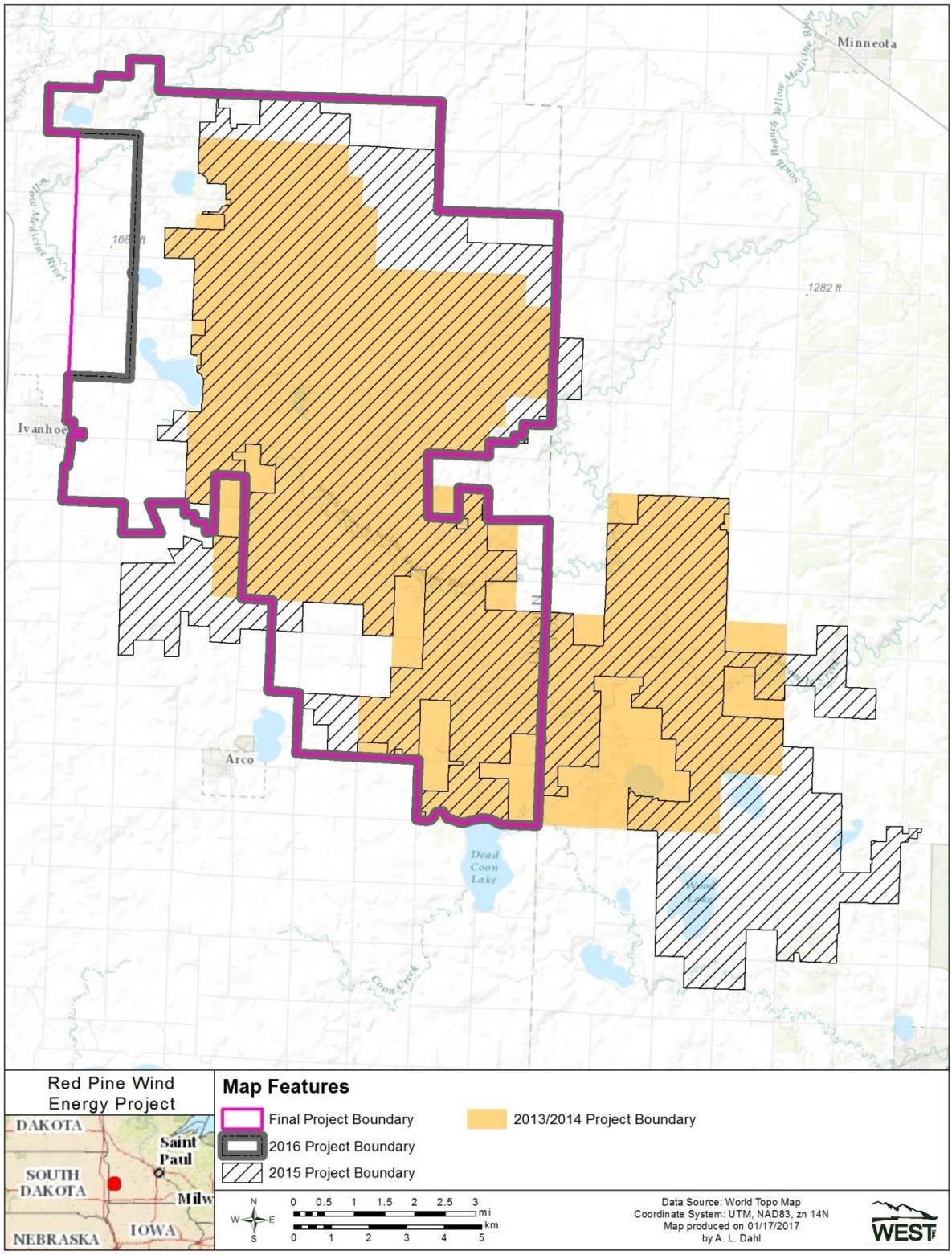

Figure 3. 2013/2014, 2015, 2016 and final (2017) Project boundaries for the Red Pine Wind Energy Project in Lincoln and Lyon Counties, Minnesota.

5.1 Eagle Nest Surveys

Ground-based eagle nest surveys were conducted from public access roads in spring before leaf out, when raptors would be actively tending to a nest or incubating eggs, on two different years (May 15-17, 2013 and again on April 14, 2015). Aerial surveys were conducted on March 29 and 30 in 2016 and April 5 through 7, 2017. Eagle nest surveys were conducted in accordance with the guidance provided in the USFWS ECPG (2013) and the USFWS Inventory and Monitoring Protocols (Page et al. 2010). Surveys focused on locating eyries (large, stick nest structures) in suitable eagle nesting substrate (trees, transmission lines, cliff faces, etc.) within and around the proposed Project. A one-mile buffer from the 2013/2014 Project boundary was surveyed in 2013 and a two-mile buffer of the 2015 Project boundary was surveyed in 2015 (Figure 4). A ten-mile buffer of the 2016 Project boundary was surveyed in 2016 (Figure 5) and a two-mile buffer around proposed (final layout) Project turbines was surveyed in 2017.

Ground-based Nest Surveys – 2013 and 2015

2013 Nest Survey: During the first survey in May of 2013, WEST biologists detected a total of 18 raptor nests including two occupied red-tailed hawk (RTHA) nests, one unknown raptor occupied nest, and 15 unoccupied unknown raptor nests were observed. No confirmed or suspected potential eagle nests were observed during this survey; i.e., due to their size, none of the unknown species raptor nests appeared to be unoccupied eagle nests (Appendix A).

2015 Nest Survey: WEST biologists detected a total of 46 raptor nests representing two species during surveys conducted on April 14, 2015 (Figure 4). Of these nests, three were identified as red-tailed hawk nests, one as a bald eagle nest, one as a potential bald eagle nest, and 41 unknown raptor species nests (Figure 4). No federal- or state-listed threatened or endangered raptor species with potential to occur in Lincoln and Lyon Counties, Minnesota were documented during the survey. Overall, a total of one bald eagle nest (occupied and active) and one potential bald eagle nest were identified within the two-mile buffer during the 2015 ground-based raptor nest survey. The active bald eagle nest (Nest A) was located on the edge of the 2015 Project boundary, near Threemile Creek (Figure 4, Appendix A).

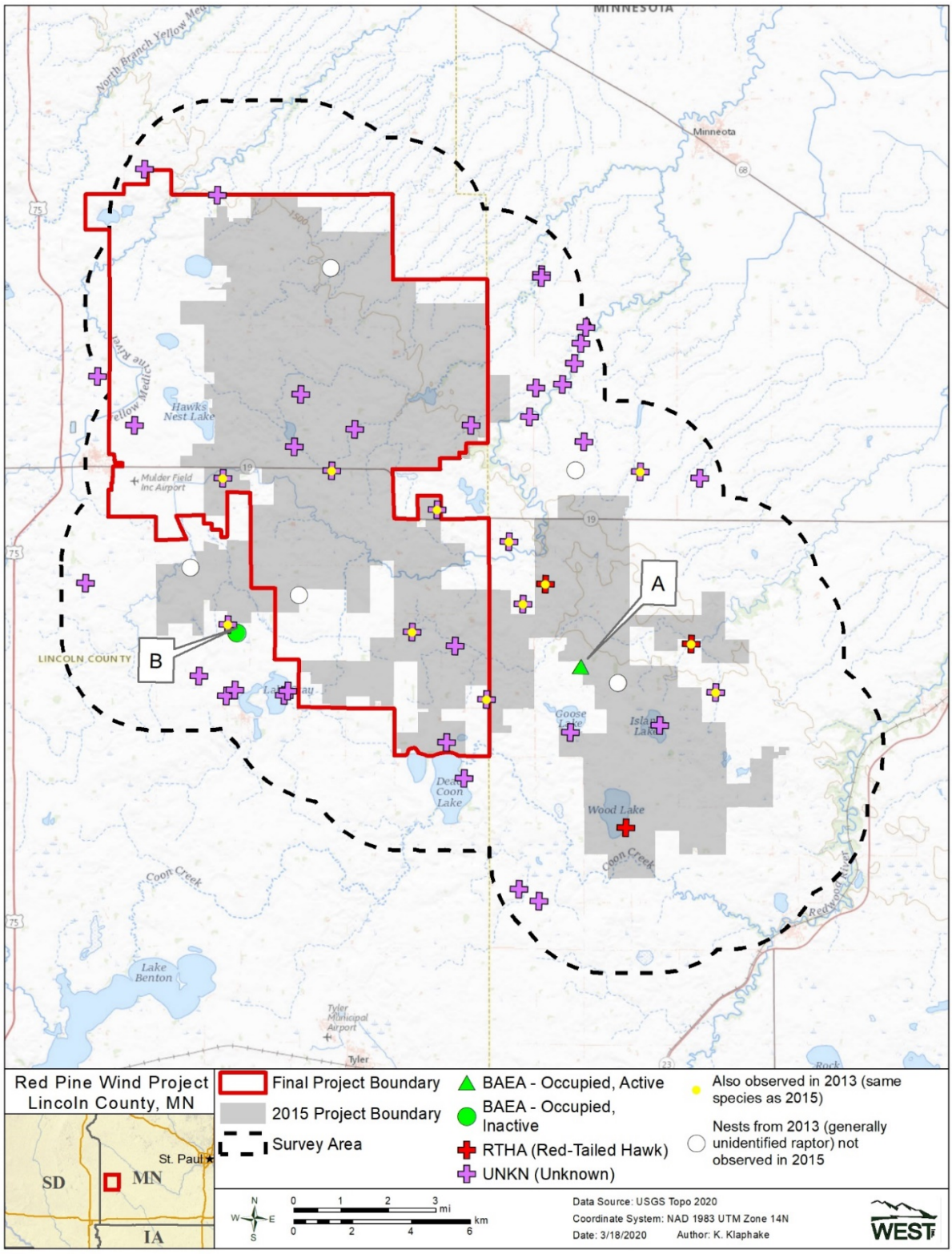

Figure 4. Eagle and raptor nests observed during 2013 and 2015 raptor nest surveys (2015 Project boundary shown) at the Red Pine Wind Project, MN.

Aerial Nest Surveys – 2016 and 2017

In 2016, WEST biologists focused on identifying eagle nests within the 10-mile buffer of the 2016 Project boundary, per the ECPG and recommendation of the USFWS. Seven occupied active bald eagle nests were documented in this survey, along with three likely bald eagle nests that appeared to be inactive and/or unoccupied (Figure 5). The two bald eagle nests documented in 2015 were both active in 2016; an additional five active bald eagle nests were observed within the expanded 10-mile survey area Appendix A). The 2017 aerial survey was conducted within a two-mile buffer of proposed turbine locations, in order to document if any new eagle nests were built in proximity to proposed turbines. No new bald eagle nests were documented as part of the 2017 survey, and all four bald eagle nests that were documented within two miles of the Project boundary in 2016 (Nests A – D below) were confirmed as present and active in 2017.

Nest A – this nest is located approximately 2.4 miles east-southeast of the nearest turbine, and was first documented (as an active nest) in 2015. The nest is in good condition, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey and again in 2017. The nest is therefore considered occupied and active.

Nest B – this nest is located approximately 2.0 miles southwest of the nearest turbine, and was first documented as occupied but inactive in 2015 (i.e., it showed signs of maintenance indicating the territory was occupied, but no signs of actual breeding such as eggs, young, etc.). The nest is in good condition, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey and the nest was again active in 2017. The nest is therefore considered occupied and active.

Nest C – this nest is located approximately 2.0 miles southeast of the nearest turbine just to the northeast of the Northern Tallgrass Prairie National Wildlife Refuge unit, and was first observed in 2016. The nest is in good condition, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey and again in 2017. The nest is therefore considered occupied and active.

Nest D – this nest is located approximately 2.8 miles north of the nearest turbine, and was outside of the 2015 survey area so was first documented in 2016. The nest is in good condition, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey; when it flew off the nest, two eggs were visible. The nest was also documented as active in 2017. The nest is therefore considered occupied and active.

Nest E – this nest was first documented in 2016 and is located approximately 7.2 miles southwest of the nearest turbine on the northern shore of Lake Benton. The nest was outside of the 2015 and 2017 survey areas. The nest was in good condition in 2016, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey. The nest was therefore considered occupied and active in 2016.

Nest F – this nest was first documented in 2016 and is located approximately 7.9 miles west of the nearest turbine on the northern shore of Lake Shaokatan. The nest was outside of the 2015 and 2017 survey areas. The nest was in good condition in 2016, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey; when it flew off the nest, three eggs were visible. The nest was therefore considered occupied and active in 2016.

Nest G – this nest was first documented in 2016 and is located approximately 9.1 miles north of the nearest turbine. The nest was outside of the 2015 and 2017 survey areas. The nest was in good condition in 2016, and an adult bald eagle was seen sitting in the nest during the 2016 aerial survey. The nest was therefore considered occupied and active in 2016.

Nest H – this nest was first documented in 2016 and is located approximately 4.5 miles east of the nearest turbine on a tree on the island in Island Lake. The nest was outside of the 2015 and 2017 survey areas. The nest was in good condition in 2016 and was consistent with an eagle nest, but no signs of activity were observed.

Nest I – this nest was first documented in 2016 and is located approximately 3.7 miles west of the nearest turbine within the Ash Lake WMA. The nest was outside of the 2015 and 2017 survey areas. The nest was in good condition in 2016 and was consistent with an eagle nest, but no signs of activity were observed.

Nest J – this nest was first documented in 2016 and is located approximately 7.0 miles northeast of the nearest turbine. The nest was outside of the 2015 and 2017 survey areas. The nest was in poor condition in 2016 and was consistent with an eagle nest, but no signs of activity were observed.

The mean inter-nest distance of all 10 bald eagle nests observed (active and likely inactive nests) in 2016 is 4.8 miles. The ECPG states that eagle pairs at nests within one-half the mean inter-nest distance, in this case 2.4 miles (Figure 6), are susceptible to disturbance take and blade strike mortality. However, it is anticipated that most flight corridors used by nesting bald eagles are located closer than 2.4 miles from the nest, as demonstrated by Figure 7 below. Additionally, the draft Midwest Wind Energy Multi-Species Habitat Conservation Plan has 1.6 miles as a suitable setback from bald eagle nests, with potential for turbines to be sited closer than 1.6 miles if evidence shows they are not located within higher use travel corridors. As shown above, no turbines are located within 1.6 miles of bald eagle nests; the closest distance any turbines were sited was 2.0 miles to a documented eagle nest. Only five of the 100 turbines are located within the half mean-internest distance of 2.4 miles (turbines 55, 81, 82, 84 and 89).

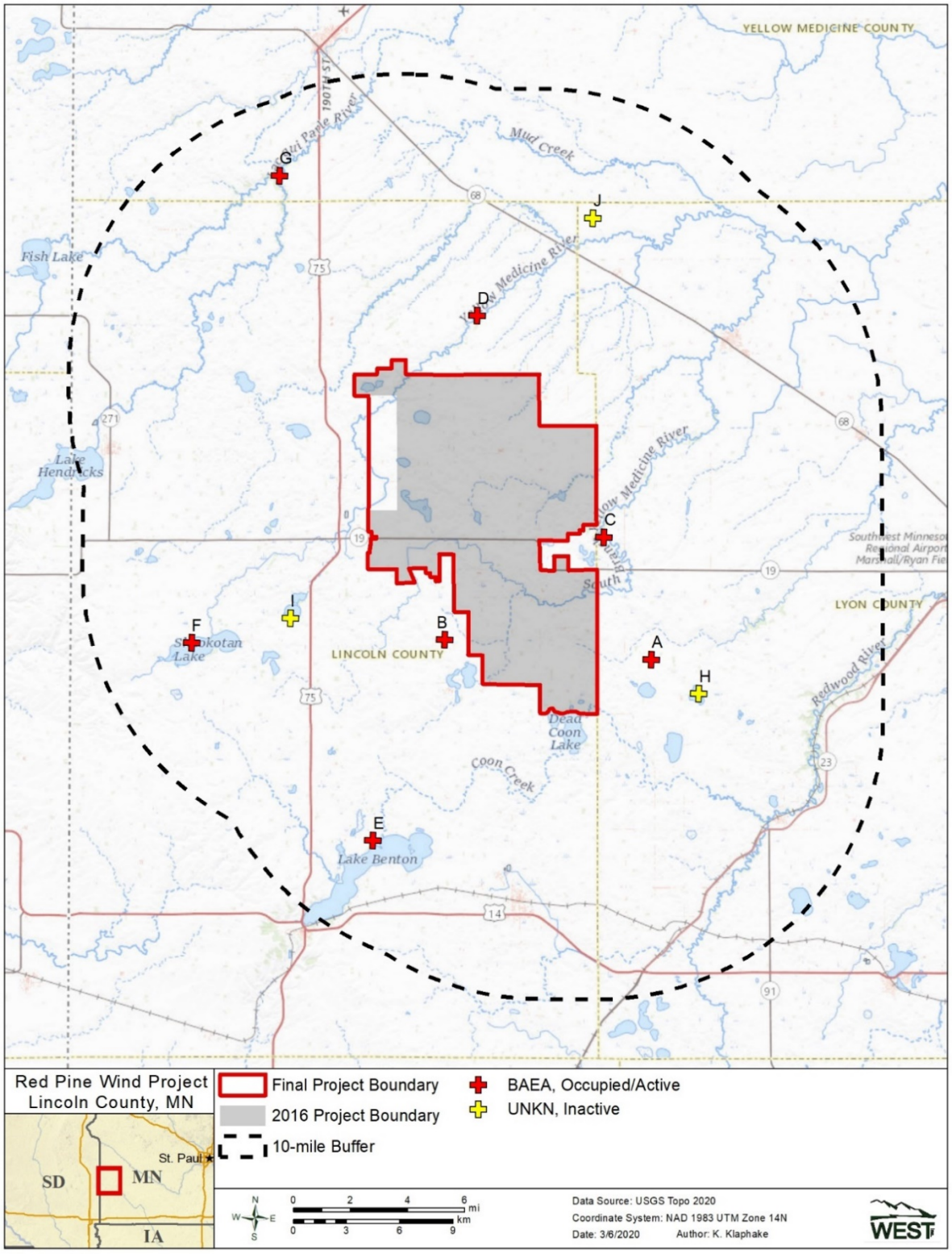

Figure 5. Eagle nests observed during 2016 and 2017 nest survey (2016 Project boundary shown) at the Red Pine Wind Project, MN.

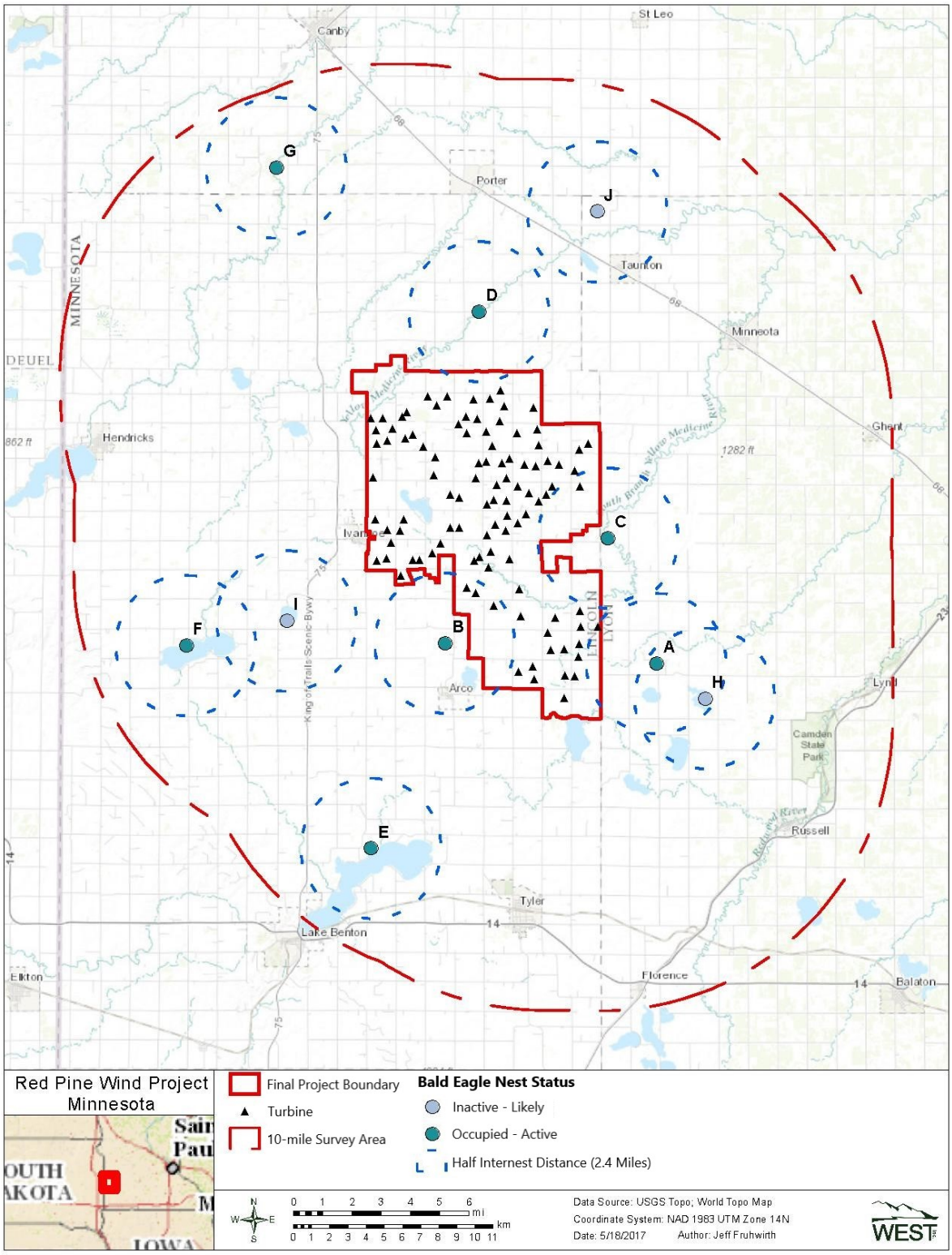

Figure 6. Half-mean Internest Distance from Nests and Turbine Layout (Final Project boundary shown) at the Red Pine Wind Project, MN.

5.1.1 Follow-up Ground Nest Monitoring Surveys

2015

Biologists completed 24 total survey observation hours of follow up eagle nest monitoring in May and June at the confirmed bald eagle nest and potential bald eagle nest that were identified during the April 2015 nest survey (Nests A and B), in order to identify whether the nests were active or inactive. Eagle nest monitoring surveys were conducted May 20, 2015 and June 9, 2015 at the eastern eagle nest (Nest A), and May 21 and June 10, 2015 at the western nest (Nest B).

Twelve hours of monitoring of Nest B showed only occasional occupancy by adult eagles perching on or nearby the nest for short periods of time (Figure 7). There were no chicks observed in the western nest and adult activity at Nest B consisted of occasional and infrequent perching on or near the nest, confirming that it was an occupied territory but inactive (as in no eggs or young were produced) during 2015, and no further monitoring occurred in 2015. However, because this territory was determined to be occupied, the Project Owner modified the boundary to increase the setback from the nest. The revised Project boundary is 0.8 miles east of this nest at the closest point, compared to the 2015 boundary, which was 0.5 miles north of the nest at the closest point. Additionally, the turbine layout was sited to maximize distance to the nest to the greatest extent feasible, with the nearest turbine being 2.0 miles north of the nest.

During the 12 hours of nest observation at Nest A in May and June, two bald eagle chicks and two adult bald eagles were documented at the eastern nest (Figure 7) confirming that this was an active and occupied bald eagle nest in 2015. Adults at Nest A were observed flying above the nest and flying away from the nest in a south to southwest direction to forage and returning with fish to feed chicks. This flight pattern suggests that Goose Lake (0.9 mile south of the nest) and Dead Coon Lake (3.2 mile southwest of the nest) may be primary foraging areas for this breeding pair during the May and June monitoring period. Both of these lakes are on the far side of the nest with respect to the Project, so that flights to and from the nest to these lakes would not enter into the Project area .

Further nest monitoring of the active Nest A occurred in July and August, 2015, and all flights of the fledglings and adult eagles were mapped. Eighteen hours of monitoring occurred on July 8, July 21 and August 7, 2015 (six hours at each visit). The majority of the observed eagle flights around Nest A occurred within 0.5-mile of the nest during those months (Figure 7). The majority of the observed flights continued to either center around the nest or originate from or head in the southern direction, although several flights did also occur to the north although none entered the final Project boundary or intersected any of the turbine locations. The 2016 Project boundary was modified in part to include setbacks from this bald eagle nest – the final Project boundary is 1.9 miles west of this nest at the closest point. Additionally, the final turbine layout was sited to maximize distance to the nest to the greatest extent feasible, with the nearest turbine being 2.4 miles north of the nest.

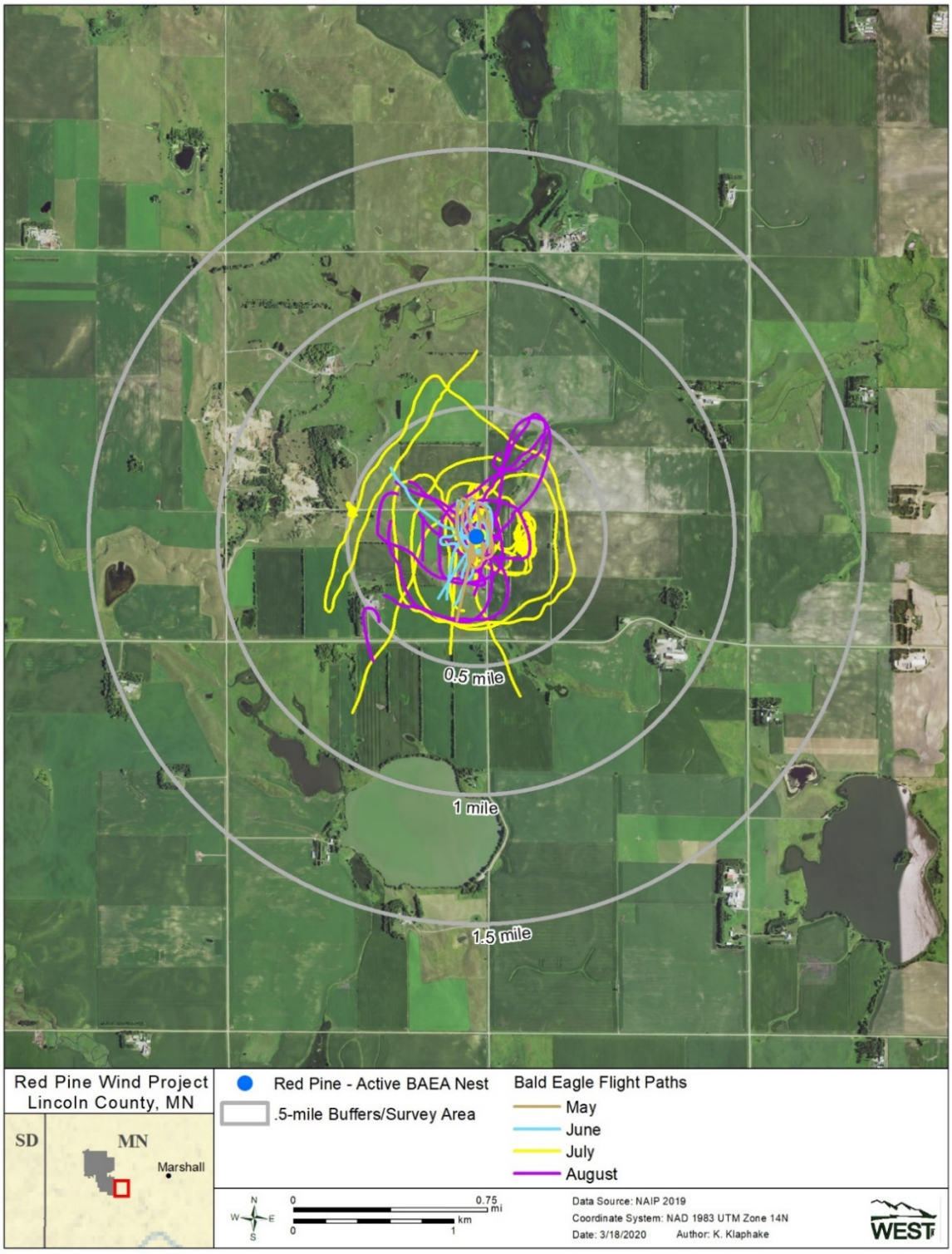

Figure 7. 2015 bald eagle flight paths at Nest A near the Red Pine Wind Project, MN. Note that the final Project boundary is more than two miles away from Nest A and no turbines are located on this figure.

2016

WEST conducted follow up monitoring at Nest C in 2016. The nearest Project turbine is 2.0 miles to the west of this nest. WEST biologists monitored the nest location on four dates in May, June and July 2016. The nest itself was not visible from public roads or access, so WEST biologists observed the general vicinity of the nest from three locations to the north, west, and east of the nest. In total 18 hours of observation occurred at this nest in 2016. Only one bald eagle was documented during this nest monitoring; it was seen flying between the general location of the nest towards the southeast along a chain of wetlands, away from the Project. Given the general lack of observed bald eagle activity near the nest in 2016, the nest may have failed, although given the lack of direct line of sight from public access this could not be confirmed. The final turbine layout was sited to maximize distance to the nest to the greatest extent feasible, with the nearest turbine being 2.0 miles northwest of the nest.

5.2 Eagle Use Studies

One year of fixed-point eagle use surveys was completed from March 2013 - March 2014 and a second year of eagle use surveys was completed December 2015 - November 2016. This two-year survey effort was conducted by WEST. The objective of the fixed-point surveys is to estimate seasonal and spatial use of the Project by birds, particularly bald eagles and golden eagles. Fixed-point eagle use surveys (variable circular plots) were conducted using methods described by Reynolds et al. (1980) and consistent with the WEG and ECPG. The first year of avian use surveys began on March 22, 2013 and continued through March 16, 2014 (Appendix A). Twenty fixed-points were selected to include representative habitats and topography within the 2013 Project boundary. This number increased to 28 survey points for the second year of surveys starting in December 2015 to accommodate changes in the Project boundary and to address feedback from the USFWS. Starting in March 2016, a final set of 26 survey points were selected within the 2016 Project boundary (Figure 8). Nine points were dropped in areas that are no longer within the Project boundary, and six new points were added to provide approximately 30% coverage of the 2016 boundary.

The revised eagle permit rules requires implementation of survey and monitoring protocols that are “Service-approved.” Generally, the Project Owner assumes this means strict adherence to the survey protocols described in Appendix C and D of the ECPG. However, the requirements could be specifically waived if approved by the USFWS. Specific requirements of pre-construction surveys and application data requirements described in the rule change are summarized in Appendix B, along with descriptions of how and whether the surveys done for the Project are consistent.

5.2.1 Survey Methods

In the 2013/2014 survey, WEST biologists recorded all large birds seen during each survey using a unique observation number, regardless of distance, with an emphasis on eagles. In the 2015/2016 survey, biologists recorded only eagles. For both years of surveys, point count surveys were conducted for one hour. In some cases, the tally of observations may represent repeated sightings of the same individual. Biologists recorded observations of large birds beyond the 800-meter (m) horizontal radius and above 200-m height; however, these observations were not included in the statistical analyses.

WEST field staff recorded the date, start and end time of the survey period, and weather information (e.g., temperature, wind speed, wind direction, precipitation, and cloud cover) for each survey. Species or best possible identification, number of individuals, sex and age class (if possible), distance from plot center when first observed, closest distance, altitude above ground, activity (behavior), and habitat(s) were recorded for each observation. Other information recorded about the observation included whether or not the observation was auditory only and the 10-min interval of the 60-min survey in which it was first observed.

Biologists recorded bird behavior and habitat for each bird observation. For bald eagle or golden eagle observations, additional behavior distance to observer and flight height data were recorded during each 1-min interval the bird was within view, per the USFWS ECPG (USFWS 2013). Behavior categories included soaring flight (SO), flapping-gliding (FL), hunting, kiting-hovering (HU), stooping/diving at prey (ST), stooping or diving in an antagonistic context with other bird species (AG), perched (PE), being mobbed (MOB), undulating/territorial flight (TER), auditory (AUD), and other (noted in comments). For each eagle observation, biologists identified the initial and changing flight patterns and habitat types on the data sheet. The flight direction of observed birds was also recorded on the data sheet and a map. Approximate flight height at first observation was recorded to the nearest 5.0 m (16.4 feet [ft]); the approximate lowest and highest flight heights observed were also recorded. The biologist also noted any comments or unusual observations in the comments section of the data sheet.

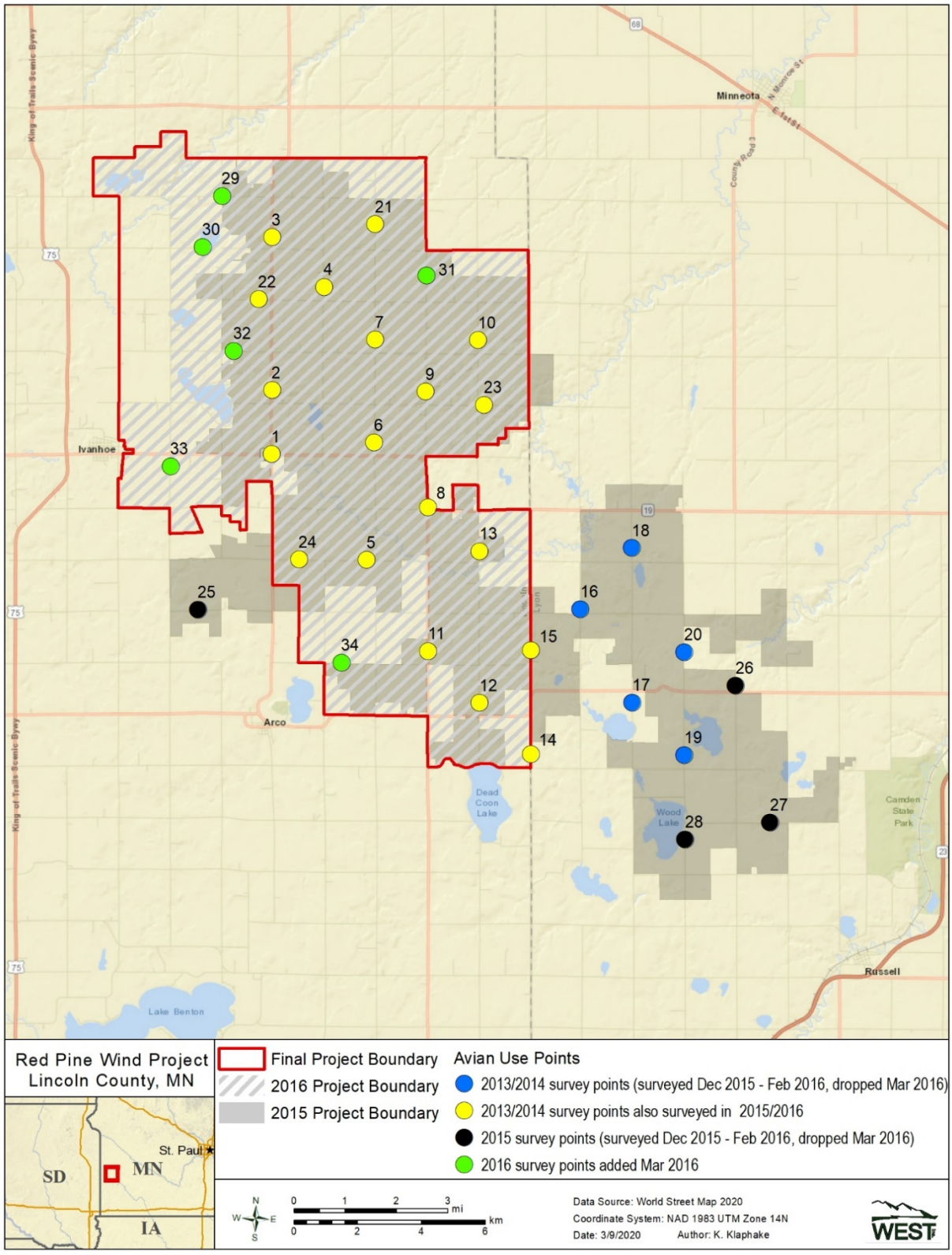

Figure 8. Avian/Eagle Use Survey Points at the Red Pine Wind Project, MN.

5.2.2 Results and Discussion

2013/2014 Survey – Year 1

WEST conducted 336 hours of fixed-point bird use surveys during 18 visits to the Project between March 22, 2013 and March 13, 2014. During this period, 15 bald eagle observations were made during fixed-point surveys and an additional 19 bald eagles were sighted during incidental observations. No golden eagles were observed during this period. During this time, bald eagles were documented for 306 minutes (including perched birds; only 18 minutes of flight time was recorded) during the 336 hours of surveys and 12 flight paths were recorded. Of the 18 minutes of flight time recorded, fifteen minutes were recorded within 800 m of the observer and under 200 m in height. Flight paths for eagles showed no apparent pattern (Figure 9). Mean use for bald eagles was relatively higher in spring (0.05 bald eagles/plot/20-minute survey) and fall (0.04) than summer and winter (0.01 each).

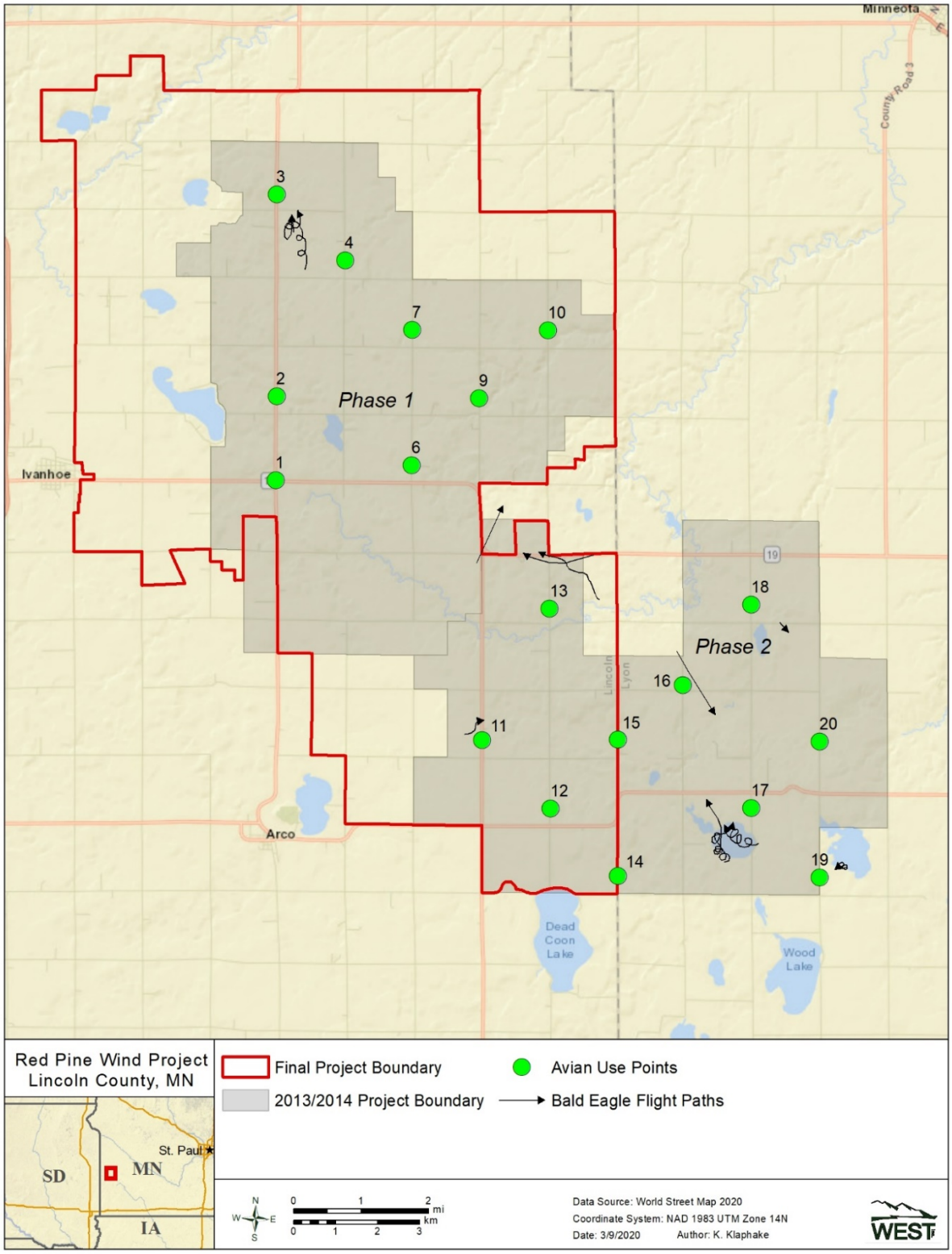

Figure 9. Bald eagle flight paths observed during 60-min fixed-point bird use surveys (March 2013 – March 2014) at the Red Pine Wind Project, MN.

2015/2016 Survey – Year 2

WEST conducted 281 hours of fixed-point eagle use surveys during 12 visits to the Project between December 10, 2015 and November 17, 2016. During this period, 48 bald eagle observations were made during fixed-point surveys and an additional 2 bald eagles were sighted during incidental observations. No golden eagles were observed during this period. During this time, bald eagles were documented for 158 minutes (including perched birds and eagles flying farther than 800 m away from the observer and/or higher than 200 m – 97 flight minutes were recorded within 800 m of observer under 200 m in height) during the 281 hours of surveys and 40 flight paths were recorded. In general, flight paths for eagles showed no apparent pattern, although there were several localized areas of relatively higher numbers of bald eagle observations/flights: around survey point 1, an area west of survey point 23 and east/northeast of survey point 9, as well as an area west of point 13 (Figure 10). In Year 2, mean use for bald eagles was relatively higher in fall (0.35 bald eagles/plot/20-minute survey) than the other seasons, which all had similar mean use (0.10 for summer and 0.08 in the spring and winter). Overall, bald eagle use was higher in every season in the Year 2 survey compared to the use in Year 1.

Figure 11 compares the mean use between Year 1 and Year 2 for the 15 survey points with comparable levels of data (i.e., that were surveyed for both full years). As shown on Figure 11, mean use levels at individual survey points that had eagle use were relatively higher in Year 2 compared to Year 1; however, there is no obvious pattern between years as far as which points had observed eagle use and which points had no eagle use during surveys. Therefore no consistent areas of concentrated eagle use were documented in the two years of data.

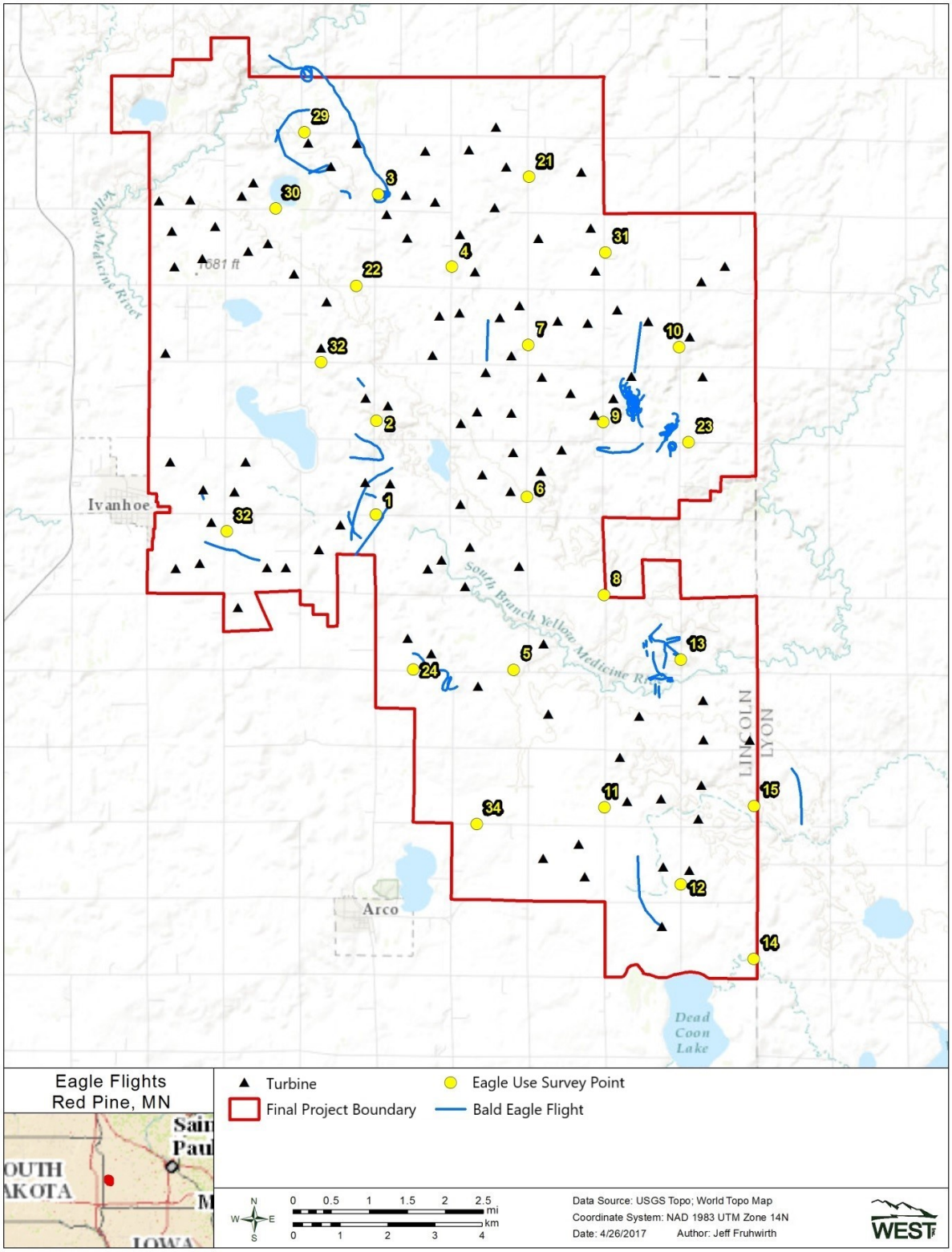

Figure 10. Bald eagle flight paths observed during 60-min fixed-point eagle use surveys (December 2015 – November 2016) at the Red Pine Wind Project, MN.

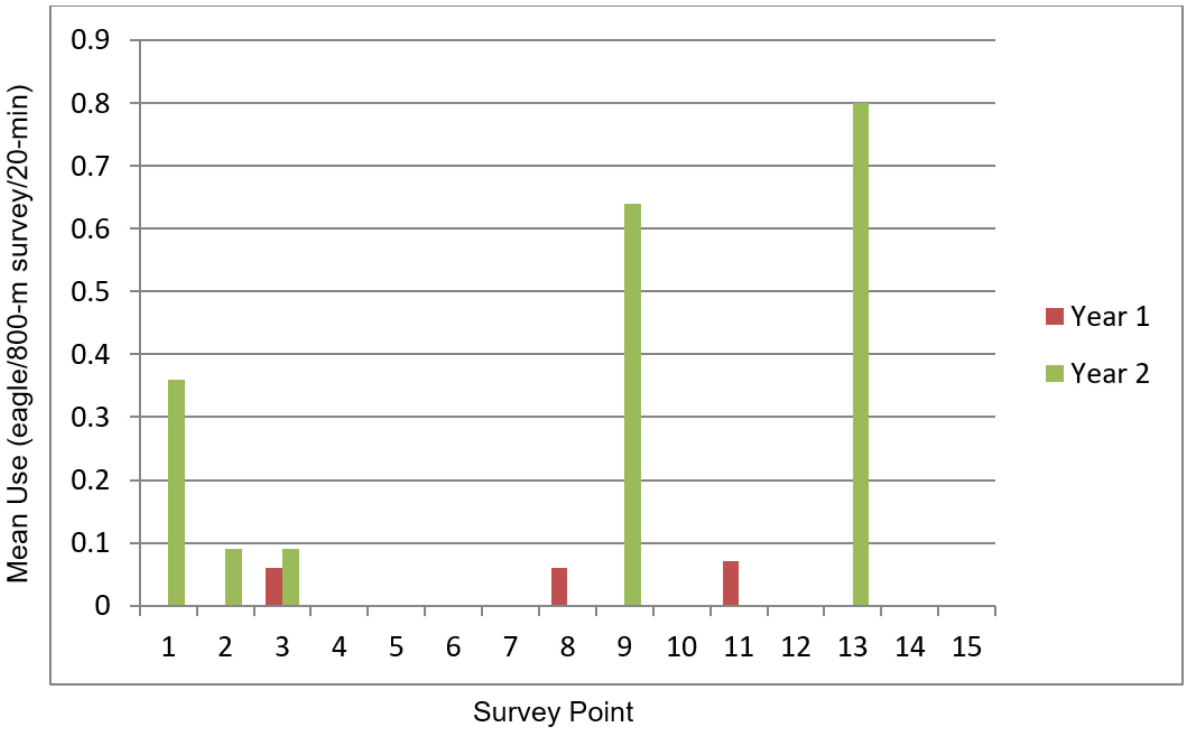

Figure 11. Bald eagle mean use by survey point for the 15 survey points with two full years of survey data at the Red Pine Wind Project, MN.

6 STAGE 3 – PREDICTING EAGLE FATALITIES

6.1 Qualitative Risk Assessment

Based on a study by Pagel et al. (2013), there have been 85 known eagle fatalities at wind energy facilities throughout the United States since 1997 (excluding eagle fatalities at the Altamont Pass Wind Resource Area in California). Of these 85 fatalities, 79 have been of golden eagles and 6 bald eagles. As described above, golden eagles were not observed or expected in the Project and are considered at very low risk of impact from the Project. Conversely, bald eagles are common and expected to occur in the Project on a fairly regular basis.

As of 2018, relatively few impacts to bald eagles resulting from collision with wind turbines had occurred, with 55 bald eagle fatalities reported at wind energy facilities in North America, 27 of which have been documented in the Mississippi Flyway (Kritz et al. 2018, Pagel et al. 2013, Allison 2012).

It is likely that the actual number of bald eagle fatalities or injuries at wind farms in the region is somewhat higher than have been publicly reported in these sources. However, it appears that there are far fewer records of bald eagle fatalities or injuries than there are for golden eagles (Pagel, et al. 2013). This may be due to a number of different factors and evidence to support any particular theory is lacking. The few reported bald eagle fatalities or injuries compared to the total number of turbines within the range of the species suggest that bald eagles may not be particularly

susceptible to collisions with wind turbines; however, there is no empirical evidence to support this speculation. Up to 20% of the contiguous U.S. bald eagle population winters in Iowa, where nearly 3,200 utility-scale wind turbines have been built (Neumann 2009, AWEA 2014), yet only a handful of bald eagle injuries or mortalities have been publically reported in Iowa to date. This is potentially relevant to the Project, as bald eagles wintering in Iowa often feed on livestock or wildlife carcasses found in upland areas, increasing their potential risk of collision (Neumann 2009, Pagel et al. 2013). Similarly, bald eagles might be found in the Project area during the winter months.

The current level of observed bald eagle fatalities at wind-energy projects suggest that bald eagles are at some risk of colliding with wind turbines. It is probable that not all bald eagle fatalities resulting from wind turbine collision have been detected or reported; however, the level of fatalities recorded thus far is well below a level that would impact regional or local area population levels. Bald eagle populations are increasing, and in 2009 the USFWS determined that up to 548 bald eagles could be taken in the U.S. (excluding Alaska) per year before bald eagle populations would be negatively affected (USFWS 2009). As described further in Section 7.2.2, the 2016 Eagle Rule utilized additional data showing increasing populations to establish updated take thresholds at the eagle management unit level, which for the Project is the Mississippi Flyway. The allowable annual threshold of bald eagle take at this unit is 1,640 bald eagles (USFWS 2016).

The few available studies of bald eagle use, flight paths, and nesting before and after construction of wind facilities suggest that bald eagles may avoid wind facilities. At the Forward Wind Energy Center in Wisconsin, pre-construction bald eagle use observed during point counts was 0.004 bald eagles/plot/20-min survey; bald eagle use declined in the first year after construction (0.001 bald eagles/plot/20-min survey), and no bald eagles were observed during point counts two years following construction (Garvin and Drake 2011). During a comparison of pre- and post-construction bald eagle use at the Pillar Mountain Wind Project near Kodiak, Alaska, bald eagle mean annual use of the area was similar between 2007 and 2010, yet no flight paths crossed the ridge between turbine locations in 2010 after turbines were erected, even though flights over the ridge at that location were observed in 2007 (Sharp et al. 2010, 2012). In 2011, bald eagles were only observed crossing the ridge between turbines when turbines were off (four of 18 flights: Sharp et al. 2012).

6.2 Quantitative Risk Assessment

6.2.1 USFWS Bayesian Collision Risk Model Methodology

For the purposes of the eagle risk assessment for the Project, the USFWS (2013) Bayesian modeling framework was used, in coordination with the USFWS, to predict impact to bald eagles. This approach uses statistical models to define the relationship between eagle exposure, collision rate, and fatalities, and to account for uncertainty. Variables used are presented in Table 2 and discussed in this section. Details of the model and approach are presented in the ECPG (USFWS 2013); the risk model used for the Project follows the ECPG baseline approach using pre-construction use data to predict post-construction fatalities.

Table 2. Definitions of variables used in the USFWS approach for predicting annual eagle fatalities from turbine collisions at a wind facility (USFWS 2013 Eagle Conservation Plan Guidance [ECPG], Appendix D).

Parameter	Variable Name	Definition
F	Annual Fatalities	Annual eagle fatalities from turbine collisions
λ	Exposure Rate	Eagle-minutes flying within the Project footprint (in proximity to turbine hazards) per hr per square kilometer (km^2), or stated another way, the expected number of exposure events (eagle-minutes) per survey hour per square kilometer (hr ·km^2)
C	Collision Rate	The rate of an eagle colliding with a turbine per exposure
ε	Expansion Factor	Product of daylight hours and total hazardous area hr km^2
k	Eagle-Minutes	Number of minutes that eagles were observed flying within 800 meters (m) and below 200 m during survey point counts
δ	Turbine Hazardous Area	Rotor-swept area around a turbine or proposed turbine (km^2)
n	Trials	Number of trials for which events could have been observed (the number of hr km^2 observed)
τ	Risk Hours	Total hours (e.g., 4,383 hrs per year adjusted for expected operational time in each season) eagles are at risk during a given year or season
n_t	Number of Turbines	Number of turbines (or proposed turbines) for the Project

Turbine Specifications

The collision risk model used the final specifications of the turbine layout, which includes 50 Vestas V100 turbines and 50 Vestas V110 turbines. The Vestas V100 turbines have a rotor diameter of 100 m and a total rotor swept area of 7,854 m^2 (0.007854 square kilometers [km^2]), and the Vestas V110 turbines have a rotor diameter of 110 m and a total rotor swept area of 9,503 m^2 (0.009503 km^2). The latitude and longitude of the 100 turbines are listed in Appendix D.

Exposure Rate

Exposure rate (λ) is the expected number of exposure events (eagle-minutes) per survey hour per square kilometer (hr·km^2). The USFWS prior distribution for exposure rate was derived from data from a range of projects under USFWS review and the projects from Whitfield (2009). The prior distribution is intended to model exposure rates for any wind energy facility. The USFWS defines the prior distribution for exposure rate as:

Prior λ ~ Gamma (α, β), with shape and rate parameters α = 0.97 and β = 2.76.

Pre-construction eagle exposure data are used to update the prior distribution to estimate the parameters for the posterior distribution. By assuming the exposure minutes follow a Poisson distribution with rate parameter λ, the posterior distribution for exposure rate is:

$$\text{Posterior } \lambda \sim \text{Gamma}\left(\alpha + \sum_{i=1}^{n} k_i,\ \beta + n\right)$$

where $\sum k_i$ is the total observed eagle minutes, n is the number of trials, and α and β are from the prior distribution. The number of trials is the number of hr·km^2 that were conducted in the pre-construction survey.

Eagle flight minutes that were observed within 800 m of the observer and under 200 m in height above ground from survey points that have overlapping 800-m survey areas (green buffers around survey points on Figure 12) with the Project footprint (merged 1-km buffer of turbines shown as the purple buffer on Figure 12) were input into the model. Survey points that were located farther from the final Project footprint (i.e., survey points 14, 17, 18, 19, 20, 26, 27 and 28, which are more than 800 m from the merged 1-km buffer of the turbines) were not included into the model. As described further in Section 7.1.1, the Project Owner used the eagle use data from 2013/2014 during Project siting to modify the Project boundary and potential development area. Eagle use was higher in the south and east portion of the 2013/2014 study area, with twice as many eagle minutes documented in the five Lyon County survey points than the 14 survey points in Lincoln County. The Project Owner modified the Project boundary in early 2016 to exclude all development in Lyon County mainly based on the results of the eagle use data (along with eagle nest data), in order to avoid development in the area where relatively higher use was recorded and reduce risk to eagles. Therefore, the risk model for the final Project footprint excludes survey data from the points that are more than a mile from the Project footprint, as that eagle use data is not anticipated to be reflective of the use in the final Project footprint. Table 3 shows the month to month breakdown of survey effort at the points that intersect the Project footprint and eagle flight minutes within 800-m and under 200-m of height that were documented in Year 1 (2013/2014) and Year 2 (2015/2016).

Table 3. Survey Effort and Bald Eagle Flight Minutes Recorded within 800-m and under 200-m Height at Survey Points that Intersect Project Footprint (1-km Buffer of Turbines)

	Year 1		Year 2	
Month	**Survey Effort (hrs)**	**Eagle Flight Minutes**	**Survey Effort (hrs)**	**Eagle Flight Minutes**
January	11	0	20	0
February	10	0	20	6
March	22	4	24	0
April	35	0	24	8
May	25	0	24	1
June	15	0	24	16
July	15	0	0	0
August	22	0	24	0
September	30	0	22.6	19
October	30	0	24	31
November	30	0	24	3
December	7	2	18	0
Total	**252**	**6**	**248.6**	**84**

From March 2013 through March 2014, a total of 6 bald eagle flight minutes under 200 m were recorded during 252 hours of survey efforts within the 15 fixed-point plots that intersect the Project footprint. As discussed in Section 5.2.2, the full effort at all 20 points surveyed in Year 1 consisted of 336 hours and documented 15 bald eagle flight minutes within 800 m and under 200 m in

height; the 9 bald eagle flight minutes that were observed at survey points that do not intersect the Project footprint are not included in the risk model.

From December 2015 through November 2016, a total of 84 bald eagle flight minutes under 200 m were recorded during 248.6 hours of survey efforts within the 26 fixed-point plots that intersect the Project footprint. As discussed in Section 5.2.2, the full effort at all 34 points surveyed in Year 2 consisted of 281 hours and documented 97 bald eagle flight minutes within 800 m and under 200 m in height; the 13 bald eagle flight minutes that were observed at survey points that do not intersect the Project footprint are not included in the risk model.

In total 90 eagle flight minutes and 500.6 hours of surveys were input into the model.

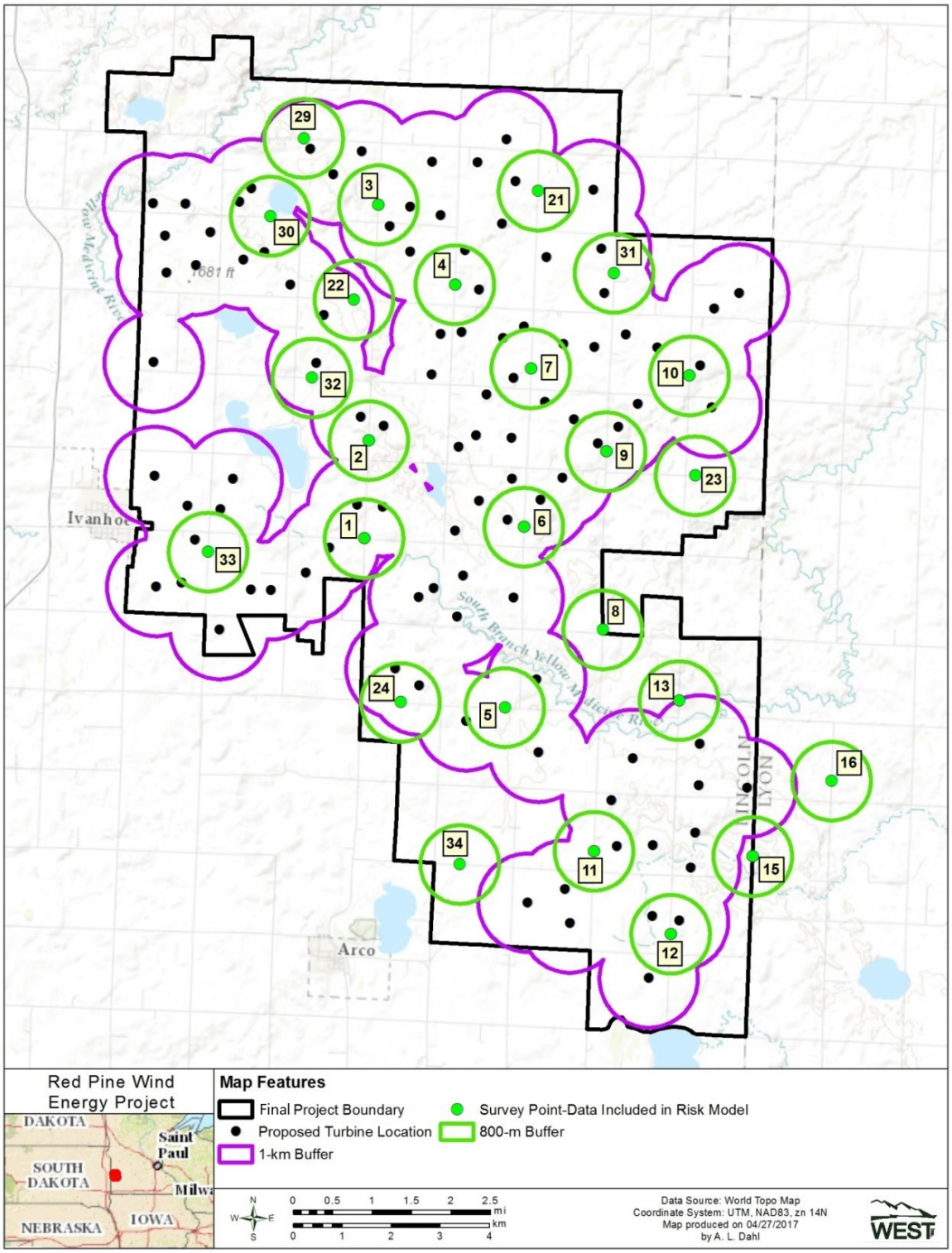

Figure 12. Survey points with 800-m survey radii that intersect the Project footprint (1-km buffer of turbines) at the Red Pine Wind Project, MN.

6.2.2 Risk Modeling Results

Through coordination with the USFWS (including the results of the USFWS' Collision Risk Model as provided in July 2018) and following the ECPG Bayesian collision risk model, with the assumptions and input described above, the predicted annual mean bald eagle fatalities are estimated at 1.97 eagles/year and an 80 percent credible interval of 2.60 eagles/year (Table 5). To analyze the seasonal risk patterns at the Project, the risk model was run by season, although the predicted take (and proposed take limit) is based on the overall annual take limits shown in Table 4. Overall, the ECPG model indicates that risk to bald eagles may be relatively higher in the fall at the Project, with more moderate risk in breeding season, and the lowest relative risk in the winter (Table 4).

Table 4. Estimated Bald Eagle Fatalities at the Red Pine Wind Farm

Variable	Breeding	Fall	Winter	Annual
Estimated mean seasonal bald eagle fatalities	0.78	0.95	0.24	1.97
80% Credible Interval	1.15	1.4	0.36	2.60

For the purposes of the ITP application, the Project Owner has assumed that the 80-percent credible limit for the updated ECPG model for the optimized Project layout (2.60 eagles/year) provides a conservative prediction of facility-wide bald eagle fatalities. Based on an estimated annual take rate of 2.60 bald eagles per year, the Project Owner is requesting a permit for the incidental take of up to 63 bald eagles over the 24-year duration of the permit (13 eagles/five-year term x four five-year terms [52 eagles in Years 1 - 20], plus 2.60 eagles/year x four years, rounded up [11 eagles in Years 21 – 24]). To ensure that the authorized take is not exceeded over the life of the permit, check-ins with the USFWS will occur at five-year intervals for Years 1 – 20, with the final check-in occurring at the end of the remaining four-year period (Years 21 – 24). At each of these check-ins, the Project Owner will discuss with USFWS the results of post-construction monitoring, take estimated to have occurred to date and the latest methods of take estimation, the status of bald eagles in the eagle management unit and LAP, new data or information relating to eagle risk and minimization measures, and whether any modifications are warranted to the adaptive management triggers and responses (Section 9, Table 6) of this ECP.

7 STAGE 4 – AVOIDANCE AND MINIMIZATION OF RISK AND COMPENSATORY MITIGATION

7.1 Development of Conservation Measures

Per the USFWS's ECPG (USFWS 2013), the Project should be considered a "Category 2" site. A Category 2 site indicates moderate to high risk to eagles but with the opportunity to mitigate impacts. Projects in this category will potentially take eagles, but the risk might be reduced to an acceptable level through a combination of conservation measures and reasonable compensatory mitigation. This indication of risk categorization does not reflect a permit decision, which would follow only after review of a take permit application and consideration of a NEPA review (including intra-office Section 7 consultation). A list of avoidance and minimization measures for an applicant to consider is included in Appendix E in the ECPG. Below is an overview of the conservation

measures that the Project Owner has implemented or will implement to avoid or minimize risk to eagles as part of the Project:

- Project boundary – Project boundary was shifted significantly west (dropping all portions in Lyon County), to avoid areas in Lyon County where eagle use appeared to be higher (Figure 3).

- Turbine siting – Turbines were set back at least 2.0 miles from bald eagle nests and the overall Project boundary was modified to remove areas of higher eagle use documented in Lyon County based on the results of Project-specific surveys.

- Project design – Use of free-standing permanent meteorological towers and burying all collection lines (reducing collision risk).

- Reducing length of overhead transmission line from the initial planned route of 3 miles in length to 700 ft (reducing collision risk).

- Habitat impact minimization – Layout designed to avoid and minimize impacts to wooded habitat.

- Operations measures – Landowner outreach and operation staff training to monitor, report and remove livestock or wildlife carcasses in the vicinity of Project turbines to avoid attracting eagles.

The following section provides more details on these avoidance and minimization measures.

7.1.1 Project Design/Construction Avoidance and Minimization Measures

General Project Siting

The initial proposed Project boundary consisted of two phases. Phase 1 covered an area of 19,520 acres and phase 2 covered an area of 30,400 acres, for a combined total Project area of approximately 49,920 acres. These initial Project areas have been substantially altered based on the results of avian use and raptor nest monitoring as well as guidance and consultation with the USFWS and MNDNR. The revised Project area is approximately 44,600 acres and avoids impacts to National Wildlife Refuges, state-managed WMAs and WPAs, active bald eagle nests and several public waters.

The eagle use data collected in Year 1 (2013/2014) showed more eagle use in the southeastern portion of the 2013 survey area (12 minutes of eagle flight in 84 survey hours at survey points 14 and 17 – 20) versus the western portion of the 2013 survey area (6 minutes of eagle flight in 252 hours at points 1 – 13, 15 and 16). This information was a factor in the Project Owner's decision in early 2016 to drop the eastern portion of the Project in Lyon County, in order to minimize risk to eagles based on the data available. Additionally, the location of the one active bald eagle nest documented in 2015 was another primary factor in the Project boundary change that occurred in early 2016, with the boundary moving almost two miles away from that nest.

The Project location contains a patchy assemblage of habitat types that may be suitable to eagles and other raptors. Prominent habitat features such as large bodies of water with abundant fish and/or waterfowl populations that can provide eagle foraging opportunities have largely been

avoided in the revised Project boundary, but these features do exist near the Project and may attract resident or migrating eagles and other birds. However, distinct ridges oriented north and south that may be used as migration corridors by eagles are not found within the Project.

While the surveys show that the Project has bald eagle use year-round, including the winter, the Big Sioux River, Des Moines River, Minnesota River, and Mississippi River tend to attract the largest concentrations of bald eagles in the region during the winter months and major eagle congregation areas along these rivers are many miles from the Project. The closest major documented wintering congregation area for bald eagles is the area surrounding Sioux Falls and the nearby Big Sioux River approximately 60 miles southwest of the Project (see eBird.org). Therefore, it is anticipated that winter eagle use will be low at the Project compared to these other areas of concentration in the state, a conclusion which the two years of eagle use data supports.

Turbine Siting and Setbacks

The Project Owner identified avoidance areas and used a minimum two-mile setback from all active bald eagle nests documented during the 2016 and 2017 nest surveys. Turbine siting was prioritized to the greatest extent feasible to areas shown or suspected to be used less frequently by eagles. This includes maximizing use of cultivated agricultural fields set back from forest patches, wetlands, and riparian corridors as much as possible.

Specifically, beyond the two-mile setback from eagle nests, turbines were sited away from documented eagle activity west of survey point 13, where multiple bald eagles were observed during eagle use surveys. Turbines were also sited away from survey point 23, where bald eagles were also observed on multiple occasions. Several bald eagles were observed northeast of survey point 9, generally flying along a small stream corridor and an adjacent farm operation. Turbines 53 and 54 were set back as far from the stream corridor as possible given land control and engineering constraints; these turbines are both located in cultivated fields and they do not intersect any documented bald eagle flightpaths.

Additionally, turbines were not sited within 5 rotor diameter lengths (500 meters, on the prevailing wind side) and 3 rotor diameter lengths (300 meters, on the non-prevailing wind side) from state and federally protected areas per MNDNR guidance. By prioritizing turbine locations on lands that provide relatively lower potential for use by eagles, overall risk to eagles has been reduced, particularly during breeding seasons.

Minimize Habitat Disturbances

The Project layout has been developed to use the cultivated lands, existing public and private road network to the degree possible. Impacts to wooded and untilled grassland habitats were avoided during Project construction.

Avoid Use of Structures That Are Attractive to Birds for Perching

The Project Owner used turbines with monopoles (non-lattice structures) that will not attract birds for perching or nesting.

Free-standing Meteorological Towers

The Project Owner installed permanent meteorological towers that are free-standing or will use diverters if guy-wires are used. The temporary meteorological towers used at the site during pre-

construction and construction phases were removed at the earliest practical time after construction, after calibration of the permanent meteorological towers, and no later than after power performance testing of wind turbines has been completed.

Bury Power Lines to Reduce Avian Collision and Electrocution

The Project Owner installed the onsite electrical collection system underground, thus minimizing the risk for bird collisions or electrocutions.

7.1.2 Project Operations Avoidance and Minimization Measures

Landowner Outreach/Education

On an ongoing basis, the Project Owner will provide information to participating and neighboring landowners to reduce or limit harmful wildlife interactions. A common action that can minimize attracting bald eagles into the Project area is proper livestock carcass disposal procedures. Through direct communications, newsletters, and/or web-based materials, this effort will encourage landowners to take steps that will minimize attracting scavenging eagles into the Project area.

Carrion Monitoring/Removal

The Project Owner and/or its contractors will establish a worker education and training program for regularly monitoring and reporting livestock or wildlife carcasses found near Project turbines. When these carcasses could attract eagles into proximity of Project turbines, the Project Owner will dispose of the carcasses directly or through working with landowners or County officials. For deer carcasses in particular, if the Project is ever within a designated management zone for chronic wasting disease, handling and disposal of deer remains will follow MNDNR guidelines in effect and applicable to Lincoln County with regards to managing chronic wasting disease.

Post-Construction Nest Monitoring

Disturbance monitoring may occur if any new bald eagle nests are built within the Project footprint. Per the ECPG, the objective of such monitoring will be to determine post-construction: 1) territory or roost occupancy rates, 2) nest success rate, and 3) productivity. If, during the operational life of the Project a new bald eagle nest is built within the Project footprint (within 1 kilometer of turbines), the Project Owner will coordinate with USFWS and MNDNR on disturbance monitoring protocol and any additional appropriate actions, and trained biologists will monitor the nest for two years after the nest is built and/or first documented to record general observations of nesting, nesting success, and any evidence of potential disturbance associated with the Project. Thereafter, trained on-site personnel will monitor eagle nests within 1 kilometer of the turbines for the life of the Project.

If dead or injured bald eagles are documented either during third-party monitoring or incidentally that appear to be associated with an active bald eagle nest within or adjacent to the Project, coordination with the USFWS will occur to determine if a nest removal permit is an appropriate response to minimize risk.

7.2 Review of Compliance with Tiering Criteria; Voluntary Conservation Measures

7.2.1 Introduction

The 2016 PEIS states that the USFWS anticipates tiering subsequent reviews for site specific Projects off of the PEIS, which would involve a streamlined review, including a summary of the issues discussed in the PEIS and incorporation by reference of appropriate analysis included in the PEIS (USFWS 2016). This tiering approach is stated as appropriate when a specific Project meets the following three criteria:

1. The Project "will not take eagles above the eagle management unit take limits (unless it is offset)";
2. The Project "will not result in cumulative authorized take within the LAP exceeding 5%"; and
3. The Project "will fulfill their compensatory mitigation requirements via methods that will offset the take."

The Project meets all three of these criteria, as described further below, and therefore qualifies for tiering to the PEIS.

7.2.2 Eagle Management Unit Take Limits

Per the ECPG, where take which may occur after avoidance and minimization measures have been used to the maximum extent possible and when eagle populations at the scale of the USFWS eagle management units are not healthy enough to sustain additional mortality over existing levels, permit applicants must reduce the effect of permitted mortality to a level that is compatible with the preservation of eagles (USFWS 2013a; 2016).

The allowable annual threshold of bald eagle take in the USFWS Mississippi Flyway eagle management unit is 1,640 eagles (USFWS 2016). This sustainable annual take is based on the predicted population of bald eagles in this geographical area (27,334 for Mississippi Flyway) in conjunction with the harvest threshold for estimated annual production of the population (6.0%; USFWS 2016).

The estimated annual level of take at the Project (2.60 bald eagles) is approximately 0.16% of the overall take limit for the Mississippi Flyway eagle management unit. The Project therefore meets the first criteria for tiering to the PEIS because it does not result in take above the eagle management unit take limits.

7.2.3 Local Area Population Take Thresholds

To determine if the Project's impact on the local area bald eagle population is biologically problematic, LAP 1% and 5% benchmarks were calculated (Table 5). The LAP is the number of bald eagles within an 86-mile radius of the turbines, as estimated by the USFWS' Cumulative Effects Tool as provided to the Project Owner on August 9, 2021, or 873 bald eagles (see Figure 13 and Table 5). This population estimate is based on the median distance eagles disperse from the nest where they are hatched to where they settle to breed (USFWS 2016), and takes into account the portion of the 86-mile-radius local-area that occurs within the Mississippi Flyway/Great Lakes Region (62%) and the Central Flyway/Rocky Mountains and Plains Region (38%) and their associated eagle densities and known information on nests that is contained in the USFWS' August 4, 2021 Cumulative Effects Tool output. Take rates between 1% and 5% of

the estimated LAP size are considered sustainable by USFWS, with 5% being at the upper end of what might be appropriate under the BGEPA preservation standard (USFWS 2013a) as well as one of the criteria considered when determining if a Project can tier to the PEIS.

The conservative estimated 80th confidence interval level of take for the Project is 2.60 bald eagles per year. This level of estimated annual take represents 0.30% of the total LAP of 873 bald eagles (as based on USFWS' Cumulative Effects Tool output from August 4, 2021). This level of take, should the USFWS authorize it, is far below the 5% threshold at the local area level. Furthermore, the Project Owner is not aware of any additional wind projects that have obtained an ITP for bald or golden eagles within the Project's LAP since the time when the Cumulative Effects Tool was run; therefore it is anticipated that this Project will not result in cumulative authorized take within the LAP exceeding 5%, meeting the tiering criteria.

The LAP calculation assumes that bald eagle density is uniform across a given area (in this case, the Great Lakes and Rocky Mountains and Plains Regions, as detailed in Table 7). If USFWS develops more reliable models for predicting the distribution of eagles at finer scales, the Project Owner will coordinate with the USFWS on how to incorporate this information on any future five-year check-in associated with the permit.

The USFWS conducted a Cumulative Effects Analysis on this Project on August 4, 2021 to look at other permits issued in the LAP of this wind facility. The 2021 analysis indicated there are overlapping permitted and/or pending take authorizations for 6.2 eagles a year (0.71% of the LAP), which is well within the USFWS benchmark for permitted take. The USFWS will update the Cumulative Effects Analysis prior to publishing the EA for their review; the EA will contain updated overlapping permitted take information and an associated analysis.

Table 5. Calculated Local Area Population (LAP) Annual Take Benchmarks.

BAEA Management Unit	Region[a]	Maximum Take Rate (% LAP per year)[b]	Local Area Population[c]	Local-area 5% Benchmark (eagles per year)[d]	Local-area 1% Benchmark (eagles per year)[e]
Mississippi Flyway	Great Lakes	5.0	845.24	42.26	8.45
Central Flyway	Rocky Mountains and Plains	5.0	27.61	1.38	0.28
Total			**872.85**	**43.64**	**8.73**

[a]Region 3 (within Mississippi Flyway) and Region 6 (within Central Flyway) are referenced in order to determine appropriate bald eagle densities.
[b] USFWS upper benchmark for bald eagle take at the local area population scale.
[c] Local area population, as calculated by the USFWS' August 4, 2021 Cumulative Effects Tool output.
[d] Local-area 5% benchmark = LAP * 0.05.
[e] Local area 1% benchmark = LAP * 0.01

7.2.4 Compensatory Mitigation Requirements

As stated above, the estimated annual take at the Project represents 0.3% of the total LAP of 873 bald eagles and is well below the 1% sustainable annual take of the LAP.

In addition, as bald eagle populations continue to increase in Minnesota and the Mississippi Flyway eagle management unit, the level of take predicted by the conservative USFWS collision risk model for this Project is likely to stay well within the sustainable threshold for the regional bald eagle population for the foreseeable future. Compensatory mitigation is not required for an eagle take permit for this Project. Therefore, the Project meets the third criteria for tiering to the PEIS.

Despite the fact that compensatory mitigation is not required, the Project Owner plans to voluntarily contribute to ongoing eagle conservation programs through implementation of the following:

- Within 30 days of receiving an ITP for the Project, the Project Owner will donate $10,000 for use by:
    - a local rehabilitation center actively involved in the treatment, rehabilitation, and re-release of wild eagles to the local/regional eagle population;
    - a local non-profit environmental organization actively involved in educating the public on the negative impacts of lead in the environment on eagles and other wildlife; and/or
    - a local non-profit environmental organization actively involved in making non-toxic (lead-free) fishing tackle and/or ammunition available to the local hunters or anglers.
- After each five-year term of Project operations after the permit is issued, the Project Owner will donate an additional $10,000 towards the wildlife conservation organization(s) listed above.

Should at any point during the life of the permit, the USFWS identify other acceptable uses for mitigation dollars or recipients of such funds (e.g., towards power pole retrofits to minimize eagle electrocution risks, habitat protection/enhancement, road kill carcass removal programs to reduce risk of eagle-vehicle collisions, etc.), the Project Owner will, in consultation with the USFWS, agree to redirect mitigation funds to other uses as long as the total mitigation contributions do not exceed the funds committed to as described above.

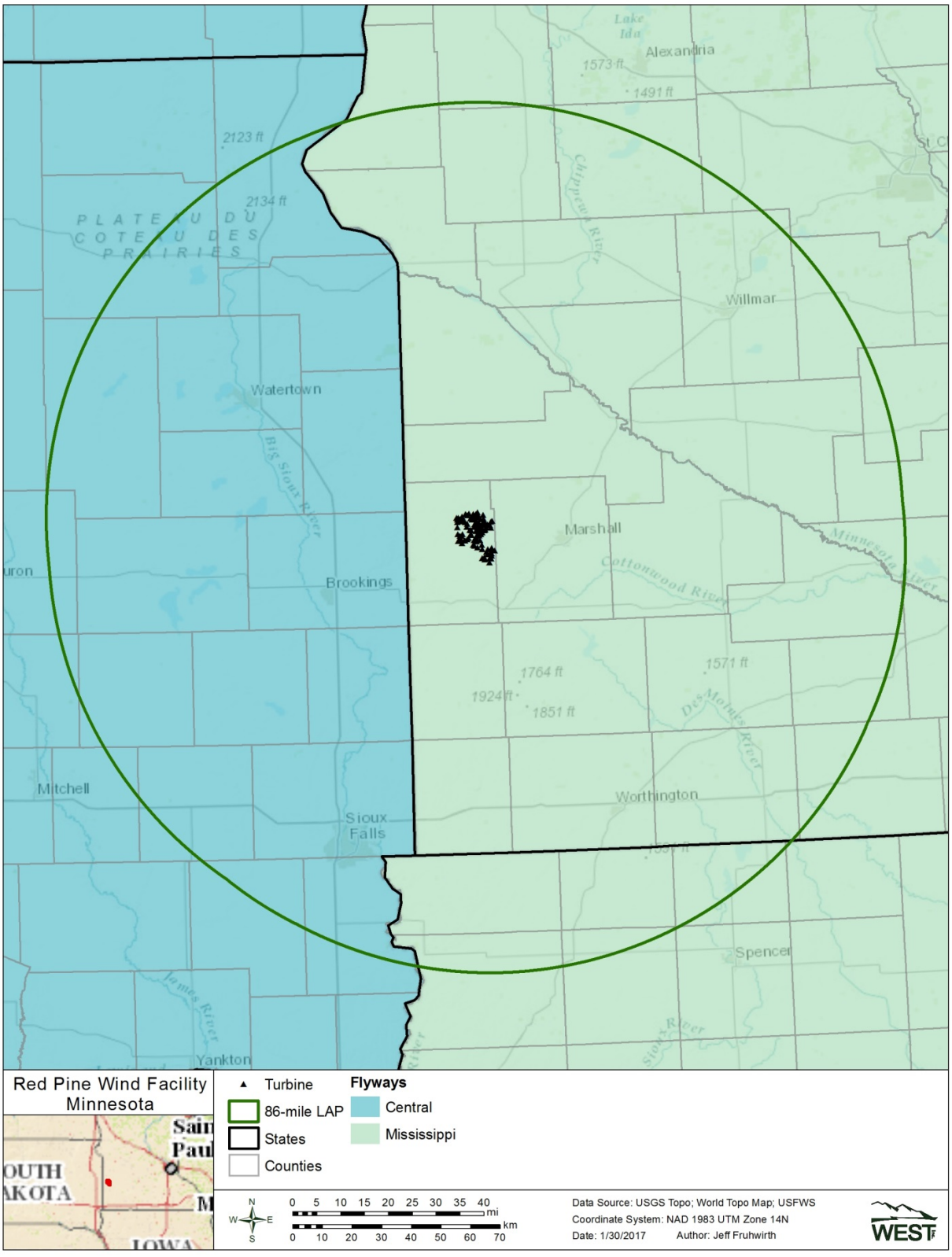

Figure 13. Bald eagle local population area at the Red Pine Wind Facility, MN.

8 STAGE 5 – CALIBRATING AND UPDATING THE FATALITY PREDICTION AND CONTINUED RISK-ASSESMENT

The Project Owner will implement an ongoing monitoring program to assess potential Project impacts to eagles. This monitoring program will include an initial two-year effort completed by an independent third-party and thereafter by trained operations staff.

8.1 Post-Construction Fatality Monitoring

The methods for the fatality monitoring study are broken into four primary components:

1) standardized carcass surveys of selected turbines with search plot size and search interval designed to detect impacts to eagles;
2) searcher efficiency trials to estimate the percentage of carcasses found by searchers;
3) carcass persistence trials to estimate the length of time that a carcass remains in the field for possible detection; and
4) analyses to estimate the total number of eagle fatalities within the Project.

As Appendix C details, the Project Owner proposes to have a third-party monitor conduct two years of post-construction eagle fatality monitoring at the Project (Years 1 – 2); this monitoring will occur after the USFWS approves the approach outlined in Appendix C as sufficient for purposes of ITP compliance monitoring and after the ITP has been granted. For the eagle-specific monitoring, all of the turbines will be surveyed on a monthly basis, during which the third-party surveyor will visually scan the area around all directions of the turbine to a distance of 100 m, as well as walk transects to search for eagle carcasses. Due to the relatively flat terrain of the Project and the relatively large size of eagles (i.e., remains will be visible from relatively far distances), plots will not be cleared; instead the 100-m area will be visually scanned from around the turbine and transects will be walked as long as the vegetation is 30 inches or shorter, as described in Section 3 of Appendix C.

For the remaining 19 years of the permit term (Years 3 – 24), third-party monitoring will occur at regular intervals as shown in Table 1 of Appendix C, following the same general approach as described in Section 3 of Appendix C for the first two years. Any eagle remains or injured eagles that are discovered by O&M staff or incidentally observed will be reported. Appendix C provides more detail on the proposed approach to eagle fatality monitoring for ITP compliance.

During each year in the permit term (Years 1 – 24), turbines will be visited on a quarterly basis using the same area surveyed by third-party monitors (out to approximately 100 m) via scans using binoculars from the nacelles, as described in Section 4 of Appendix C. Road and pad areas will also be searched during turbine visites for routine maintenance. O&M staff searcher efficiency will be tested by a third-party (e.g., as part of the formal Year 1 – 2 fatality monitoring program described above, as well as in subsequent third-party monitoring years, as described in Table 1 of Appendix C). If qualified biological monitor contractors conduct the lower intensity monitoring, searcher efficiency trials will be conducted during the lower intensity monitoring years (starting in Year 3). These searcher efficiencies (and carcass persistence rates measured during third-party monitoring years) will then be used on a yearly basis along with the number of eagles discovered during monitoring to estimate overall actual eagle fatality numbers.

8.2 Agency Reporting

The Project Owner will notify the USFWS within 48 hours of discovering any injured or dead eagle at the Project for the life of the Project. Additionally, the Project Owner will prepare and submit an eagle incident report to the USFWS within 7 days that will include a description of the find, photographs, and a data sheet that provides such information as: date/time, turbine # and location, physical description of the find (including any obvious injuries and general remains condition), evidence of scavenging, whether the remains were found incidentally or as part of a systematic search, and estimated time of injury/death. USFWS Law Enforcement will be notified and will take possession of the eagle (if dead), or the eagle will be transported to a rehab facility if injured. The address and contact information for the nearest wildlife rehab facility will be posted at the O&M facility for reference in the event that an injured eagle is discovered.

In addition to specific incident reports, the Project Owner will provide the USFWS with an annual report after each year of formal fatality monitoring that will occur for the first two years and every year during the life of the eagle take permit, if issued. During years when qualified biologist monitoring is conducted, the report will present estimates of facility-wide eagle fatalities using appropriate statistical estimators if necessary. During years when qualified biologist monitoring is not conducted, the report will present records of all eagles found as specified in the eagle take permit.

Finally, as discussed in Section 7.1.2, the Project Owner will coordinate with the USFWS and MNDNR in the event that a new bald eagle nest is discovered within one kilometer of Project turbines, and will report the location and activity status of the nest.

9 ADAPTIVE MANAGEMENT

As discussed in Section 6.2.2, based on an estimated annual take rate of 2.605 bald eagles per year, the Project Owner is requesting a permit for the incidental take of up to 63 bald eagles over the 24-year duration of the permit. To ensure that the authorized take is not exceeded over the life of the permit, check-ins with the USFWS will occur at five-year intervals for Years 1 – 20, with the final check-in occurring at the end of the remaining four-year period (Years 21 – 24). Adaptive management is an iterative process implemented throughout the life of the Project, which allows for continuous improvement regarding decisions and actions taken in an effort to avoid or minimize impacts to eagles. For the Red Pine Wind Project, adaptive management will consist of a program designed to monitor and assess impacts to eagles at the Project and an iterative process of assessing and implementing additional avoidance and minimization measures should results of the third-party monitoring or O&M staff monitoring indicate that such additional measures are warranted. The adaptive management thresholds are based on estimated take using eagle carcasses found and probability estimates of undetected eagle take. However, the amount of undetected take will vary significantly based on the estimated g-value and confidence bound when applying Evidence of Absence estimates.

The robust approach to fatality monitoring (scans plus transects during third-party monitoring years, and quarterly nacelle scans during the O&M staff monitoring years) has been proposed by the Project Owner (see Appendix C) as a method anticipated to result in probabilities of detection that will be sufficient to estimate the eagle take at the Project for compliance and adaptive management purposes. The number of turbine searches for eagles during the first five years is estimated to be ~4,400 turbine searches & scans for this five-year review. The number of turbine

searches in subsequent five-year periods will average between ~2,000 and ~3,200 searches and scans per five-year review. Since the search effort during the first five-year review period will be much greater than the remaining five-year reviews, we expect the higher g-value and lower uncertainty will provide more accurate information for determining adaptive responses, and provide sufficient time to implement adaptive responses so the permit take limit is not exceeded. As a result, the Project Owner set specific thresholds for the first five-year review period, and provides other thresholds during the subsequent review periods so that there are appropriate responses to avoid exceeding the 24-year permit limit. The proposed higher thresholds in the latter years of the permit account for the effect of using Evidence of Absence for take estimates, which will allow for the level of monitoring to remain appropriate to document compliance with the permitted take levels, but not require the same higher intensity level of effort as the first five years. The proposed higher thresholds in the latter years of the permit are in place to account for potential unforeseen circumstances as well as the proposed level of monitoring, and not because the Project Owner or the USFWS anticipate take to be higher in latter years.

Table 6 sets forth the adaptive management framework that would be implemented at the Project based on actual and estimated bald eagle fatalities. If at any time a golden eagle fatality or injury is documented, the Project Owner will coordinate with USFWS on appropriate next steps.

Table 6. Adaptive Management Framework for the Red Pine Wind Farm.

Level	Threshold or Trigger	Adaptive Management Response**
1	For Years 1 to 5, an estimate* of 8 or fewer bald eagle fatalities within the first five-year period. For Years 6 to 24, an estimate of 9 or fewer bald eagle fatalities within a five-year period.	• Continue implementation of ECP
2	For Years 1 to 5, an estimate* of 9 to 10 bald eagles within the first five-year period. For Years 6 to 24, an estimate* of 10 to 12 bald eagle fatalities within a five-year period. For all years, if 3 actual bald eagle injuries or carcasses are found in any one year,	• Continue implementation of ECP; and • Review the pattern and rate of estimated eagle fatalities to determine whether the permit limit is likely to be exceeded, based on the percentage of the take limit up to that time. If the total estimated take over the prior five-year periods is below 70% of the take limit based on 2.605 eagles per year, no additional adaptive management response is required. For example, at the second five-year period, if the estimate is 17 eagles total, then 2.605 x 10 years = 26.05 eagles, and 17 eagles is 65.3% of the take limit, so no additional adaptive management response is required. • Evaluate cumulative monitoring effort to date to assess confidence in mortality estimates. If evaluation suggests that take estimate is unreliable due to limitations in survey design, additional

Level	Threshold or Trigger	Adaptive Management Response**
		efforts or modifications to the mortality monitoring regime may be warranted; and • Assess the cause or likely contributing risk factor(s) to the eagle fatalities and whether additional management response is warranted and feasible; and • Develop a timeline and benchmarks for management response.
3	For Years 1 to 5, an estimate* of 11 to 13 bald eagle fatalities within the first five-year period. For Years 6 to 24, an estimate* of 13 to 14 bald eagle fatalities within a five-year period For all years, if 4 or 5 actual bald eagle injuries or carcasses are found in any one year	• Continue implementation of the ECP; and • Evaluate cumulative monitoring effort to date to assess confidence in mortality estimates. • Coordinate with the USFWS to help determine if immediate response or management action or monitoring is needed; and • If mutually agreed upon by the Service and Project owner, add at least one year of third-party monitoring to the monitoring effort planned in the following check-in monitoring period. (Other actions that result in an equivalent increase to the overall monitoring detection probability may be used instead, if agreed to by the Project and the Service); and • Develop a timeline for each management response, including check-ins and benchmarks, as well as measures to determine if the adaptive management response has been successful.
4	For Years 1 to 5, an estimate* of 14 or more bald eagle fatalities within five year period. For Years 6 to 24, an estimate* of 15 or more bald eagle fatalities within a five year period For all years, if 6 or more actual eagle injuries or carcasses are found in any one year	• Continue implementation of the ECP; and; • Evaluate cumulative monitoring effort to date to assess confidence in mortality estimates. • Add at least one year of third-party monitoring to the monitoring effort planned in the following check-in monitoring period. (Other actions that result in an equivalent increase to the overall monitoring detection probability may be used instead, if agreed to by the Project and the Service); and • Consult with USFWS to help determine if: o immediate response or management action is needed, and/or o a longer term action plan or management response plan should be developed, including whether the take limit for the project should be adjusted and the permit amended. • As appropriate, implement targeted additional carcass removal or landowner carcass disposal outreach efforts to minimize the presence of eagle attractants within the Project.

Level	Threshold or Trigger	Adaptive Management Response**
		• As appropriate, temporarily implement and test the effectiveness of additional conservation measures (such as use of biomonitors, targeted operational minimization, eagle deterrents, or nest removal permits, if appropriate, as discussed further in Section 7.1.2) to further avoid or minimize risk to eagles. • Develop a timeline for each management response, including check-ins and benchmarks, as well as measures to determine if the adaptive management response has been successful.

* Estimated values will be rounded up to nearest whole number when evaluating triggers (e.g., if the estimate at Year 10 for the previous five years is 9.4 bald eagles, that would be rounded up to 10 bald eagles, corresponding to Level 2).

** USFWS will estimate via Evidence of Absence, or another statistically sound estimator, using monitoring results at five year periods. The thresholds/triggers will also be evaluated within 60 days of the end of the monitoring season following the discovery of eagle remains equaling the actual eagles found in any one year at the site. For example, if three bald eagle carcasses are documented during a third-party or O&M monitoring year, in addition to reporting the remains to the USFWS per Section 8.2, the responses and processes described in the applicable Level of this table would be followed, regardless of when the next official five-year evaluation period would occur.

**Note: additional adaptive management alternatives may be added to this table if feasible alternatives are available and determined to be appropriate during the five-year check-in with USFWS.

As discussed in Section 8.2, the Project Owner will report any dead or injured bald or golden eagles found at the site (whether during monitoring or incidentally) to the USFWS within 48 hours of discovery and identification. USFWS will make the determination of the cause of the injury/death of the eagle. Pending the results of that investigation, the Project Owner will coordinate with the USFWS to determine if there is an obvious cause or likely contributing risk factor(s) to the eagle fatality and whether an adaptive management response is warranted and/or feasible in accordance with the framework set forth in Table 6. Adaptive management responses will be designed to specifically address the root cause(s) of take where practicable, and/or to reduce the risk of take going forward. For example, if take has only been documented during the winter months, appropriate measures may be implemented only during the winter months at the site. Or, if take has only occurred in one area of the site, additional measures would only be implemented in those areas where take has previously occurred.

Over the life of the permit and Project it is also possible that conservation strategies that were once deemed effective will later become obsolete as more effective strategies are developed and proven. Should more effective measures be identified that would reduce risk to a greater degree than existing, available minimization measures, the Project Owner may propose to the USFWS revising the adaptive management framework to allow for the incorporation and implementation of those measures. If appropriate and mutually agreeable, these measures can be incorporated into the ECP and/or permit conditions.

10 LITERATURE CITED

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APPENDIX A – EAGLE SURVEY REPORTS

APPENDIX B – REVIEW OF CONSISTENCY WITH PRE-CONSTRUCTION SURVEY PROTOCOLS

APPENDIX C – EAGLE FATALITY MONITORING PLAN

APPENDIX D – TURBINE COORDINATES