Appendix H. Bird and Bat Conservation Strategy (BBCS) and Survey Reports

Bird and Bat Conservation Strategy

Silver Queen Wind Farm

Crawford and Carroll Counties, Iowa

Prepared by

Silver Queen Wind Farm, LLC

1805 29th Street, Suite 2050
Boulder, CO 80301

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Version History

Version ID	Version Date	Authors	Version Notes
2024-01	February 2024	WEST – Tim Sichmeller, Joshua Parrott, Kara Hempy-Mayer Scout – Andrew Pinger, Bobby Quinones, Zach Lasek	Initial draft of the Project BBCS.

The Silver Queen Wind Farm's Bird and Bat Conservation Strategy is a living document used by the Project owner to document and manage risk to birds and bats throughout the lifetime of the Project. As more information is gathered from the Project and as wildlife regulations evolve, it will be important for this management document to acknowledge and adapt to those changes.

This version history table will document when and for what purpose this document has been updated. Version ID will be the year of the update followed by the two-digit number of version for that year. For example, a second version produced in 2024 will be Version ID 2024-02.

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Abbreviations, Acronyms, and Initialisms

Project Entities

Silver Queen	Silver Queen Wind Farm LLC, the project company that developed the Silver Queen Wind Farm
Project	The Silver Queen Wind Farm in Crawford and Carroll counties, Iowa that includes up to 77 wind turbine generators, pads and foundations, an electrical collection system, substation, operations and maintenance building, project roads.
Project Area	the 170 square kilometers (42,816 acres) of privately-owned land in western Iowa that has been leased by Silver Queen to host the Project.
Scout	Scout Clean Energy LLC

Laws, Regulations, and Guidance

BGEPA	Bald and Golden Eagle Protection Act of 1940
CFR	Code of Federal Regulations
ECPG	Eagle Conservation Plan Guidance - Module 1 - Land-Based Wind Energy Version 2
ESA	Federal Endangered Species Act of 1973
Guidelines	2020 Range-Wide Indiana Bat Summer Survey Guidelines
IDNR	Iowa Department of Natural Resources
MBTA	Migratory Bird Treaty Act of 1918
USC	United States Code

Units

C	Celsius
ft	feet
m	meter
mi	mile
min	minute(s)
MW	megawatt
km	kilometer

Technical Terms

AWWI	American Wind and Wildlife Institute
BBCS	Bird and bat conservation strategy
BCC	birds of conservation concern
BCR	bird conservation region
CMs	conservation measures
ECP	eagle conservation plan
EITP	eagle incidental take permit under the BGEPA
IPaC	USFWS Information, Planning, and Consultation system
ITP	incidental take permit under the federal ESA
M.	Myotis
MCP	minimum convex polygon
NLCD	national landcover database
NLEB	northern long-eared bat (Myotis septentrionalis)
RSH	rotor-swept height
SGCN	species of greatest conservation need
T&E	threatened and endangered
TRBA	tricolored bat (Perimyotis subflavus)
USFWS	United States Fish and Wildlife Service
WEG	USFWS Land-based Wind Energy Guidelines
WEST	Western EcoSystems Technology, Inc.

1 INTRODUCTION

Although wind energy facilities utilize a renewable-energy resource, potential impacts to birds and bats may result from their construction and operation. Interactions with wind turbines and the associated infrastructure such as energy transmission, distribution, and substations may result in fatalities or indirect effects that may include displacement or habitat loss. To address these concerns, Silver Queen Wind Farm, LLC (Silver Queen) contracted Western EcoSystems Technology, Inc. (WEST) to develop this site-specific Bird and Bat Conservation Strategy (BBCS) for the Silver Queen Wind Farm (Project) which is located on approximately 42,816 acres of privately owned land (Project Area) in Crawford and Carroll counties, Iowa (Figure 1.2).

This BBCS addresses the pre-construction assessments that Silver Queen has conducted (including Tiers 1 – 3) of the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (WEG; USFWS 2012) and provides a review of bird and bat species of sensitive status (Iowa Department of Natural Resources [IDNR] 2023c) in compliance with all state and federal avian and bat conservation and protection laws and regulations applicable to the proposed Project. In addition, the BBCS describes methods to avoid, minimize, and mitigate potential effects from construction and operation of the Project, consistent with the WEG.

The purpose of the BBCS is to assess the risk to avian and bat species that may inhabit the Project Area and to develop processes to minimize and manage the risk. Relevant regulatory guidance that informed the development of the BBCS is presented in Section 3.

1.1 OBJECTIVES

Silver Queen has developed this BBCS to meet the following objectives:

1. Document and describe the scope of the Project, the biological survey work that was completed during pre-construction, and provide an assessment of risks to avian and bat resources posed by the Project. This objective includes establishing this document as the primary reference for information related to avian and bat studies performed in relation to the Project.
2. Provide a plan that avoids, minimizes, and monitors potential effects to avian and bat species resulting from the construction and operation of the Project consistent with the WEG.
3. Describe post-construction monitoring efforts that will be implemented at the Project to record impacts to birds and bats, as well as the methods for reporting the results of monitoring.

4. Outline the adaptive management framework that Silver Queen is committed to over the life of the Project, and describe how Silver Queen plans to implement adaptive management during operation of the Project.
5. Provide an educational and practical reference for Silver Queen's employees and contractors to facilitate the application of measures that avoid and minimize potential negative effects to avian and bat species at the Project.

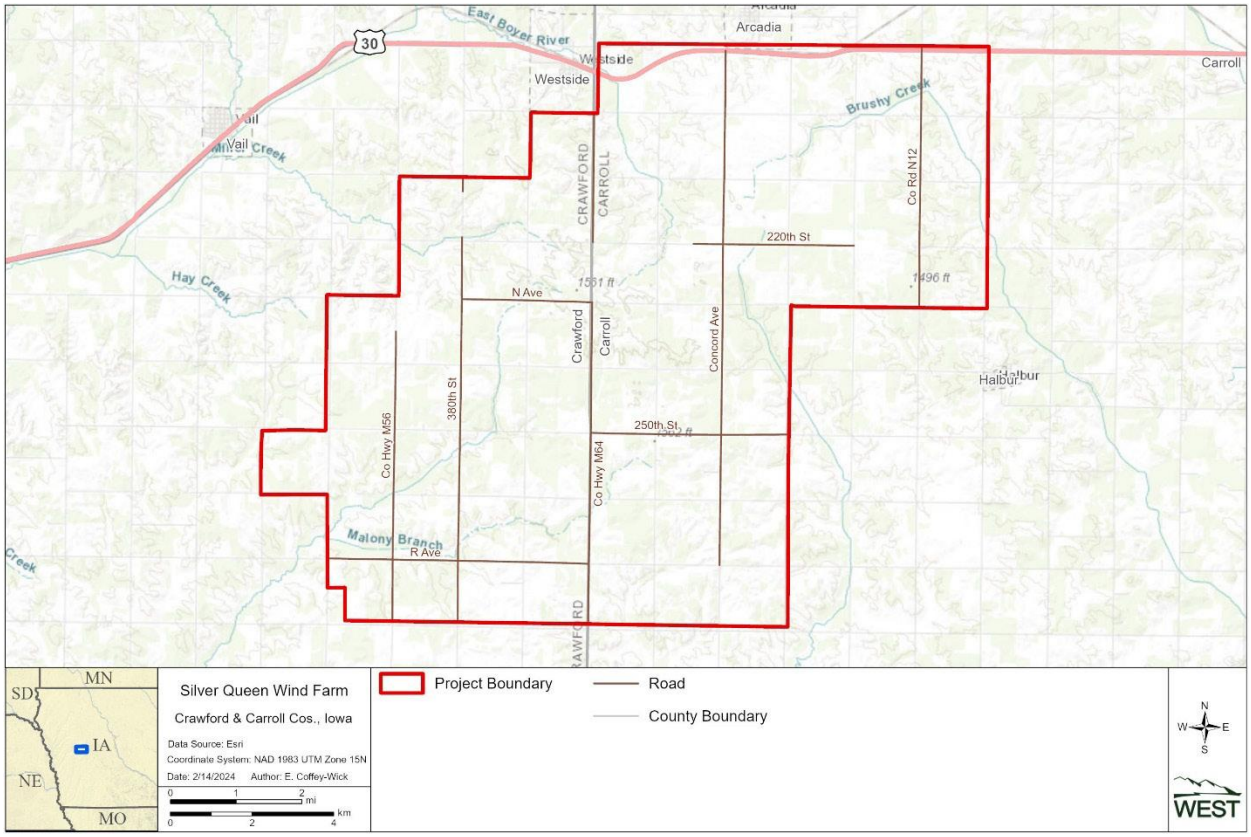

Figure 1.1 Location of the proposed Silver Queen Wind Farm in Crawford and Carroll counties, Iowa.

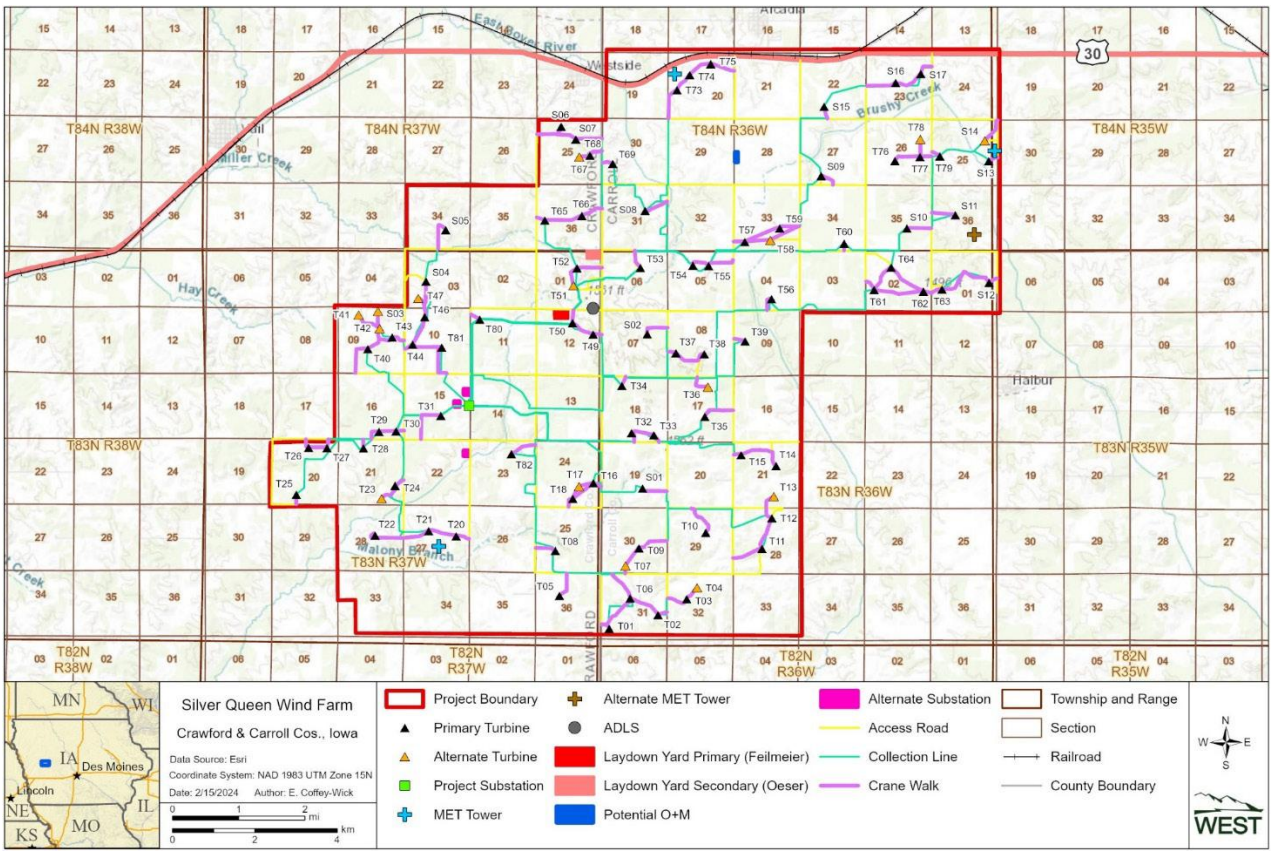

Figure 1.2 Location of proposed turbines within the proposed Silver Queen Wind Farm in Crawford and Carroll counties, Iowa.

2 SITE AND PROJECT DESCRIPTION

The proposed Project is located in Crawford and Carroll Counties, Iowa, on 173 square kilometers (42,816.2 acres) of private land in western Iowa (Project Area), approximately eight kilometers (km; five miles [mi]) west of the town of Carroll, Iowa and 16 km (10mi) east of Denison, Iowa. Historically, the Project Area was likely covered with tallgrass prairie with woodlands occurring along valleys and streams, habitat typical of the Steeply Rolling Loess Prairies Level IV Ecoregion; however, much of the region has been converted to cropland (Chapman et al. 2002). According to the National Land Cover Database (2021), approximately 93.6 percent of the Project Area is cultivated crops with the remaining land cover including developed land (4.8 percent), and other land cover types comprising less than 2.0 percent each, of the proposed Project Area.

Table 2.1 Land cover types, coverage, and percent composition within the proposed Silver Queen Wind Farm Project Area in Crawford and Carroll counties, Iowa.

Land Cover Type	Square Kilometers	Acres	% Composition
Cultivated Crops	162	40,088	93.6
Developed[1]	8	2,003	4.7
Hay/Pasture	2	605	1.4
Herbaceous	<1	63	0.1
Barren Land	<1	28	0.1
Deciduous Forest	<1	17	<0.1
Open Water	<1	7	<0.1
Mixed Forest	<1	3	<0.1
Shrub/Scrub	<1	2	<0.1
Emergent Herbaceous Wetlands	<1	2	<0.1
Evergreen Forest	<1	<1	<0.1
Total[2]	**173**	**42,816**	**100**

1. Includes open space, low intensity, medium intensity, and high intensity developed land cover types.
2. Sums of values may not add to total value shown, due to rounding.

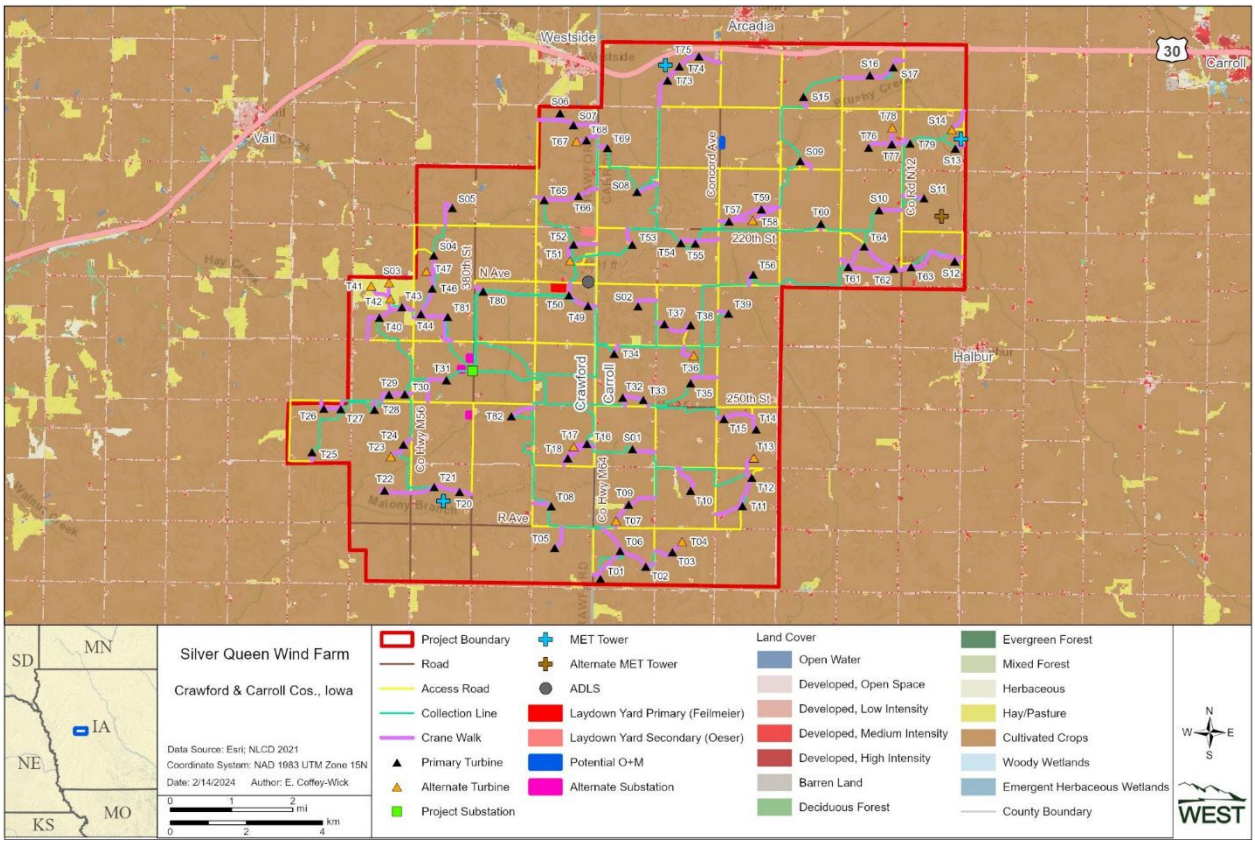

Figure 2.1 Land cover types of the proposed Silver Queen Wind Farm in Crawford and Carroll counties, Iowa.

3 RELEVANT WILDLIFE REGULATIONS

3.1 FEDERAL ENDANGERED SPECIES ACT OF 1973

Species at risk of extinction, including many birds and bats, are protected under the ESA, as amended. The purpose of the ESA is to protect threatened and endangered species and to provide a means to conserve their habitats. Take under the ESA is defined as "..to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Harm is an act which injures or kills a wildlife species, including significant habitat modification or degradation; whereas harass is defined as an intentional or negligent act or omission which creates the likelihood of injury by annoying the animal to the extent it significantly disrupts normal behavior patterns such as breeding, feeding, or sheltering. The ESA authorizes the USFWS to issue permits for "incidental take" of threatened and/or endangered (T&E) wildlife species, which is take resulting from an otherwise lawful activity.

3.2 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (MBTA) integrates and implements four international treaties that provide for international protection of migratory birds. The MBTA 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 US Code [USC] § 703; 1918). 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…" (50 Code of Federal Regulations [CFR] § 10.12; 1973). A series of contradictory legal opinions have been issued since 1978 (see United States v. FMC Corporation, 572 F.2d 902 (2d Cir. 1978) regarding whether incidental take (non-intentional take), as seen at wind energy facilities, is prohibited under the MBTA. Regardless, the USFWS currently has no permitting program in place that authorizes incidental take of migratory birds under the MBTA. The USFWS maintains a list of all species protected by the MBTA at 50 CFR § 10.13 (1973), including eagles.

3.3 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA), 16 USC 668-668d (1940), affords bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) additional legal protection. The BGEPA prohibits the take, sale, purchase, barter, offer of sale, 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. The BGEPA also defines take to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb," (16 USC 668c [1940]), and includes criminal and civil penalties for violating the statute (see 16 USC 668 [1940]). The USFWS further defined the term "disturb" 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 September of 2009, the USFWS promulgated a final rule on two new permit regulations that specifically authorize under the BGEPA the non-purposeful (i.e., incidental) take of eagles and eagle nests in certain situations. Revisions to the final rule were issued in December of 2016 (see 50 CFR 22.26 [2009] and 22.27 [2009]). 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 Eagle Incidental Take Permits (EITPs) for wind energy facilities the USFWS finalized the Eagle Conservation Plan Guidance – Module 1 - Land-Based Wind Energy Version 2 (ECPG; USFWS 2013a). The ECPG describes specific actions that are recommended to achieve compliance with the regulatory requirements in the BGEPA for an EITP, as described in 50 CFR 22.80 (2009) and 22.85 (2009). The ECPG provides a national framework for assessing and mitigating risk specific to eagles through development of ECPs and issuance of programmatic EITPs for eagles at wind facilities.

In February 2024, the USFWS once again revised the permit regulations for incidental take of eagles under 50 CFR 22. The Permits for Incidental Take of Eagles and Eagle Nests (2024 Eagle Rule; USFWS 2024) included the creation of a general permit option (50 CFR 22 Subpart E §

22.210) for authorizing incidental take at a wind facility "that occur frequently enough for the Service to have developed a standardized approach to permitting and ensure permitting is consistent with the preservation standard." To be eligible for a general permit, a wind facility must 1) be in an area with relative abundance below the seasonal thresholds identified by the USFWS for both eagle species, and 2) not have a golden eagle nest within 2 miles or a bald eagle nest within 660 feet of turbines (USFWS 2024). For facilities ineligible for a general permit (based on the above criteria), a "specific permit" (§ 22.200) can authorize incidental eagle take in much the same way as permits were issued under the 2016 Eagle Rule. The 2024 Eagle Rule included the establishment of tiers within specific permits. For all eagle incidental take permits, the USFWS continues to require implementation of all practicable avoidance and minimization measures to reduce the likelihood of take. Finally, the USFWS also revisited permit fees, including a tiered-fee structure for specific permits.

3.4 IOWA WILDLIFE LAWS

Pursuant to Iowa state law (571 IAC) Endangered Plants and Wildlife (Chapter 481B of the Iowa Code [IC]), the Iowa Department of Natural Resources (IDNR), the Natural Resources Commission and the Director of the Department of Natural Resources are the state agencies responsible for the administration, regulation, management, restoration, conservation and regulation of birds, fish, game, and wildlife resources in the state. The IDNR maintains a list of species that it considers endangered, threatened, or species of greatest conservation need (SGCN). In accordance with IC 481A and 481B, take of any plant or animal species on the state threatened and endangered species list is prohibited (IDNR 2023). The SGCN are species that have low and declining populations within the state of Iowa but are not protected by regulation (IDNR 2015).

4 AGENCY CONSULTATION

The WEG strongly encourages energy developers to coordinate with agencies to obtain information on bird, bat, or other wildlife issues within a project area and vicinity. Agencies can help developers identify potential biological resource issues early in the development process. Silver Queen began coordination with the agencies in 2017, beginning with discussing Tier 1 and Tier 2 studies and coordinating an approach to risk assessment for potential listed bats and eagles. Starting in 2017, multiple meetings, calls and video conferences have occurred to discuss results of bird and bat studies, as well as the ongoing discussions involved in the National Environmental Policy Act (NEPA) processes. An agency communication log and brief description of these correspondences is in Exhibit 1.

5 AVIAN AND BAT RESOURCES: WEG TIERS 1-3

The WEG outlines a tiered approach that assesses the habitat suitability and risks to wildlife at a potential wind resource area. The "tiered" approach ensures that sufficient data are collected to

enable project proponents to make informed decisions about continued development of a proposed project (USFWS 2012). At each tier, potential issues associated with the development or operations of the project are identified and questions are formulated to guide the decision process. This process starts at a broad scale and provides more site-specific detail at each tier as more data are gathered and the potential for avian and bat issues are better understood. This approach ensures that sufficient data are collected to enable Silver Queen to make informed decisions regarding the Project while ensuring that Silver Queen is complying with its corporate environmental policy.

5.1 TIERS 1 AND 2 – PRELIMINARY SITE EVALUATION AND CHARACTERIZATION

As described in the WEG, Tiers 1 and 2 provide a framework for evaluating potential issues that may need to be addressed before further actions can be taken relative to the development or operations of the Project. The objective of the Tier 1 study is to assist the developer in further identifying a potential wind energy site. Tier 1 studies provide a preliminary desktop evaluation or screening of public data from federal, state, and tribal entities and offer early guidance about the sensitivity of the site, in regard to flora and fauna. The objective of Tier 2 studies is to determine potential effects of the proposed project on any federal and state sensitive species. Tier 2 studies may include a review of existing information, including publicly available data on land use/land cover, topography, wetland data, wildlife, habitat, and sensitive plant distribution, a reconnaissance level site visit (to confirm presence of habitat types), and making first contact with agencies involved.

5.1.1 Potentially Occurring Sensitive Bird and Bat Species

WEST reviewed publicly available lists of federally and state-listed bird and bat species, as well as a list of USFWS Birds of Conservation Concern with the potential to occur in Crawford and Carroll counties, Iowa. Bald eagles and golden eagles (protected by the BGEPA) have potential to occur in the Project Area, as do nine state-listed bird species (Table 5.2) and 25 Birds of Conservation Concern (Table 5.3).

The northern long-eared bat (Myotis septentrionalis; NLEB; Table 5.3) is listed as endangered under the federal ESA and has the potential to occur within the Project Area. Two other bat species that may soon have federal protection under the ESA also have the potential to occur in the Project Area including the tricolored bat (Perimyotis subflavus; TRBA), and the little brown bat (M. lucifugus; LBBA; IDNR 2023b).

Table 5.1 Federally and state-listed or protected bird species with the potential to occur at the Silver Queen Wind Farm, Crawford and Caroll counties, Iowa.

Common Name	Scientific Name	Status[1]
bald eagle	*Haliaeetus leucocephalus*	BGEPA

Common Name	Scientific Name	Status[1]
golden eagle	*Aquila chrysaetos*	BGEPA
barn owl	*Tyto alba*	SE
northern harrier	*Circus hudsonius*	SE
piping plover	*Charadrius melodus*	SE
short-eared owl	*Asio flammeus*	SE
long-eared owl	*Asio otus*	ST
Henslow's sparrow	*Centronyx henslowii*	ST

[1] BGEPA = Bald and Golden Eagle Protection Act (1940),
SE = State Endangered (IDNR 2023a),
ST = State Threatened (IDNR 2023a)

The barn owl (Tyto alba; state endangered) occurs in both Carroll and Crawford counties. This species is typically found in semi-open habitats such as farmlands and wetlands. However, they can also be found in forests and cities if open foraging territory, such as open fields or agricultural areas, are nearby (Audubon 2023b). Barn owls primarily roost and nest in tree hollows and cavities and manufactured structures, such as barns and nestboxes (The Barn Owl Trust 2023). The above-mentioned habitat can be found within the Project Area, with approximately 42,816.2 ac of the Project Area consisting of potential habitat. This high proportion of potential habitat is due to the barn owl's use of cropland habitat for foraging, with croplands being the majority of the Project Area (NLCD 2021). Barn owls were not observed during any of the avian use surveys (Bay and McDonald 2018; Bay et al.2019a; McDonald and Bay 2021).

While not listed as occurring in Carroll or Crawford counties in the IDNR Natural Areas Inventory, the state-endangered northern harrier was observed during all three avian use surveys (Bay and McDonald 2018; Bay et al.2019a; McDonald and Bay 2021). Northern harriers can be found in open habitats such as fields and wetlands, and prairies, where they will roost, outside of breeding season, and nest on the ground (Audubon 2023c; Hawk Mountain 2023). They primarily forage in open habitats with mixed vegetative cover and avoid areas with short vegetation (Hawk Mountain 2023). The above-mentioned habitat types can be found within the Project Area (NWI 2021; Figure 5.1; NLCD 2021), with approximately 42,021.3 ac of the Project Area consisting of potential habitat.

Table 5.2 U.S. Fish and Wildlife Service (USFWS) Migratory Birds of Conservation Concern with the potential to occur within Bird Conservation Region 22 Eastern Tallgrass Prairie (USFWS 2021).

Common Name	Scientific Name
American golden-plover	*Pluvialis dominica*

Common Name	Scientific Name
black-billed cuckoo	*Coccyzus erythropthalmus*
bobolink	*Dolichonyx oryzivorus*
buff-breasted sandpiper	*Calidris subruficollis*
cerulean warbler	*Setophaga cerulea*
chimney swift	*Chaetura pelagica*
dunlin (Hudson Bay)	*Calidris alpina*
eastern whip-poor-will	*Antrostomus vociferus*
grasshopper sparrow (northern)	*Ammodramus savannarum*
Henslow's sparrow	*Centronyx henslowii*
Hudsonian godwit	*Limosa haemastica*
Kentucky warbler	*Geothlypis formosa*
king rail	*Rallus elegans*
lesser yellowlegs	*Tringa flavipes*
loggerhead shrike (eastern)	*Lanius ludovicianus*
pectoral sandpiper	*Calidris melanotos*
prothonotary warbler	*Protonotaria citrea*
red-headed woodpecker	*Melanerpes erythrocephalus*
ruddy turnstone (atlantic)	*Arenaria interpres*
rusty blackbird	*Euphagus carolinus*
semipalmated sandpiper (eastern/central)	*Calidris pusilla*
short-billed dowitcher	*Limnodromus griseus*
short-eared owl	*Asio flammeus*
upland sandpiper	*Bartramia longicauda*
wood thrush	*Hylocichla mustelina*

Table 5.3 Bat species with potential to occur at the Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

Species	Status under the Federal ESA[a]	Likelihood to Occur
eastern red bat *Lasiurus borealis*	n/a	presence likely; common species and long distant migrant
little brown bat *Myotis lucifugus*	Under review for federal listing	presence possible; roosts include buildings, trees, rock crevices, bridges, and tunnels
northern long-eared bat *Myotis septentrionalis*	FE	presence unlikely; low suitable habitat is known to occur within the Project Area; unlikely based on results of Tier 3 studies
evening bat *Nycticeius humeralis*	n/a	presence likely; common species and roosts include trees, buildings, rock crevices
tricolored bat *Perimyotis subflavus*	Proposed FE	presence unlikely; low suitable habitat is known to occur within the Project Area; summer probable absence; low potential for migration from documented occurrences in nearby watersheds
big brown bat *Eptesicus fuscus*	n/a	presence likely; common species and roosts include trees, buildings, rock crevices
hoary bat *Lasiurus cinereus*	n/a	presence likely; common species and long distant migrant
silver-haired bat *Lasionycteris noctivagans*	n/a	presence likely; common species and long distant migrant

[a] FE = federally endangered; Data source: Bat Conservation International 2018

5.2 TIER 3 – BASELINE AVIAN AND BAT STUDIES

This section summarizes baseline avian and bat studies conducted by WEST and other consultants for the proposed Project. Information about eagle and bat risk (particularly listed bats and bats either proposed for or those under review for listing) at the proposed Project is presented in detail in the Environmental Assessment (EA).

Baseline wildlife studies included:

- avian use surveys (Appendices A, B, and C),
- aerial raptor nest surveys (Appendix D),
- bat activity acoustic surveys (Appendix E), and
- summer presence/absence acoustic surveys (Appendices F and G).

5.2.1 2017-2018 Avian Use Surveys

5.2.1.1 Methods

Surveys occurred once per month at 16 observation points from May 2017 – April 2018. Small bird avian use surveys were 10 minutes (min) in duration and conducted within a 100-meter (m; 328-foot [ft]) observation radius centered on each survey point and occurred immediately prior to the eagle and other large bird survey. Eagle and other large bird use surveys were designed based on methods described by Reynolds et al. (1980) and consistent with ECPG, and in coordination with the USFWS Iowa Ecological Field Services Office in Rock Island, Iowa. Eagle and other large bird surveys were 60 min in duration and conducted within an 800-m (2,625-ft) observation radius centered on each survey point (Figure 5.1; Appendix A).

5.2.1.2 Results

A total of 192 fixed-point bird use surveys were conducted from May 25, 2017 – April 28, 2018. During the eagle and other large bird surveys, 23 large bird species were recorded. The most common large bird type documented was doves/pigeons (235 observations) and diurnal raptors (116). Diurnal raptors observed included nine species, with larger numbers of red-tailed hawks (Buteo jamaicensis; 46) and Swainson's hawks (B. swainsoni; 31), federally protected bald eagles (Haliaeetus leucocephalus; 6), and the state-endangered northern harrier (Circus cyaneus; 10). Overall large bird use (bird observations/800-m radius plot/60-min survey) varied by season, with mean use highest in fall (4.48 birds/800-m radius plot/60-min survey), followed by summer (4.42), spring (2.77), and winter (1.54). In fall, large bird use was primarily due to doves/pigeons (1.73), followed by gulls/terns (0.73), diurnal raptors (0.71), and vultures (0.5). Eagle use varied across seasons with mean use highest in fall (0.06), followed by spring and winter (0.02), and no observations documented during the summer. Diurnal raptor use varied across seasons with mean use highest in spring (1.15), followed by fall (0.71), winter (0.25), and summer (0.21). Most flying diurnal raptors (61.8 percent) were recorded below the rotor-swept height (RSH; 25-150 m [82-492 ft]), while 37.1 percent were within the RSH and 1.1 percent were above the RSH.

During the small bird surveys, 37 small bird species were recorded. The most common small bird species recorded were brown-headed cowbirds (Molothrus ater; 288 observations), European starling (Sturnus vulgaris; 250), barn swallow (Hirundo rustica; 156), and cliff swallow (Petrochelidon pyrrhonota; 148). Overall small bird use (birds/100-m radius plot/10-min survey) varied by season, with mean use highest in summer (13.10 birds/100-m radius plot/10-min survey), followed by fall (7.40), winter (6.12), and spring (5.90).

Bald eagle observations were recorded during the study period; however, no federally listed threatened or endangered species were recorded during the study. One state-endangered bird species (northern harrier [Circus cyaneus]) was recorded during surveys (10 observations). Six bald eagles were observed were recorded as incidental observations outside of standardized survey intervals.

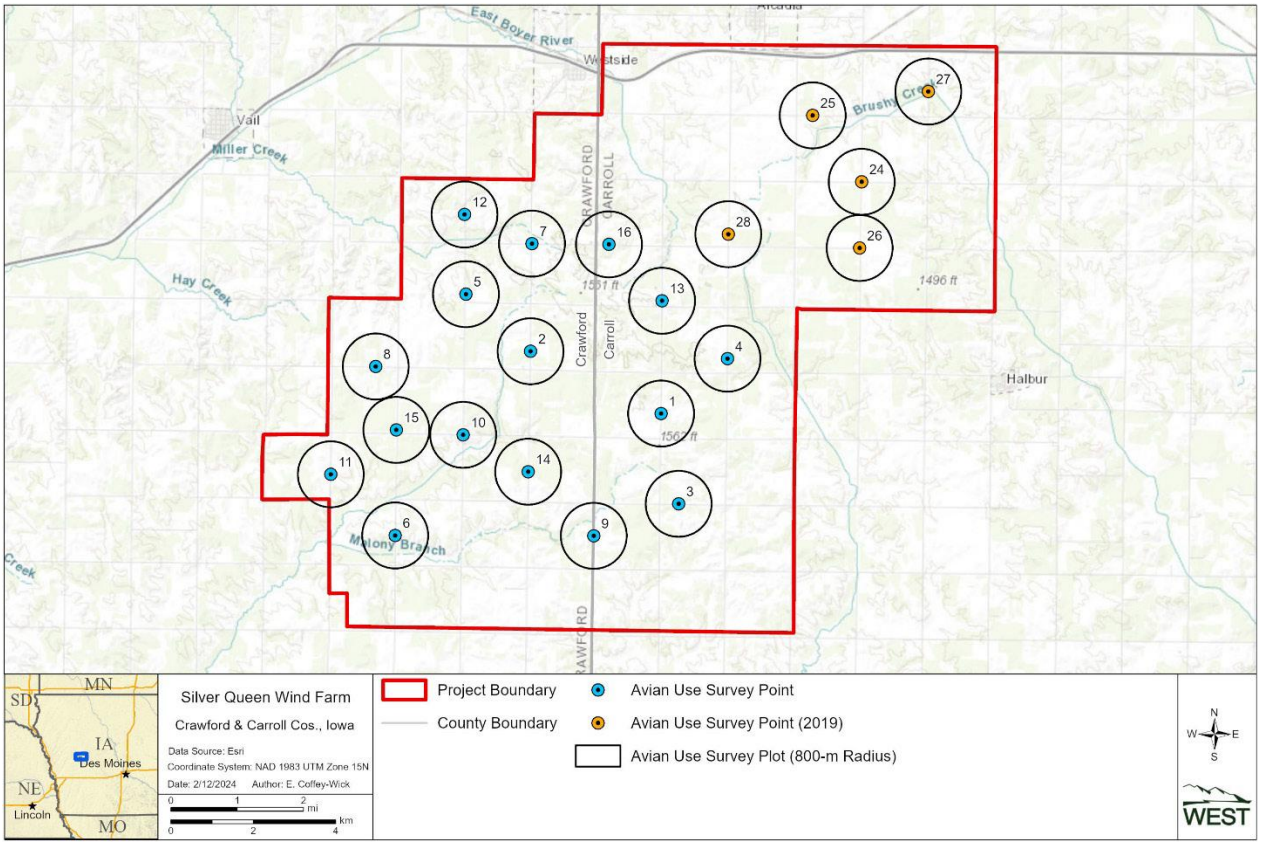

Figure 5.1 Location of fixed-point bird use surveys from May 25, 2017 – April 28, 2018 at the Silver Queen Wind Farm in Crawford and Carroll counties, Iowa.

5.2.2 2018-2019 Avian Use Surveys

5.2.2.1 Methods

WEST completed a second year of avian use surveys from May 2018 through April 2019 using the same methods described in Section 5.2.1.1. Surveys were conducted at the same 16 points (plus seven additional points to the west of the Project Area) used in 2017-2018 surveys (Appendix B).

5.2.2.2 Results

One hundred ninety-two paired large bird and small bird use surveys were conducted from May 8, 2018 – April 26, 2019. Biologists identified 16 large bird species over the course of fixed-point bird use surveys. Large bird use was predominantly composed of doves/pigeons (156 observations) and diurnal raptors (107 observations). Diurnal raptors observed included six species, with larger numbers of red-tailed hawks (68 observations) and American kestrel (Falco

sparverius; 18), and the state-listed endangered northern harrier (14). Overall large bird use (birds/800-m plot/60-min survey) varied by season, with mean use highest during summer (3.06) followed by spring (2.42), fall (2.29), and winter (0.98). In summer, large bird use was primarily due to doves/pigeons (2.19), followed by shorebirds (0.42). Diurnal raptor use varied across seasons with mean use highest in fall (0.85), followed by winter (0.71), spring (0.56), and summer (0.10). Most flying diurnal raptors (58.4 percent) were recorded below the RSH (25-150 m [82-492 ft]), while 41.6 percent were within the RSH and no raptors were documented above the RSH.

Twenty-two small bird species were documented during the small bird fixed-point bird use surveys. During the small bird surveys, the most common small bird species recorded were Lapland longspur (Calcarius lapponicus; 340 observations), European starling (190), house sparrow (Passer domesticus; 174), and horned lark (Eremophila alpestris; 129), which made up 66% of all small birds observed. Overall mean small bird use varied by season, with mean use highest in the fall (11.65 birds/100-m plot/10-min survey), followed by summer (4.27), spring (3.83), and winter (3.73; Appendix B).

Bald eagle observations were recorded during the study period, within the expansion study area; however, no federally listed threatened or endangered bird species were observed. One state-endangered bird species (northern harrier) was recorded during surveys (21 observations). Additionally, four state special concern species were recorded during the fixed-point count avian use surveys, and most of these observations were of American kestrel (23 observations). Three bald eagles were observed during fixed-point bird large bird use surveys. Overall eagle use within the Project during this period was low (0.04 eagles/60-min survey) and ten eagle risk minutes, as defined by the ECPG (flying below 200 m and within 800 m of the observer) were recorded (Appendix B).

5.2.3 2018-2020 Expansion Area Avian Use Surveys

5.2.3.1 Methods

In addition to the two years of avian use studies, WEST completed avian use surveys within an expansion area due to Project boundary changes using the same methods described in Section 5.2.1.1. Surveys were conducted once per month at five observation points from November 2018 through October 2020 (Appendix C).

5.2.3.2 Year One Results

Sixty paired large bird and small bird use surveys were conducted from November 29, 2018 – October 31, 2019. Biologists identified 13 large bird species over the course of fixed-point bird use surveys. Large bird use was predominantly composed of doves/pigeons (47 observations), shorebirds (38), diurnal raptors (36), and vultures (35). Diurnal raptors observed included five species, with larger numbers of red-tailed hawks (25 observations). Overall large bird use (birds/800-m plot/60-min survey) varied by season, with mean use highest during spring (4.07)

followed by summer (2.87), fall (2.07), and winter (1.27). In spring, large bird use was primarily due to shorebirds (1.67), followed by vultures (0.87), and waterfowl (0.47). Diurnal raptor use varied across seasons with mean use highest in spring and winter (0.87), followed by spring (0.33), and summer (0.07). Most flying diurnal raptors (56.7 percent) were recorded within the RSH (25-150 m [82-492 ft]), while 43.3 percent were below the RSH and no raptors were documented above the RSH.

Fifteen small bird species were documented during the small bird fixed-point bird use surveys. During the small bird surveys, the most common small bird species recorded were horned lark (848 observations) and Lapland longspur (620 observations), which made up 66% of all small birds observed. Overall mean small bird use varied by season, with mean use highest in the winter (101.53 birds/100-m plot/10-min survey), followed by fall (4.13), spring (3.33), and summer (1.40; Appendix C).

No bald eagle observations were recorded during the study period, within the expansion study area and no federally listed threatened or endangered bird species were observed. One state-endangered bird species (northern harrier) was recorded during surveys (four observations). Additionally, nine state special concern species were recorded during the fixed-point count avian use surveys, and most of these observations were of horned lark (848 observations).

5.2.3.3 Year Two Results

Sixty paired large bird and small bird use surveys were conducted from November 25, 2019 – October 6, 2020. Biologists identified 13 large bird species over the course of fixed-point bird use surveys. Large bird use was predominantly composed of shorebirds (180 observations), waterfowl (105), doves/pigeons (94), and vultures (88). Diurnal raptors observed included five species, with larger numbers of Swainson's hawk (24 observations) and red-tailed hawks (13 observations). Overall large bird use (birds/800-m plot/60-min survey) varied by season, with mean use highest during spring (11.07) followed by summer (5.8), fall (5.33), and winter (0.73). In spring, large bird use was primarily due to shorebirds (8.53), followed by large corvids (0.87), and upland game birds (0.73). Diurnal raptor use varied across seasons with mean use highest in spring (0.20), followed by fall and winter (0.13), with no use during the summer. All flying diurnal raptors (100.0%) were recorded below the RSH (25-150 m [82-492 ft]), while no raptors were documented within or above the RSH.

Twenty-one small bird species were documented during the small bird fixed-point bird use surveys. During the small bird surveys, the most common small bird species recorded were horned lark (848 observations) and Lapland longspur (620 observations), which made up 66% of all small birds observed. Overall mean small bird use varied by season, with mean use highest in the summer (9.93 birds/100-m plot/10-min survey), followed by spring (6.80), fall (4.53), and winter (1.20; Appendix C).

One bald eagle observations was recorded during the study period, within the expansion study area; however, no federally or state-listed threatened or endangered bird species were observed. Additionally, eleven state special concern species were recorded during the fixed-point count avian use surveys, and most of these observations were of Swainson's hawk (25 observations and horned lark (24 observations).

5.2.4 2017 Aerial Raptor Nest Surveys

5.2.4.1 Methods

The objective of the aerial raptor nest surveys was to record eagle nests within a 16.1 km (10.0 mi) buffer area around the proposed Project Area; and all other raptor nests were documented within a 1.6 km (1.0 mi) buffer. WEST conducted two rounds of aerial raptor nest surveys from a helicopter during spring 2017 (Figure 5.2). The first aerial survey was conducted in early April 2017; with a follow-up ground survey conducted on May 11, 2017. (Appendix D).

5.2.4.2 Results

Forty-five stick nests were documented within the 2017 Nest Survey Area. Of these, 32 were observed to be occupied and active nests. Only one of the 32 active nests and two inactive nests are located within the Project Area. Raptor species on active nests in 2017 included red-tailed hawk (n=24), great horned owl (Bubo virginianus; n=6), and bald eagle (n=1). A rookery of eight occupied nests of great blue heron (Ardea herodias) and an unoccupied heron rookery were also recorded. Thirteen nest structures were classified as unoccupied because they could not be identified down to the species level because no raptors were present at the nest. Additionally, there was one nest structure (nest number 35) that was classified as unoccupied but could also be considered occupied due to the nest bowl being freshly lined. The location of two flying immature bald eagles was recorded as an incidental observation. Photos of each nest are provided in Appendix D. No features that could be potentially attractive to eagles were identified during surveys.

The bald eagle nest was revisited from the ground on May 11, 2017, at which time two adults were observed together at the nest with one of the adults actively moving in the nest. The bald eagle nest was revisited again on May 25, 2017, at which time two adults and two nestlings were observed at the nest (Appendix D).

Figure 5.2 Location of raptor nests identified during the 2017 raptor and eagle nest searches within the Silver Queen Wind Farm and surrounding 10-mile buffer, April 1-7, 2017.

5.2.5 2018 General Bat Activity Acoustic Surveys

5.2.5.1 Methods

WEST conducted acoustic monitoring studies from April 16 – October 16, 2018. The objectives of these surveys were to estimate the level of bat activity within the proposed Project Area. Four AnaBat™ SD1 and three SD2 ultrasonic detectors were deployed within the Project Area (Figure 5.3). Two detectors were paired with a met tower, with one placed near the ground (SQ1g and SQ2g; 1.5 m [5.0 ft]) and the other within the proposed RSH (SQ1r and SQ2r, 45 m [148 ft]); the three remaining AnaBat detectors were placed near ground level at locations that were representative of potential turbine locations within the Project Area ("representative stations"; SQ3g, SQ4g, and SQ5g; Appendix E).

5.2.5.2 Results

A total of 875 detector nights across the sampling locations resulted in a mean (± standard error) of 8.51 ± 0.92 bat passes per detector night. However, the number of bat passes varied spatially.

The AnaBat unit at the ground stations recorded 5,650 bat passes on 597 detector-nights for a mean of 11.03 ± 1.11 bat passes per detector-night. The raised detectors recorded 497 bat passes on 278 detector nights for a mean of 2.21 ± 0.29 per detector-night. The highest single peak of weekly acoustic activity occurred from August 2 and August 8, 2018 (39.43). Approximately 88% of bat passes recorded were emitted by low-frequency bats, suggesting greater relative abundance of species such as big brown bat (Eptesicus fuscus), silver-haired bat (Lasionycteris noctivagans), and hoary bat (Lasiurus cinereus). Bat activity at the met tower stations suggests that bat fatalities at the proposed Project will be highest during late summer to early fall and may consist largely of migrating individuals (Appendix E). This is discussed in further detail within the draft EA.

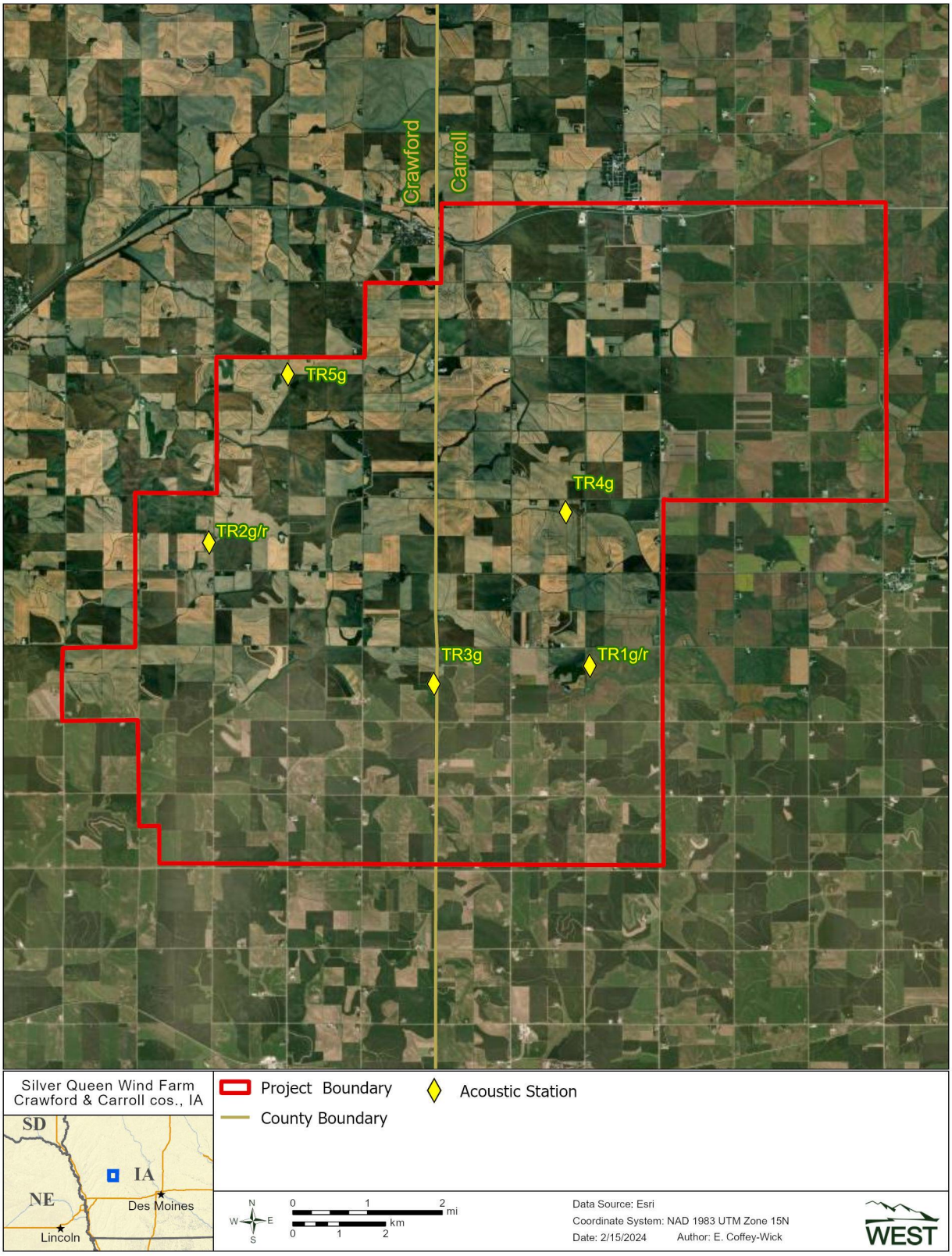

Figure 5.3 Acoustic detector locations for the 2018 bat activity surveys in the proposed Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

5.2.6 2017 Bat Summer Presence/Probable Absence Surveys

5.2.6.1 Methods

WEST conducted summer presence/probable absence surveys (acoustic surveys; Figure 5.4) for NLEB from August 4 – August 12, 2017 (Appendix F), consistent with the 2017 Range-Wide Indiana Bat Summer Survey Guidelines which could be used for NLEB (USFWS 2017). A full description of survey methods is provided in Appendix F.

The objectives of the summer bat surveys were to collect data on summer presence/probable absence of target bat species in areas potentially affected by construction activities, determine sites where follow-up mist-net surveys for NLEB should be conducted (if warranted), and locate NLEB at the proposed Project (should individuals be captured). Acoustic surveys were conducted from two acoustic detection sites from August 4 – 12, 2017.

Table 5.4 Survey level of effort for 2017 listed bat presence/probable absence acoustic surveys at the Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

Total Acreage of Project Area	Acreage of Potential Suitable NLEB Habitat	Recommended Level of Effort Based on Potential Suitable NLEB Habitat[a]
42,816	12.7	a minimum of four detector nights per 123 acres of suitable summer habitat over the course of at least two calendar nights

[a] *2017 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2017)*

5.2.6.2 Results

Following the 2017 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS 2017), survey level of effort is determined by the amount of identified potential suitable habitat for NLEB within the 2017 Project Area. The summer survey guidelines recommend four detector nights per 0.5 square kilometers (123 acres) of identified potential suitable habitat for NLEB. Based on a habitat assessment of the Project Area, a total of 0.05 square kilometers (12.7 acres) was identified as potential suitable habitat. Acoustic surveys were completed at two sites from August 4 – 12, 2017, for a total of eight detector nights. The number of bat calls per detector night ranged from 60 bat calls per detector night to 260, with an average of 177.3. Qualitative analysis of potential NLEB and INBA calls determined the calls were not indicative of INBA or NLEB. Based on this data, INBA and NLEB were considered to be likely absent at all summer acoustic survey sites within the Project Area in 2017.

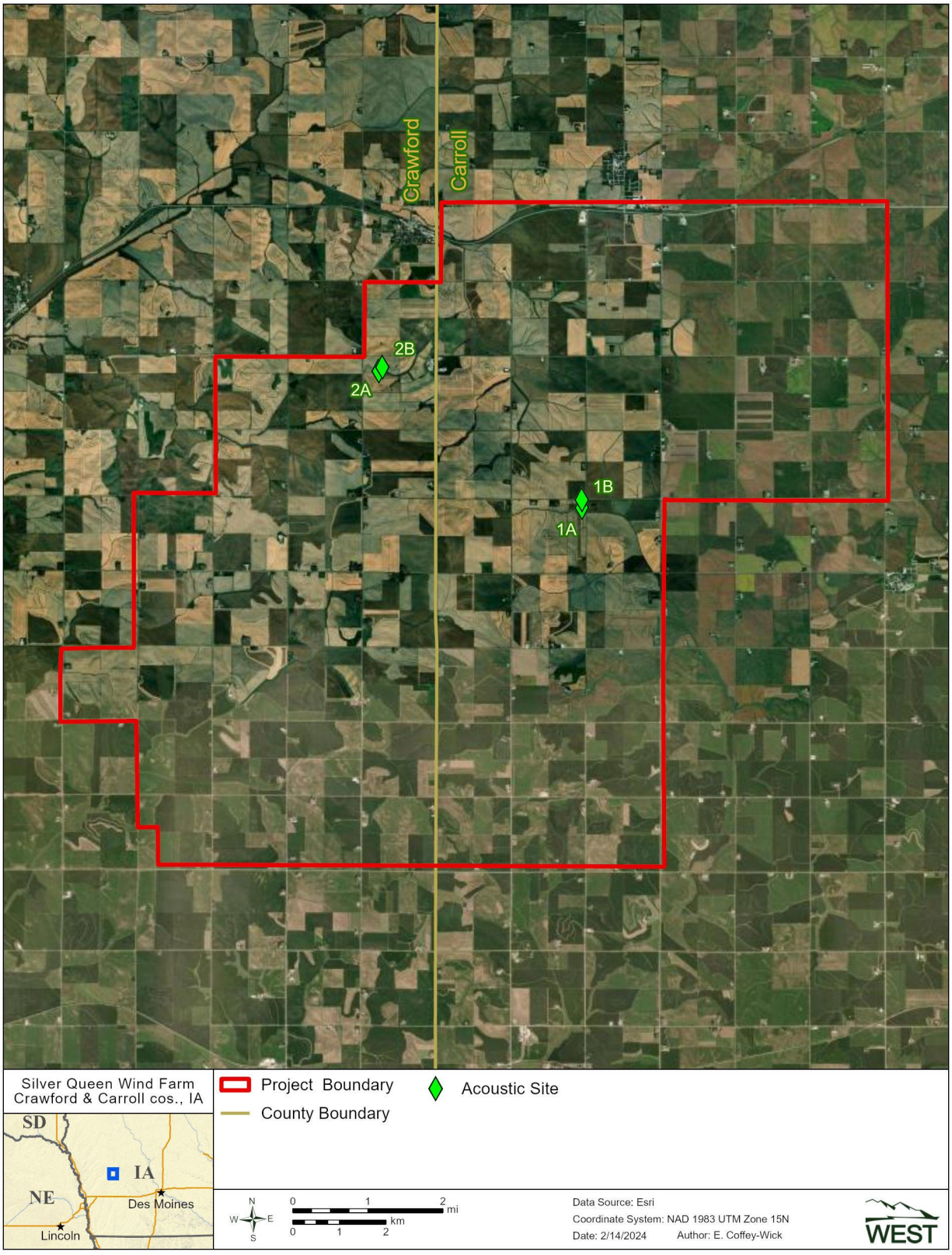

Figure 5.4 Survey locations for 2017 listed bat presence/probable absence acoustic surveys at the Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

5.2.7 2021 Bat Summer Presence/Probable Absence Surveys

5.2.7.1 Methods

WEST conducted an additional summer presence/probable absence survey (acoustic surveys; Figure 5.5) for NLEB from July 2 – July 8, 2021 (Appendix G), consistent with the 2020 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS 2020). A full description of survey methods is provided in Appendix G.

The objectives of the summer bat surveys were to collect data on summer presence/probable absence of target bat species in areas potentially affected by construction activities, determine sites where follow-up mist-net surveys for NLEB should be conducted (if warranted), and locate NLEB at the proposed Project (should individuals be captured).

Table 5.5 Survey level of effort for 2021 listed bat presence/probable absence acoustic surveys at the Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

Total Acreage of Project Area	Acreage of Potential Suitable NLEB Habitat	Recommended Level of Effort Based on Potential Suitable NLEB Habitat[a]
42,816	9.6	a minimum of 8 detector nights per 123 acres of suitable summer habitat; at least 2 detector locations per 123 acres

[a] *2020 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2020)*

5.2.7.2 Results

Following the 2020 Range-Wide Indiana Bat Summer Survey Guidelines (USFWS 2020), survey level of effort is determined by the amount of identified potential suitable habitat for NLEB within the 2020 Project Area. The summer survey guidelines recommend eight detector nights per 0.5 square kilometers (123 acres) of identified potential suitable habitat for NLEB. Based on a habitat assessment of the Project Area, a total of 0.04 square kilometers (9.6 acres) was identified as potential suitable habitat. Acoustic surveys were completed at two sites from July 2 – 8, 2021, for a total of 17 detector nights. The number of bat calls per detector night ranged from 146.8 bat calls per detector night to 355.8, with an average of 281.1. Qualitative analysis of potential NLEB calls determined the calls were not indicative of NLEB. Based on this data, NLEB were considered to be likely absent during the summer maternity season within the Project Area in 2021.

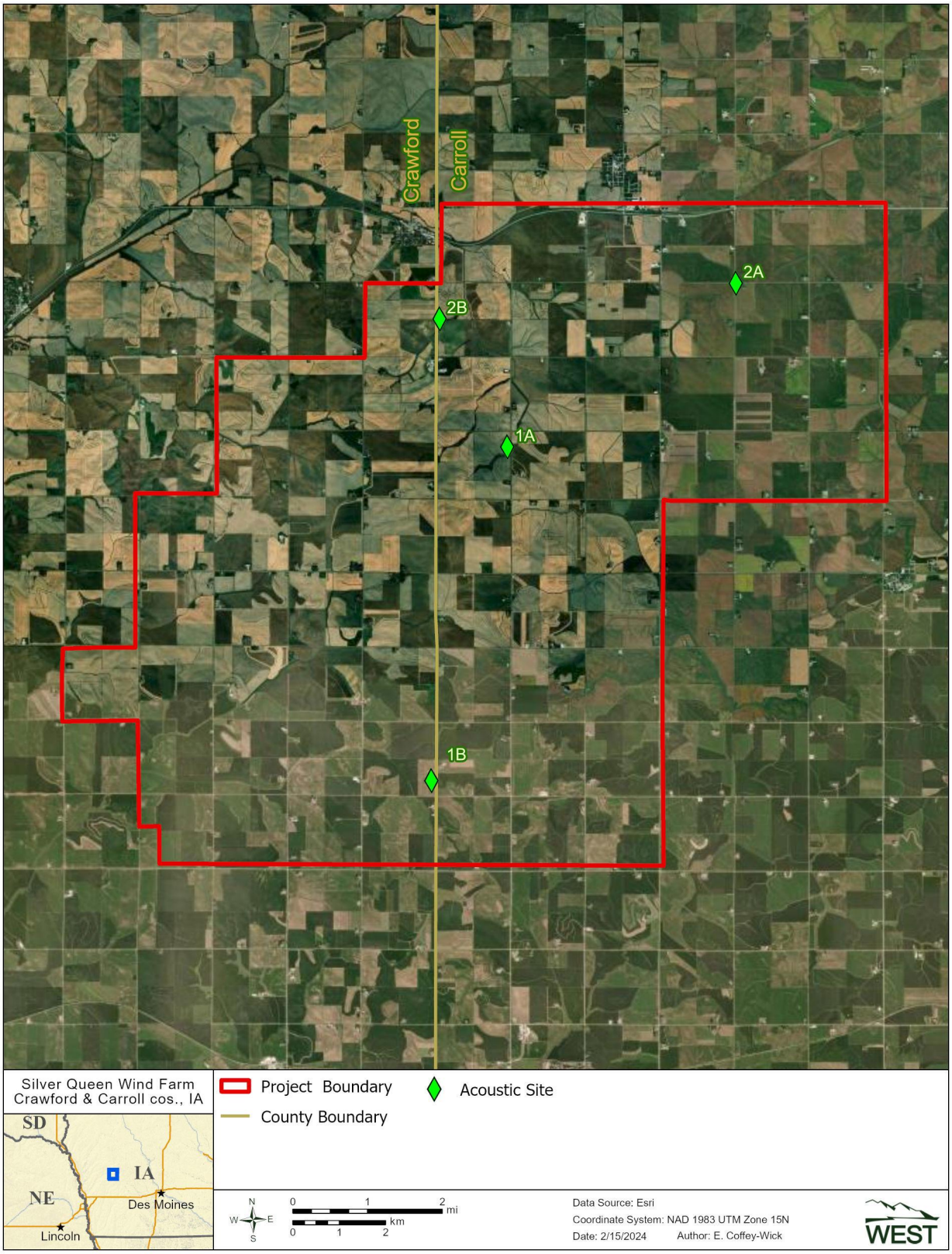

Figure 5.5 Survey locations for 2021 listed bat presence/absence acoustic surveys at the Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

6 ASSESSMENT OF RISKS TO BIRDS AND BATS

Direct impacts to wildlife resources can occur at different temporal scales (e.g., during the construction, operation, and decommissioning phases of the Project) and spatial scales (e.g., within or outside the Project Area). Direct impacts include wildlife fatalities resulting from interactions with facility development or infrastructure. Some potential direct impacts from wind-energy development include:

- Collisions: turbines, overhead lines, vehicle, and equipment collisions,
- Habitat loss, fragmentation, and/or alteration during construction, operation, and decommissioning

Assessment of potential impacts to avian and bat species at the Project was informed by Tier 3 studies conducted for the Project along with the most up-to-date publicly available information on impacts to wildlife from wind energy. Analysis of impacts to birds and bats resulting from collision with wind turbines relies on WEST's Renew database that contains results of post-construction fatality monitoring studies for birds and bats from across the United States. Fatality studies were screened to provide "comparable" information across wind energy facilities by including annual fatality estimates that,

1. were calculated from turbines greater than 0.5 megawatt (MW);
2. were calculated from the Huso, Shoenfeld, or GenEst estimators;
3. covered adequate sampling time for taxa of interest when most fatalities have been observed (i.e., two seasons for bats, three seasons for birds); and
4. were averaged for each wind energy facility when multiple fatality studies were conducted at a facility.

6.1 FATALITY ESTIMATES

Impacts to avian species from the construction and operation of the Project can be direct or indirect and can occur at different temporal scales (e.g., during and after construction and operation) and spatial scales (e.g., within or outside the Project Area).

6.1.1 All Birds

Impacts to birds include collisions as well as avoidance or displacement. Impacts to birds due to collisions with wind turbines at land-based wind energy facilities have been documented in the United States since the late 1980s (Orloff and Flannery 1992). Impacts due to avoidance and displacement have been measured for different bird species and bird groups (Leddy et al. 1999, Loesch et al. 2013, Shaffer and Buhl 2016, Pearse et al. 2021).

WEST compiled data from 617 studies across 372 wind energy facilities in the United States and Canada that have reported 363 species of birds as fatalities (WEST 2023). Using only the studies that met the screening requirements described above, bird fatality estimates ranged from zero to 8.45 birds/MW/year; median and mean estimates ranged from 2.63 (median) to 2.87 (mean; Table 6.1). While reviews of other wind projects in the Midwest Region had estimated bird fatalities from 0.26 – 8.25 fatalities/MW/year (Appendix A). The overall magnitude of these population impacts is expected to be low, especially since a majority of birds observed during the PCM surveys and those most likely to be impacted, were passerines (70– 72 percent). While passerines are the most documented species group fatality in North America (approximately 62 percent), individual species experiencing small (less than 0.05 percent) direct impacts from collisions with wind turbines (Erickson et al. 2014). In addition, the Project is located on the edge of the Mississippi Flyway, further reducing the risk for mortalities of large numbers of birds in single events during migration.

Table 6.1 Summary of fatality estimates for all birds in the United States.[1]

	Fatality Estimates (Birds/Megawatt/Year)				Facilities[2]	Studies[3]
Spatial Scale	Minimum	Maximum	Median	Mean		
United States	0	8.45	2.63	2.87	83	125

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2023).
2. Facilities are individual wind projects.
3. Multiple studies may occur at a given facility in different years.

6.1.1.1 Diurnal Raptors

Diurnal raptors occur in most areas with the potential for wind energy development (National Research Council 2007). Of the 60 most recent public study results in WEST's Renew database, diurnal raptor fatality estimates ranged from zero to 0.5 diurnal raptor fatalities per MW per year (WEST 2023). In both years, diurnal raptor use was highest in winter, and lowest in summer; therefore, risk to diurnal raptors is expected to vary over the course of the year, with highest risk in winter, relatively moderate risk in spring and fall, and lowest risk in summer. Red-tailed hawks were the most commonly observed diurnal raptor species during both years of surveys.

Across 36 studies in the Midwest, the average raptor fatality rate was estimated to be 0.07 fatalities/MW/year. Another study comparing 14 studies reported that diurnal raptors and vultures accounted for six percent of all bird fatalities and had a combined raptor fatality rate of 0.04 fatalities/MW/year (NRC 2007). However, raptor fatality rates as high as 1.79 raptor fatalities/MW/year have also been estimated in the Midwest (range: 0.0 – 1.79, mean: 0.19, median: 0.09 fatality/MW/year; Johnson and Stephens 2011). These impacts could affect a number of raptor species based on their presence documented in the Project Area. Based on the low occurrence of bald eagles in the Project Area, it is not anticipated bald eagle take will be a

result of Project operation at this time. Additional raptor nest surveys are planned for the spring of 2024. Results will be updated in this BBCS.

Flight height characteristics are based on initial flight height and number of individuals. The percentage of diurnal raptors that initially occurred below, within, or above the RSH was calculated for each diurnal raptor species identified flying through the RSH during avian use surveys at the Project. During both years of avian use surveys, more than 55 percent of diurnal raptors were observed flying below the RSH, with approximately 35 – 40 percent within the RSH (Table 6.2). Although the results of Tier 3 studies for the Project and diurnal raptor fatality data from wind energy facilities across the United States indicates some risk to raptors exists at the Project, this risk will be minimized to the extent practicable through the avoidance and minimization measures described in Section 7.

Table 6.2 Flight characteristics by diurnal raptors through all years and expansions during 60-minute fixed-point large bird use surveys at the Silver Queen Wind Farm, Crawford and Carroll counties, Iowa.

Study Year	# Groups Flying	# Obs Flying	% Obs Flying	Mean Flight Height (m)	% within Flight Height Categories		
					0–25 (m)	25–150 (m)	>150 (m)
Year One (2017-2018)	62	89	80.2	38.16	61.8	37.1	1.1
Year Two (2018-2019)	101	101	94.4	28.17	58.4	41.6	0
Expansion Year One (2018-2019)	30	30	93.8	28	43.3	56.7	0
Expansion Year Two (2019-2020)	2	2	28.6	12	100	0	0

[a] The likely "rotor-swept height" for potential collision with a turbine blade, or 25 to 150 meters (m; 82 to 492 feet) above ground level

obs=observations

6.1.1.2 Species of Concern

Thirty-five northern harriers were observed during standardized fixed-point surveys. Northern harriers generally hunt and fly at low elevations, and therefore, have a low risk of collision with modern wind turbines (Whitfield and Madders 2005). 80 percent of northern harriers were observed flying below the RSH during the Year One 60-min large bird and eagle use surveys and no northern harriers were observed during the summer breeding season. 93 percent of northern harriers were observed flying below the RSH during the Year Two 60-min large bird and eagle use surveys and no northern harriers were observed during the summer breeding season. 75 percent of northern harriers were observed flying below the RSH during the Year One Expansion 60-min

large bird and eagle use surveys and no northern harriers were observed during the summer breeding season. No northern harrier were observed during the Year Two Expansion 60-min large bird and eagle use surveys. Northern harrier breeding habitat includes grassland, wet meadow, and open wetlands (Smith et al. 2011), and this habitat is limited within the Project Area.

6.1.2 Bats

Twenty-eight species of bats have been recorded as fatalities at wind energy facilities in the United States (WEST 2023). Fatality estimates for all bats ranged from zero to 40.20 bats/MW/year, while the median estimate was 3.66 and the mean estimate was 7.18 (Table 6.3).

Table 6.3 Summary of fatality estimates for all bats in the United States.

	Fatality Estimates (Bats/Megawatt/Year)				Facilities[2]	Studies[3]
Spatial Scale	Minimum	Maximum	Median	Mean		
United States	0	40.20	3.66	7.18	132	196

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2023).
2. Facilities are individual wind projects.
3. Multiple studies may occur at a given facility in different years.

Bay et al. (2019b) reported the fatality rate range for two nearby operating wind-energy facilities in similar landscapes to range from 6.48 to 11.71 fatalities/MW/year. Public RENEW data of fatality rates at wind energy facilities with similar habitat as the Project and within 50 km of the Project Area was also reviewed (Western EcoSystems Technology, Inc. [WEST] 2023). Under the search criteria, public data was available for two wind projects. The all-bat fatality rate for the two projects ranged from 5.66 to 33.8 fatalities/MW/year. These ranges fall within the estimated fatality range for other Region 3 wind energy facility fatalities, comparing across 70 studies (0.4 to 73 fatalities/MW/year; American Wind Wildlife Institute [AWWI] 2020).

Potential direct impacts include fatalities of bats such as eastern red bats, hoary bats, and silver-haired bats, which are among the most common bat fatalities at many wind projects. Due to the high percentage of LF passes recorded in the acoustic surveys, it is likely that the LF characteristics bats, such as the big brown bat, hoary bat, and silver-haired bat, are expected to be the primary species with fatalities in this Project. The potential for fatalities of northern long-eared bats, tricolored bats, and little brown bats is discussed in further detail within the draft EA. Impacts would be minimized in accordance with the Conservation Measures in Section 7.

6.2 DISTURBANCE/DISPLACEMENT

6.2.1 Birds

Construction of the Project will result in habitat impacts that could lead to avoidance or displacement of local avian species. Displacement effects, defined as "the displacement of birds from areas within and surrounding wind farms due to visual intrusion and disturbance that can amount effectively to habitat loss," are a primary indirect impact at wind energy facilities (Drewitt and Langston 2006). Displacement may occur during both construction and operation of a wind project and may be caused by the presence of turbines and/or ongoing site activities such as vehicle and personnel movements or site maintenance.

The scale and degree of displacement effects varies according to site and species-specific factors. The scale of disturbance caused by wind energy facilities varies greatly and is likely to depend on multiple factors including seasonal and daily patterns of use by birds, location to important habitats, availability of alternative habitats, and turbine and wind project specifications (Drewitt and Langston 2006, Lange et al. 2018). Similarly, the degree of behavioral responses will vary among species and individuals and may depend on factors such as life cycle stage (e.g., wintering, molting, breeding), flock size, and degree of habituation. AWWI (2017) concluded that indirect impacts on birds from operating wind turbines due to displacement result in some species showing consistent decreases in abundance while other species show no effect.

Avoidance and minimization measures that will be implemented during construction and operation are expected to minimize disturbance and displacement to birds, particularly limiting tree clearing during the primary nesting season in Iowa (May 15 – August 1) during Project construction. If clearing is necessary within this timeframe, a bio-monitor will survey planned cleared areas for nesting birds prior to clearance. This measure will reduce disturbance to birds during the breeding season. For additional measures, see Section 7.

6.2.2 Bats

Understanding how wind energy development could affect bats through disturbance or displacement is limited by the lack of knowledge on this topic (Kunz et al. 2007; AWWI 2018). Avoidance and minimization measures that will be implemented during construction and operation are expected to minimize disturbance and displacement to bats. Limiting tree clearing during the bat active season (April 1 – September 30) during Project construction was designed to minimize risk to covered bat species but will similarly protect non-listed bat species. If clearing is necessary within this timeframe, a bio-monitor will survey planned cleared areas for roosting bats prior to clearance.

7 AVOIDANCE AND MINIMIZATION MEASURES

Information gathered during Tier 1, 2, and 3 studies were used during the Project design and turbine and infrastructure siting process to reduce potential impacts to birds and bats and their habitats. The following Conservation Measures (CMs) will be implemented during the design, construction, and operational phases of the Project. These CMs represent Silver Queen's willingness to ensure the least harm to avian and bat species.

7.1 CONSERVATION MEASURES IMPLEMENTED DURING SITE SELECTION AND PROJECT DESIGN

Based on the initial Tier 1-3 studies, Silver Queen determined the Project area to be the preferred location for a wind energy project based upon the following reasons related to potential avian and bat impacts:

- Eagle use and nesting activity in the vicinity of the Project area is considered low for the region.
- The Project area contains few wetlands and/or streams.

Silver Queen made efforts during initial site selection and during project design to locate and select wind turbines, met towers, and other appurtenances such that bird and bat collisions are minimized. Project design and siting measures to avoid or minimize risk to avian and bat species include the following:

- Use the existing road network to reduce the need for road construction.
- Coordinate with the Federal Aviation Administration to minimize the number of wind turbines and met towers that require lighting.
- An aircraft detection lighting system (ALDS) would be installed to detect and trigger turbine lighting for safer nocturnal aircraft while simultaneously minimizing visual impacts for surrounding landowners and nocturnal animal migrants.
- Keep lighting at substations and other operations and maintenance (O&M) facilities at a minimum required for safety and security needs (i.e., directional, hooded and/or shielded, low-intensity, low-sodium lights equipped with motion sensors). Extinguish all Internal turbine nacelle and tower lighting when unoccupied.
- To the extent commercially reasonable, maximize power generation per turbine in order to reduce the number of turbines needed to achieve maximum energy production.

7.2 CONSERVATION MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION

Construction of the Project is expected to begin in 2025 and occur over a period of approximately 12 months and will be the heaviest use of the site during the life of the Project. The following CMs will be implemented to avoid or minimize risk to avian and bat species during construction:

- Vehicle speeds will be limited to 25 miles per hour (mph) to avoid wildlife collisions. Construction vehicles will be restricted to pre-designated access routes. Following Project construction, roads not needed for site operations will be restored to pre-existing conditions.
- To the extent feasible, the area required for Project construction and operation will be minimized. Silver Queen will develop a restoration plan for restoring all areas of temporary disturbance, including the use of native species when seeding or planting during restoration. The restoration plan will ensure:
    - All areas disturbed temporarily by Project construction will be restored including temporary disturbance areas around structure construction sites, laydown/ staging areas, and temporary access roads,
    - Topsoil salvage will be included in all grading activities.
- Appropriate natural fiber erosion control methods will be used during construction to eliminate or minimize runoff and avoid impacts to hydrology.
- Maintenance activities would include litter cleanup and noxious weed control.
- No unleashed dogs will be brought on the Project site by Silver Queen personnel or their contractors during construction.
- All trash will be covered in containers and work sites will be cleared regularly of any garbage and debris related to food.
- All permanent met towers will be un-guyed.
- All power lines will be constructed in accordance with the most current Avian Power Lines Interaction Committee (APLIC) Guidelines (APLIC 2012) to protect birds from electrocution and collision.

7.3 Conservation Measures to be Implemented during Operations

- Additional measures may be identified and added during WAPA Section 7 consultation process.
- Low speed limits (e.g., less than 25 mph) will be enforced on all roads within the facility.
- Other than maintenance vehicles which will park at the entrance of turbines for maintenance purposes, parts and equipment which may be used as cover for prey will not be stored at the base of wind turbines while a turbine is operational and spinning.

- Fire hazards from vehicles and human activities will be reduced (e.g., use of spark arrestors on power equipment, avoiding driving vehicles off roads, allowing smoking in designated areas only).
- Developing and implementing a noxious weed plan in accordance with land lease agreements during construction and operation.
- Pest and weed control measures will be implemented as specified by county, state, and federal requirements.
- A carcass removal program will be implemented to minimize potential attractants for carrion-feeding raptors.
- All of Silver Queen's employees and contractors working on site will receive worker awareness training for identifying and responding to encounters with sensitive biological resources, including avian and bat species. The training:
    - Will be conducted by Silver Queen or their designee.
    - Will include instructions for all employees, contractors, and site visitors to avoid harassing or disturbing wildlife.
    - Will include instruction on identification and values of plant and wildlife species and substantial natural plant community habitats, the issue of microtrash and its effects, fire protection measures and measures to minimize the spread of weeds during construction as well as hazardous material spill and containment measures.
    - Will include posting a flier on the Project detailing information on potential state and federal special-status animal and plant species that might be discovered on the Project site.
    - Will include an overview of the distribution, general behavior, and ecology of golden and bald eagles. Employees will be informed that they are not authorized to approach, handle, or otherwise move any eagles that might be encountered during construction, whether alive, injured, or deceased. Operations personnel will be instructed to report any finding of an injured or deceased eagle to USFWS within 24 hours of positive identification by a qualified biologist.
- The following feathering and curtailment regime as described in the NLEB Consistency Form will be implemented:

- From ½ hour before sunset to ½ hour after sunrise, turbines shall be feathered and shall not cut-in until wind speeds are at least 16.4 feet/second (5.0 meters/second) based on a 10-minute rolling average during the fall migration period for NLEB (August 15 – September 30).
- From ½ hour before sunset to ½ hour after sunrise, turbine blades shall be feathered when wind speeds are below the manufacturer's cut-in speed during the bat active season outside the fall migration period (April 1 – August 14).

8 POST-CONSTRUCTION MONITORING: TIER 4

8.1 TIER 4A – AVIAN AND BAT FATALITY MONITORING

Post-construction fatality monitoring is a critical component of this BBCS. The primary objective of fatality monitoring is to estimate avian and bat mortality at the Project and to determine whether the estimated mortality is lower, similar to, or higher than the average mortality observed at other regional projects, and consistent with the low levels of mortality predicted during the pre-construction risk assessments (see Section 6). Silver Queen proposes to conduct two years of avian and bat fatality monitoring at the Project.

8.1.1 Baseline Monitoring

Baseline monitoring consists of short-term intensive surveys involving standardized carcass searches, bias trials for searcher efficiency, and carcass removal trials conducted by trained biologists. Baseline fatality monitoring will be conducted during the first two years of commercial operations of the Project. The monitoring study design will be consistent with the recommendations for operations monitoring included in the WEG. Additionally, the scope and duration of the fatality monitoring study will be developed to be consistent with, and within the range of, monitoring programs that have been conducted at other wind projects in the United States.

5..6.1 Monitoring Activities

Baseline fatality monitoring will be conducted during all seasons of the first two years of commercial operations of the Project. Baseline avian and bat monitoring will consist of the following components:

1. Standardized carcass searches of selected turbines in a rectangular plot centered on the turbine and searches of road and pad on other turbines;
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;

4. Data analysis and calculation of fatality rates.

Following the first two years of monitoring, Silver Queen will coordinate with the USFWS and the IDNR to share the results of the studies and to discuss any future studies.

5..6.2 Reporting

A PCM report will be completed following each year of fatality monitoring and will be provided to the USFWS, WAPA, and the IDNR by December 15 of the year following the start of generation. The report will detail the results of mortality surveys, as well as the results of searcher efficiency and carcass removal trials. Fatality rates will be estimated following the most recent and acceptable methods. The annual report will also include a validation of risk assessment, comparing the impacts as determined by the post-construction fatality monitoring with other projects in the region.

8.1.2 Long-term Monitoring

O&M staff will be specifically trained to monitor for dead or injured golden eagles, bald eagles, and other sensitive wildlife species during their work activities. A data sheet that describes how Project personnel can recognize an injured or dead eagle or sensitive species will be posted in the maintenance facility. The data sheet will include instructions and the procedures that personnel shall take in the event an injured or dead golden eagle, bald eagle, or other protected species is discovered onsite, including whom to notify and what actions shall be taken. Any incident involving a state or federally listed threatened or endangered species or a golden or bald eagle will be reported to the USFWS and the IDNR within 24 hours of identification.

8.2 Tier 4b – Assessing Impacts to Habitat

No Tier 4b studies to assess impacts to habitat or species of special concern are deemed necessary at this time, based on Tier 3 findings.

9 RESEARCH: TIER 5

In addition to the Tiers 1-4 described above, the WEG contain a Tier 5 Other Post-Construction Studies. In general, the studies identified in Tier 5 are research related and "will not be necessary for most wind energy projects." Considering that the site-specific and regional information collected during the pre-construction period indicated relatively low potential impacts, no Tier 5 studies are currently planned.

10 ADAPTIVE MANAGEMENT

Within the WEG, the USFWS defines adaptive management as "an iterative decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes

from management actions and other events become better understood. Comprehensively applying the tiered approach embodies the adaptive management process" (USFWS 2012). The WEG further notes that adaptive management at most a wind facility is unlikely to be needed if they are sited in accordance with the tiered approach. Nevertheless, Silver Queen recognizes the value of applying this approach to its Project activities that include some uncertainty. As such, Silver Queen will incorporate an adaptive approach for the conservation of wildlife potentially impacted by the Project. This section of the BBCS focuses on the proposed adaptive management approach for avian species and non-listed bat species.

Section 5 of this BBCS describes the tiered approach used to study pre-construction wildlife conditions and predict Project impacts. Based on Project siting and the results of pre-construction wildlife studies, no substantial adverse impacts are anticipated from the Project and mortality is expected to fall within the overall range of other projects in the Midwest region (see Section 6). Tier 4 post-construction monitoring will be conducted to estimate the actual level of avian and bat mortality at the Project. If impacts are determined to be minimal, no further action may be needed. Should the results of the Tier 4 studies indicate higher than anticipated impacts during the NEPA review and Section 7 consultation process, adaptive management measures could be considered to further avoid, minimize, or compensate for unanticipated and substantial project impacts to wildlife. Thresholds for considering an adaptive response may include:

- Mortality of an eagle or a species listed as state or federal endangered/threatened; or
- Substantial levels of mortality of unlisted species of birds or bats. Significance will be determined by qualified biologists and will be based on the latest information available, including the most recent data on species' population sizes and trends. For example, even relatively high levels of mortality of the most common species may not be substantial. Conversely, lower levels of mortalities of less common species may be of more concern, particularly if these species appear to be at risk (e.g., USFWS Birds of Conservation Concern).

If effects are determined to be higher than anticipated, an assessment of why effects are occurring will be conducted to aid in developing appropriate mitigation actions. If causation of effects is unknown, further monitoring efforts may be implemented to help understand effects. Some of the adaptive management options that could be considered depending on the results of the post-construction mortality monitoring and taking into account economic feasibility[1] include:

[1] Once a project is operational there is a fixed amount of capital expenditure and the only available source of funding is from operational budgets, which must be within the economic parameters of the Project.

- Additional on-site studies (e.g., more intensive area use studies, prey base studies);
- Addition or modification of anti-perching, anti-nesting, or electrocution protection devices on "problem" project facilities;
- Prey-base management through habitat alteration; and
- Experimentation with visual and/or auditory bird flight diverters.

Once the mitigation measures are put into place, additional monitoring to determine the effectiveness of the mitigation measures may be conducted, and, depending on the results, further remedial measures may or may not be warranted.

11 CONCLUSIONS

This BBCS was written to provide guidance for avoiding, minimizing, and monitoring potential effects to avian and bat species at the Silver Queen Wind Farm. The measures described in this document are intended to help protect and reduce effects to avian and bat species during the construction phase of the Project, as well as to monitor potential effects to avian and bat species following implementation of the Project. Further, it is anticipated that this BBCS will facilitate adaptive management at the Project based on information gathered following construction of the Project.

12 PREPARERS

This document was prepared in consultation with the USFWS and IDNR. The following companies and key individuals contributed to its preparation (Table 12.1).

Table 12.1 Bird and Bat Conservation Strategy Preparers

Company	Key Preparers
Scout Clean Energy	Andrew Pinger, Zach Lasek, Bobby Quinones
Western EcoSystems Technology, Inc.	Tim Sichmeller, Joshua Parrott, Kara Hempy-Mayer

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13.2 Acts, Rules, and Regulations

16 United States Code (USC) § 703. 1918. Title 16 - Conservation; Chapter 7 - Protection of Migratory Game and Insectivorous Birds; Subchapter II - Migratory Bird Treaty; Section (§) 703 - Taking, Killing, or Possessing Migratory Birds Unlawful. 16 USC 703. [July 3, 1918, Chapter (ch.) 128, § 2, 40 Statute (Stat). 755; June 20, 1936, ch. 634, § 3, 49 Stat. 1556; Pub. L. 93–300, § 1, June 1, 1974, 88 Stat. 190; Pub. L. 101–233, § 15, December 13, 1989, 103 Stat. 1977; Public Law (Pub. L.) 108-447, division E, title I, § 143(b), December 8, 2004, 118 Stat. 3071.].

16 United States Code (USC) §§ 668 - 668d. 1940. Title 16 - Conservation; Chapter 5a - Protection and Conservation of Wildlife; Subchapter II - Protection of Bald and Golden Eagles; Sections (§§) 668-668d - Bald and Golden Eagles. 16 USC 668-668d. [June 8, 1940, Chapter (Ch.) 278, Section (§) 1, 54 Statute (Stat.) 250; Public Law (PL) 86-70, § 14, June 25, 1959, 73 Stat. 143; PL 87-884, October 24, 1962, 76 Stat. 1246; PL 92-535, § 1, October 23, 1972, 86 Stat. 1064.]. Available online: https://www.gpo.gov/fdsys/pkg/USCODE-2010-title16/pdf/USCODE-2010-title16-chap5A-subchapII.pdf

50 Code of Federal Regulations (CFR) § 10.12. 1973. Title 50 - Wildlife and Fisheries; Chapter I -United States Fish and Wildlife Service, Department of the Interior; Subchapter B Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 10 - General Provisions; Subpart B - Definitions; Section (§) 10.12. Definitions. 50 CFR 10.12. [38 Federal Register (FR) 22015, August 15, 1973, as amended at 42 FR 32377, June 24, 1977; 42 FR 59358, November 16, 1977; 45 FR 56673, August 25, 1980; 50 FR 52889, December 26, 1985; 72 FR 48445, August 23, 2007.].

50 Code of Federal Regulations (CFR) § 10.13. 1973. Title 50 - Wildlife and Fisheries; Chapter I -United States Fish and Wildlife Service, Department of the Interior; Subchapter B Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 10 - General Provisions; Subpart B - Definitions; Section (§) 10.13. List of Migratory Birds. 50 CFR 10.13. [38 Federal Register (FR) 22015, August 15, 1973, as amended 50 FR 52889, December 26, 1985.].

50 Code of Federal Regulations (CFR) § 22.26. 2009. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart C - Eagle Permits; Section (§) 22.26 - Permits for Eagle Take That Is Associated with, but Not the Purpose of, an Activity. 50 CFR 22.26. [74 FR 46877, September 11, 2009, as amended at 79 FR 73725, December 9, 2013].

50 Code of Federal Regulations (CFR) § 22.27. 2009. Title 50 - Wildlife and Fisheries; Chapter I -United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart C - Eagle Permits; Section (§) 22.27 - Removal of Eagle Nests. 50 CFR 22.27. [74 Federal Register (FR) 46877, September 11, 2009].

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

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

National Environmental Policy Act (NEPA). 1969. 42 United States Code Annotated (Usca) 4321-4370e. [Public Law 91-190, § 2, January 1, 1970, 83 Statute 852.]. Available online: https://www.gpo.gov/fdsys/pkg/USCODE-2015-title42/pdf/USCODE-2015-title42-chap55.pdf

Exhibit 1. Log of Communications between Consultants, Developers, and Wildlife Agencies

Exhibit 1. Communications with WEST, USFWS, IDNR and other participating entities regarding the Silver Queen Wind Farm in Crawford and Carroll counties, Iowa.

Date	Participants	Event	Topic/Main Points
January 18, 2024	Silver Queen, WEST, USFWS, Nossaman, WAPA	virtual meeting	Discuss TRBA risk assessment and avoidance measures
December 4, 2023	Silver Queen, WEST, USFWS, Nossaman, WAPA	correspondence	Receipt of USFWS recommended TRBA avoidance measures
October 30, 2023	Silver Queen, WEST, USFWS, Nossaman, WAPA	virtual meeting	WAPA Agency Scoping meeting with USFWS and IDNR
August 24, 2023	Silver Queen, WEST, USFWS	correspondence	Receipt of watershed occurrence data from USFWS
August 24, 2023	Silver Queen, WEST. USFWS	correspondence	Technical assistance request submitted from Silver Queen to USFWS
July 13, 2021	Silver Queen, WEST, USFWS	correspondence	Submitted bat presence/probable absence study plan to USFWS
November 20, 2019	Silver Queen, WEST, USFWS	meeting	Project update meeting
October 23, 2018	Silver Queen, WEST, USFWS, IDNR	meeting	Discuss studies, introductions, Project updates
June 15, 2017	Silver Queen, WEST, USFWS, IDNR	meeting	Discuss Project with stakeholder

WEST = Western EcoSystems Technology, Inc.; USFWS = US Fish and Wildlife Service; IDNR = Iowa Department of Natural Resources; Silver Queen = Silver Queen Wind Farm, LLC; Nossaman = Nossaman LLP; EA = Environmental Assessment; NEPA = National Environmental Policy Act of 1969; MOU = Memorandum of Understanding; TAL = Technical Assistance Letter; ESA = Endangered Species Act of 1973; TRBA = Tricolored Bat; WAPA = Western Area Power Administration.

Appendix A. Report from Baseline Avian Use Surveys from May 2017 – April 2018 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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Appendix B. Report from Baseline Avian Use Surveys from May 2018 – April 2019 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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Appendix C. Report from Baseline Avian Use Surveys within the Expansion Area from November 2018 – October 2020 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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Appendix D. Memo from Baseline Aerial Raptor and Eagle Nest Surveys from April – May 2017 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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Appendix E. Report from Baseline Bat Acoustic Activity Surveys from April – October 2018 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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Appendix F. Report from Baseline Summer Bat Presence/ Probable Absence Surveys from August 2017 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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Appendix G. Report from Baseline Summer Bat Presence/Probable Absence Surveys from July 2021 for the Proposed Silver Queen Wind Farm in Crawford and Carroll Counties, Iowa

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