Upland Sandpiper Conservation Plan
for the Cardinal Point Wind Project
McDonough and Warren Counties, Illinois

Cardinal Point LLC

Capital Power Corporation
155 Federal Street, Suite 1200
Boston, Massachusetts 02110

In consultation with:

Western EcoSystems Technology, Inc.

415 West 17th Street, Suite 200
Cheyenne, Wyoming 82001

June 2025

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

Cardinal Point LLC (the Applicant), a wholly owned subsidiary of Capital Power Corporation (Capital Power), owns and operates the Cardinal Point Wind Project (Project) in McDonough and Warren counties, Illinois (Figure 1). The Project is located on private land. Commercial operation of the Project began in March 2020. The Applicant developed a Bird and Bat Conservation Strategy (BBCS) in 2020 to minimize and avoid potential impacts to birds and bats at the Project. To monitor the Project's impacts on bird and bat species, the BBCS proposed fall post-construction monitoring (PCM) for the first two years of operation. Due to concerns regarding higher than anticipated bat fatalities in 2020 (Stantec Consulting Services, Inc. [Stantec] 2021a) and in 2021 (Chodachek et al. 2021), the Applicant coordinated with the US Fish and Wildlife Service (USFWS) to develop a Habitat Conservation Plan (HCP) and received an Incidental Take Permit (ITP) for four bat species in 2023. Western EcoSystems Technology, Inc. (WEST), conducted PCM at the Project in 2022, 2023, and 2024 as part of the HCP conservation measures. A black-billed cuckoo (*Coccyzus erythropthalmus*) carcass was found during the 2022 PCM. The Applicant received an Incidental Take Authorization (ITA) from the state of Illinois on January 17, 2024, which covered state-listed bats, the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*M. septentrionalis*), and the state-listed black-billed cuckoo.

On May 17, 2024, during the fifth year of PCM, an upland sandpiper (*Bartramia longicauda*) carcass was found. The upland sandpiper is state-listed as endangered by the Illinois Department of Natural Resources (IDNR). The Applicant is requesting an amendment to the ITA from the IDNR for take of upland sandpiper from Project operation. This *Upland Sandpiper Conservation Plan* for the Project has been developed to assess the potential for this bird species to occur in or near the Project area, estimate the potential impacts to the upland sandpiper from Project operation, and outline the avoidance and minimization measures developed for the Project.

1.1 Project Description

The Project is a renewable energy generation facility that consists of 60 wind turbine generators (turbines) and associated infrastructure with a total generating capacity of 166 megawatts (MW). The Project consists of General Electric 48 2.8-MW and 12 2.5-MW turbines and their associated infrastructure (overhead 115-kilovolt generator tie transmission line, access roads, a collector substation, an operation and maintenance facility, and one permanent meteorological [met] tower). Each turbine has a 127-meter (m) rotor diameter and a hub height of 89 m. The maximum height of the turbines from the tower base to the highest blade tip is 152 m above ground level.

The Project area is largely cultivated cropland (92.8%), with corn (*Zea mays*) and soybeans (*Glycine max*) as the dominant crops (National Land Cover Database 2019). Hay, pastureland, and herbaceous areas are sparsely distributed throughout the site. Trees are also sparsely distributed and typically restricted to small clusters along stream corridors.

Figure 1. Location of the Cardinal Point Wind Project in McDonough and Warren counties, Illinois.

2 BIOLOGICAL DATA OF AFFECTED SPECIES

2.1 Upland Sandpiper

2.1.1 Migration

The upland sandpiper is a long-distance nocturnal migrant that can travel more than 20,000 kilometers (km) during their annual migrations. They are known to cross major ecological barriers,

traveling more than 5,000 km non-stop over five to seven days (Hill et al. 2019). Upland sandpipers begin their northbound migration in the spring, which takes approximately 1.5 months, and begin to arrive on breeding grounds in the Midwestern US from mid-April to mid-May (Hill et al. 2019, IDNR 2020). Upland sandpipers begin their southbound migration to their wintering grounds in South America in late summer, with migration occurring over a 3-month span between mid-July and early September (Hill et al. 2019).

2.1.2 Breeding

Upland sandpipers have a large home range that typically includes nesting sites with adjacent feeding grounds (Houston et al. 2023). In Illinois, nesting occurs in the north and central portions of the state and takes place from mid-May to mid-June (IDNR 2020). Upland sandpipers nest on the ground in a hollow ground scrape where vegetation is moderately tall (IDNR 2020, Houston et al. 2023). In Illinois, upland sandpipers prefer ungrazed, upland habitats with moderately tall, dense vegetation to provide concealment (Houston et al. 2023). Upland sandpipers have shown a preference for Kentucky bluegrass (*Poa pratensis*) and other non-native grass species for nesting as opposed to native tallgrass prairie species (Dechant et al. 2002). Three or four eggs are typically laid over several days with an incubation period of 21 to 29 days (IDNR 2020, Houston et al. 2023). Upland sandpipers typically produce only one nest per season due to the short nesting season, however re-nesting has been observed (Dechant et al. 2002).

2.1.3 Post-breeding Dispersal and Lifespan

Most chicks depart the nest within the first week after hatching in search of food but are unable to fly until approximately four weeks. Upland sandpiper chicks are generally accompanied by at least one adult, with males providing most care to chicks post-hatching (Houston et al. 2023). Adult females typically depart from the nesting area within five days after the eggs hatch (Casey et al. 2011). Chicks often move into more open habitats to find food, such as small invertebrates (Houston et al. 2023). Upland sandpipers typically have complete juvenile plumage after 30 days and appear full grown (Houston et al. 2023). Little is known about upland sandpiper lifespans, however, data from banding recoveries show the oldest birds recovered were five years old (Clapp et al. 1982) and eight years old (Houston et al. 1999).

2.1.4 Population Status

The upland sandpiper experienced population declines in the early 1900s due to excessive hunting and changes to breeding and wintering habitat in North and South America. In recent decades, with hunting protections implemented, populations have increased in North America (Morrison et al. 2001). From 1966–2019, populations in the US increased by 0.6% per year (95.0% confidence interval [CI] = 0.1–1.0% per year [/year] ; n = 770 routes; Sauer et al. 2020), while trends for Illinois increased by 0.4% per year (95.0% CI = -1.6–2.5%/year; n = 45 routes; Sauer et al. 2020).

While the North American Breeding Bird Survey (BBS) population trends over the long and short-term have been positive, these trends vary geographically. Populations in northeastern North America, including Canadian Prairie provinces, southern Ontario, New York, and other eastern states, as well as parts of the US Midwest (Illinois, Wisconsin, Minnesota, and Michigan) have

decreased significantly over a 20-year period, while central North American populations have been increasing (Vickery et al. 2010, Andres et al. 2013). In 2001 and 2006, the total upland sandpiper population size was estimated to be 350,000 individuals (Morrison et al. 2001, 2006). However, the most recent estimate in 2012 suggests an upland sandpiper population size of 750,000 individuals (Andres et al. 2013), with the upper Great Plains region supporting approximately 70% (525,000 individuals) of upland sandpiper breeding populations (Vickery et al. 2010).

Upland sandpipers were once considered common residents throughout Illinois but were nearly hunted to extinction before given protection in the early 1900s (IDNR 2020). Today, the greatest threats to upland sandpipers are habitat loss and the use of chemicals during agricultural practices. Additionally, changes in farming and ranching practices, as well as habitat fragmentation and natural forest succession, continue to be a threat to upland sandpipers (Vickery et al. 2010). BBS data indicates the species is more common in northern and central Illinois, with decreasing abundance in southern Illinois. The species is currently considered an uncommon migrant and summer resident in Illinois (IDNR 2020). In Illinois, the upland sandpiper population was estimated at approximately 283,000 individuals in the early 1900s and approximately 177,000–208,000 individuals in the late 1950s (Morrison et al. 2001).

After reviewing raw BBS data from 1966–2022 (Ziolkowski et al. 2023), 363 upland sandpiper detections were recorded on 2,459 survey routes, statewide, during the most recent 30-year period (1992–2022) for an average of 0.15 upland sandpiper/route (Table 1). Surveys were not conducted in 2020. Over the most recent five years of data (2017–2022), 136 upland sandpipers were recorded on 24 routes (over 428 survey routes total) for an average of 0.32 upland sandpiper/route, with 11 survey routes having upland sandpiper observations recorded in multiple years (Table 1, Figure 2).

The closest BBS route to the Project is the Terre Haute Route (Number 22), which is located approximately 18 km northwest of the Project area. No upland sandpipers have been observed on the Terre Haute Route. The closest BBS route with the most recent upland sandpiper record is the Cameron Route (Number 24), which is located approximately 37 km northeast of the Project and has been consistently surveyed over the past 49 years. Upland sandpipers were first observed on the Buda Route in 2007 and are regularly observed, with the most recent record in 2022.

In summary, breeding upland sandpipers are relatively uncommon in Illinois. Based on the BBS route-level analysis for the Project, upland sandpipers are infrequent breeders on BBS routes in Illinois, including those routes near the Project.

Table 1. Upland sandpiper observations by breeding bird survey (BBS) route for Illinois 1992–2022 from Ziolkowski et al. (2023).

Route Number	Year	Count
1	1994	1
2	1992	1
	1993	3
	1997	1
	2001	2
	2002	4
	2007	2
	2008	1
	2012	1
	2013	1
	2019	1
7	1994	1
	2003	1
	2007	1
	1997	1
	2015	1
	2016	2
	2018	2
	2019	2
	2021	1
9	1997	1
	2019	1
11	1997	1
	2014	1
	2015	3
	2016	1
	2017	5
	2019	5
	2021	4
	2022	7
12	1995	1
13	2005	3
	2007	2
	2019	2
14	1996	1
16	2011	1
20	2000	1
	2001	3
	2003	2
	2005	2
	2007	1
	2009	2
	2010	2
	2015	1
	2016	1
	2017	2
	2018	4
	2019	1
23	2001	2
24*	2012	1
	2016	1
	2019	2
	2022	1
27	2021	1
28	2006	1
29	2016	2
	2018	2
	2019	2
	2022	1
30	1994	1
	2009	1
	2011	2
	2012	4
	2013	3
	2014	8
	2015	3
	2016	3
	2017	2
	2018	4
	2019	3
	2021	9
	2022	6
33	1994	2
	1996	5
34	1997	1
	1999	2
	2000	5
	2003	1
	2004	1
	2005	3
	2006	2
	2007	4
	2008	4
	2011	8
	2012	2
	2013	2
	2018	8
	2019	10
	2022	3
36	2007	1
	2016	1
	2022	3
44	2002	1
	2005	1
51	2008	1
54	1998	1
56	1992	1
58	2000	1
65	2007	1
	2010	1
	2011	1
	2018	2
66	2001	1
67	1995	1
	1996	2
	2002	1
	2007	1
	2011	1
73	2019	2
301	2013	1
	2014	1
302	2001	2
	2002	1
	2018	2
304	2011	1
	2021	3
307	2017	2
308	2005	1
	2007	2
	2008	2
	2009	2
	2010	2
	2011	2
	2012	1
	2013	4
	2015	1
	2017	1
	2018	4
309	2005	1
	2006	1
	2007	2
	2008	2
	2010	1
	2011	1
	2013	5
	2014	2
	2016	1
	2017	1
	2018	3
	2019	1
	2021	1
	2022	4
312	2009	1
313	2016	1

Table 1. Upland sandpiper observations by breeding bird survey (BBS) route for Illinois 1992–2022 from Ziolkowski et al. (2023).

Route Number	Year	Count	Route Number	Year	Count	Route Number	Year	Count	Route Number	Year	Count
16	2014	2	31	1994	1	68	2007	1	313	2017	2
	2017	1		1997	2		2011	1	314	2013	1
	2018	2		1999	1		2012	7	–	–	–
19	2001	1		2000	1		2013	2	–	–	–
	2005	1		2001	2		2014	1	–	–	–
20	1993	2		2022	1		2015	1	–	–	–
	1995	1	32	2012	2		2019	5	–	–	–
	1996	1		2014	2		2022	4	–	–	–
	1998	1		2015	1	69	2022	1	–	–	–
	1999	2		2016	2	70	2000	1	**Total**		**363**

* Closest BBS route to Project with the most recent upland sandpiper record.

Note: Surveys were not conducted in 2020. Years listed in the table include only the years where upland sandpipers were observed on the referenced route during the analysis period. Does not include years when the target species was not observed or routes where the target species were never observed.

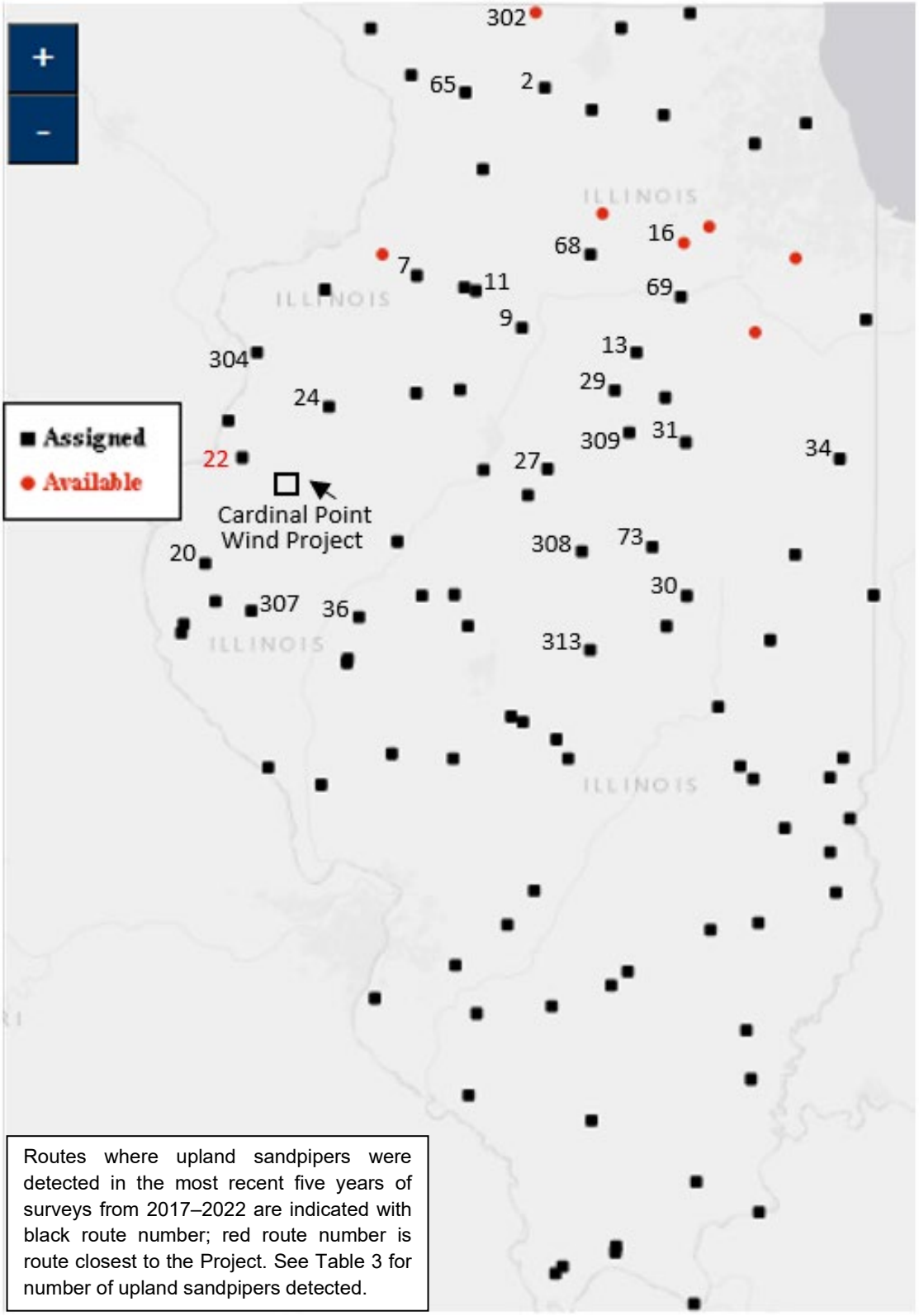


Figure 2. Breeding bird survey route locations in Illinois, designated as either available (not currently surveyed) or currently assigned for survey.

2.1.5 Habitat Requirements

Upland sandpipers prefer open spaces such as prairies, agricultural fields, red clover fields, fallow fields, and grasslands adjacent to airfields (IDNR 2020, Houston et al. 2023). During breeding, upland sandpipers primarily use open grassland areas that contain a variety of vegetation heights (Houston et al. 2023). Upland sandpipers forage within short vegetation (10–20 centimeters [cm] high), nest and rear young in taller vegetation, and choose areas with suitable perches nearby (Dechant et al. 2002). The minimum area required to support upland sandpiper breeding is approximately 100 hectares (ha); however, upland sandpipers are most often found in grasslands 200 ha or greater (Griffis and Campa 2023). Most breeding pairs are nonterritorial and upland sandpipers rarely nest alone, instead preferring to nest in loose colonies (Bowen and Kruse 1993, Houston et al. 2023).

Upland sandpipers often use large, mowed hayfields, plowed fields, and pastures for staging and stopover sites during migration (Vickery et al. 2010).

2.1.6 Species Status in the Cardinal Point Wind Project Area

2.1.6.1 Pre-construction Surveys

2.1.6.1.1 2010–2011 Avian Use Surveys

Pre-construction roadside count surveys were conducted from April 2010 – February 2011, including 15 2-day survey events at 64 point-count stations (Stantec 2011). Avian use survey results included 29,703 individual birds encompassing 102 species. Four species (3.9% of all species) comprised 49.0% of the observations: red-winged blackbird (*Agelaius phoeniceus*), horned lark (*Eremophila alpestris*), common grackle (*Quiscalus quiscula*), and non-native European starling (*Sturnus vulgaris*).

Twenty-seven upland sandpipers were observed during four survey events at 13 different locations. Based on the observations of multiple upland sandpipers and the timing of the detections during the survey events, individuals were likely nesting in the Project area. However, of the 27 observations, only four occurred within the rotor-swept area suggesting these birds remain relatively close to the ground during the breeding/nesting season (Stantec 2011).

2.1.6.1.2 2015–2018 Avian Use Surveys

Avian use surveys were conducted within the Project area from July 30, 2015, through August 24, 2018 (Stantec 2018). Twenty-four randomly located survey points were surveyed 24 times for 5-minute periods within a 100-m radius. The survey results included 5,851 individual birds encompassing 75 species. Five species (6.7% of all species) comprised 61.9% of the observations: red-winged blackbird, snow goose (*Anser caerulescens*), brown-headed cowbird (*Molothrus ater*), horned lark, and dickcissel (*Spiza americana*).

Upland sandpipers were observed on multiple occasions during the surveys (Stantec 2018).

2.1.6.1.3 2019 Upland Sandpiper Survey

Three upland sandpiper surveys events were conducted from April 15 – May 2, 2019, during peak breeding season (Stantec 2019). Thirteen survey points located adjacent to suitable upland sandpiper nesting habitat were surveyed for 15 minutes within a 400-m radius plot. Thirty-five upland sandpipers were observed during the surveys. Two individuals were recorded flying through the Project and did not land. Twenty-seven individuals were observed perched within the 400-m radius plots. Two incidental observations of six individuals were recorded during two surveys. No sign of nests or nesting behavior was observed near the observed individuals.

2.1.6.2 Post-construction Surveys

2.1.6.2.1 2024 Upland Sandpiper Nesting Surveys

Upland sandpiper surveys were conducted from June 12–19, 2024 (Hale et al. 2024). Surveys were conducted once a day at each of the 20 point-count locations, which were located near the 20 turbines that were searched for the concurring PCM. Surveys were conducted to identify potential nesting activity.

Twenty upland sandpipers were observed during surveys and incidentally. No upland sandpiper nests were observed during surveys or incidentally. Observations were recorded at six of the 20 point-count locations near turbines 7, 21, 28, 49, 52, and 66. Upland sandpipers were observed throughout the Project area in corn and soybean fields, cropland, and along roadways.

2.1.6.3 Upland Sandpiper Habitat Evaluation

The Project is within the Western Dissected Illinoian Till Plain Level IV Ecoregion (US Environmental Protection Agency 2012, 2013). This Ecoregion is a well dissected till plain that was historically covered with a mosaic of prairie and forest. Today, native prairies have been replaced with agriculture, primarily cropland and pastureland (Woods et al. 2006).

The Project is located within the known range of the upland sandpiper. Approximately 421 ha of hay/pasture and herbaceous areas are found throughout the Project area and account for approximately 2.4% of the Project area (Table 2). These hay/pasture and herbaceous areas may provide breeding habitat for upland sandpipers. Additionally, upland sandpipers may use hay/pasture, herbaceous areas, and cultivated cropland for staging and stopover sites during migration.

Table 2. Land cover types, coverage, and percent composition within the Cardinal Point Wind Project Permit Area, McDonough and Warren counties, Illinois.

Land Cover Type	Coverage (hectares)	Coverage (acres)	Percent Composition
Cultivated Crops	17,340	42,849	92.8
Developed	788	1,948	4.2
Hay/Pasture	420	1,039	2.3
Forest	124	306	0.7
Barren Land	4	9	<0.1
Open Water	1	3	<0.1
Herbaceous	<1	1	<0.1
Total[1]	**18,678**	**46,155**	**100**

Source: National Land Cover Database 2019.

1. Sums can differ from total values shown due to rounding.

2.1.6.4 Upland Sandpiper Carcass Detections and Correlates of Risk

Multiple years (2020–2024) of PCM were performed at the Project. One upland sandpiper carcass was detected at the Project in 2024 (Table 3). PCM in 2024 was the only year where monitoring occurred in the spring; monitoring only occurred in the fall in 2020–2023. To understand if risk could be identified for upland sandpipers based on information from carcass detections, the spatial (i.e., location) and temporal (i.e., timing) information associated with carcasses in the context of life history and habitat preferences of the upland sandpiper were examined. Only one carcass was detected; therefore, limited inference can be drawn regarding spatial and temporal correlates of risk.

Table 3. Post-construction monitoring surveys and upland sandpiper carcasses at the Cardinal Point Wind Project.

Survey Time Period	Date of Upland Sandpiper Found	Turbine Number	Age	Habitat at Turbine (≤328 ft)	Weather During Night of Estimated Occurrence
Fall 2020[1]	None	NA[2]	NA	NA	NA
Fall 2021[3]	None	NA	NA	NA	NA
Fall 2022[3]	None	NA	NA	NA	NA
Fall 2023[3]	None	NA	NA	NA	NA
Spring – Fall 2024[3]	May 17, 2024	52	unknown	Agriculture	Clear

1. Monitoring conducted by Stantec Consulting Inc. (2021a)
2. NA: not applicable
3. Monitoring conducted by Western EcoSystems Technology, Inc. (Chodachek et al. 2021, 2023; Hale et al. 2024)

One upland sandpiper carcass was detected May 17, 2024, during PCM. The 2024 carcass was a bird of unknown age, and the carcass was estimated to have been on the ground for four to seven days before it was discovered, according to qualified biologists conducting the PCM. The carcass was found partially intact and approximately 63 m from Turbine 52. Turbine 52 is in cultivated crops and within 1.6 km of pastureland and herbaceous areas. Other turbines at the Project that were monitored for carcasses were in similar habitat (agriculture with limited shelterbelts) and upland sandpiper carcasses were not detected. Therefore, no inferences regarding spatial patterns of collision risk were determined due to the limited sample of carcasses (n = 1).

The mid-May fatality date coincides with the spring migration period and the beginning of the breeding season. Nesting surveys conducted June 12–19, 2024, reported a limited number of observations of upland sandpipers near turbines; however, no nests or nesting behavior was observed. Given that migratory stopover habitat and limited breeding habitat is present in the Project area, and that upland sandpipers were reported on-site in June, risk may occur during spring migration and the breeding season.

Collisions of nocturnal migrants with towers are hypothesized to be influenced by the type of lighting on the structure and weather conditions, specifically the presence of fog or low clouds (Bevanger 1994, Shire et al. 2000, Gehring et al. 2009). Comparing the fatality rate of birds near lighted and non-lighted turbines indicates the red blinking lights required by the Federal Aviation Administration (FAA) on wind turbines do not create a strong attractant (Kerlinger et al. 2010). No severe weather occurred during the estimated dates when the fatality occurred (Weather Underground 2024). Lighting and weather did not appear to influence upland sandpiper behavior at the Project.

3 DESCRIPTION OF PROJECT ACTIVITIES

3.1 Activities with Potential for Incidental Take

Authorization is requested to permit take of upland sandpipers that may occur incidental to the continued commercial operation of the Project turbines.

3.2 Timeline

Commercial operation of the Project began in March 2020. Capital Power proposes to continue to operate the Project for up to 25 years, through 2045. Therefore, the requested permit term is for 20 years, from 2025 – 2045.

3.3 Other Permitting Review

The Project received all necessary permits to construct and operate prior to construction and, as noted above, has been coordinating with the USFWS and IDNR on obtaining appropriate ITPs. The wildlife permits received for the Project include:

- USFWS Native Endangered & Threatened Species Recovery Endangered and Threatened Wildlife Permit: TE234121-9
- IDNR Endangered and Threatened Species Permit – Scientific Research Permit 10875 and 15131
- IDNR Scientific Permit: NH21.6581, NH21.6584, NH21.6585, NH21.6596, NH22.6820, and NH22.6821
- Native Endangered & Threatened Species HCP – ITP: ESPER3926307
- IDNR ITA for Black-billed cuckoo, Indiana bat, and Northern long-eared bat – ITA 263.

During PCM, bird carcasses were not handled or collected because a Federal Migratory Bird Special Purpose – Utility Permit was not obtained; rather, bird carcasses were marked discreetly

(e.g., paint on foot and beak of carcass) so it could be easily identified by searchers and other personnel, to ensure they were not recorded again.

The Applicant has been coordinating with the IDNR throughout the siting, permitting, and operation phases of the Project. On June 7, 2018, the Applicant coordinated with the IDNR using the IDNR's Ecological Compliance Assessment Tool (EcoCAT) to identify state-listed threatened and endangered species with the potential to occur in the Project vicinity. The upland sandpiper was identified in the EcoCAT reports, but in the pre-construction coordination, the IDNR did not recommend an ITA be obtained for that species.

4 POTENTIAL EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES

There is approximately 421 ha of potential breeding habitat in the Project area for upland sandpipers (Table 2); however, the Project is in a portion of the overall upland sandpiper range with low abundance during the breeding season (Section 2.1.4). As described in Section 2.1.6.1, multiple upland sandpipers were observed during pre-construction avian use surveys and during surveys after the upland sandpiper carcass was found in 2024. No effects to breeding habitat will occur during operation of the Project because no hay/pasture or herbaceous habitat will be cleared or modified. Effects to migratory stopover habitat will be minimized by limiting the amount of mowing that occurs in soy plots. Additional disturbance or displacement impacts of wind turbines are not expected because no additional turbines or infrastructure are proposed.

Continued operation of the Project may result in the incidental take of upland sandpipers through collisions with wind turbines. Upland sandpipers typically nest and forage at heights below the rotor-swept areas. Male upland sandpipers could fly within the rotor-swept area during courtship displays if suitable habitat is present around a turbine. However, most publicly available upland sandpiper fatalities range wide occur during spring migration (April–June; WEST 2023) and the Project turbines are not located in large parcels of breeding habitat (i.e., hay/pasture, herbaceous areas); thus, collision risk is likely greatest during migration when they use cultivated cropland for staging and stopover sites. Migrating upland sandpipers would be more likely to be potentially affected by turbine operation, with effects to breeding individuals anticipated to be unlikely or minimal.

4.1 Spatial and Temporal Patterns

One upland sandpiper carcass was detected on May 17, 2024, during PCM. The carcass was found at a turbine consisting of cultivated crops, which is similar to other turbines where no carcasses were found. Therefore, no inferences regarding spatial patterns of collision risk were determined due to the limited sample of carcasses (n = 1). The mid-May fatality date coincides with the spring migration period and the beginning of the breeding season. No carcasses were found during four years (2020–2023) of fall-only PCM and one carcass was found in 2024 during spring-fall monitoring. This data indicates there may be more risk during spring migration than fall. Since limited breeding habitat is present in the Project area and upland sandpipers were reported on-site in June, risk may also occur during the breeding season.

4.2 Amount of Habitat Affected

As described in Section 2.1.6.2, there are approximately 421 ha of potential upland sandpiper breeding habitat (2.4% of total area) within the approximately 18,678-ha Project boundary (Table 2). The Project is already built and operational, and, as stated above, impacts to upland sandpiper habitat were avoided and minimized during siting and construction. Upland sandpiper breeding and migration habitat could be impacted during operation of the Project if fatality monitoring necessitates clearing of vegetation; however, best management practices outlined in Section 4.6.1 will avoid and minimize impacts to the species during operation.

4.3 Incidental Take of Individuals

A percent composition approach was used to estimate the incidental take of upland sandpipers at the Project. This percent composition approach pools carcass data from the Project and other wind energy projects in Illinois and across the US to calculate a take estimate for upland sandpipers by determining the anticipated percent of all bird carcasses that will be upland sandpipers over the 20-year permit period (2025 – 2045). In Illinois, in addition to the one upland sandpiper found at the Project, one upland sandpiper has been publicly reported at the Green River project (IDNR 2023). Adding the 162 bird carcasses found over the four years of monitoring at the Project to the 1,201 bird carcasses documented at other PCM studies in Illinois with publicly available data (see Table 4) results in a total denominator for the species composition calculation of 1,291 birds. Dividing the two documented upland sandpipers by the total of 1,291 documented bird fatalities results in an Illinois species composition of 0.15%.

Due to the low number of publicly available upland sandpiper fatality information in Illinois, range-wide data was queried and a range-wide species composition rate was generated to provide a range of upland sandpiper take for the Project. Projects that fell within states that overlapped the upland sandpiper range (Houston et al. 2023) were included in the range-wide dataset. Projects with publicly available data along with Project-specific data have documented 16,931 bird carcasses during PCM studies across the states within upland sandpiper range, which was the denominator for the upland sandpiper range-wide species composition calculation. Across their range, 46 upland sandpipers have been publicly reported across nine states (Illinois, Indiana, Iowa, Kansas, Minnesota, Nebraska, North Dakota, South Dakota, Texas; WEST 2023). Adding the one upland sandpiper fatality found at the Project to the 46 publicly available fatalities results in 47 upland sandpiper fatalities. Dividing the 47 documented upland sandpipers by the total of 16,931 documented bird fatalities results in a range-wide species composition of 0.27%. This range-wide upland sandpiper species composition rate is similar to the 0.20% upland sandpiper species composition rate previously reported by the American Wind Wildlife Institute (2020).

Because the Project's PCM was designed to focus on bats, no bird fatality estimates were calculated and no searcher efficiency or carcass persistence trials specific to birds have been conducted. Therefore, bird fatality estimates from other Illinois projects with publicly available data were examined to produce a representative range of estimated bird fatality rates for the Project. There are six PCM studies from wind energy facilities in Illinois with publicly available estimated

bird fatality data, with the all-bird fatality estimates ranging from 0.03 birds/MW/study period to 3.1 (Table 4).

Table 4. Illinois wind facilities with publicly available bird carcass count and bird fatality estimates and Project data used in percent composition analysis.

Project Name	Total Birds Found	Birds/MW/Study Period	Citation
Anonymous Illinois (2013–2018)	1	NA	Kritz et al. 2018
Bishop Hill (2012)	16	NA	Simon et al. 2014a
Bishop Hill (2013)	28	NA	Ritzert et al. 2013, Simon et al. 2014b
Bishop Hill (2014)	15	NA	Ritzert et al. 2014b, Shoener Environmental 2015a
Bishop Hill (2015)	33	NA	Shoener Environmental 2015c
California Ridge (2013)	43	0.05	Gruver et al. 2014
California Ridge (2014)	62	0.03	Shoener Environmental 2015b
California Ridge (2015)	33	NA	Stantec 2021b
California Ridge (2021)	8	3.1	Stantec 2022
California Ridge (2022)	183	NA	Ritzert et al. 2023a
Cardinal Point (2020)	4	NA	Cardinal Point LLC 2023
Cardinal Point (2021)	41	NA	Cardinal Point LLC 2023
Cardinal Point (2022)	27	NA	Cardinal Point LLC 2023
Cardinal Point (2023)	90	NA	Hale et al. 2024
Crescent Ridge (2005–2006)	10	NA	Kerlinger et al. 2007
Ford County (2022)	63	NA	Stucker et al. 2023
Green River (2022)	140	NA	Brown et al. 2023
Hoopeston (2018)	9	NA	Iskali and Pham 2019
Hoopeston (2019)	41	NA	Rodriguez et al 2020
Hoopeston (2020)	44	NA	Rodriguez et al. 2021
Hoopeston (2021)	11	NA	Rodriguez et al. 2022
Hoopeston (2022)	4	NA	Rodriguez et al. 2023
Minonk (2013 – 2014)	15	0.8	Ritzert et al. 2014a
Pilot Hill (2017)	70	NA	Iskali et al. 2019
Pilot Hill (2018)	70	NA	Iskali et al. 2019
Pioneer Trail (2012–2013)	18	NA	ARCADIS U.S. 2013
Pioneer Trail (2013–2014)	9	NA	ARCADIS U.S. 2014
Pioneer Trail (2017)	6	NA	Stantec 2017
Pioneer Trail (2022)	4	NA	Stantec 2023
Radford's Run (2019)	17	NA	Ecology and Environment, Inc. 2020
Radford's Run (2020)	28	NA	Stantec 2021c
Rail Splitter (2012–2013)	5	0.84	Good et al. 2013a
Sugar Creek (2022)	37	NA	Ritzert et al. 2023b
Top Crop I and II (2012–2013)	32	1.35	Good et al. 2013b
Twin Groves (2009)	39	NA	Johnson et al. 2010
Twin Groves I & II (2007–2009)	35	NA	Johnson et al. 2009

MW = megawatts; Stantec = Stantec Consulting Services, Inc.

The all-bird fatality estimates (birds/MW/study period) from publicly available Illinois projects were multiplied by the 166-MW associated with the Project, to come up with a general range of annual project-wide all-bird fatality estimates for the Project. The all-bird fatality estimates ranged from

5.0–514.6 birds/project/year. The percent composition of upland sandpipers based on Illinois and range-wide data was then multiplied by the project-wide all bird fatality estimates.

Using the Illinois all bird fatality estimates and the Illinois and range-wide percent composition (0.15% and 0.27%, respectively) for upland sandpipers, a range of zero to 1.4 upland sandpiper take/year is estimated for the Project (Table 5). While there is potential breeding habitat for upland sandpipers within the Project, upland sandpipers typically forage and nest at heights below the rotor-swept area; therefore, collision risk is likely greatest during migration for this species. The Applicant is, therefore, applying for an ITA to take up to 20 upland sandpipers over the 20-year permit term, which corresponds to an average of one upland sandpiper taken per year.

Table 5. Estimated take of upland sandpiper at the Cardinal Point Wind Project.

Species	Data	Estimated All-Bird Fatality Rate at Project (all birds/year)[1]	Estimated Species Composition	Range of Take per Year at Project	Estimated Take over 20 Year Term
Upland Sandpiper	Illinois	5.0–514.6	0.15%	0–0.8	20 (estimated average of 1/year)
	Range-wide		0.27%	0–1.4	

[1] Estimated all-bird fatality rate at the Project from publicly available Illinois projects.

4.4 Management of the Affected Area

The Project is already built and operational, and the Applicant will continue to maintain existing turbines and Project infrastructure, including existing gravel access roads and pads through 2045. No impacts to hay/pasture and herbaceous habitat will occur during operation of the Project, and continued operation of the Project will not affect the ability of the upland sandpiper to use hay/pasture, herbaceous areas, or cultivated crops adjacent to the turbines and other components of the Project.

4.5 Measures to Minimize and Mitigate Effects

4.5.1 Minimization and Mitigation – Project Design and Operation

During Project development and construction, the Applicant implemented measures to avoid and minimize effects to wildlife, including the upland sandpiper:

- The Project was sited in a previously disturbed landscape (i.e., among cultivated cropland, hay/pasture, and developed lands) to avoid critical habitats for sensitive species.
- Fragmentation of wildlife habitat was avoided through the use, where practical, of lands already disturbed, including using existing roadways.
- To avoid disturbance of nesting upland birds, unnecessary mowing was avoided during the peak nesting season for birds (May 1 – August 1).
- Project personnel were advised regarding speed limits on roads, and travel was restricted to designated roads to minimize wildlife mortality due to vehicle collisions, including minimizing the potential for collision with upland sandpipers, and to avoid impacts to vegetation.

- Environmental training for all construction personnel was provided to avoid and minimize impacts to wildlife. Personnel were instructed to report wildlife incidents to the environmental compliance specialist as outlined in the Project's environmental documentation.
- Standard construction best management practices were followed to minimize accidental spills of solid material, contaminants, debris, and other pollutants. Excavated material was not deposited near streams. All waste material was removed from the construction area.

Design and operation of the Project incorporated the following avoidance and minimization measures to minimize and mitigate impacts to wildlife, including the upland sandpiper:

- Ground disturbance and vegetation clearing in upland sandpiper breeding habitat (hay fields, pasture, other grassland) will be avoided from April 15 through July 31.
    - If clearing of plots for fatality monitoring is necessary in suitable upland sandpiper breeding habitat during the nesting season, then vegetation will be mowed to a height of less than 10 cm prior to April 15 and maintained below 10 cm from April 15 through July 31. If the vegetation is not maintained below 10 cm and additional mowing is necessary between April 15 and July 31, upland sandpiper nest clearance surveys by a qualified biologist would occur prior to mowing.
- The facility employed unguyed met towers and tubular towers for the turbines.
- Collection and communication lines were buried where interference with other features would not preclude it, avoiding the potential for bird collision.
- Lighting was minimized to that which is required by the FAA.

No additional avoidance or minimization measures are proposed at this time because (1) the siting and construction measures already committed to by the Applicant have minimized, and will continue to minimize, impacts to the upland sandpiper; (2) no specific collision risk patterns have been detected and, therefore, there is no basis for effective design of potential minimization measures such as curtailment; and (3) impacts to the species have been low and are predicted to be low during the term of the permit.

4.5.2 Mitigation

In addition to implementation of avoidance and minimization measures summarized in Section 5.2, the Applicant has committed to a monetary contribution of $25,000 submitted to the Prairie Land Conservancy to assist with creating more short grass native prairie habitat that will be suitable for use by the upland sandpiper. An opportunity has been identified in the Prairie Hills Wetland Reserve in Fulton County (Figure 3); if this restoration project does not occur, the Conservancy will use the funds to restore and/or maintain shortgrass prairie/suitable upland sandpiper habitat in another similar location(s) in the state.

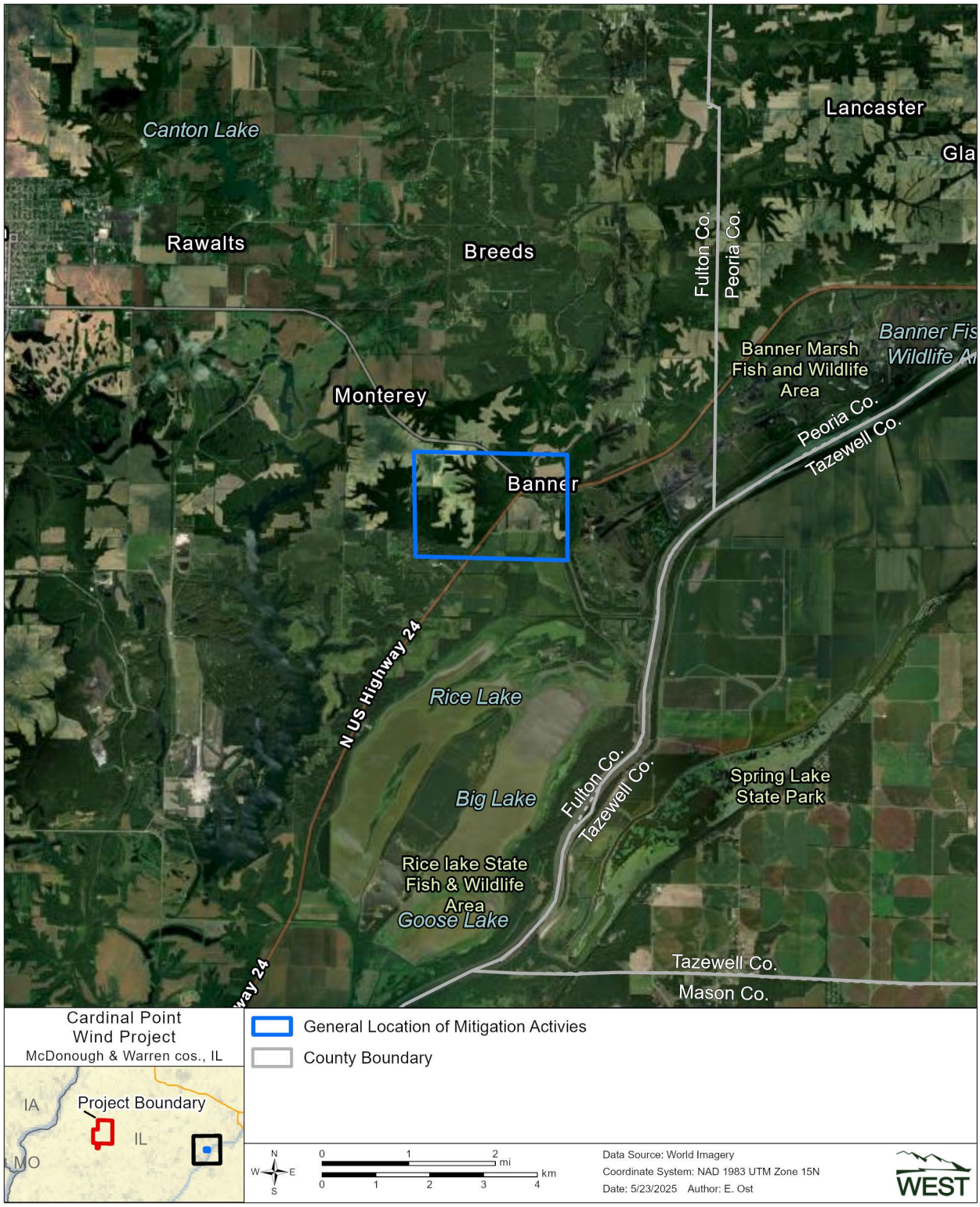


Figure 3. General location of Cardinal Point mitigation activities in Fulton County, Illinois.

4.6 Monitoring

4.6.1 Intensive Carcass Monitoring

PCM for the Project will follow the same approach and schedule as in the *Black-billed Cuckoo Conservation Plan for the Cardinal Point Wind Project, McDonough and Warren Counties, Illinois* (Section 4.7; Cardinal Point LLC 2023). The monitoring approach and schedule follows that which is committed to in the *Indiana Bat, Northern Long-eared Bat, Little Brown Bat, and Tricolored Bat Habitat Conservation Plan for the Cardinal Point Wind Project, McDonough and Warren Counties, Illinois* (Cardinal Point LLC 2023b).

4.6.2 Incidental Monitoring

Project personnel are trained in wildlife issues, protection, and considerations at wind projects and how to respond to the discovery of a carcass or injured animal. An incidental reporting process was developed for operations personnel that requires the documentation and reporting of animal carcasses detected within the Project area. Operations personnel are prohibited from touching the carcass and are required to immediately photograph the carcass and report it to the Applicant's environmental staff. Once the field report is submitted, the environmental staff are required to assess each carcass report, deferring to a biologist when necessary, and report all state-listed endangered or threatened species to the IDNR within 24 hours of positive species identification.

4.7 Adaptive Management

4.7.1 Adaptive Management Goals

The goals of the adaptive management plan are to enable the Project to respond to issues and unanticipated events identified by monitoring data collected over the term of the permit. Certain trigger events and subsequent changes to the avoidance, minimization, and mitigation plan have been defined as a part of the adaptive management plan, to guide the adaptive process.

4.7.2 Adaptive Management Plan

The events that would trigger changes to the avoidance, minimization, and mitigation plan presented herein would be documented take of upland sandpiper above the anticipated level, which is expected to average up to one bird/year over the 20-year term of the permit.

If any upland sandpiper carcasses are detected at the Project, the following actions will be taken.

1) IDNR will be notified within one business day of positive identification.
2) The carcass will be examined, and information will be included in Project's database.

If more than two upland sandpipers are found within a single year, the following measures will be implemented:

1) The Applicant will confer with the IDNR to determine, based on the available data, the circumstances under which the carcasses occurred.

2) If a specific cause for the carcasses can be identified and it is attributable to the Project, the Applicant will develop specific additional onsite and/or operational mitigation measures in consultation with IDNR to address those causes:
    a) During the next year when monitoring would occur under the federal ITP, the Applicant will conduct follow-up PCM in the season(s) in which the carcasses were discovered to assess whether onsite mitigation measures were successful at reducing mortality.
3) If there continues to be no spatial, weather, or temporal pattern to when and where upland sandpiper carcasses are found, no mitigation measures will be taken based on one year with higher than anticipated take levels. However, if two additional sequential monitoring periods occur where two or more upland sandpiper carcasses are detected, the Applicant and IDNR will determine the need to pursue an amendment to the Project's ITA.

4.8 Verification of Adequate Funding

The Applicant has already funded and completed five years of intensive monitoring at the Project and will continue to fund monitoring at intervals as committed to in this Conservation Plan for the life of the Project. Prior to each year of follow-up monitoring, the Applicant will provide the IDNR with a letter certifying that a monitoring contract has been executed with a firm qualified to conduct monitoring in accordance with the approved monitoring plan. Funding may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the Conservation Plan.

5 ALTERNATIVES CONSIDERED

5.1 No-action Alternative

The No-action alternative, in this case, would consist of the Project not being developed, constructed, or operated. The Project has been built and operational since March 2020. This option is a non-viable alternative.

5.2 Construction and Operation Alternatives

Since the Project is already constructed and operational, no construction alternatives were considered. The Project was sited to avoid and minimize impacts to the upland sandpiper by placing all turbines in cultivated fields and avoiding and minimizing impacts to hay/pasture and herbaceous areas. Placing turbines elsewhere in the counties would not be expected to reduce the risk to the upland sandpiper.

One upland sandpiper carcass was discovered in five years of PCM in agricultural fields during the spring migration period. As described in Sections 4.1 and 4.2, risk may occur during spring migration and breeding season. However, due to the low quantities of upland sandpipers present, the Applicant concluded that operational modifications are not an appropriate alternative.

6 EFFECTS DETERMINATION

The continued operation of the Project will not impact the likelihood of the survival of the upland sandpiper in Illinois for the following reasons:

1) Project operation is expected to result in zero to one upland sandpiper fatalities/year (compared to estimated breeding population of 750,000 in the US).
2) Project operation will not impact upland sandpiper breeding habitat and will not affect the upland sandpiper's ability to use adjacent hay/pasture or herbaceous land during breeding or migration. If fatality monitoring requires cleared plots that may be upland sandpiper habitat, the plots will be mowed/cleared to a height of less than 10 cm prior to April 15 and maintained below 10 cm from April 15 through July 31. If the vegetation is not maintained below 10 cm and additional mowing is necessary between April 15 and July 31, upland sandpiper nest clearance surveys by a qualified biologist would occur prior to mowing.
3) As stated in Section 2.1, the upland sandpiper life history is characterized by a short life span and high reproductive output, with breeding occurring every year of a female's life. In species with this type of life history, survival of individuals is not the driver of population trends. Instead, impacts to fecundity, such as direct impacts to nests and nest success have more influence on population dynamics (Stahl and Oli 2006). Furthermore, population trends of North American birds with similar life history strategies are not discernibly affected by collision mortality such as that anticipated at the Project (Arnold and Zink 2011).

In conclusion, the low level of anticipated annual take from Project operation is not anticipated to affect the upland sandpiper population that migrates through or breeds in Illinois.

7 REFERENCES

American Wind Wildlife Institute (AWWI). 2020. Technical Report 2nd Edition: Summary of Bird Fatality Monitoring Data Contained in AWWIC. American Wind Wildlife Information Center (AWWIC) database. AWWI, Washington, D.C. November 24, 2020. Available online: https://rewi.org/wp-content/uploads/2020/11/2nd-Edition-AWWIC-Bird-Report-11-24-2020.pdf

Andres, A. A., P. A. Smith, R. I. G. Morrison, C. L. Gratto-Trevor, S. Brown, and C. Friis. 2013. Population Estimates of North American Shorebirds, 2012. Wader Study Group Bulletin 119: 178-194.

ARCADIS U.S., Inc. 2013. Fall 2012 and Spring 2013 Avian and Bat Post-Construction Mortality Monitoring Report: Pioneer Trail Wind Farm. Prepared for E.On Climate & Renewables, North America. Prepared by ARCADIS U.S., Inc., Milwaukee, Wisconsin. August 2013.

ARCADIS U.S., Inc. 2014. Fall 2013 and Spring 2014 Avian and Bat Post-Construction Mortality Monitoring Report: Pioneer Trail Wind Farm. Prepared for E.On Climate & Renewables, North America. Prepared by ARCADIS U.S., Inc., Milwaukee, Wisconsin. July 2014.

Arnold, T. W. and R. M. Zink. 2011. Collision Mortality Has No Discernible Effect on Population Trends of North American Birds. PLoS ONE 6(9): e24708. doi: 10.1371/journal.pone.0024708.

Bevanger, K. 1994. Bird Interactions with Utility Structures: Collision and Electrocution, Causes and Mitigating Measures. Ibis 136(4): 412-425.

Bowen, B. and A. Kruse. 1993. Effects of Grazing on Nesting by Upland Sandpipers in South-Central North Dakota. Journal of Wildlife Management 57(2): 291-301. doi: 10.2307/3809426.

Brown, T. T., M. Crane, T. Owen, A. Suehring, and G. DiDonato. 2023. Post-Construction Fatality Monitoring for Green River Wind Farm, Lee and Whiteside Counties, Illinois. Final Report: May 1, 2022 – October 15, 2022. Prepared for Green River Wind Farm Phase 1, LLC, Bloomington, Minnesota. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. January 25, 2023.

Bureau of Land Management (BLM). 2019. BLM National Public Land Survey System (PLSS) Polygons - National Geospatial Data Asset (Ngda). Accessed January 2019. Bureau of Land Management (BLM), Available online: https://landscape.blm.gov/geoportal/catalog/search/resource/details.page?uuid=%7BA8E4F937-4653-4542-9554-9FBF308FB624%7D

Cardinal Point LLC. 2023a. Black-Billed Cuckoo Conservation Plan for the Carindla Point Wind Project, Mcdonough and Warren Counties, Illinois. Draft. *In:* Illinois Department of Natural Resources Conservation Plan, Appendix B. April 2023. Available online: https://naturalheritage.illinois.gov/content/dam/soi/en/web/naturalheritage/permits/documents/ita-conservation-plans/conservation-plans/263-cp.pdf

Cardinal Point LLC. 2023b. Indiana Bat, Northern Long-Eared Bat, Little Brown Bat, and Tricolored Bat Habitat Conservation Plan for the Cardinal Point Wind Project, McDonough and Warren Counties, Illinois. Prepared by Cardinal Point LLC, Boston, Massachusetts, in consultation with Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. Aprul 28, 2023.

Casey, A. E., B. Sandercock, and S. M. Wisely. 2011. Genetic Parentage and Local Population Structure in the Socially Monogamous Upland Sandpiper. The Condor 113(1): 119-128. doi: 10.1525/cond.2011.100100.

Chodachek, K., J. Pickle, and K. Nasman. 2021. Post-Construction Bat Fatality Monitoring Study, Cardinal Point Wind Project, Mcdonough and Warren Counties, Illinois. Final: July 2021 – October 2021. Prepared for the Capital Power Corporation, Calgary, Alberta. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. March 3, 2022.

Chodachek, K., J. Pickle, and K. Nasman. 2023. Post-Construction Bat Mortality Monitoring Study, Cardinal Point Wind Project, Mcdonough and Warren Counties, Illinois. Draft Report: August 2022 – October 2022. Prepared for Capital Power Corporation, Calgary, Alberta. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. February 8, 2023.

Clapp, R. B., M. K. Klimkiewicz, and J. H. Kennard. 1982. Longevity Records of North American Birds: Gaviidae through Alcidae. Journal of Field Ornitholgy 53(2): 81-124.

Dechant, J. A., M. F. Dinkins, D. H. Johnson, L. D. Igl, C. M. Goldade, B. D. Parkin, and B. R. Euliss. 2002. Effects of Management Practices on Grassland Birds: Upland Sandpiper. US Geological Survey Northern Prairie Wildlife Research Center, Jamestown, North Dakota. June 1999. Revised January 2002. Available online: https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1129&context=usgsnpwrc

Ecology and Environment, Inc. 2020. 2019 Bat Deterrent Study Report for the Radford's Run Wind Farm, Macon County, Illinois. Prepared for Radford's Run Wind Farm, LLC, Chicago, Illinois. Prepared by Ecology and Environment, Inc., Chicago, Illinois. January 2020. 70 pp.

Esri. 2024. World Street Map. ArcGIS Resource Center. Environmental Systems Research Institute (Esri), producers of ArcGIS software, Redlands, California. October 26, 2017. Updated March 20, 2024. Accessed December 2024. Available online: https://www.arcgis.com/home/item.html?id=de26a3cf4cc9451298ea173c4b324736

Gehring, J., P. Kerlinger, and A. M. Manville, II. 2009. Communication Towers, Lights, and Birds: Successful Methods of Reducing the Frequency of Avian Collisions. Ecological Applications 19(2): 505-514. doi: 10.1890/07-1708.1.

Good, R. E., M. L. Ritzert, and K. Adachi. 2013a. Post-Construction Monitoring at the Rail Splitter Wind Farm, Tazwell and Logan Counties, Illinois. Final Report: May 2012 - May 2013. Prepared for EDP Renewables, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. December 16, 2013.

Good, R. E., J. P. Ritzert, and K. Adachi. 2013b. Post-Construction Monitoring at the Top Crop Wind Farm, Gundy and Lasalle Counties, Illinois. Final Report: May 2012 - May 2013. Prepared for EDP Renewables, Houston, Texas. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. December 13, 2013.

Griffis, E. K. and I. H. Campa. 2023. Upland Sandpiper (*Bartramia longicauda*) Breeding Habitat Ecology, Home Range, and Nest Site Conservation Guidelines. Wilson Journal of Ornithology 135(4): 502-511. doi: 10.1676/23-00011.

Gruver, J., P. Rabie, C. Meinke, S. Howlin, and K. Bay. 2014. Bat Deterrent Research Study California Ridge Wind Energy Facility Champaign and Vermillion Counties, Illinois Year 1 Research Report July 15, 2013 - September 30, 2013. Prepared for California Ridge Wind Energy, LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. April 10, 2014. 39 pp. + appendices.

Hale, A., A. Ciecka, D. Kobler, M. True, C. Frederick, J. Pickle, and V. Zero. 2024. Post-Construction Monitoring Study for the Cardinal Point Wind Project, Mcdonough and Warren Counties, Illinois. Year 1 Incidental Take Permit Report – 2023. Prepared for Cardinal Point LLC, Boston, Massachusetts. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 15, 2024.

Hill, J. M., B. Sandercock, and R. B. Renfrew. 2019. Migration Patterns of Upland Sandpipers in the Western Hemisphere. Frontiers in Ecology and Evolution 7: 426. doi: 10.3389/fevo.2019.00426.

Houston, C. S., S. C. Drury, and G. Holroyd. 1999. Upland Sandpiper Banding in North America. North American Bird Bander 24(1): 1-2.

Houston, C. S., C. Jackson, D. E. Bowen, Jr., and F. Medrano. 2023. Upland Sandpiper (*Bartramia longicauda*), Version 2.0. *In*: N. D. Sly, ed. Birds of the World. Cornell Lab of Ornithology, Ithaca, New York. doi: 10.2173/bow.uplsan.01. Available online: https://birdsoftheworld.org/bow/species/uplsan/cur/introduction

Illinois Department of Natural Resources (IDNR). 2023. Conservation Plan, Green River Wind Farm, Lee and Whiteside Counties, Illinois. Prepared for Green River Wind Farm Phace 1, LLC, Bloomington, Minnesota. November 16, 2023.

Illinois Department of Natural Resources (IDNR). 2020. Upland Sandpiper. Wild About Birds - Illinois Shorebirds! IDNR, Springfild, Illinois. Accessed June 2024. Available online: https://dnr.illinois.gov/education/wildaboutpages/wildaboutbirds/wildaboutbirdsshorebirds/family---scolopacidae/wabuplandsandpiper.html

Iskali, G. and D. Pham. 2019. Operational Monitoring at the Hoopeston Wind Project, Vermillion County, Illinois. April - October 2018. Prepared for Hoopeston Wind, LLC, Charlottesville, Virginia. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. March 1, 2019. 24 pp. + appendices.

Iskali, G., J. Lombardi, R. Good, T. McDonald, and K. DuBridge. 2019. Post-Construction Monitoring for the Pilot Hill Wind Farm, Kankakee and Iroquois Counties, Illinois. Final Report: July 23 – October 23, 2018. Prepared for Pilot Hill Wind, LLC, San Diego, California. Prepared by Western EcoSystems Technology, Inc., Bloomington, Indiana. May 7, 2019.

Johnson, G. D., W. P. Erickson, K. Bay, J. Ritzert, M. Sonnenberg, and D. Tidhar. 2009. Bird and Bat Fatality Studies: Twin Groves Wind-Energy Facility, Mclean County, Illinois. November 14, 2007 - February 28, 2009. Prepared for Horizon Wind Energy, Houston, Texas. Draft report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Johnson, G. D., W. P. Erickson, D. Solick, C. Nations, J. Ritzert, M. Sonnenberg, and K. Bay. 2010. Bird and Bat Fatality Studies: Twin Groves Wind-Energy Facility, Mclean County, Illinois. August 2 - October 15, 2009. Prepared for Horizon Wind Energy, Houston, Texas. Draft report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 2007. Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Kerlinger, P., J. L. Gehring, W. P. Erickson, R. Curry, A. Jain, and J. Guarnaccia. 2010. Night Migrant Fatalities and Obstruction Lighting at Wind Turbines in North America. Wilson Journal of Ornithology 122(4): 744-754. doi: 10.1676/06-075.1.

Kritz, K., M. Rheude, B. Millsap, M. Sadlowski, J. Pagel, M. Stuber, C. Borgman, T. Witting, U. Kirkpatrick, J. Muir, and H. Beeler. 2018. Bald Eagle Mortalities and Injuries at Wind Energy Facilities in the United States. Poster. The Wildlife Society (TWS) 25th Annual Conference, Cleveland, Ohio. October 7 - 11, 2018.

Morrison, R. I. G., R. E. Gill, B. A. Harrington, S. Skagen, G. W. Page, C. Gratto-Trevor, and S. M. Haig. 2001. Estimates of Shorebird Populations in North America. Occasional Paper No. 104, Canadian Wildlife Service, Ottawa, Ontario. 64 pp. Available online: https://publications.gc.ca/collections/Collection/CW69-1-104E.pdf

Morrison, R. I. G., B. J. McCaffery, R. E. Gill, S. K. Skagen, S. L. Jones, G. W. Page, C. L. Gratto-Trevor, and B. A. Andres. 2006. Population Estimates of North American Shorebirds, 2006. Wader Study Group Bulletin 111: 67-85.

National Land Cover Database (NLCD). 2019. National Land Cover Database 2019 - Landcover & Imperviousness (Nlcd2019). Available online: https://www.mrlc.gov/data. *As cited* includes:

Dewitz, J., and US Geological Survey (USGS). 2021. National Land Cover Database (NLCD) 2019 Products. Version 2.0. USGS data release. June 2021. doi: 10.5066/P9KZCM54.

Homer, C., J. Dewitz, S. Jin, G. Xian, C. Costello, P. Danielson, L. Gass, M. Funk, J. Wickham, S. Stehman, R. Auch, and K. Riitters. 2020. Conterminous United States Land Cover Change Patterns 2001–2016 from the 2016 National Land Cover Database. ISPRS Journal of Photogrammetry and Remote Sensing 162(5): 184-199. doi: 10.1016/j.isprsjprs.2020.02.019.

Jin, S., C. Homer, L. Yang, P. Danielson, J. Dewitz, C. Li, Z. Zhu, G. Xian, and D. Howard. 2019. Overall Methodology Design for the United States National Land Cover Database 2016 Products. Remote Sensing. 2971. doi: 10.3390/rs11242971.

Wickham, J., S. V. Stehman, D. G. Sorenson, L. Gass, and J. A. Dewitz. 2021, Thematic Accuracy Assessment of the NLCD 2016 Land Cover for the Conterminous United States: Remote Sensing of Environment 257: 112357. doi: 10.1016/j.rse.2021.112357.

and

Yang, L., S. Jin, P. Danielson, C. Homer, L. Gass, S. M. Bender, A. Case, C. Costello, J. Dewitz, J. Fry, M. Funk, B. Granneman, G. C. Liknes, M. Rigge, and G. Xian. 2018. A New Generation of the United States National Land Cover Database: Requirements, Research Priorities, Design, and Implementation Strategies. ISPRS Journal of Photogrammetry and Remote Sensing 146: 108-123. doi: 10.1016/j.isprsjprs.2018.09.006.

Ritzert, J., R. Good, and M. Ritzert. 2013. Carcass Monitoring Report for the Bishop Hill Wind Energy Facility: Spring 2013. Prepared for Bishop Hill Energy LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. December 13, 2013.

Ritzert, J. P., M. Ritzert, and K. Bay. 2014a. Post-Construction Monitoring at the Minonk Wind Energy Facility, Woodford and Livingston Counties, Illinois. Final Report: June 2013 - May 2014. Prepared for Algonquin Power Company, Oakville, Ontario. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. October 27, 2014.

Ritzert, J. P., M. Ritzert, R. Good, and K. Adachi. 2014b. Carcass Monitoring Report for the Bishop Hill Wind Energy Facility, Henry County, Illinois: April 15, 2014 - May 15, 2014. Prepared for Invenergy LLC., Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. July 21, 2014.

Ritzert, M., J. Bushey, and A. Hedrick. 2023a. Post-Construction Monitoring Study for the California Ridge Wind Farm, Champaign and Vermilion Counties, Illinois. Year 2 Final Report: April 1 – October 15, 2022. Prepared for California Ridge Wind Energy, LLC, Armstrong, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Camp Hill, Pennsylvania. January 27, 2023. 23 pp. + appendices.

Ritzert, M., J. Bushey, P. Rabie, and A. Hedrick. 2023b. Post-Construction Monitoring Study, Sugar Creek Wind Project, Logan County, Illinois. Final Report: April 1 – October 15, 2023. Prepared for Fort County Wind Farm, LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Golden Valley, Minnesota. February 24, 2023. 18 pp. + appendices.

Rodriguez, M., A. Ciecka, L. McManus, and J. Bushey. 2020. Operational Monitoring at the Hoopeston Wind Project, Vermilion County, Illinois. Prepared for Hoopeston Wind, LLC, Charlottesville, Virginia. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. January 28, 2020.

Rodriguez, M., J. Studyvin, and M. Kaufmann. 2021. Operational Monitoring at the Hoopeston Wind Project, Vermilion County, Illinois. Final Report: April – October 2020. Prepared for Hoopeston Wind, LLC, Charlottesville, Virginia. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. February 2021.

Rodriguez, M., L. Voorhees, L. Bishop-Boros, P. Rabie, and A. Tredennick. 2022. Operational Monitoring Study at the Hoopeston Wind Project, Vermilion County, Illinois: April – October 2021. Prepared for Hoopeston Wind, LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. January 24, 2022. 18 pp. + appendices.

Rodriguez, M., L. Voorhees, and A. Medina-Garcia. 2023. Operational Monitoring at the Hoopeston Wind Project, Vermilion County, Illinois: April – October 2022. January 13, 2023.

Sauer, J. R., W. A. Link, and J. E. Hines. 2020. The North American Breeding Bird Survey, Analysis Results 1966 - 2019. U.S. Geological Survey data release. November 3, 2020. doi: 0.5066/P96A7675.

Shire, G. G., K. Brown, and G. Winegrad. 2000. Communication Towers: A Deadly Hazard to Birds. A Report Compiled by American Bird Conservancy Documenting the Killing of 230 Bird Species. American Bird Conservancy, Washington, D. C. June 2000. Available online: http://abcbirds.org/wp-content/uploads/2015/05/towerkillweb.pdf

Shoener Environmental. 2015a. 2014 Avian Fatality Monitoring Report: Bishop Hill Wind Energy Facility, Henry County, Illinois. Prepared for Invenergy, Chicago, Illinois. Prepared by Shoener Environmental, Dickson City, Pennsylvania. January 22, 2014.

Shoener Environmental. 2015b. 2014 Bat Behavior and Carcass Monitoring Report: Research Results of Deterrent and Turbine Curtailment Strategies. Recovery Permit No. Te03502b-0. California Ridge Wind Energy Facility, Vermilion and Champaign Counties, Illinois. Submitted to California Ridge Wind Energy, LLC, Fithian, Indiana. Prepared by J. R. Skalski, Columbia Basin Research, School of Aquatic and Fisheries Sciences, University of Washington, Seattle, Washington, and Shoener Environmental, Dickson City, Pennsylvania. January 30, 2015. 38 pp. + attachments.

Shoener Environmental. 2015c. Post-Construction Bird and Bat Carcass Monitoring Fall 2015 Final Report: Bishop Hill Wind Energy Facility, Henry County, Illinois. Prepared for Bishop Hill Energy LLC, Cambridge, Illinois. Prepared by Shoener Environmental, Dickson City, Pennsylvania. December 3, 2015.

Simon, S., R. Good, S. Howlin, and J. Ritzert. 2014a. Bird Carcass Monitoring Report for the Bishop Hill Wind Energy Facility: Fall 2012. Prepared for Invenergy LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. February 12, 2014.

Simon, S., R. Good, S. Howlin, and M. Ritzert. 2014b. Bird Carcass Monitoring Report for the Bishop Hill Wind Energy Facility: Fall 2013. Prepared for Invenergy LLC. Prepared by Western EcoSystems Technology, Inc. (WEST), Bloomington, Indiana. April 1, 2014.

Stahl, J. T. and M. K. Oli. 2006. Relative Importance of Avian Life-History Variables to Population Growth Rate. Ecological Modelling 198: 23-29. doi: 10.1016/j.ecolmodel.2006.04.001.

Stantec Consulting Services, Inc. (Stantec). 2011. Pre-Construction Avian Survey, Cardinal Point Wind Energy Project, Mcdonough, Warren, and Henderson Counties, Illinois. Prepared for EcoPoint Wind LLC, PortaInd, Oregon. Prepared by Stantec, Cottage Grove, Wisconsin. October 2011.

Stantec Consulting Services, Inc. (Stantec). 2017. 2017 Post-Construction Bat Mortality Monitoring Report, Pioneer Trail Wind Farm, Ford and Iroquois Counties, Illinois. Prepared for Pioneer Trail Wind Farm, LLC, Chicago, Illinois. Prepared by Stantec Consulting, Independence, Iowa. December 22, 2017. 23 pp. + appendices.

Stantec Consulting Services, Inc. (Stantec). 2018 – Avian and Eagle Use Surveys. Cardinal Point Wind Enegery Facility, Warren and McDonough Counties, Illinois. 19 pp.

Stantec Consulting Services, Inc. (Stantec). 2019. Memo: Upland Sandpiper Survey, Cardinal Point Wind Energy Facility, Warren and McDonough Counties, Illinois. Prepared for Capital Power Corporation. Prepared by Stantec. May 31, 2019.

Stantec Consulting Services, Inc. (Stantec). 2021a. 2020 Post-Construction Mortality Monitoring Report Cardinal Point Wind Project Mcdonough and Warren Counties, Illinois. Prepared for Capital Power Corporation, Boston, Massachusetts. Prepared by Stantec Consulting, Independence, Iowa. May 26, 2021.

Stantec Consulting Services, Inc. (Stantec). 2021b. California Ridge Wind Energy Project, Final Habitat Conservation Plan for Indiana Bat, Northern Long-Eared Bat, Little Brown Bat, and Tricolored Bat. Prepared for California Ridge Wind Energy LLC. Prepared by Stantec Consulting, Independence, Iowa. July 13, 2021.

Stantec Consulting Services, Inc. (Stantec). 2021c. Radford's Run Wind Farm 2020 Post-Construction Bat Mortality Monitoring Report, Macon County, Illinois. Prepared for Radford's Run Wind Farm, LLC, c/o RWE Renewables Americas, LLC, Chicago, Illinois. Prepared by Stantec Consulting, Arlington, Virginia. January 29, 2021.

Stantec Consulting Services, Inc. (Stantec). 2022. 2021 Post-Construction Bat and Bird Mortality Monitoring Report, California Ridge Wind Farm, Champaign and Vermilion Counties, Illinois. Project #193705145. Prepared for California Ridge WInd Energy LLC, New York, New York. Prepared by Stantec Consulting, Independence, Iowa. January 26, 2022.

Stantec Consulting Services, Inc. (Stantec). 2023. 2022 Post-Construction Bat Mortality Monitoring Report, Pioneer Trail Wind Farm, Ford and Iroquois Counties, Illinois. Project #193708913. Prepared for Pioneer Trail Wind Farm, LLC, Chicago, Illinois. Prepared by Stantec Consulting, Independence, Iowa. January 25, 2023. 19 pp. + appendices.

Stucker, J., C. Marshall, and J. Bushey. 2023. Post-Construction Monitoring Study for the Ford County Wind Farm (Fka Ford Ridge), Ford County, Illinois. Draft Report: April 1 – October 15, 2022. Prepared for Ford County Wind Farm, LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Golden Valley, Minnesota. January 30, 2023. 23 pp. + appendices.

True, M., A. Hale, A. Ciecka, D. Kobler, J. Pickle, and V. Zero. 2025. Post-Construction Monitoring Study for the Cardinal Point Wind Project. Year 2 Incidental Take Permit Report – 2024. Prepared for Cardinal Point LLC, Boston, Massachusetts. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. February 15, 2025.

US Environmental Protection Agency (USEPA). 2012. Level III and Level IV Ecoregions of Illinois. Ecoregions of the United States. USEPA Office of Research and Development - National Health and Environmental Effects Research Laboratory, Corvallis, Oregon. May 8, 2012. Accessed December 2024. Available online: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-5#pane-11

US Environmental Protection Agency (USEPA). 2013. Level III and Level IV Ecoregions of the Continental United States. Ecosystems Research, USEPA. April 16, 2013. Accessed December 2024. Available online: https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states

Vickery, P. D., D. E. Blanco, and B. Lopez-Lanus. 2010. Conservation Plan for the Upland Sandpiper (*Bartramia longicauda*). Version 1.1. Manomet Center for Conservation Sciences, Manomet, Massachusetts.

Weather Underground. 2024. Wundermap. Home Page. Accessed December 2024. Available online: https://www.wunderground.com/wundermap

Western EcoSystems Technology, Inc. (WEST). 2023. Regional Summaries of Wildlife Fatalities at Wind Facilities in the United States and Canada: 2022 Report from the Renew Database. WEST, Cheyenne, Wyoming. July 1, 2023. Available online: https://connect.west-inc.com/Renew/RenewReport2022.html

Woods, A. J., J. M. Omernik, C. L. Pederson, and B. C. Moran. 2006. Level III and IV Ecoregions of Illinois. EPA/600/R-06/104. Oregon State University, US Environmental Protection Agency (USEPA), National Health and Environmental Effects Research Laboratory, Corvallis, Oregon; US Geological Survey, USEPA, National Health and Environmental Effects Research Laboratory, Corvallis, Oregon; Department of Biological Sciences, Eastern Illinois University, Charleston, Illinois; and Indus Corporation, USEPA, National Health and Environmental Effects Research Laboratory, Corvallis, Oregon. September 2006. Available online: https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/il/il_eco_desc.pdf

Ziolkowski, D. J., Jr., M. Lutmerding, W. B. English, V. I. Aponte, and M.-A. R. Hudson. 2023. North American Breeding Bird Survey Dataset 1966 - 2022. US Geological Survey (USGS) data release. USGS Patuxent Wildlife Research Center, Laurel, Maryland. July 18, 2023. Available online: https://www.sciencebase.gov/catalog/item/64ad9c3dd34e70357a292cee

Appendix A. Wind Facilities with Publicly Available Bird Carcass Count and Bird Fatality Estimates used in the Upland Sandpiper Range-wide Percent Composition Analysis

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Adair (2014 - 2015)	0	108
Adams (2016 - 2017)	0	88
Anonymous Alaska (2013 - 2018)	0	6
Anonymous Colorado 1 (2010)	0	1
Anonymous Colorado 1 (2011)	0	2
Anonymous Illinois (2013 - 2018)	0	1
Anonymous Iowa (2013 - 2018)	0	6
Anonymous Iowa 1 (2011)	0	1
Anonymous Iowa 2 (2012)	0	1
Anonymous Iowa 3 (2012)	0	1
Anonymous Maryland 1 (2012)	0	1
Anonymous Michigan (2013 - 2018)	0	8
Anonymous Minnesota (2013 - 2018)	0	2
Anonymous Missouri (2013 - 2018)	0	1
Anonymous Montana (2013 - 2018)	0	1
Anonymous New York (2013 - 2018)	0	1
Anonymous North Carolina (2013 - 2018)	0	1
Anonymous North Dakota (2013 - 2018)	0	4
Anonymous Oklahoma (2013 - 2018)	0	2
Anonymous Oregon 2 (2009)	0	1
Anonymous Oregon 2 (2012)	0	1
Anonymous Texas 1 (2012)	0	1
Anonymous Wyoming (2013 - 2018)	0	5
Anonymous Wyoming 1 (2010)	0	1
Anonymous Wyoming 1 (2011)	0	1
Anonymous Wyoming 2 (2011)	0	1
Anonymous Wyoming 2 (2012 - 2010)	0	1
Anonymous Wyoming 3 (2009)	0	3
Anonymous Wyoming 3 (2010)	0	5
Anonymous Wyoming 5 (2010)	0	2
Anonymous Wyoming 5 (2011)	0	1
Anonymous Wyoming 6 (2011)	0	5
Anonymous Wyoming 7 (2012)	0	3
Beech Ridge (2012)	0	81
Beech Ridge (2013)	0	96
Big Blue (2013)	0	14
Big Blue (2014)	0	7
Big Smile (2012 - 2013)	0	5
Biglow Canyon I (2008)	0	43
Biglow Canyon I (2009)	0	80
Biglow Canyon II (2009 - 2010)	0	45
Biglow Canyon III (2010 - 2011)	0	40
Biglow Canyon III (2011 - 2012)	0	44
Bingham (2017)	0	34
Bishop Hill (2012)	0	16
Bishop Hill (2013)	0	27
Bishop Hill (2013)	0	1
Bishop Hill (2014)	0	15
Bishop Hill (2015)	0	33
Bitter Ridge (2021)	0	106
Bitter Ridge (2022)	0	95
Black Oak Getty (2017)	0	51

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Black Oak Getty (2018)	0	43
Black Oak Getty (2019)	0	23
Blazing Star (2020)	0	159
Blazing Star (2021)	0	114
Blazing Star II (2021)	0	178
Blue Sky Green Field (2008 - 2009)	0	43
Bluff Point (2021)	0	42
Bluff Point (2022)	0	101
Buffalo Gap I (2006)	0	23
Buffalo Gap II (2007 - 2008)	0	23
Buffalo Mountain (2000 - 2003)	0	64
Buffalo Mountain (2005)	0	11
California Ridge (2013)	0	43
California Ridge (2014)	0	62
California Ridge (2015)	0	33
California Ridge (2021)	0	8
California Ridge (2022)	0	183
Campbell Hill (2014 - 2015)	0	4
Cardinal Point (2020)	0	4
Cardinal Point (2021)	0	41
Cardinal Point (2022)	0	27
Carroll (2014 - 2015)	0	87
Casselman (2008)	0	32
Casselman (2009)	0	33
Cedar Ridge (2009)	0	47
Cedar Ridge (2010)	0	28
Century (2015 - 2016)	3	165
Charles City (2015 - 2016)	0	102
Charles City (2016 - 2017)	0	1
Chopin (2016 - 2017)	0	4
Cohocton/Dutch Hill (2009)	0	18
Cohocton/Dutch Hill (2010)	0	9
Cohocton/Dutch Hill (2013)	0	24
Combine Hills (2004 - 2005)	0	34
Combine Hills (2011)	0	42
Community Wind North (2021)	0	26
Crescent Ridge (2005 - 2006)	0	10
Criterion (2011)	0	261
Criterion (2012)	0	28
Criterion (2013)	0	23
Criterion (2018)	0	25
Crossroads (2022)	0	94
Crowned Ridge II (2021)	0	16
Crystal Lake II (2009)	0	24
Eclipse (2014 - 2015)	0	114
Elkhorn Valley (2008)	0	34
Elkhorn Valley (2010)	0	27
Elkhorn Valley (2013 - 2014)	0	2
Foote Creek Rim (1998 - 1999)	0	63
Foote Creek Rim (1999 - 2000)	0	88
Foote Creek Rim (1999 - 2000)	0	47
Foote Creek Rim (2001 - 2002)	0	26

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Ford County (2022)	0	63
Forward Energy Center (2008 - 2010)	0	24
Fowler (2014)	0	16
Fowler (2015)	0	22
Fowler (2016)	0	17
Fowler (2017)	0	10
Fowler (2018)	0	19
Fowler (2019)	0	18
Fowler (2020)	0	18
Fowler (2021)	0	28
Fowler (2022)	0	18
Fowler I (2009)	0	28
Fowler I, II, III (2010)	0	60
Fowler I, II, III (2011)	0	77
Fowler I, II, III (2012)	0	9
Fowler III (2009)	0	3
Freeborn (2021)	2	36
Green River (2022)	0	140
Green River (2023)	1	NA
Groton (2013)	0	23
Groton (2014)	0	13
Groton (2015)	0	7
Hancock (2017)	0	9
Happy Jack (2015 - 2016)	0	4
Happy Jack (2017 - 2018)	0	1
Hay Canyon (2009 - 2010)	0	15
Headwaters (2019)	0	37
Headwaters (2020)	0	115
Headwaters (2021)	0	65
Headwaters (2022)	0	15
Headwaters II (2022)	0	103
Heritage Garden (2012 - 2013)	0	25
Heritage Garden (2013 - 2014)	0	28
High Prairie (2021)	0	51
Highland (2015 - 2016)	9	363
Highland (2016 - 2017)	0	1
Hog Creek (2022)	0	47
Hoopeston (2018)	0	9
Hoopeston (2019)	0	41
Hoopeston (2020)	0	44
Hoopeston (2021)	0	11
Hoopeston (2022)	0	4
Howard (2012)	0	17
Howard (2013)	0	6
Ida Grove (2017 - 2018)	0	250
Intrepid (2015 - 2016)	3	162
Jeffers (2021)	0	32
Jordan Creek (2022)	0	149
Judith Gap (2006 - 2007)	0	26
Kewaunee County (1999 - 2001)	0	25
Kibby (2011)	0	21
Kit Carson (2011 - 2012)	0	14

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Klondike (2002 - 2003)	0	8
Klondike II (2005 - 2006)	0	43
Klondike III (2007 - 2009)	0	194
Klondike III (2007 - 2009)	0	194
Klondike IIIa (2008 - 2009)	0	10
Lake Benton (2021)	0	15
Lake Benton II (2020)	0	254
Lake Benton II (2021)	0	37
Lake Winds (2013 - 2014)	0	17
Lake Winds (2014 - 2015)	0	4
Lakefield (2014)	0	18
Lakefield Wind (2012)	0	66
Laurel (2015 - 2016)	0	93
Laurel Mountain (2011 - 2012)	0	78
Laurel Mountain (2013)	0	41
Laurel Mountain (2014)	0	59
Leaning Juniper II (2011 - 2012)	0	56
Leaning Juniper II (2012 - 2013)	0	54
Llano Estacado (2009 - 2011)	0	1
Locust Ridge II (2009)	0	32
Locust Ridge II (2010)	0	22
Los Vientos I & II (2014 - 2015)	4	312
Los Vientos I & II (2014 - 2015)	4	312
Los Vientos I & II (2015 - 2016)	0	766
Los Vientos I & II (2015 - 2016)	0	766
Lundgren (2014 - 2015)	0	96
Lundgren (2015 - 2016)	0	225
Macksburg (2014 - 2015)	0	72
Macksburg (2015 - 2016)	0	123
Madison (2001 - 2002)	0	6
Maple Ridge (2006)	0	142
Maple Ridge (2007)	0	92
Maple Ridge (2008)	0	97
Mars Hill (2007)	0	22
Mars Hill (2008)	0	21
Meadow Lake I-VI (2021)	0	76
Meadow Lake I-VI (2022)	0	71
Meyersdale (2004)	0	13
Minonk (2013 - 2014)	0	15
Montague (2019 - 2020)	0	80
Morning Light (2014 - 2015)	0	39
Mount Storm (2008)	0	37
Mount Storm (2009)	0	142
Mount Storm (2010)	0	140
Mount Storm (2011)	0	308
Mountaineer (2003)	0	69
Mountaineer (2004)	0	15
Mower County (2021)	0	53
Munnsville (2008)	0	10
New Creek (2018)	0	12
Noble Altona (2010)	0	19
Noble Altona (2011)	0	9

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Noble Bliss (2008)	0	27
Noble Bliss (2009)	0	32
Noble Bliss (2011)	0	5
Noble Chateaugay (2010)	0	28
Noble Clinton (2008)	0	23
Noble Clinton (2009)	0	24
Noble Ellenburg (2008)	0	22
Noble Ellenburg (2009)	0	21
Noble Wethersfield (2010)	0	18
Nobles 2 (2021)	1	73
North Allegheny (2011)	0	30
North Allegheny (2021)	0	19
NPPD Ainsworth (2006)	1	38
Oakfield (2016)	0	50
Oakfield (2017)	0	71
O'Brien (2017 - 2018)	0	29
Odell (2016 - 2017)	0	14
Oklahoma Wind Energy Center (2004 - 2005)	0	11
Palmer's Creek (2019)	0	1
Panhandle I & II (2016 - 2017)	3	249
Pantex (2009 - 2011)	0	1
Pantex (2015 - 2017)	1	28
Passadumkeag (2016)	0	31
Pebble Springs (2009 - 2010)	0	20
Pilot Hill (2017)	0	70
Pilot Hill (2018)	0	70
Pinnacle (2012)	0	54
Pinnacle (2013)	0	8
Pioneer Prairie II (2011 - 2012)	0	11
Pioneer Prairie II (2013)	0	2
Pioneer Prairie II (2014)	0	3
Pioneer Trail (2012 - 2013)	0	18
Pioneer Trail (2013 - 2014)	0	9
Pioneer Trail (2017)	0	6
Pioneer Trail (2022)	0	4
Pleasant Valley (2016 - 2017)	0	16
Pomeroy (2015 - 2016)	0	159
Prairie Rose (2014)	0	4
Prairie Winds SD1 (2011 - 2012)	2	53
Prairie Winds SD1 (2012 - 2013)	1	57
Prairie Winds SD1 (2013 - 2014)	1	27
PrairieWinds ND1 (2010)	0	56
PrairieWinds ND1 (2011)	1	45
Radford's Run (2019)	0	17
Radford's Run (2020)	0	28
Rail Splitter (2012 - 2013)	0	5
Rattlesnake Road (2009 - 2010)	0	13
Rattlesnake Road (2010 - 2011)	0	15
Record Hill (2012)	0	53
Record Hill (2014)	0	97
Record Hill (2016)	0	38
Red Canyon (2006 - 2007)	0	30

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Red Hills (2012 - 2013)	0	4
Red Pine (2018)	0	80
Rolling Hills (2014 - 2015)	3	177
Rolling Hills (2015 - 2016)	0	261
Rollins (2012)	0	9
Rollins (2014)	0	28
Rosewater (2021)	0	57
Rosewater (2022)	0	64
Roth Rock (2011)	0	35
Sheffield (2012)	0	35
Shepherds Flat Central (2013 - 2014)	0	187
Shepherds Flat North (2013 - 2014)	0	228
Shepherds Flat South (2013 - 2014)	0	143
Silver Sage (2014 - 2015)	0	2
Silver Sage (2015 - 2016)	0	1
Silver Sage (2017 - 2018)	0	1
Spion Kop (2015)	0	4
Spion Kop (2016)	0	2
Spion Kop (2017)	0	13
Spruce Mountain (2012)	0	5
Spruce Mountain (2014)	0	35
Star Point (2010 - 2011)	0	13
Steel Winds I & II (2012 - 2013)	0	11
Steel Winds I & II (2013)	0	28
Steel Winds I (2007)	0	24
Stetson II (2014)	0	17
Stetson Mountain I (2009)	0	39
Stetson Mountain I (2011)	0	9
Stetson Mountain I (2013)	0	32
Stetson Mountain II (2010)	0	11
Stetson Mountain II (2012)	0	5
Stoneray (2019)	1	47
Sugar Creek (2022)	0	37
Thunder Spirit (2016 - 2017)	0	27
Timber Road (2022)	0	120
Timber Road II (2011)	0	26
Timber Road II (2013)	0	144
Timber Road II (2014)	0	126
Timber Road II (2015)	0	63
Timber Road II (2017)	0	51
Timber Road II (2018)	0	7
Timber Road III (2017)	0	135
Top Crop I and II (2012 - 2013)	0	32
Top of Iowa (2003)	0	2
Top of Iowa (2004)	0	10
Top of the World (2010 - 2011)	0	53
Top of the World (2011 - 2012)	0	36
Top of the World (2012 - 2013)	0	36
Top of the World (2014 - 2015)	0	8
Top of the World (2015 - 2016)	0	8
Twin Groves (2009)	0	39
Twin Groves I & II (2007 - 2009)	0	35

Appendix A. Wind facilities with publicly available bird carcass count and bird fatality estimates used in the upland sandpiper range-wide percent composition analysis.

Project Name	Total Upland Sandpipers Found	Total Birds Found
Vansycle (1999)	0	12
Victory (2014 - 2015)	0	39
Vienna I (2015 - 2016)	0	147
Vienna II (2015 - 2016)	0	9
Walnut (2014 - 2015)	0	39
Waverly Wind (2016 - 2017)	4	136
Wellsburg (2015 - 2016)	0	174
Wessington Springs (2009)	0	30
Wessington Springs (2010)	1	12
Wheat Field (2009 - 2010)	0	7
Wheat Field (2010 - 2011)	0	5
Wildcat (2013)	0	18
Wildcat (2015)	0	16
Wildcat (2016)	0	19
Wildcat (2017)	0	15
Wildcat (2018)	0	18
Wildcat (2019)	0	6
Wildcat (2020)	0	3
Wildcat (2021)	0	4
Wildcat (2022)	0	4
Willow Creek (2009 - 2010)	0	21
Willow Creek (2010 - 2011)	0	14

Appendix B. Implementing Agreement

Implementing Agreement
Conservation Plan for Upland Sandpiper

Cardinal Point Wind Project
McDonough and Warren Counties, IL

The Illinois Department of Natural Resources (IDNR) is responsible for the review of this Conservation Plan and for subsequent issuance of the ITA. Upon approval of the Conservation Plan and issuance of the ITA, Cardinal Point LLC (Applicant) will be responsible for meeting the terms and conditions of the ITA and will allocate sufficient personnel and resources to ensure the effective implementation of the plan. The Applicant will oversee all avoidance, minimization, and monitoring efforts identified within the Conservation Plan. Furthermore, The Applicant will be responsible for planning, contract execution, and construction supervision for the entire project.

The Applicant will implement this Conservation Plan in coordination with the IDNR. The Applicant will be responsible for the plan's implementation, planning, and coordination with IDNR as specified in the plan as required in the ITA. The Applicant will retain a lead consultant who will be responsible for coordinating and overseeing any onsite work that requires knowledge, skills, and expertise related to the listed species.

The schedule for implementation of monitoring, mitigation, and adaptive management is detailed in the Conservation Plan. The Applicant will report any upland sandpiper carcasses to IDNR within 48 hours once positive species identification has been determined or within 72 hours for suspected carcasses.

The Applicant will obtain the required federal and Illinois permit(s) to conduct the monitoring plan. All federal and state laws, regulations, permits, and commitments will be adhered to.

The Applicant hereby certifies that is has authority and funding to continue operating this project and to implement all proposed conservation measures included in this Conservation Plan for the state-listed species covered by the ITA. The Applicant is in charge of this project and assures that all applicable federal, state, and local laws will be adhered to during the completion of the project.

The Applicant reserves the right to relinquish the ITA prior to expiration by providing 30 days advance written notice to the IDNR. The Applicant may surrender the ITA by returning it to the IDNR along with a written statement of its intent to surrender and cancel the ITA. The ITA shall be deemed void and canceled upon receipt of the permit by the IDNR. The Conservation Plan may be amended or modified with the written consent of both the Applicant and IDNR. The terms the Conservation Plan and ITA are not intended to run with the land, and will not bind the existing owners of covered lands or subsequent purchasers of the project or covered lands unless such parties agree in writing to become bound by the Conservation Plan and ITA.

The individual who will oversee implementation of the conservation plan as required by the ITA is:

Robert Suttis
Director, Operations Renewables US
Suite 940 - 2398 E Camelback Road
Phoenix, AZ, USA, 85016

The undersigned certify that they have the legal authority to carry out the obligations and responsibilities set forth in this agreement and Conservation Plan.

Signature: _____ Date: June 3, 2025

Robert Suttis, Director, Operations Renewables US
Cardinal Point LLC

Illinois Department of Natural Resources
CONSERVATION PLAN
(Application for an Incidental Take Authorization)
Per 520 ILCS 10/5.5 and 17 Ill. Adm. Code 1080

PROJECT APPLICANT:

Cardinal Point LLC, a wholly owned subsidiary of Capital Power Corporation
Suite 1200, 10423 101 Street NW
Edmonton AB T5H 0E9
Canada
Primary Contact: Jennifer Schroeder

PROJECT NAME: Cardinal Point Wind Project

COUNTY: McDonough and Warren Counties, Illinois

AREA OF IMPACT (acreage): 46,155

Illinois Conservation Plan – Required Elements
Data provided in the Cardinal Point Wind Project (Project) Black-billed Cuckoo Conservation Plan (BBCCP) and Habitat Conservation Plan (HCP) for the Cardinal Point Wind Farm satisfies the following required elements needed for preparation of the State Conservation Plan. Cardinal Point LLC, a wholly owned subsidiary of Capital Power Corporation (Applicant) requests a 22-year Incidental Take Authorization (ITA) for the Illinois state-listed black-billed cuckoo and a 6-year ITA for the federal and Illinois state-listed Indiana bat and northern long-eared bat. It is the intent of the Applicant to use the BBCCP and the federal HCP, along with this document, to satisfy the requirements for an ITA from the State of Illinois. The 60-turbine project is already built and operating and take of the covered species is only anticipated during turbine operation. Project turbines will be curtailed at wind speeds below the cut-in wind speed, down to a minimum of 3.0 m/s, from sunset to sunrise for the entire active season for bats (April 1 – October 15) when the temperature is above 10 degrees (°) Celsius (C). In addition, the Project would test and then implement an optimized curtailment algorithm during periods of peak collision risk to reduce collision exposure by at least 50%. The first two to three years of the ITA would be used to test alternate minimization strategies and choose one for implementation (and potential continued refinement, per adaptive management assessments) in the final years of the ITA (Section 6.2 of the HCP). The Implementing Agreement is included in Appendix A, the BBCCP is included in Appendix B, and the federal HCP for the bat species is included in Appendix C.

The incidental taking of endangered and threatened species shall be authorized by the Illinois Department of Natural Resources (IDNR) only if an applicant submits a Conservation Plan to the IDNR Incidental Take Coordinator that meets the following criteria:

1. A description of the impact likely to result from the proposed taking of the species that would be covered by the authorization, including but not limited to -

A) identification of the **area to be affected** by the proposed action, include a legal description and a detailed description including street address, map(s), and GIS shapefile. Include an indication of ownership or control of affected property. Attach photos of the project area.

Figure 1 in Section 1.1 of the BBCCP shows the Project location relative to the affected townships. Figure 1 in Section 1.3 of the HCP shows the Project location and turbine layout. Shapefiles of the turbine layout and Project boundary have been provided to the State of Illinois. Take of the covered species may occur due to operations at turbines locations.

The Project is located approximately 13 kilometers (eight miles) northwest of Macomb, Illinois. Directions to the Project from Macomb, Illinois: Travel north along Highway 67.

McDonough County:
Township 6N, Range 3W, Sections 6 & 7
Township 6N, Range 4W, Sections 1 & 12
Township 7N, Range 3W, Sections 1-36
Township 7N, Range 4W, Sections 1-2, 11-14, 23-26, & 35-36

Warren County:
Township 8N, Range 3W, Sections 13-36

This Cardinal Point Conservation Plan applies to all lands owned (substation/operations and maintenance [O&M] building) and leased (turbines, access roads, and adjacent properties) by Cardinal Point for the operation of the Project. These lands include the locations of the turbines and associated facilities, as well as a surrounding buffer (based off site-specific eagle data).

The terms of the individual lease agreements vary but the agreements are valid through the anticipated lifespan of the Project. The Project is anticipated to be operational for 30 years (beginning in 2020), after which time it may be repowered or decommissioned.

B) **biological data** on the affected species including life history needs and habitat characteristics.

- Black-billed cuckoo (*Coccyzus erythropthalmus*) – Section 2.1 of the BBCCP
- Indiana Bat (*Myotis sodalis*) – Section 3.1 of the HCP
- Northern Long-eared Bat (*Myotis septentrionalis*) – Section 3.2 of the HCP

In addition to the Indiana bat and northern long-eared bat, the HCP provides biological data for the little brown bat (*Myotis lucifugus*) and the tricolored bat (*Perimyotis subflavus*; Sections 3.3 and 3.4 of the HCP, respectively). Although these species are currently not listed by the State of Illinois, the Applicant is including these species due to the potential for future listing. It is understood that the State of Illinois cannot provide take authorization for these species at this time due to their unlisted status, however, it is assumed that take coverage for little brown bats and tricolored bats would become effective should these species become listed in the future, potentially through an amendment of this ITA. The Applicant will remain in contact with the State of Illinois regarding these species should they become listed during the ITA term.

C) **description of project activities** that will result in taking of an endangered or threatened species, including practices to be used, a timeline of proposed activities, and any permitting reviews, such as a USFWS biological opinion or USACE wetland review. Please consider all potential impacts such as noise, vibration, light, predator/prey alterations, habitat alterations, increased traffic, etc.

See Section 3 of the BBCCP – Description of Project Activities
See Section 2 of the HCP – Project Description and Covered Activities

Timeline of Proposed Activities – The Project is currently built and operating. It is anticipated to continue operations, maintenance, mitigation, and monitoring.

D) explanation of the anticipated **adverse effects on listed species**; how will the applicant's proposed actions impact each of the species' life cycle stages.

Section 4 of the BBCCP includes the anticipated take and impact of take on the black-billed cuckoo.

Section 5 of the HCP includes the anticipated take and impact of take on the Indiana bat, northern long-eared bat, little brown bat, and tricolored bat as a result of the Project.

2. Measures the applicant will take to minimize and mitigate that impact and the funding that will be available to undertake those measures, including, but not limited to –

A) plans to **minimize the area affected** by the proposed action, the estimated **number of individuals** of each endangered or threatened species that will be taken, and the **amount of habitat** affected (please provide an estimate of area by habitat type for each species).

The Project is currently built and operating; there are no new habitat impacts.

Section 4.6 of the BBCCP includes plans to minimize impacts from operation. Section 4.5 of the BBCCP includes take estimates of the black-billed cuckoo.

Section 6.2 of the HCP includes plans to minimize impacts from operation. Section 5.1 of the HCP includes takes estimates for the covered species.

B) **plans for management of the area** affected by the proposed action that will enable continued use of the area by endangered or threatened species by maintaining/re-establishing suitable habitat (for example, native species planting, invasive species control, use of other best management practices, restored hydrology, etc.).

No habitat will be impacted.

C) description of **all measures to be implemented to avoid, minimize, and mitigate** the effects of the proposed action on endangered or threatened species.

- Avoidance measures include working outside the species' habitat.
- Minimization measures include timing work when species is less sensitive or reducing the project footprint.

- Mitigation is additional beneficial actions that will be taken for the species such as needed research, conservation easements, propagation, habitat work, or recovery planning.
- It is the applicants responsibility to propose mitigation measures. IDNR expects applicants to provide species conservation benefits 5.5 times larger than their adverse impact.

Section 4.6 of the BBCCP includes measures to minimize take and mitigate effects from Project operations on black-billed cuckoo.

Section 6.2 of the HCP includes measures to minimize take of covered bat species from Project operations. Section 6.3 of the HCP describes the four mitigation options the Applicant will choose from to mitigate the effects of Project operation on the covered species.

The State of Illinois will be provided any mitigation reports.

D) plans for **monitoring** the effects of the proposed actions on endangered or threatened species, such as species and habitat monitoring before and after construction, include a plan for follow-up reporting to IDNR.

Section 4.7 of the BBCCP summarizes the intensive carcass and incidental monitoring plans from the HCP.

Section 6.4.1, Section 6.4.2, and Section 6.4.3 describe the mitigation, compliance, and acoustic monitoring plans, respectively.

The State of Illinois will be provided any relevant monitoring reports. The Applicant will test different optimized smart curtailment algorithms based on acoustic data and predictor variables collected at the Project (starting with the data gathered in 2022), and will revise these in the initial years of the ITA. The results of monitoring under the short-term ITP are designed to inform risk and identify appropriate minimization measures under a long-term HCP and ITP.

E) **adaptive management practices** that will be used to deal with changed or unforeseen circumstances that affect on endangered or threatened species. Consider environmental variables such as flooding, drought, and species dynamics as well as other catastrophes. Management practices should include contingencies and specific triggers. Note: Not foreseeing any changes does not quality as an adaptive management plan.

See Section 4.8 of the BBCCP – Adaptive Management
See Section 6.5 of the HCP – Adaptive Management
See Section 7 of the HCP – Changed and Unforeseen Circumstances

F) verification that **adequate funding** exists to support and implement all mitigation activities described in the conservation plan. This may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the Conservation Plan.

See Section 4.9 of the BBCCP - Verification of Adequate Funding
See Section 8 of the HCP – Funding

3. A description of alternative actions the applicant considered that would reduce take, and the reasons that each of those alternatives was not selected. A "no-action" alternative" shall be included in this description of alternatives. Please, describe the economic, social, and ecological tradeoffs of each action.

   See Section 5.0 of the BBCCP – Alternatives Considered
   See Section 1.5 of the HCP – Alternatives to Taking

4. Data and information to indicate that the proposed taking will not reduce the likelihood of the survival or recovery of the endangered or threatened species in the wild within the State of Illinois, the biotic community of which the species is a part, or the habitat essential to the species existence in Illinois.

   Occurrences of covered species are not limited to the Project Area. All covered species occur elsewhere in Illinois.

   See BBCCP, Section 2.1.4 – Population Status (Black-billed Cuckoo)
   See HCP, Section 3.1.1 – Status and Distribution (Indiana Bat)
   See HCP, Section 3.2.1 – Status and Distribution (Northern Long-eared Bat)

   All take will be fully offset by the mitigation described in Section 4.6.2 of the BBCCP and Section 6.3 of the HCP.

5. An implementing agreement, which shall include, but not be limited to (on a separate piece of paper containing signatures):

   A) the names and signatures of all participants in the execution of the conservation plan;

   B) the obligations and responsibilities of each of the identified participants with schedules and deadlines for completion of activities included in the conservation plan and a schedule for preparation of progress reports to be provided to the IDNR;

   C) certification that each participant in the execution of the conservation plan has the legal authority to carry out their respective obligations and responsibilities under the conservation plan;

   D) assurance of compliance with all other federal, State and local regulations pertinent to the proposed action and to execution of the conservation plan;

   E) **copies of any final federal authorizations for a taking already issued to the applicant**, if any.

   See Appendix A – Implementing Agreement.

PLEASE SUBMIT TO: Incidental Take Authorization Coordinator, Illinois Department of Natural Resources, Office of Resource Conservation, Division of Natural Heritage, One Natural Resources Way, Springfield, IL, 62702 OR DNR.ITAcoordinator@illinois.gov

Appendix A. Implementing Agreement

Implementing Agreement
Conservation Plan for Black-Billed Cuckoo,
Indiana Bat, and Northern Long-eared Bat

Cardinal Point Wind Project
McDonough and Warren Counties, IL

The Illinois Department of Natural Resources (IDNR) is responsible for the review of this Conservation Plan and for subsequent issuance of the ITA. Upon approval of the Conservation Plan and issuance of the ITA, Cardinal Point LLC (Applicant) will be responsible for meeting the terms and conditions of the ITA and will allocate sufficient personnel and resources to ensure the effective implementation of the plan. The Applicant will oversee all avoidance, minimization, and monitoring efforts identified within the Conservation Plan. Furthermore, The Applicant will be responsible for planning, contract execution, and construction supervision for the entire project.

The Applicant will implement this Conservation Plan in coordination with the IDNR. The Applicant will be responsible for the plan's implementation, planning, and coordination with IDNR as specified in the plan as required in the ITA. The Applicant will retain a lead consultant who will be responsible for coordinating and overseeing any onsite work that requires knowledge, skills, and expertise related to the listed species.

The following schedule is planned for implementation of turbine cut-in speeds and feathering protocols, mitigation, monitoring and progress reports to be provided to the IDNR:

- Implement approved turbine cut-in speeds and feathering protocols – Upon permit issuance
- Summer bat habitat mitigation – timeline varies by mitigation option, see Section 6.3 of the HCP
- Compliance monitoring reports (See Section 6.5 of the HCP) – February 15 following the completion of each year of the ITA term

The Applicant will report any black-billed cuckoo, Indiana bat, or northern long-eared bat carcasses to IDNR within 24 hours once positive species identification has been determined or within 72 hours for suspected carcasses. If listed in the future, the Applicant will also promptly report any little brown bat or tricolored bat carcasses to IDNR.

The Applicant will obtain the required federal and Illinois permit(s) to conduct the monitoring plan. All federal and state laws, regulations, permits, and commitments will be adhered to. The Applicant is working with USFWS to obtain a federal ITP. A copy of this will be provided to IDNR when available.

The Applicant hereby certifies that is has authority and funding to complete this project and to implement all proposed conservation measures included in this Conservation Plan for the three state-listed species covered by the ITA. The Applicant is in charge of this project and assures that all applicable federal, state, and local laws will be adhered to during the completion of the project. Federal authorizations for taking of listed species will also be obtained for this project.

The Applicant reserves the right to relinquish the ITA prior to expiration by providing 30 days advance written notice to the IDNR. The Applicant may surrender the ITA by returning it to the IDNR along with a written statement of its intent to surrender and cancel the ITA. The ITA shall be deemed void and canceled upon receipt of the permit by the IDNR. The Conservation Plan may be amended or modified with the written consent of both the Applicant and IDNR. The terms the Conservation Plan and ITA are not intended to run with the land, and will not bind the existing owners of covered lands or subsequent

purchasers of the project or covered lands unless such parties agree in writing to become bound by the Conservation Plan and ITA.

The individual who will oversee implementation of the conservation plan as required by the ITA is:

Greg Milne
Senior Consultant, Environment
Suite 1200, 10423 101 Street NW
Edmonton AB T5H 0E9
Canada

The undersigned certify that they have the legal authority to carry out the obligations and responsibilities set forth in this agreement and Conservation Plan.

Signature: _____ Date: June 6, 2023

Greg Milne, Senior Consultant, Environment
Cardinal Point LLC

Appendix B. Black-billed Cuckoo Conservation Plan

Black-billed Cuckoo Conservation Plan - DRAFT
for the Cardinal Point Wind Project
McDonough and Warren Counties, Illinois

Cardinal Point LLC

Capital Power Corporation
155 Federal Street, Suite 1200
Boston, Massachusetts 02110

In consultation with:

Western EcoSystems Technology, Inc.

415 West 17th Street, Suite 200
Cheyenne, Wyoming 82001

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION

Cardinal Point LLC (the Applicant), a wholly owned subsidiary of Capital Power Corporation (Capital Power) owns and operates the Cardinal Point Wind Project (Project) in McDonough and Warren counties, Illinois (Figure 1). The Project is located on private land. Commercial operation of the Project began in March 2020. The Applicant developed a Bird and Bat Conservation Strategy (BBCS) to minimize and avoid potential impacts to birds and bats at the Project. To monitor the Project's impacts on bird and bat species, the BBCS proposed fall post-construction mortality for the first two years of operation. Due to concerns regarding higher than anticipated bat fatalities in 2020 (Stantec Consulting Services, Inc. [Stantec] 2021) and in 2021 (Chodachek et al. 2021), the Applicant has been coordinating with the US Fish and Wildlife Service (USFWS) on options for compliance with the Endangered Species Act (ESA) and is developing a Habitat Conservation Plan (HCP) to support a request for an Incidental Take Permit (ITP) for federally listed bat species. In 2021, the Applicant requested a Technical Assistance Letter (TAL) from the USFWS, which was received on September 30, 2021. In 2022, the Applicant requested a revised TAL from the USFWS, which was received on April 27, 2022. Additionally, the Applicant contracted Western EcoSystems Technology, Inc. (WEST) to conduct a third year of PCMM at the Project in 2022, as part of their conservation measures.

On September 23, 2022, during the third year of the post construction monitoring, a black-billed cuckoo (*Coccyzus erythropthalmus*) carcass was found. The black-billed cuckoo (*Coccyzus erythropthalmus*) is state-listed as threatened in Illinois by the Illinois Department of Natural Resources (DNR). The Applicant is applying for an Incidental Take Authorization (ITA) from the state for Project operation. This Black-billed Cuckoo Conservation Plan for the Project has been developed to assess the potential for this bird species to occur in or near the Project area, estimate the potential impacts to the black-billed cuckoo from Project operation, and outline the avoidance and minimization measures developed for the Project. Once the HCP for the bat species has been developed through coordination with the USFWS, this Conservation Plan will be amended to address the state-listed bat species.

1.1 Project Description

The Project is a renewable energy generation facility that consists of 60 wind turbines and associated infrastructure with a total generating capacity of 150 megawatts (MW). The Project consists of General Electric 48 – 2.8MW turbines and 12 – 2.5MW turbines wind turbine generators (turbine) and their associated infrastructure (overhead 115-kilovolt generator tie transmission line, access roads, a collector substation, an operation and maintenance facility, and one permanent meteorological tower). Each turbine has a 127-meter (m; 417-foot [ft]) rotor diameter and a hub height of 89 m (291 ft). The maximum height of the turbines from tower base to highest blade tip is 152 m above ground level.

The Project area is largely cultivated cropland, with corn and soy bean production as the dominant crops. Trees are sparsely distributed and typically restricted to small clusters along stream corridors.

Figure 1. Location of the Cardinal Point Wind Energy Project in McDonough and Warren Counties, Illinois.

2.0 BIOLOGICAL DATA OF AFFECTED SPECIES

2.1 Black-billed Cuckoo

2.1.1 Migration

The black-billed cuckoo is a long-distance nocturnal migrant assumed to migrate over vast areas without stopping (Hughes 2020). The species engages in a short nomadic period after spring migration during which food resources are evaluated (Nolan and Thompson 1975). Individuals are commonly observed outside this species' breeding range during this period (Hughes 2020). During fall migration, individuals are inconspicuous and do not typically migrate in large groups (Robbins 1991).

Generally, black-billed cuckoos begin to arrive on breeding grounds in the central United States (U.S.) from late April to early May, and the number of arrivals peaks during mid-May. Timing of migration can be highly irregular, and spring migrants can arrive as late as early June in the Midwestern U.S. (Hughes 2020). Much less is known about the timing of fall migration. Generally, migrants begin to depart breeding sites in the Midwest in late August, and peak departure occurs in late September or early October (Hughes 2020). Individuals are known to linger as late as October 31 in Illinois (Bohlen 1989) and November 13 in Ohio (Peterjohn 1989).

2.1.2 Breeding

Although no specific data are available for black-billed cuckoo, female yellow-billed cuckoo (*Coccyzus americanus*) appear to breed in their first year (Laymon 1998), and given that the species are closely related, it is likely that female black-billed cuckoo follow the same pattern. The onset of black-billed cuckoo nesting has been correlated with the emergence of invertebrates, and timing of first clutch is variable as it is associated with food availability. Peak breeding activity has been related to peak numbers of annual cicadas and caterpillar emergence, and the delayed onset of nesting may result from the delayed emergence of caterpillars (Hughes 2020). Generally, nesting occurs in the Midwestern U.S. from late May to late June, but active nests have been recorded as late as mid-September (Eastman 1991). Eggs have been recorded in Illinois as early as May 7 and as late as July 20 (Bent 1940). Little is known about how often cuckoos raise 2 broods in a year, and black-billed cuckoos are generally assumed to raise 1 brood/year. Records of eggs in late summer are suspected to be late first broods associated with late-season emergence of prey populations (Pistorius 1985).

Clutch size for black-billed cuckoo is most often 2 to 3 eggs, rarely 4 or 5. Nests with 6 or more eggs likely include multiple females laying in a single nest (Bent 1940). Cuckoos are brood parasites that may lay eggs in other black-billed cuckoo nests, and occasionally in other species nests. (e.g., yellow-billed cuckoo; Hughes 2020). Eggs are usually laid every second day, but intervals of 1 to 4 days have been reported. Because incubation begins after the first egg is laid, estimates of length of incubation are variable, and range from 10 to 11 days (Hughes 2020). Incubation that begins with the first egg also results in nestlings at different phases of development within the same nest. Most young depart the nest at 6 to 7 days but are unable to fly until

approximately 3 weeks of age (Hughes 2020). During this stage, young climb through branches and run along the ground, and individuals have been found up to 2.1 km (1.3 mi) from the nest site before they were capable of flight (Sealy 1985). Because young are accompanied and fed by adults during this stage, fledging is estimated to occur at 21 to 24 days when young can fly (Jauvin and Bombardier 1996), although age at which juveniles are able to feed on their own is not known (Hughes 2020).

2.1.3 Post-Breeding Dispersal and Lifespan

After departure from the nest, but before independence, the adults may divide the brood to reduce competition from larger siblings (Sealy 1985), likely resulting in a relatively large area required for post-breeding dispersal of a given brood. After fledging, both adults and juveniles disperse widely in search of food (Jauvin and Bombardier 1996). The average lifespan of the black-billed cuckoo is not well documented; however, based on the small amount of data available from banded cuckoos, it is thought they have relatively short lives, up to 4 or 5 years (de Magalhaes et al. 2005, Hughes 2020).

2.1.4 Population Status

The black-billed cuckoo experienced population declines throughout North America during the twentieth century, particularly during the 1980s and 1990s (Hughes 2020). From 1966-2021, populations in the U.S., as reported in the North American Breeding Bird Survey declined by 1.4%/year (95.0% CI = 0.7 – 2.0%/year; *n* = 1,328 routes; Sauer et al. 2022), while trends for Illinois declined by 3.3%/year (95.0% CI = 1.1 – 5.7%/year; *n* = 61 routes; Sauer et al. 2022).

Local abundance may be highly variable from year to year. Since cuckoo populations have been correlated with irruptions of cicadas (Nolan and Thompson 1975) and caterpillars (Jauvin and Bombardier 1996), there can be large increases in local populations from immigration during insect irruptions. Thus, black-billed cuckoo may become locally common in areas where, in most years, it is rare. The nomadic nature of the black-billed cuckoo, even during the breeding season, can result in population estimates that fluctuate annually (Hughes 2020). Thus, long-term trends provide the best insight into population dynamics for this species.

Black-billed cuckoos were considered a common summer resident in northern Illinois in the early 1900s, but the population has declined since then, due to loss of nesting habitat, such as orchards and hedgerows (Kleen et al. 2004). Breeding bird survey data indicate the species has always been more common in northern Illinois, with decreasing abundance observed in southern Illinois. The species is currently considered a common migrant and an uncommon summer resident in Illinois, with lower abundance occurring in southern Illinois (Kleen et al. 2004; IDNR 2021). As of 2020, there are estimated to be approximately 880,000 black-billed cuckoos breeding in North America, with approximately 380,000 breeding in the U.S., and approximately 3,300 breeding in Illinois (Partners in Flight 2020).

Raw breeding bird survey (BBS) data from 1966 – 2021 (Sauer et al. 2022) were reviewed to determine if there were areas of concentrated black-billed cuckoo records during the breeding season and if BBS routes near the Project contained black-billed cuckoo observations. The BBS

uses established routes on public roads, resulting in a long-term bird survey throughout the U.S., Canada, and Mexico.

Statewide, 158 black-billed cuckoo detections were recorded over 2,464 survey routes during the most recent 30-year period (1991 – 2021) for an average of 0.06 black-billed cuckoo/route (Table 1). Surveys were not conducted in 2020 due to travel restrictions related to the pandemic. Over the most recent 5 years of data (2016 – 2021), 16 black-billed cuckoos were recorded over 427 survey routes for an average of 0.04 black-billed cuckoo/route.

During the most recent 5 years, black-billed cuckoos were detected on 9 survey routes, and black-billed cuckoos were detected on the same survey route twice in the 5-year period (Route 25; Figure 2).

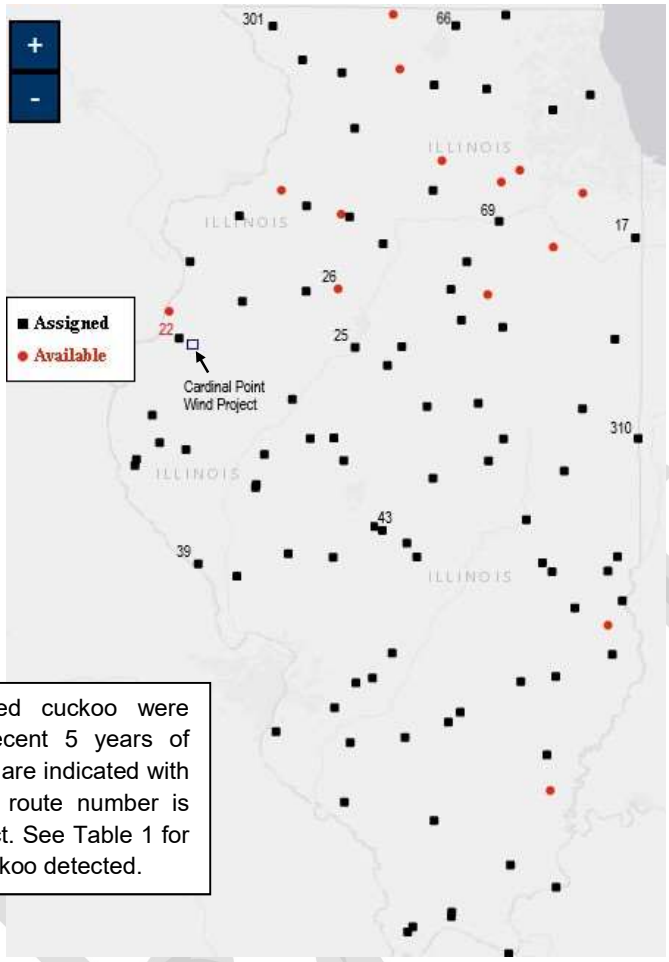
The closest BBS route to the Project is the Terre Haute Route (number 22), which is located approximately 13.1 km (8.2 mi) to the northwest of the Project area. One black-billed cuckoo was recorded in 1997, and the most recent observation, recorded in 2003, was also of 1 bird. The route has been surveyed consistently, with the most recent survey conducted in 2021.

In summary, breeding black-billed cuckoos are uncommon in Illinois. Based on the route-level analysis for the Project, black-billed cuckoos are infrequent breeders on BBS routes in Illinois, including those routes in the vicinity of the Project.

Table 1. Black-billed cuckoo observations by breeding bird survey route for Illinois 1991 – 2021 from Sauer et al. (2022). Surveys were not conducted in 2020. Years listed in table include only the years where black-billed cuckoos were observed on the referenced route during the analysis period. Does not include years when the target species was not observed or routes where the target species were never observed.

Route number	Year	Count
1	1991	1
	1992	1
2	1993	1
	2002	2
	2006	1
	2007	2
3	2008	3
4	1993	1
5	1991	1
8	1992	1
	1993	1
	1994	1
	2013	3
10	1994	1
	1995	4
	1997	1
	2004	1
11	1991	1
13	1992	1
14	1997	1
17	2019	1
18	1991	1
19	1991	1
22*	1997	1
	2003	1
24	1991	1
	1992	1
	2010	1
25	1993	2
	1994	1
	1995	1
	1999	1
	2003	2
	2004	1
	2005	1
	2007	1
	2014	2
	2016	2
	2018	2
	2019	1
26	2016	1
27	1994	2
	1997	2
34	2007	2
35	1992	2
	1994	5
	1998	1
37	1992	1
	1994	1
	1996	1
38	1991	3
	1992	3
	1995	1
	1996	2
	1997	1
	1998	3
	1999	1
	2001	3
	2002	1
	2003	5
	2004	1
	2008	1
	2011	2
39	2016	1
40	1993	1
41	2003	3
	2004	2
	2011	1
43	2018	1
44	1999	1
45	2001	1
46	1991	1
	2004	1
47	2006	1
	2007	1
51	2003	1
	2007	1
52	1993	1
58	1992	1
60	1996	1
66	1993	2
66	2005	2
	2008	2
	2015	1
69	2016	2
	2021	2
74	2007	1
75	1998	1
	2002	2
	2004	2
75	2007	1
77	2011	1
	2015	1
	2000	1
77	2001	1
301	2004	1
	2008	1
301	2019	1
302	2002	1
	2003	2
	2006	2
302	2007	3
304	2008	1
	2009	1
	2010	1
305	2015	1
310	2019	2
Total		**158**

*Closest BBS route to Project



Routes where black-billed cuckoo were detected in the most recent 5 years of surveys from 2016 - 2021 are indicated with black route number; red route number is route closest to the Project. See Table 1 for number of black-billed cuckoo detected.

Figure 2. Breeding bird survey route locations in Illinois, designated as either available (not currently surveyed) or currently assigned for survey.

2.1.5 Habitat Requirements

Black-billed cuckoos use a wide range of habitats but are most commonly associated with groves of trees, woodland edges, and thickets and are less likely to use suburban areas (Kleen et al. 2004; Hughes 2020; Illinois Department of Natural Resources [IDNR] 2021). Nests are generally well concealed and have been observed in both coniferous and deciduous trees, as well as shrubs (Spencer 1943). Trends in habitat use across breeding bird atlas records suggest that black-billed cuckoos will nest in habitats associated with water or marshy areas and use trees that typically form thickets such as willow, alder, birch, and beech (Spencer 1943; Hughes 2020). Nests are usually placed 1 to 2 meter (m; 3.3 to 6.6 feet [ft]) above ground (Hughes 2020), but have been documented among weeds as low as 0.6 m (2 ft) and as high as 13.5 m (44 ft) in trees (Hughes 2020).

It is unknown if black-billed cuckoos are territorial, but during the breeding season cuckoos are observed alone or in breeding pairs (Hughes 2020). Freemark and Merriam (1986) hypothesized that home range size is 2 – 5 hectares (ha; 5 – 12 acres [ac]).

Little is known about habitat use during migration; it is assumed to be similar to breeding habitat (Hughes 2020). Fall migrants usually begin arriving in Illinois from the north in August (IDNR 2021), with departures peaking between late September and early October (Eastman 1991).

2.1.6 Species Status in the Project Area

2.1.6.1 Pre-construction Surveys

Black-billed cuckoos were not detected at the Project area during pre-construction avian use surveys.

2010-2011 Avian Use Surveys

Pre-construction roadside count surveys were conducted by Stantec from April 2010 – February 2011, including a total of 15 two-day survey events at 64 point count stations (Stantec 2011). Avian use survey results included 29,703 individual birds encompassing 102 species. Four species (3.9% of all species) comprised 49% of the observations: red-winged blackbird (*Agelaius phoeniceus*), horned lark (*Eremophila alpestris*), common grackle (*Quiscalus quiscula*), and non-native European starling (*Sturnus vulgaris*).

No federally-listed threatened or endangered bird species were detected. Two Illinois state-listed endangered species, the northern harrier (*Circus cyaneus*) and upland sandpiper (*Bartramia longicauda*), were observed on multiple occasions during the surveys. Black-billed cuckoos were not detected within the Project area (Stantec 2011).

2015 - 2018 Avian Use Surveys

Avian use surveys were conducted within the Project area by Stantec from July 30, 2015, through August 24, 2018 (Stantec 2018). Twenty-four randomly located survey points were surveyed 24 times for 5 minute periods within a 100 m (328 ft) radius. Avian use survey results included 5,851 individual birds encompassing 75 species. Five species (6.7% of all species) comprised 61.9% of the observations: red-winged blackbird, snow goose (*Chen caerulescens*), brown-headed cowbird (*Molothrus ater*), horned lark, and dickcissel (*Spiza Americana*).

No federally-listed threatened or endangered bird species were detected. Three Illinois state-listed endangered species, the northern harrier, short-eared owl (*Asio flammeus*), and upland sandpiper, were observed on multiple occasions during the surveys. Black-billed cuckoos were not detected within the Project area (Stantec 2018).

2.1.6.2 Black-billed Cuckoo Habitat Evaluation

The Project is within the Western Dissected Illinoian Till Plain Level IV Ecoregion (US Environmental Protection Agency 2012a, 2012b). The Western Dissected Illinoian Till Plain Level IV Ecoregion is a well dissected till plain that was historically covered with a mosaic of prairie and forest. Today, native prairies have been replaced with agriculture, primarily cropland and pastureland (Woods et al. 2006).

The Project is located within the known range of the black-billed cuckoo. Approximately 124 ha (306 ac) of forest are found scattered along stream corridors accounting for approximately 0.7% of the Project area (Table 2). These isolated woodland areas may provide habitat for black-billed cuckoos.

Table 2. Land cover types, coverage, and percent composition within the Cardinal Point Wind Project Permit Area, McDonough and Warren counties, Illinois.

Land Cover Type	Coverage (hectares)	Coverage (acres)	Percent Composition
Cultivated Crops	17,340	42,849	92.8
Developed	788	1,948	4.2
Hay/Pasture	420	1,039	2.3
Forest	124	306	0.7
Barren Land	4	9	<0.1
Open Water	1	3	<0.1
Herbaceous	<1	1	<0.1
Total[1]	**18,678**	**46,155**	**100.0**

Source: National Land Cover Database 2019.

[1] Sums can differ from total values shown due to rounding.

2.1.6.3 Black-billed Cuckoo Carcass Detections and Correlates of Risk

During multiple years of post-construction monitoring, one black-billed cuckoo carcass was detected at the Project (Table 3). To understand if risk could be identified for black-billed cuckoos based on information from carcass detections, the spatial (i.e., location) and temporal (i.e., timing) information associated with carcasses in the context of life history and habitat preferences of black-billed cuckoo was examined. Only one carcass was detected; therefore, limited inference can be drawn regarding spatial and temporal correlates of risk. The carcass detected was not at a turbine near woodlands.

Collisions of nocturnal migrants with towers are hypothesized to be influenced by the type of lighting on the structure and weather conditions, specifically the presence of fog or low clouds (Bevanger 1994, Shire et al. 2000, Gehring et al. 2009). Comparing the fatality rate of birds near lighted and non-lighted turbines indicates that the red blinking lights required by the Federal Aviation Administration (FAA) on wind turbines do not create a strong attractant (Kerlinger et al. 2010). Thunderstorms occurred during the estimated dates when the fatality occurred (Table 2). The cuckoo was estimated to have a time of death one to two days prior to being found on September 23, 2022 and thunderstorms occurred in the area early the morning of September 21 (Weather Underground 2023). Thus, the carcass discovery was potentially related to an inclement weather event typically associated with bird collision risk at structures (Bevanger 1994; Shire et al. 2000; Gehring et al. 2009).

Table 3. Post-construction monitoring surveys and black-billed cuckoo carcasses at the Cardinal Point Wind Project.

Survey Time Period	Date of Black-billed Cuckoo Found	Turbine Number	Age	Habitat at Turbine (≤328 ft)	Weather During Night of Estimated Occurrence
Fall 2020[1]	None	NA[2]	NA	NA	NA
Fall 2021[3]	None	NA	NA	NA	NA
Fall 2022[3]	September 23, 2022	30	NA	Agriculture	Thunderstorm, September 21 Clear, September 22

[1] Monitoring conducted by Stantec Consulting Inc. (Stantec 2021)

[2] NA: not applicable

[3] Monitoring conducted by Western EcoSystems Technology, Inc. (Chodachek et al. 2021; Chodachek et al. 2023)

3.0 DESCRIPTION OF PROJECT ACTIVITIES

3.1 Activities with Potential for Incidental Take

Authorization is requested to permit take that may occur incidental to the continued commercial operation of the Project turbines.

3.2 Timeline

Commercial operation of the Project began in March 2020. CRWE proposes to continue to operate the Project for up to 25 years, through 2045. Therefore, the requested permit term is for 22 years, from 2023 – 2045.

3.3 Other Permitting Review

The Project received all necessary permits to construct and operate prior to construction. The wildlife permits received for the Project include:

- USFWS Native Endangered & Threatened Species Recovery Endangered and Threatened Wildlife Permit - TE234121-9
- IDNR Endangered and Threatened Species Permit - 10875 and 15131
- IDNR Scientific Permit - NH21.6581, NH21.6584, NH21.6585, and NH21.6596, NH22.6820, and NH22.6821

During post-construction monitoring, bird carcasses were not handled or collected because a Federal Migratory Bird Special Purpose – Utility Permit was not obtained; rather, bird carcasses were marked discreetly (e.g., paint on foot and beak of carcass) so it could be easily identified by searchers and other personnel, to ensure they were not recorded again.

The Applicant developed a BBCS to minimize and avoid potential impacts to birds and bats at the Project in 2020. The Applicant has been coordinating with the USFWS on options for compliance

with the ESA and is developing a HCP to support a request for an ITP for listed bats. Once the HCP for the bat species has been developed through coordination with the USFWS, this Conservation Plan will be amended to address the state-listed bat species

The Applicant has been coordinating with the IDNR throughout the siting, permitting, and operation phases of the Project. On June 7, 2018, the Applicant coordinated with the IDNR using the IDNR's Ecological Compliance Assessment Tool (EcoCAT) to identify state-listed threatened and endangered species with the potential to occur in the project vicinity. The black-billed cuckoo was not identified in the EcoCAT reports.

4.0 POTENTIAL EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES

Although there is some potential breeding habitat in the Project area (Figure 4), it is scarce, and the Project is located in a portion of the overall black-billed cuckoo range with relatively low abundance during the breeding season (Section 2.1.4). As described in Section 2.1.6.1, no black-billed cuckoos were observed during pre-construction avian use surveys. No effects to breeding habitat will occur due operation of the Project because no wooded habitat will be cleared or modified. Additional disturbance or displacement impacts of wind turbines are not expected because no additional turbines or infrastructure are proposed.

Continued operation of the Project may result in the incidental take of black-billed cuckoo through collision with wind turbines. Black-billed cuckoos typically nest and forage at heights below the rotor swept areas, and collision risk is likely greatest during migration. Therefore, migrating individuals would be more likely to be potentially affected by turbine operation, with effects to breeding individuals anticipated to be unlikely or minimal.

4.1 Spatial Patterns

As noted in Table 3, one black-billed cuckoo carcass was detected in September 2022 during post-construction monitoring. The 2022 carcass was a bird of unknown age and the carcass was estimated to have been on the ground for 1 to 2 days before it was discovered, according to the qualified biologists conducting the post-construction monitoring. The carcass was found intact and approximately 111 m (364 ft) from turbine 30. Turbine 30 was located in agricultural habitat and was within approximately 1.4 km (0.9 mi) of woodlands. Other turbines at the Project that were monitored for carcasses were located in similar habitat (agriculture with limited shelterbelts) and black-billed cuckoo carcasses were not detected. Thus, it is unlikely that the turbine where a carcass was detected at the Project is in an area that is attractive to black-billed cuckoos. Inference regarding spatial patterns of collision risk are limited by the small sample of carcasses (n = 1). However, based on the current sample, there is no apparent association of carcass locations to black-billed cuckoo breeding habitat (shelterbelts or woodlots).

4.2 Temporal Patterns

The 2022 carcass discovered at the Project was detected in the latter half of September, which coincides with the fall migration period. While thunderstorms occurred during the estimated dates

when the fatality occurred, there were rain and thunderstorm events without associated discovery of carcasses. It is therefore not possible to identify specific locations or time periods of risk to black-billed cuckoo from the Project, but the small sample of data indicates that risk may occur during fall migration.

4.3 Amount of Habitat Affected

As described in Section 2.1.6.2, there are approximately 124 ha (306 ac) of potential black-billed cuckoo breeding habitat (0.7%) within the approximately 18,678 ha (46,155 ac) Project boundary (Table 1). The Project is already built and operational, and as stated above, impacts to black-billed cuckoo habitat were avoided and minimized during siting and construction. No impacts to black-billed cuckoo habitat will occur during operation of the Project

4.4 Incidental Take of Individuals

A percent composition approach was used to estimate the incidental take of black-billed cuckoos at the Project. This percent composition approach pools carcass data from the Project and other wind energy projects in Illinois to calculate a take estimate for black-billed cuckoos by determining the anticipated percent of all bird carcasses that will be black-billed cuckoos over the 22-year permit period (2023 – 2045). In Illinois, in addition to the one black-billed cuckoo found at the Project, six black-billed cuckoos have been publicly reported (two at the Bishop Hill project, three at the California Ridge project, and one at the Radford's Run project (IDNR 2023). Adding the 72 bird carcasses found over the three years of monitoring at the Project to the 765 bird carcasses documented other PCM studies in Illinois with publicly available data (see Table 4) results in a total denominator for the species composition calculation of 881 birds. Dividing the seven documented black-billed cuckoos by the total of 881 documented bird fatalities results in an Illinois species composition of 0.8%.

Because the Project's post-construction monitoring was designed to focus on bats, no bird fatality estimates were calculated and no searcher efficiency or carcass persistence trials specific to birds have been conducted. Therefore, bird fatality estimates from other Illinois projects with publicly available data were examined to produce a representative range of estimated bird fatality rates for the Project. There are eight PCM studies from wind energy facilities in Illinois with publicly available estimated bird fatality data, with the all-bird fatality estimates ranging from 0.03 birds/MW/study period to 3.1 birds/MW/study period (Table 4).

Table 4. Illinois wind facilities with publicly available bird carcass count and bird fatality estimates used in percent composition analysis.

Project Name[1]	Total birds found	Birds/MW/Study period
Anonymous Illinois (2013 - 2018)	1	NA
Bishop Hill (2013)	28	NA
Bishop Hill (2014)	15	NA
Bishop Hill (2015)	36	NA
California Ridge (2013)	43	0.05
California Ridge (2014)	1	0.03

California Ridge (2015)	61	NA
California Ridge (2021)	8	3.1
Cayuga Ridge (2010 - 2011)	9	0.17
Crescent Ridge (2005 - 2006)	10	NA
Grand Ridge I (2009)	2	0.48
Green River (2022)	140	NA
Hoopeston (2018)	9	NA
Hoopeston (2019)	41	NA
Hoopeston (2020)	44	NA
Hoopeston (2021)	11	NA
Hoopeston (2022)	4	NA
Minonk (2013 - 2014)	15	0.8
Pilot Hill (2017)	70	NA
Pilot Hill (2018)	70	NA
Pioneer Trail (2012 - 2013)	18	NA
Pioneer Trail (2017)	6	NA
Radford's Run (2019)	18	NA
Radford's Run (2020)	28	NA
Rail Splitter (2012 - 2013)	5	0.84
Top Crop I and II (2012 - 2013)	32	1.35
Twin Groves (2009)	39	NA
Twin Groves (2010)	10	NA
Twin Groves I & II (2007 - 2009)	35	NA

[1] Sources:

Project Name	Citation
Anonymous Illinois (2013 - 2018)	Kritz et al. {,2018 #25099}
Bishop Hill (2013)	Ritzert et al. {,2013 #24322}, Simon et al. {,2014 #24321}
Bishop Hill (2014)	Shoener Environmental {,2015 #24751}
Bishop Hill (2015)	Shoener Environmental {,2015 #24756}
California Ridge (2013)	Gruver et al. {,2014 #25865}
California Ridge (2021)	Stantec Consulting Services Inc. {,2022 #36566}
California Ridge I (2013)	Ritzert et al. {,2014 #25367}
Cayuga Ridge (2010 - 2011)	Ritzert et al. {,2012 #9522}
Crescent Ridge (2005 - 2006)	Kerlinger et al. {,2007 #13489}
Grand Ridge I (2009)	Derby et al. {,2010 #13908}
Green River (2022)	Brown et al. {,2023 #36674}
Hoopeston (2018)	Iskali and Pham {,2019 #31460}
Hoopeston (2019)	Rodriguez et al {,2020 #29660}
Hoopeston (2020)	Rodriguez et al. {,2021 #34228}
Hoopeston (2021)	Rodriguez et al. {,2022 #34018}
Hoopeston (2022)	Rodriguez et al. {,2023 #36565}
Minonk (2013 - 2014)	Ritzert et al. {,2014 #8167}
Pilot Hill (2017)	Iskali et al. {,2019 #24963}
Pilot Hill (2018)	Iskali et al. {,2019 #24963}
Pioneer Trail (2012 - 2013)	ARCADIS U.S. {,2013 #19350}
Pioneer Trail (2017)	Stantec {,2017 #25380}
Radford's Run (2019)	Ecology and Environment, Inc. {,2020 #36434}
Radford's Run (2020)	Stantec Consulting Services Inc. {,2021 #36487}
Rail Splitter (2012 - 2013)	Good et al. {,2013 #21889}
Top Crop I and II (2012 - 2013)	Good et al. {,2013 #21890}
Twin Groves (2009)	Johnson et al. {,2010 #2357}
Twin Groves (2010)	Johnson et al. {,2011 #25507}
Twin Groves I & II (2007 - 2009)	Johnson et al. {,2009 #9512}

The all bird fatality estimates (birds/MW/study period) from publicly available Illinois projects was multiplied by the 150 MW associated with the Project, to come up with a general range of annual facility-wide all-bird fatality estimates for the Project of 4.5 – 465 birds/Project/year. The percent composition of black-billed cuckoos based on Illinois data was then multiplied by this range of facility-wide all bird fatality estimates. As shown in Table 5, a range of approximately 0 – 4 black-billed cuckoo take/year is estimated for the Project, with a potential for an average of approximately two black-billed cuckoos taken per year. The Applicant is therefore applying for an ITA to take up to 44 black-billed cuckoos over the 22-year permit term.

Table 5. Estimated take of black-billed cuckoo at the Cardinal Point Wind Project.

Estimated All-Bird Fatality Rate at Project (all birds/year)	Estimated Species Composition of Black-billed Cuckoo	Range of Black-billed Cuckoo Take per Year at Project	Estimated Take of Black-billed Cuckoo over 22 Year Term
4. 5 – 465	0.08%	0 – 3.7	44 (estimated average of 2/year)

4.5 Management of the Affected Area

The Project is already built and operational, and the Applicant will continue to maintain existing turbines and Project infrastructure, including existing gravel access roads and pads through 2045. No impacts to wooded habitat will occur during operation of the Project, and continued operation

of the Project will not affect the ability of the black-billed cuckoo to use wooded habitat adjacent to the turbines and other components of the Project.

4.6 Measures to Minimize and Mitigate Effects

4.6.1 Minimization and Mitigation – Project Design and Operation

During Project development, the Applicant implemented measures to avoid and minimize effects to wildlife, including the black-billed cuckoo:

- The Project was sited in a previously disturbed landscape (i.e., among cultivated cropland, hay/pasture, and developed lands) and to avoid critical habitats for sensitive species such as the black-billed cuckoo.

- Fragmentation of wildlife habitat (including fragmentation of tracts of wooded potential black-billed cuckoo habitat) was avoided through the use, where practical, of lands already disturbed, including using existing roadways.

- Removal or disturbance of vegetation (including woody vegetation that could provide black-billed cuckoo habitat) was minimized through site management (e.g., by utilizing previously disturbed areas, designating limited equipment/materials storage yards and staging areas, scalping) and reclaiming all disturbed areas not required for operations.

- To avoid disturbance of nesting upland birds, unnecessary mowing was avoided during the peak nesting season for birds (May 1 – August 1).

- Project personnel were advised regarding speed limits on roads, and travel was restricted to designated roads to minimize wildlife mortality due to vehicle collisions, including minimizing the potential for collision with black-billed cuckoos, and to avoid impacts to vegetation.

- Environmental training for all construction personnel was provided avoid and minimize impacts to wildlife. Personnel were instructed to report wildlife incidents to the environmental compliance specialist as outlined in the project's environmental documentation.

- Standard construction best management practices were followed to minimize accidental spills of solid material, contaminants, debris, and other pollutants. Excavated material were not deposited near streams. All waste material was removed from the construction area.

Design and operation of the Project incorporated the following avoidance and minimization measures to minimize and mitigate impacts to wildlife, including the black-billed cuckoo:

- Turbines employed unguyed, met towers and tubular towers for the turbines.

- Collection and communication lines were buried where interference with other features would not preclude it, avoiding the potential for bird collision.

- Lighting was minimized to that which is required by the Federal Aviation Administration.

No additional avoidance or minimization measures are proposed at this time because (1) the siting and construction measures already committed to by the Applicant have minimized, and will continue to minimize, impacts to the black-billed cuckoo; (2) no specific collision risk patterns have been detected and therefore there is no basis for effective design of potential minimization measures such as curtailment; and (3) impacts to the species have been low and are predicted to be low during the term of the permit.

4.6.2 Mitigation

In addition to implementation of avoidance and minimization measures summarized in Section 5.2, the Applicant has committed to a monetary contribution of $25,000 submitted to the Illinois Wildlife Preservation Fund to assist with management of, or bring conservation benefit to, the black-billed cuckoo.

4.7 Monitoring

4.7.1 Intensive Carcass Monitoring

Post-construction bat carcass monitoring for the Project began in fall 2020, consistent with the BBCS. In 2020 (Stantec 2021) and 2021 (Chodachek et al. 2021), the first two years of post-construction monitoring were conducted. Due to concerns regarding higher than anticipated bat fatalities, a third year of monitoring was conducted in fall 2022 (Chodachek et al. 2023). Those monitoring events also recorded all bird species fatalities, including any black-billed cuckoo.

Table 6 summarizes the 2020 – 2022 monitoring that has occurred at the Project. Monitoring will continue at the Project, with the exact details to be determined through coordination with the USFWS regarding the HCP for federally listed bats. Table 6 presents the current potential schedule, with the approximate level of effort of monitoring associated with the HCP; timing of when the intensive monitoring will occur (2023 or 2024) will be determined by when the Incidental Take Permit (ITP) for the federally listed bats is received. For instance, if the ITP is not received until late 2023 or early 2024, then the schedule listed in Table 6 would be pushed back by one year. Furthermore, the Applicant is currently discussing a six-year ITP for federally listed bats at the Project, at the end of which a modified HCP and associated monitoring plan will be discussed with the USFWS. The frequency and intensity of subsequent monitoring would be anticipated to still provide relevant information on black-billed cuckoo take at the Project in the fall migration period.

Table 6. Post-construction monitoring (PCM) and proposed Incidental Take Permit (ITP) compliance monitoring for black-billed cuckoo at Cardinal Point Wind Project.

Protocol (Year[s])	Date	Plot Type (Number of Turbines Searched)	Search Interval (Days)	Results
PCM (2020)[1]	July 15 – October 15	Road and pads out to 40 - 100 m (131 - 328 ft) at 60 turbines	7	No black-billed cuckoos documented
PCM (2021)[2]	July 12 – October 15	Road and pads out to 100 m at 60 turbines Circular plots (262 ft [80m] radius) at 10 turbines	3.5	No black-billed cuckoos documented
PCM (2022)[2]	August 1 – October 13	Road and pads out to 125 m (410 ft) at 60 turbines	3.5	One black-billed cuckoo documented on September 23, 2022
Intensive ITP (2023)[3]	July 15 – October 1	Road and pads out to 100 m at 40 turbines Cleared plots (70 m [230 ft]) at 10 turbines Uncleared plots (70 m) at 10 turbines	3.5 - 7	NA
Intensive ITP[4] (2024 - 2025)	April 1 – May 15	Road and pads out to 100 m at 60 turbines	14	NA
	May 16 – July 14	Road and pads out to 100 m at 20 turbines Cleared plots (70 m) at 10 turbines Uncleared plots (70 m) at 10 turbines	3.5	
	July 15 – October 1	Road and pads out to 100 m at 40 turbines Cleared plots (70 m) at 10 turbines Uncleared plots (70 m) at 10 turbines	3.5 - 7	
Lower intensity ITP[4] (2026 – 2028)	April 1 – May 15 July 15 – September 30	Road and pads out to 100 m at 60 turbines	3.5 - 7	NA
Subsequent monitoring[4]	Minimum of July 15 – September 30	Details to be determined as part of further coordination with USFWS and DNR	NA	NA

[1] Monitoring conducted by Stantec Consulting Inc. (Stantec 2021)

[2] Monitoring conducted by Western EcoSystems Technology, Inc. (Chodachek et al. 2021; Chodachek et al. 2023)

[3] Timing determined by when the ITP for the federally listed bats is received

[4] Monitoring protocols will be dependent and adjusted based on data from previous ITP monitoring years

4.7.2 Incidental Monitoring

Project personnel are trained on wildlife issues, protection, and considerations at wind projects and how to respond to the discovery of a carcass or injured animal. An incidental reporting process was developed for operations personnel that requires the documentation and reporting of animal carcasses detected within the Project area. Operations personnel are prohibited from touching the carcass and are required to immediately photograph the carcass and report it to the Applicant's environmental staff. Once the field report is submitted, the environmental staff are required to assess each carcass report, deferring to a biologist when necessary, and report all state-listed endangered or threatened species to the DNR within 24 hours of positive species identification.

4.8 Adaptive Management

4.8.1 Adaptive Management Goals

The goals of the adaptive management plan are to enable the Project to respond to issues and unanticipated events identified by monitoring data collected over the term of the permit. Certain trigger events and subsequent changes to the avoidance, minimization, and mitigation plan have been defined as a part of the adaptive management plan, to guide the adaptive process.

4.8.2 Adaptive Management Plan

The events that would trigger changes to the avoidance, minimization, and mitigation plan presented herein would be documented take of black-billed cuckoo above the anticipated level, which is expected to average up to 2 birds/year over the 22-year term of the permit.

If any black-billed cuckoo carcasses are detected at the Project, the following actions will be taken.

1) DNR will be notified within 1 business day of positive identification.
2) The carcass will be examined, and information will be included in Project's database.

If more than two black-billed cuckoos are found within a single year, the following measures will be implemented:

1) Cardinal Point LLC will confer with the DNR to determine, based on the available data, the circumstances under which the carcasses occurred.
2) If a specific cause for the carcasses can be identified and it is attributable to the Project, the Applicant will develop specific additional onsite and/or operational mitigation measures in consultation with DNR to address those causes:
    - The Applicant will conduct follow-up post-construction monitoring during the subsequent year in the season(s) in which the carcasses were discovered to assess whether onsite mitigation measures were successful at reducing mortality.
3) If there continues to be no spatial, weather, or temporal pattern to when and where black-billed cuckoo carcasses are found, no mitigation measures will be taken based on one year with higher than anticipated take levels. However, if two additional monitoring periods occur where three or more black-billed cuckoo carcasses are detected, the Applicant and DNR will determine the need to pursue an amendment to the Project's ITA.

4.9 Verification of Adequate Funding

The Applicant has already funded and completed three years of intensive monitoring at the Project and will continue to fund monitoring at intervals as committed to in this Conservation Plan for the life of the Project. Prior to each year of follow-up monitoring, the Applicant will provide the DNR with a letter certifying that a monitoring contract has been executed with a firm qualified to conduct monitoring in accordance with the approved monitoring plan. Funding may be in the form of bonds, certificates of insurance, escrow accounts, or other financial instruments adequate to carry out all aspects of the Conservation Plan.

5.0 ALTERNATIVES CONSIDERED

5.1 No Action Alternative

The No Action alternative in this case would consist of the Project not being developed, constructed, or operated. The Cardinal Point Wind Project has been built and operational since March 2020. This option is considered to be a non-viable alternative.

5.2 Construction and Operation Alternatives

Since the Project is already constructed and operational, no construction alternatives were considered. The Project was sited to avoid and minimize impacts to the black-billed cuckoo by placing all turbines in cultivated fields and avoiding and minimizing impacts to wooded habitat. Placing turbines elsewhere in the counties would not be expected to reduce the risk to the black-billed cuckoo.

One black-billed cuckoo carcass was discovered in three years of post-construction monitoring in agricultural fields during the fall migration period. As described in Sections 4.1 and 4.2, it is not possible to identify specific location or time periods of risk to the black-billed cuckoo, and therefore the Applicant concluded that operational modifications are not an appropriate alternative.

6.0 EFFECTS DETERMINATION

The continued operation of the Project will not impact the likelihood of the survival of the black-billed cuckoo in Illinois for the following reasons:

1. Project operation is expected to result in 0 – 2 black-billed cuckoo fatalities/year (compared to estimated breeding population of 380,000 in the U.S. and breeding population of 3,300 in Illinois).
2. Project operation will not impact black-billed cuckoo breeding habitat and will not affect the black-billed cuckoo's ability to use adjacent wooded habitat during breeding or migration.
3. As stated in Section 2.1, the black-billed cuckoo life history is characterized by a short life span and relatively high reproductive output, with breeding occurring every year of a female's life. In species with this type of life history, survival of individuals is not the driver

of population trends. Instead, impacts to fecundity, such as direct impacts to nests and nest success have more influence on population dynamics (Stahl and Oli 2006). Furthermore, population trends of North American birds with similar life history strategies are not discernibly affected by collision mortality such as that anticipated at the Project (Arnold and Zink 2011).

In conclusion, the low level of anticipated annual take of primarily migrating individuals from Project operation is not anticipated to affect the black-billed cuckoo population that migrates through or breeds in Illinois.

REFERENCES

Arnold, T.W. and R.M. Zink. 2011. Collision mortality has no discernible effect on population trends of North American birds. PLoS One 6(9): e24708. Doi:10.1371/journal.pone.0024708

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for raptor protection on power lines; the state of the art in 2006. Edison Electric Institute, APLIC, and Raptor Research Foundation, Washington D.C.

Avian Power Line Interaction Committee (APLIC). 2012. Reducing avian collisions with power lines: the state of the art in 2012. Edison Electric Institute and APLIC. Washington, D.C.

Bent, A.C. 1940. Life Histories of North American Cuckoos, Goatsuckers, Hummingbirds, and Their Allies. U.S. National Museum Bulletin No. 176.

Bevanger, K. 1994. Bird interactions with utility structures: collision and electrocution, causes and mitigating measures. Ibis 136: 412-425.

Chodachek, K., J. Pickle, and K. Nasman. 2021. Post-Construction Bat Fatality Monitoring Study, Cardinal Point Wind Project, McDonough and Warren Counties, Illinois. Final August 2022 – October 2022. Prepared for the Capital Power Corporation, Calgary, Alberta. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota.

Chodachek, K., J. Pickle, and K. Nasman. 2023. Post-Construction Bat Fatality Monitoring Study, Cardinal Point Wind Project, McDonough and Warren Counties, Illinois. Final July 2021 – October 2021. Prepared for the Capital Power Corporation, Calgary, Alberta. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. March 3, 2022.

CPC Environmental, Inc. 2010. Post-Construction Bird and Bat Mortality Study: Cedar Ridge Wind Farm, Fond Du Lac County, Wisconsin. Interim Report prepared for Wisconsin Power and Light, Madison, Wisconsin. Prepared by CPC Environmental, Inc. Cincinnati, Ohio. February 2010.

CPC Environmental, Inc. 2011. Post-Construction Bird and Bat Mortality Study: Cedar Ridge Wind Farm, Fond Du Lac County, Wisconsin. Final Report. Prepared for Wisconsin Power and Light, Madison, Wisconsin. Prepared by CPC Environmental, Inc. Cincinnati, Ohio. February 2011.

Blancher, P.J., K.V. Rosenberg, A.O. Panjabi, B. Altman, A.R. Couturier, W.E. Thogmartin, and the Partners in Flight Science Committee. 2013. Handbook to the Partners in Flight Population Estimates Database, Version 2.0. PIF Technical Series No 6. http://www.partnersinflight.org/pubs/ts/

Bohlen, H.D. 1989. The Birds of Illinois. Indiana University Press, Bloomington, Illinois.

California Ridge Wind Energy LLC. 2011. Avian and bat protection plan for California Ridge Wind Energy's California Ridge Wind Energy Project in Vermillion and Champaign Counties, Illinois.

de Magalhaes, J., J. Costa, and O. Toussaint. 2005. "HAGR: the Human Ageing Genomic Resources" Available online at:

http://genomics.senescence.info/species/entry.php?species=Coccyzus_erythropthalmus

Accessed May 5, 2015.

Derby, C., J. Ritzert, and K. Bay. 2010. Bird and Bat Fatality Study, Grand Ridge Wind Resource Area, Lasalle County, Illinois. January 2009 - January 2010. Prepared for Grand Ridge Energy LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. July 13, 2010. Revised January 2011.

Eastman, J. 1991. Black-billed Cuckoo. Pp. 232-233 *In* The atlas of breeding birds of Michigan (R. Brewer, G.A. McPeek, and R.J. Adams, Jr. eds.). Michigan State Univ. Press, East Lansing.

Freemark, K.E. and Merriam, H.G. 1986. Importance of area and habitat heterogeneity to bird assemblages in temperate forest fragments. Biological Conservation 36: 115 – 141.

Gehring, J.L., P. Kerlinger, and A.M. Manville II. 2009. Communication towers, lights, and birds: successful methods of reducing the frequency of avian collisions. Ecological Applications 19: 505–514.

Grodsky, S.M. and D. Drake. 2011. Assessing Bird and Bat Mortality at the Forward Energy Center. Final Report. Public Service Commission (PSC) of Wisconsin. PSC REF#:152052. Prepared for Forward Energy LLC. Prepared by Department of Forest and Wildlife Ecology, University of Wisconsin-Madison, Madison, Wisconsin. August 2011.

Gruver, J., M. Sonnenberg, K. Bay, and W. Erickson. 2009. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond Du Lac County, Wisconsin July 21 - October 31, 2008 and March 15 - June 4, 2009. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. December 17, 2009.

Halterman, M., M.J. Johnson, J.A. Homes, and S.A. Laymon. 2015. A natural history summary and survey protocol for the western distinct population segment of the yellow-billed cuckoo: U.S. Fish and Wildlife Techniques and Methdods, 45 p.

Howe, R.W., W. Evans, and A.T. Wolf. 2002. Effects of Wind Turbines on Birds and Bats in Northeastern Wisconsin. Prepared by University of Wisconsin-Green Bay, for Wisconsin Public Service Corporation and Madison Gas and Electric Company, Madison, Wisconsin. November 21, 2002. 104 pp.

Hughes, J.M. 2020. Black-billed Cuckoo (*Coccyzus erythropthalmus*), version 1.0. P. G. Rodewald, ed. In: The Birds of the World. Cornell Lab of Ornithology. Ithaca, New York. Retrieved from Birds of the World Online: https://birdsoftheworld.org/bow/species/bkbcuc/1.0/introduction; doi:10.2173/bow.bkbcuc.01

Illinois Department of Natural Resources (IDNR). 2021. Black-billed Cuckoo. Biodiversity of Illinois. Available https://www2.illinois.gov/dnr/education/CDIndex/BlackbilledCuckoo.pdf Accessed: January 30, 2023.

Invenergy Services LLC. 2013. Fire Protection and Prevention Plan. Revision 0, issued October 24, 2013. 8 pp.

Jauvin, D. and M. Bombardier. 1996. Black-billed Cuckoo. Pp. 578-581. *In*: J. Gauthier and Y. Aubry, eds. The Breeding Birds of Quebec: Atlas of Breeding Birds of Southern Quebec. Association québecoise des groupes d'ornithologues, Province of Quebec Society for the Protection of Birds, Canadian Wildlife Service, Environment Canada, Québec Region, Montréal.

Johnson, G.D., M. Ritzert, S. Nomani, and K. Bay. 2010. Bird and Bat Fatality Studies, Fowler Ridge I Wind-Energy Facility Benton County, Indiana. Unpublished report prepared for British Petroleum Wind Energy North America Inc. (BPWENA) by Western EcoSystems Technology, Inc. (WEST).

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 2007. Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Kerlinger, P., J.L. Gehring, W.P. Erickson, R. Curry, A. Jain, and J. Guarnaccia. 2010. Night migrant ratalities and obstruction lighting at wind turbines in North America. Wilson Journal of Ornithology 122(4):744-754.

Kleen, V.M., L. Cordle, and R.A. Montgomery. 2004. The Illinois Breeding Bird Atlas. Illinois Natural History Survey Special Publication No. 26 xviii + 459 pp.

Kunz, T.H. ,E. B. Arnett, W.P. Erickson, G.D. Johnson, R.P. Larkin, M.D. Stricklands, R.W. Thresher, and M. D. Tuttle, 2007. Ecological impacts of wind energy development on bats: questions, research needs and hypotheses. Frontiers in Ecology and the Environment, 5: 315-324.

Laymon, S. A. 1998. Yellow-billed Cuckoo (*Coccycus americanus*). *In* The riparian bird conservation plan: a strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/riparian_v-2.html

Nolan, V. Jr. and C.F. Thompson. 1975. The cccurrence and significance of anomalous reproductive activities in two North American nonparasitic cuckoos *Coccyzus* spp. Ibis 117: 496-503.

Partners in Flight. 2020. Population Estimates Database, version 3.1. Available at http://pif.birdconservancy.org/PopEstimates. Accessed on January 30, 2023.

Peterjohn, B.G. 1989. The Birds of Ohio. Indiana University Press, Bloomington, Indiana.

Pistorius, A. 1985. Black-billed Cuckoo. Pp. 126-127. *In* S.B. Laughlin and D.P. Kibbe, eds. The Atlas of Breeding Birds of Vermont. University Press of New England, Hanover, New Hampshire.

Robbins, S.D. 1991. Wisconsin Birdlife. University of Wisconsin Press, Madison, Wisconsin.

Sandilands, A.P. 2010. Birds of Ontario: Habitat Requirements, Limiting Factors, and Status. UBC Press, Vancouver.

Sauer, J.R., W.A. Link, and J.E. Hines. 2022. The North American Breeding Bird Survey, Analysis Results 1966 - 2021. US Geological Survey [USGS] data release. doi: 10.5066/P96A7675.

Sealy, S.G. 1985. Erect posture of the young black-billed cuckoo: an adaptation for early mobility in a nomadic species. Auk 102: 889-892.

Shire, G.G., K. Brown, and G. Winegrad. 2000. Communication towers: a deadly hazard to birds. Report for the American Bird Conservancy, June. www.abcbirds.org/policy/towerkillweb.pdf.

Spencer, O.R. 1943. Nesting habits of the black-billed cuckoo. Wilson Bulletin 55: 11-22.

Stahl, J.T. and M.K. Oli. 2006. Relative importance of avian life-history variables to population growth rate. Ecological Modeling 198, pp 23 – 39.

Stantec Constulting Inc (Stantec). 2011. Pre-construction avian survey at the Cardinal Point Wind Energy Project in McDonough, Warren, and Henderson counties, Illinois. 31pp.

Stantec. 2018. Avian and Eagle Use Surveys. Cardinal Point Wind Energy Facility, Warren and McDonough Counties, Illinois. 19pp

Stantec. 2021. 2020 Post-Construction Mortality Monitoring Report Cardinal Point Wind Project McDonough and Warren Counties, Illinois. Prepared for Capital Power Corporation, Boston, Massachusetts. Prepared by Stantec Consulting Services, Inc, Independence, Iowa. May 26, 2021.

US Environmental Protection Agency (USEPA). 2012a. Level III Ecoregions of South Dakota. Ecoregions of the United States. USEPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEERL), Corvallis, Oregon. Updated May 8, 2012. Accessed June 2021. Available online: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-8%23pane-39

US Environmental Protection Agency (USEPA). 2012b. Level IV Ecoregions of South Dakota. Ecoregions of the United States. USEPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEERL), Corvallis Oregon. Updated April 26, 2012. Accessed June 2021. Available online: https://www.epa.gov/eco-research/ecoregion-download-files-state-region-8%23pane-39

Woods, A. J., J. M. Omernik, C. L. Pederson, and B. C. Moran. 2006. Level III and IV Ecoregions of Illinois. EPA/600/R-06/104. Oregon State University, US Environmental Protection Agency (USEPA), National Health and Environmental Effects Research Laboratory, Corvallis, Oregon; US Geological Survey, USEPA, National Health and Environmental Effects Research Laboratory, Corvallis, Oregon; Department of Biological Sciences, Eastern Illinois University, Charleston, Illinois; and Indus Corporation, USEPA, National Health and Environmental Effects Research Laboratory, Corvallis, Oregon. September 2006. Available online: https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/il/il_eco_desc.pdf

Indiana Bat, Northern Long-eared Bat, Little Brown Bat, and Tricolored Bat Habitat Conservation Plan for the Cardinal Point Wind Project McDonough and Warren Counties, Illinois

Prepared by:

Cardinal Point LLC

Capital Power Corporation
155 Federal Street, Suite 1200
Boston, Massachusetts 02110

In consultation with:

Western EcoSystems Technology, Inc.

415 West 17th Street, Suite 200
Cheyenne, Wyoming 82001

DRAFT – April 28, 2023

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

1.1 Overview and Background

The Cardinal Point Wind Project (Project), located in McDonough and Warren counties, Illinois (Figure 1.1), consists of 60 turbines with a total generating capacity of 166 megawatts (MW). The Project is owned and operated by Cardinal Point LLC, a wholly owned subsidiary of Capital Power Corporation (Applicant). The Applicant has prepared this habitat conservation plan (HCP) in support of an application for an incidental take permit (ITP) for the Project under Section 10(a)(1)(B) of the Endangered Species Act of 1973 as amended (ESA)[1] and in accordance with federal regulations.[2]

1.2 Purpose and Need

The Applicant's purpose for the Project is to maximize non-carbon-emitting energy production using reliable wind resources. The Project is designed, when operating under the manufacturer's default turbine settings, to generate roughly 525 thousand MW hours of clean, renewable energy annually, enough electricity to power the homes of more than 60,000 residential utility customers in Illinois. It is also capable of reducing greenhouse gas emissions by more than 325,000 metric tons of carbon dioxide, a major contributor to global warming, by replacing fossil-fuel-based electricity production. This is equivalent to taking more than 80,000 gasoline-powered passenger vehicles off the road (USEPA 2021). The Project helps provide energy security to the United States (US) by diversifying the electricity generation portfolio, protecting against comparatively volatile natural gas spikes, and utilizing a renewable, domestic source of energy. The Project also provides economic benefits to local communities through jobs, local spending, and community investment.

The purpose of this HCP is to ensure that the impacts of incidental take resulting from the Project will be minimized and mitigated to the maximum extent practicable and will not appreciably reduce the likelihood of the survival and recovery of the "Covered Species" in the wild. The term Covered Species in this HCP refers to the federally endangered Indiana bat (*Myotis sodalis*), federally endangered northern long-eared bat (*M. septentrionalis*), tricolored bat (*Perimyotis subflavus*),[4] and little brown bat (*M. lucifugus*). To provide the Applicant with assurances that no unauthorized take of the Covered Species occurs during the active season for bats (April 1 – October 15), the Applicant is requesting issuance of a short-term ITP. An ITP application requires the development of an HCP, which is designed to ensure that the impacts of any incidental take occurring from the Project are fully offset, which in turn helps in the recovery of the Covered Species.[3] The Applicant plans to use the information collected during the short-term ITP to develop a long-term minimization strategy and conservation plan for the remaining operational life of the Project turbines.

[1] 16 United States Code [USC] 1531-1544 (1973)

[2] 50 Code of Federal Regulations (CFR) 17.22(b)(1) (1985) and 17.32(b)(1) (1985)

[3] ESA Section 10(a)(2)(B) and 50 CFR 17.22(b)(2) (1985) and 17.32(b)(2) (1985)

This HCP serves to: 1) assess the impacts of the Project on the Covered Species, 2) provide measures to minimize and mitigate the impacts of the taking of the Covered Species, 3) assure that funding is available to implement the HCP, 4) ensure that incidental take from the Project is not anticipated to appreciably reduce the likelihood that the Covered Species will survive and recover in the wild, and 5) ensure that other measures that the US Fish and Wildlife Service (USFWS) may require as necessary are provided.

1.3 Permit Area and Plan Area

The Permit Area is where the impacts of the "Covered Activities" occur for which incidental take coverage is requested (Section 2.2). Operation of the Project's wind turbines is the only activity that was determined to be reasonably certain to lead to take of the Covered Species. Therefore, the Permit Area includes the area in which all turbines are located. The total Permit Area covers approximately 18,679 hectares (ha) within McDonough and Warren counties, Illinois (Figure 1.1).

The Plan Area includes the Permit Area and comprises all areas that will be used for any activities described in the HCP, as well as all areas influenced by the HCP's biological goals and objectives, such as the mitigation, monitoring, and adaptive management measures associated with this HCP. The Plan Area, therefore, is located within McDonough and Warren counties, Illinois as well as other parts of Illinois.

1.4 Permit Duration

The Applicant is seeking a 6-year ITP from the date of issuance.

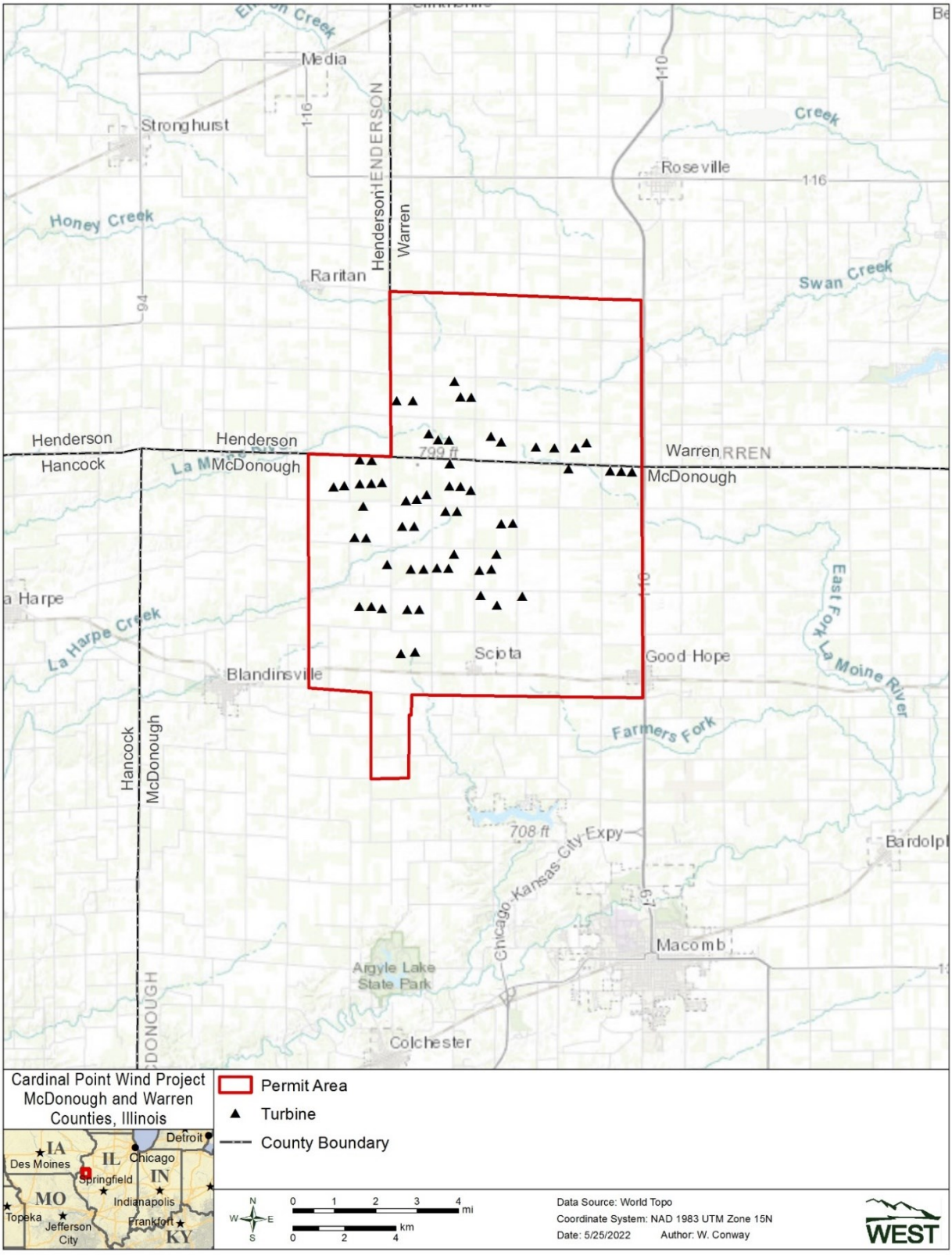


Figure 1.1. Location of the Cardinal Point Wind Project and its wind turbines.

1.5 Alternatives to Taking

An HCP submitted in support of an ITP application must describe "what alternative actions to such taking the Applicant considered, and the reasons why such alternatives are not proposed to be utilized".[4] The HCP Handbook indicates that the Applicant "should focus on significant differences in project design that would avoid or reduce the take" (USFWS and NMFS 2016).

1.5.1 Take Avoidance Alternative

Under a take avoidance alternative, all Project turbines would be curtailed[5] in a way that all fatality and acoustic data gathered at the Project to date indicate that take of the Covered Species would be reasonably certain not to occur.[6] Because take of the Covered Species would be unlikely, incidental take authorization under the ESA would not be necessary and an HCP would not be developed for the Project.

Based on previous data from the Project, operating under the above curtailment regime for six years would result in substantial losses in energy production. Lost energy production results in lost revenues, contributes to grid instability, and conflicts with renewable energy targets and contracts. These impacts are undesirable and inconsistent with the goals of the Project. Additionally, operating under the take avoidance alternative would not meet the Applicant's objective of testing a minimization strategy that will inform a longer-term HCP for this Project (Section 1.2). Moreover, the take avoidance alternative does not align with the Project's purpose of advancing the wind energy objectives set forth by the Illinois Climate and Equitable Jobs Act. That act states a goal of 100% clean energy in Illinois by 2050, with renewable sources (wind and solar) generating 50% of the state's electricity by 2040.[7]

1.5.2 Proposed Alternative

Under the proposed alternative, all Project turbines would be curtailed at wind speeds below the cut-in wind speed, down to a minimum of 3.0 m per second (m/s), from sunset to sunrise for the entire active season for bats (April 1 – October 15) when the temperature is above 10 degrees (°) Celsius (C). In addition, the Project would test and then implement an optimized curtailment algorithm during periods of peak collision risk to reduce collision exposure by at least 50%. The first two to three years of the ITP would be used to test alternate minimization strategies and choose one for implementation (and potential continued refinement, per adaptive management assessments) in the final years of the ITP (Section 6.2). Habitat mitigation would also be provided to offset the impacts of the taking of the Covered Species.

The proposed alternative was selected because it will minimize the impacts of take of the Covered Species, simultaneously limit the amount of lost energy production, and allow for collection of

[4] ESA implementing regulation 50 CFR 17.22 (b)(1)(iii)(C) (1985).

[5] "Curtailed" at this facility is the same as a "configured stop" for General Electric turbines. Specifically, turbine blades are pitched to 85° into the wind such that the turbines freewheel and rotate slowly.

[6] Per a technical assistance letter issued by the USFWS Illinois-Iowa Field Office on April 27, 2022.

[7] The Illinois Climate and Equitable Jobs Act (SB 2408) was enacted into law on September 15, 2021, as Public Act 102-0662, with an effective date of September 15, 2021.

additional information to develop a long-term minimization strategy. The Project will also reduce emissions of nitrogen oxide and sulfur dioxide which, respectively, cause smog and acid rain, by replacing energy demands that generate these pollutants. The Project will furthermore benefit the local economy through lease payments to landowners, paychecks to local workers, and tax revenue to the local township and county, as well as supporting full-time jobs during operations. These economic benefits to the local community would be lost or diminished if the Project were forced to operate under an avoidance alternative.

1.6 Summary of Relevant Laws and/or Regulation

1.6.1 Federal Endangered Species Act

The purpose of the ESA is to provide a means whereby the ecosystems upon which threatened and endangered species depend may be conserved, and to provide a program for the conservation of such threatened and endangered species.[8] Section 9(a)(1)(B) of the ESA prohibits the take of any fish or wildlife species listed as endangered. Under federal regulation, take of fish or wildlife species listed as threatened is also prohibited, unless a species-specific exemption is granted.[9] Take is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The USFWS defines "harm" as "an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."[10]

Section 10(a) of the ESA allows, under certain terms and conditions, for the incidental take of species listed as threatened or endangered by non-federal entities that would otherwise be prohibited under Section 9 of the ESA. Incidental take is defined as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity".[11] To obtain incidental take authorization, an applicant must develop, fund, and implement a USFWS-approved HCP to minimize and mitigate to the maximum extent practicable the impact of the proposed taking.

Incidental take may be permitted through the issuance of an ITP by the USFWS.[12] An ITP application must include the following components:

- The common and scientific names of the species to be covered by the ITP, as well as the number, age, and sex of such species, if known;
- A complete description of the activity for which incidental take is sought to be authorized;

[8] ESA Section 2(b), 16 USC 1531(b) (1973)

[9] 50 CFR 17.31(a) (1978)

[10] 50 CFR 17.3 (1975)

[11] 16 USC 1539(a)(1)(B) (1973)

[12] ESA Section 10(a)(1)(B), 50 CFR 7.22(b)(1985) and 17.32(b)(1985)

- An HCP that specifies:
  - The impacts that will likely result from such taking;
  - What steps the Applicant will take to monitor, minimize, and mitigate such impacts, the funding that will be available to implement such steps, and the procedures to be used to deal with unforeseen circumstances;
  - What alternative actions to such taking the Applicant considered, and the reasons why such alternatives are not proposed to be utilized; and
  - Such other measures that the USFWS Regional Director may require as being necessary and appropriate for the purposes of the plan.[13]

In addition to these necessary HCP elements, the HCP Handbook describes five clarifying components that should be included in an HCP: 1) biological goals and objectives, 2) adaptive management, 3) monitoring, 4) ITP duration, and 5) public participation.

Issuance of the ITP is a federal agency action that must also comply with Section 7 of the ESA.[14] Section 7(a)(2) of the ESA requires federal agencies to consult with the USFWS to ensure that actions that they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in destruction or adverse modification of designated critical habitat of such species. In order to issue an ITP, the USFWS is required to conduct an internal formal consultation process, which includes preparation of a Biological Opinion that evaluates the impacts of the proposed action and establishes an overall effects determination. The resulting Biological Opinion encompasses issuance of the ITP and implementation of the HCP.

1.6.2 National Environmental Policy Act

Section 102(2)(C) of the National Environmental Policy Act of 1969 (NEPA),[15] as amended, requires federal agencies to evaluate and disclose the effects of their proposed actions on the natural and human environment. The purpose of the NEPA process is to ensure that the potential environmental impacts of any proposed federal action are fully considered and made available for public review. The issuance of an ITP by the USFWS constitutes a federal action subject to NEPA compliance and review.[16] This may consist of preparing an Environmental Impact Statement[17] or Environmental Assessment[18] that includes a detailed analysis of all direct, indirect and cumulative impacts to the human environment resulting from issuance of the ITP.[19]

[13] 50 CFR 17.22(b)(1) (1985) and 50 CFR 17.32(b)(1) (1985)

[14] 16 USC 1536 (1973)

[15] 42 USC 4321, 4322(2)(c) (1970)

[16] 42 USC 4321-4347, as amended (1970)

[17] 40 CFR 1501.4 (2020)

[18] 40 CFR 1501.3 (2020)

[19] 40 CFR 1508 (1970)

1.6.3 Illinois Endangered Species Protection Act

The Illinois Endangered Species Protection Act[20] makes it unlawful for any person to possess, take, transport, sell, offer for sale, give or otherwise dispose of any animal or the product thereof of any animal species on the Illinois list of endangered and threatened species. The Endangered Species Protection Board determines what species are added to or removed from the list. The Act authorizes the Illinois Department of Natural Resources to issue incidental take authorizations.

[20] 520 Illinois Compiled Statutes 10/1 Ch. 8, par. 331 – 341.

2 PROJECT DESCRIPTION AND COVERED ACTIVITIES

2.1 Project Description

The Project is a renewable energy generation facility that consists of 60 wind turbines and associated infrastructure with a total generating capacity of 150 MW. The Project is located on private land in McDonough and Warren counties, Illinois. Commercial operation of the Project began in March 2020. The Project consists of 48 General Electric 2.8-MW turbines and 12 General Electric 2.5-MW turbines, for a total of 60 turbines. Each turbine has a hub height of 89 m and rotor diameter of 127 m. The maximum height of the turbines from tower base to highest blade tip is 152 m above ground level.

Each turbine includes a supervisory control and data acquisition operations and communications system that allows automated independent and remote operation of the turbine. General Electric 2.5-127 turbines are designed to begin generating electricity when the wind speed reaches 3.0 m/s, known as the "manufacturer's cut-in speed." To stop a wind turbine from spinning (at any wind speed), the turbine blades can be pitched parallel with the wind direction, causing them to spin at a very low rotation rate (approximately one to two rotations per minute), if at all; this is called "curtailment"

The circular pad at each turbine site consists of an approximately 314 m^2 (10-m radius) permanent gravel pad extending from the roadway to the turbine foundation. The access roads extending from the turbine pads are approximately 4.5–6.0 m wide. Other Project infrastructure includes an overhead 115-kilovolt transmission line that ties the Project to the electrical grid (often called the gen-tie line), access roads, a collector substation, an operation and maintenance facility, and one permanent, free-standing (un-guyed) meteorological tower.

2.2 Covered Activities

The HCP Handbook states that an Applicant should "include in the HCP a description of all actions within the planning area that: (1) are likely to result in incidental take; (2) are reasonably certain to occur over the life of the ITP; and (3) for which the Applicant or landowner has some form of control." These actions are the HCP's Covered Activities. Commercial operation of the Project began in March 2020 and will continue for the duration of the 6-year ITP term. Project operation includes wind turbine operation from spring through fall that may result in incidental take (Section 5.1).

The Applicant has determined that operation of Project turbines during the 6-year ITP term may result in incidental take of the Covered Species and is an activity over which the Applicant has control. Therefore, operation of the Project turbines is a Covered Activity under this HCP.

3 COVERED SPECIES

The Project is within the range of four bat species that are either listed under the ESA or are undergoing review for listing (Figure 3.1). The status, distribution, and biology of each species is described in detail in the sections below.

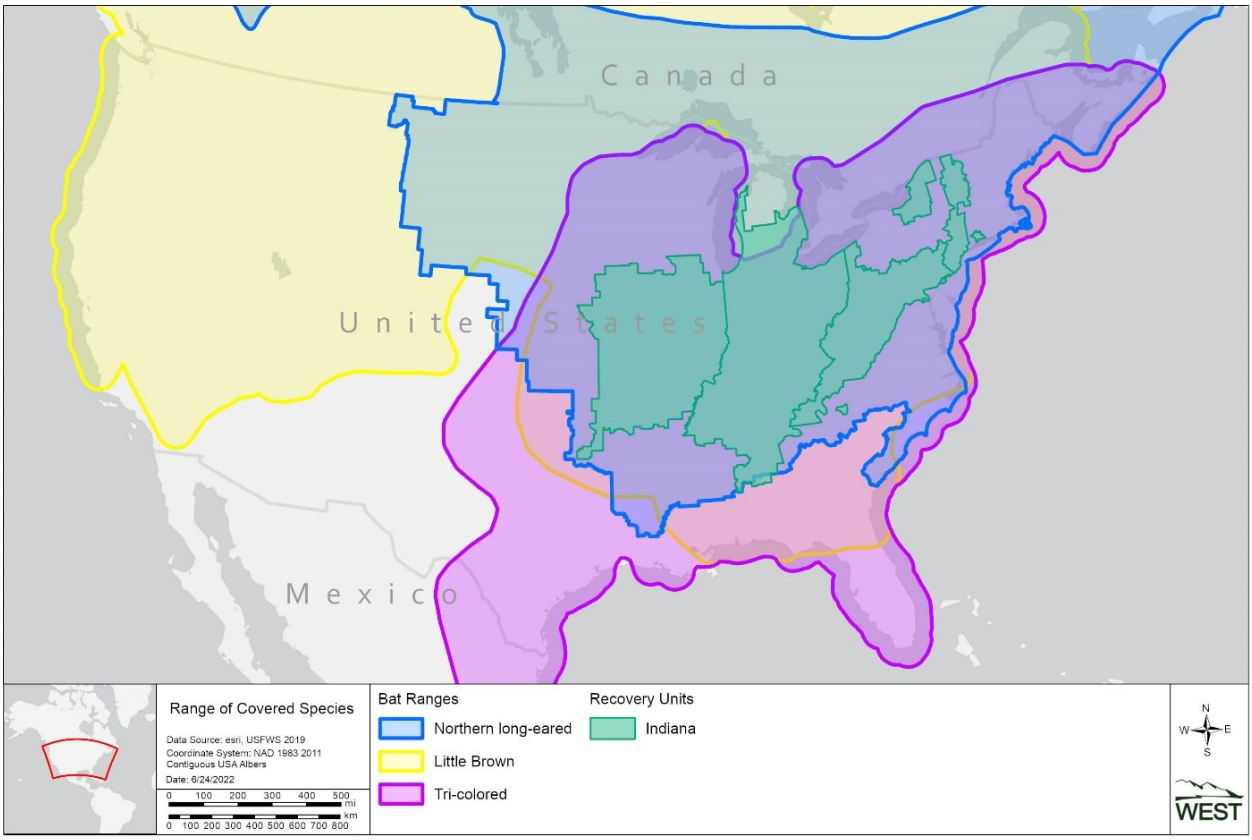


Figure 3.1. Ranges of the Covered Species in the United States.

3.1 Indiana Bat

3.1.1 Status and Distribution

3.1.1.1 Rangewide

The Indiana bat is ESA-listed as endangered wherever it occurs, which includes most of the eastern US (USFWS 1967; Figure 3.1). In the draft recovery plan for this species the USFWS identified numerous threats to Indiana bats, mainly the loss and degradation of habitat (USFWS 2007). However, white-nose syndrome (WNS), a disease that infects and often kills hibernating bats, is currently the leading cause of population decline and the main challenge to the recovery of the Indiana bat (USFWS 2019a, Thogmartin et al. 2012). The overall population was estimated to be around 880,000 individuals around the time of the initial listing decision (Clawson 2002). Since WNS was first detected in New York in 2006 (Blehert et al. 2009), it has spread steadily westward (WNS Response Team 2022). The latest winter count was

537,297 individuals from 223 hibernacula (overwintering sites) in 16 states (USFWS 2019b). Overall, researchers estimate that Indiana bat populations have declined 28% due to WNS, a threat that they characterize as pervasive, of moderate severity, and medium impact (Cheng et al. 2021).

3.1.1.2 Ozark-Central Recovery Unit

The USFWS divides the Indiana bat's range into four recovery units (USFWS 2007). This Project falls within the Ozark-Central Recovery Unit, which includes Illinois. Population estimates decreased 8.1% in 2019 after a decade of gradual population growth, but overall this recovery unit has not experienced drastic population declines (Table 3.1). The Ozark-Central Recovery Unit represents 51% of the 2019 rangewide population of Indiana bats (USFWS 2019b). There were 128 documented Indiana bat hibernacula within the Ozark-Central Recovery Unit in 2007, including 72 classified as extant (USFWS 2007), but the current number of locations with Indiana bats is unknown.

Table 3.1. Indiana bat population estimates for the Ozark-Central Recovery Unit. Source: USFWS 2019b.

State[1]	2009	2011	2013	2015	2017	2019
Arkansas	1,480	1,206	856	1,398	1,722	2,749
Illinois	53,351	57,212	66,817	69,924	81,143	78,403
Missouri	211,107	212,942	214,453	216,289	217,884	195,157
Oklahoma	0	13	5	5	8	8
Total	**265,938**	**271,373**	**282,131**	**287,616**	**300,757**	**276,317**

[1] There have been no winter populations of Indiana bats recorded since 1995 in Iowa, nor have sites been surveyed since that time, so there are no population estimates for this state (A. King, USFWS, pers. comm., February 7, 2019).

3.1.1.3 Illinois

The Indiana bat is state-listed as endangered in Illinois. The nearest historic hibernaculum to the Project, last surveyed in 2015, is 43 kilometers (km) southwest of the Project in Adams County. The Blackball Mine in LaSalle County, designated critical habitat for the Indiana bat, is located approximately 158 km northeast of the Project. The Sodalis Nature Preserve, the largest Indiana bat hibernaculum, is located approximately 120 km southwest of the Project in Marion County, Missouri (Figure 3.2). Most summer records of Indiana bats are from the southern and western portions of Illinois (IDNR 2017).

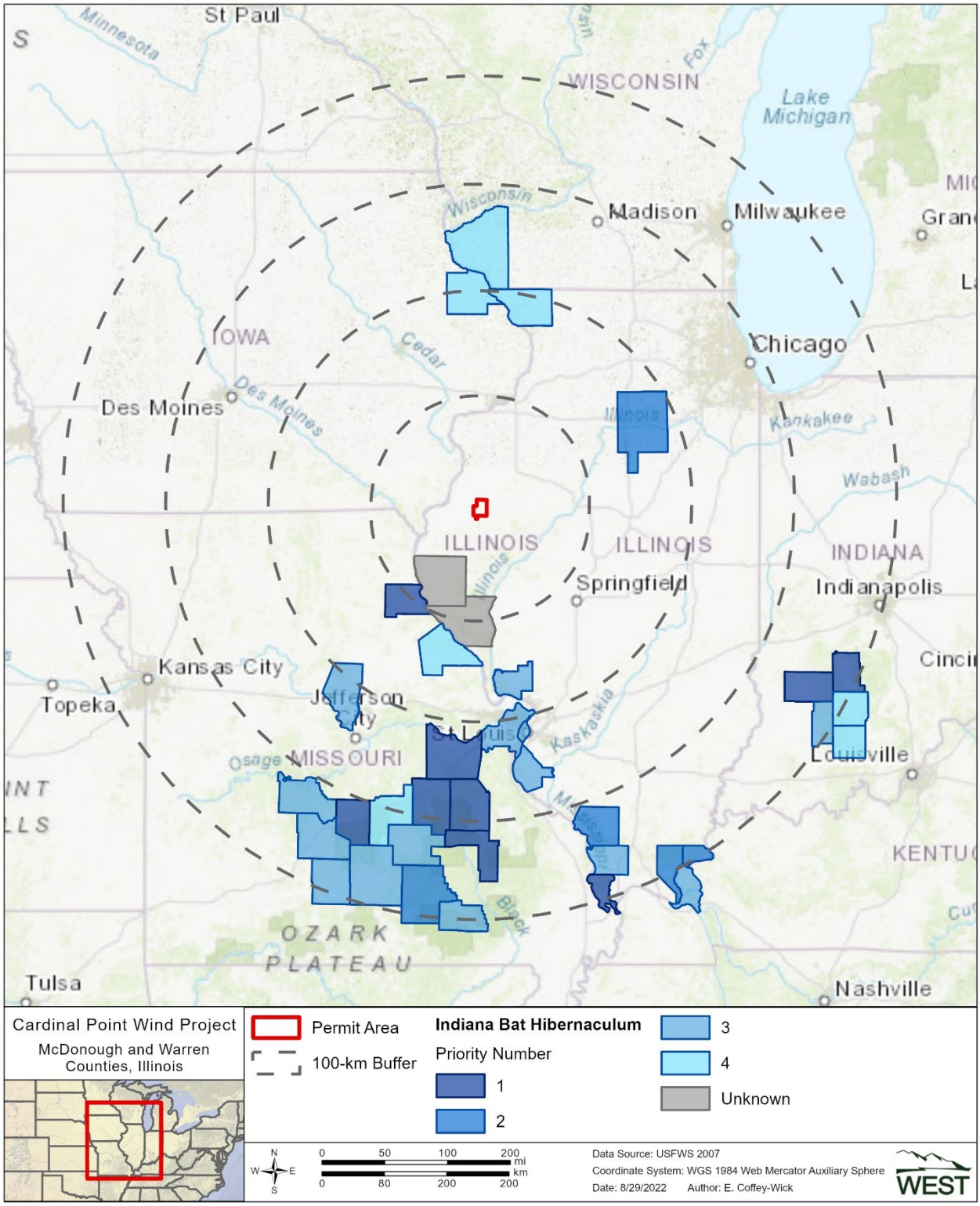


Figure 3.2. Counties within 400 kilometers (the approximate maximum migration distance for Indiana bats) of the Permit Area with Indiana bat hibernacula, labeled by the highest priority number as classified by the US Fish and Wildlife Service.

3.1.2 Habitat Characteristics and Use

The Indiana bat overwinters in caves and manmade structures, roosts in forested habitat in the summer, and migrates between the two habitats in the spring and fall (USFWS 2007). The timing of spring migration varies with latitude and weather conditions, but generally occurs sometime between the end of March and late May (USFWS 2007). Indiana bats migrate in relatively direct routes from hibernacula to summer ranges (Roby et al. 2019). Migration distances vary across the species range, but Indiana bats have been known to travel up to 560 km in a single season (Winhold and Kurta 2006).

Females give birth to one young per year by mid-July (Kurta and Rice 2002) and roost communally in maternity colonies of around 50 to 80 females (Whitaker and Brack 2002). Young bats can fly within three to five weeks, at which time the maternity colony disperses and begins migrating to hibernacula (USFWS 2007). Fall migration may begin as early as mid-July and last until mid-October (USFWS 2007). The timing of fall migration depends on weather conditions and varies by latitude, with Indiana bats in the northern portion of the species' range migrating earlier than those in the south (USFWS 2007); that is, fall migration follows cooling temperatures (weekly average of 25.9 °C in Indiana; Pettit and O'Keefe 2017).

Indiana bats swarm and mate near hibernacula prior to hibernation (Cope and Humphrey 1977), generally mid-October through mid-November. During the swarming season, forested habitat is important to Indiana bats for roosting and foraging (USFWS 2007). There is little data on where Indiana bats roost near hibernacula during the swarming season. To reduce exposure to wind turbines, the USFWS recommends a 16-km (10-mile) buffer around small hibernacula populations and a 32-km (20-mile) buffer around large hibernacula of Indiana bats (USFWS 2011).

In winter, Indiana bats concentrate into a small number of caves, most of which are found in karst areas of the east-central US. However, they may also hibernate in cave-like structures, such as abandoned mines, buildings, railroad tunnels, and hydroelectric dams (USFWS 2007). Indiana bats typically need low, stable temperatures (3-8 °C to hibernate (Tuttle and Kennedy 2002). Caves with the largest populations are usually large, complex systems that allow for airflow, yet buffer or slow changes in temperature (Brack 2004).

3.2 Northern Long-eared Bat

3.2.1 Status and Distribution

3.2.1.1 Rangewide

The northern long-eared bat is ESA-listed as endangered wherever it occurs in the US, which includes most of the eastern and north central states (USFWS 2023; Figure 3.1). The northern long-eared bat is widespread but patchily distributed, rarely occurs in large numbers, and was historically most common in the northern part of its range (Barbour and Davis 1969, Harvey 1992). In 2016, there were an estimated 6.5 million adult northern long-eared bats rangewide (USFWS 2016a). However, WNS has caused estimated population declines of 97–100% across 79% of its range (Cheng et al. 2021), making it the most severe threat facing this species (USFWS 2022a).

3.2.1.2 Midwest Representation Unit

The USFWS divides the northern long-eared bat's range into five representation units (USFWS 2022a). This Project falls within the Midwest Representation Unit, which includes Illinois. As of 2016, the USFWS Midwest Region was thought to support 43% of the US population, with an estimated 2.8 million adult northern long-eared bats (USFWS 2016a). However, it was acknowledged at the time that this was likely an overestimate, as the impacts of WNS had not been fully realized in this region.

3.2.1.3 Illinois

The northern long-eared bat is state-listed as threatened in Illinois. The USFWS estimated the 2021 Illinois population to be 21,327–106,635 individuals (USFWS 2021a). In 2014, northern long-eared bats were documented in 21 hibernacula in Illinois (USFWS 2021a).

3.2.2 Habitat Characteristics and Use

Northern long-eared bats require a stable cave environment in which to hibernate, and woodland habitat in which to roost during the summer (USFWS 2014), migrating between the two habitats in the spring and fall. Shortly after emergence, northern long-eared bats migrate to their summer habitat with the primary spring migration season from the beginning of April to mid-May (USFWS 2014). Short migratory movements between 55 to 90 km from hibernacula to summer habitat are most common (Nagorsen and Brigham 1993), suggesting the species is a regional migrant.

During the summer maternity season, female northern long-eared bats most frequently select mature-growth forests that support both dead/decaying and live trees with cavities or exfoliating bark (Ford et al. 2006). Male and non-reproductive female northern long-eared bats may roost in cooler locations, including caves and mines (Amelon and Burhans 2006).

Female northern long-eared bats give birth to one young per year and can live as long as 18 years or more (USFWS 2022b). Maternity colonies are generally small, consisting of 30 to 60 individuals (Whitaker and Mumford 2009). Birthing occurs as early as late May or early June but can occur as late as mid-July (Whitaker and Mumford 2009). Juveniles take flight approximately 21 days after birth (Krochmal and Sparks 2007).

While the primary fall migration period is from mid-August to mid-October (USFWS 2014), the actual migration periods may vary by latitude and weather, with fall migration occurring earlier in more northern areas (USFWS 2014). Northern long-eared bats begin arriving at hibernacula in August, and by mid-September large numbers can be seen flying about the entrances to certain caves and mines (Boyles et al. 2009). Mating occurs during this fall swarming period around hibernacula (USFWS 2014).

Northern long-eared bats often overwinter in caves or abandoned mines (Caceres and Barclay 2000), but may also use deep rock crevices (Lemen et al. 2016). During winter cave surveys they are often found with other bat species (Boyles et al. 2009, Reimer et al. 2014), but

generally compose a small proportion of the population in a given hibernaculum (Pearson 1962, Caire et al. 1979, Stones 1981).

3.3 Little Brown Bat

3.3.1 Status and Distribution

3.3.1.1 Rangewide

The little brown bat is not federally listed, but is currently undergoing review[21] for potential listing under the ESA due to population declines caused by WNS (Kunz and Reichard 2010). The range of the little brown bat spans most of the US and Canada (Figure 3.1). Historically, the largest populations occurred in the Appalachian Mountains and the eastern Midwest, likely due to the high densities of caves in those regions (Culver et al. 1999).

The little brown bat was once considered one of the most common and widespread bats in North America, with an estimated rangewide population of 6.5 million bats in 2006 (Frick et al. 2010, Turner et al. 2011). Since the arrival of WNS, little brown bat populations have declined throughout their range (Cheng et al. 2021, Turner et al. 2011). Researchers estimate that across 36% of their range, little brown bat populations have declined 98% due to WNS, a threat characterized as large, of extreme severity, and high impact (Cheng et al. 2021). While population declines have been drastic, there is evidence that some individuals or populations may have or even gain resilience or resistance to WNS (Dobony and Johnson 2018, Cheng et al. 2019, Frank et al. 2019, Auteri and Knowles 2020, Gignoux-Wolfsohn et al. 2021). Even in the presence of WNS, individuals can live more than 25 years (Kurta et al. 2020), suggesting some ability for populations to eventually rebound (Ineson 2020).

3.3.1.2 Illinois

The little brown bat can be found throughout the state of Illinois (IDNR 2020).Based on winter cave surveys conducted between 2010 and 2022, at least 3,249 little brown bats hibernate in Illinois (Kath 2022a).

3.3.2 Habitat Characteristics and Use

The little brown bat overwinters in caves and mines, roosts in forested habitat and structures such as barns or other buildings in the summer, and migrates between the two habitats in the spring and fall (Fenton and Barclay 1980). The species hibernates in dense clusters, mainly in high-humidity caves and mines (Fenton and Barclay 1980). Little brown bats can be found hibernating in the same caves as big brown bats, Indiana bats, northern long-eared bats, and tricolored bats (Boyles et al 2009).

Little brown bats typically emerge from hibernation between March and May, depending on the region, to migrate to their forested summer habitat (Havens 2006). Little brown bats are generally

[21] The USFWS is undertaking a discretionary status review for the little brown bat and is scheduled to propose listing, make this species a candidate for listing, provide notice of a not warranted assessment, or other action by fiscal year 2024.

regional or long-distance migrants, moving up to 650 km between hibernacula and summer colonies (Norquay et al. 2013).

Summer habitat is varied and may include fragmented agricultural landscapes and suburban areas (Fenton and Barclay 1980, Henderson et al. 2009). Females typically return to their natal roosts to form maternity colonies situated in dark, warm, undisturbed locations such as attics, barns, or tree cavities (Kalcounis and Hecker 1996, Crampton and Barclay 1998). Little brown bats prefer to forage near areas with water and along forest edges, avoiding open terrestrial habitat such as agricultural areas and roads (Bergeson et al 2013). Females give birth to one young per year between June and July (Havens 2006) and young are weaned after approximately 26 days (Kunz et al. 1998). A maternity colony may consist of hundreds of individuals (Bergeson et al. 2015, Olson and Barclay 2013, Waag et al. 2022).

In late summer through fall, little brown bats migrate to hibernacula, where they swarm and mate before hibernating (Havens 2006). Migration begins as soon as late July or early August, and swarming may occur from August through October (Thomas et al. 1979, Havens 2006).

3.4 Tricolored Bat

3.4.1 Status and Distribution

3.4.1.1 Rangewide

The tricolored bat is proposed for listing as endangered under the ESA (USFWS 2022c). Prior to 2006, there were at least 140,000 tricolored bats observed hibernating in over 1,900 hibernacula (USFWS 2022c). Tricolored bats are among the bat species most impacted by WNS, and population declines are estimated at 93% (95% credible interval: 90–100%; Cheng et al. 2021). Researchers categorize WNS as a threat that is large in scope, extreme in severity, and high in impact (Cheng et al. 2021) and is the primary reason for the rapid decline in abundance for tricolored bats rangewide (USFWS 2021b). The range of the tricolored bat extends throughout eastern North and Central America, eastern Mexico and parts of the central and Midwest US (Figure 3.1).

3.4.1.2 Illinois

Tricolored bats have been documented in at least 23 mines and caves in Illinois during winter surveys since 2010 (Kath 2022b). In 2022, over 4,000 tricolored bats were estimated to be hibernating in two mines in Alexander County (Kath 2022b).

3.4.2 Habitat Characteristics and Use

The tricolored bat overwinters primarily in caves and mines, roosts in forested habitat in the summer, and migrates between the two habitats in the spring and fall (USFWS 2021b). Tricolored bats typically hibernate singly or in small numbers, frequently in warmer and more humid portions of hibernacula than other bat species (USFWS 2021b). However, they can be found hibernating with other species, such as northern long-eared bats, Indiana bats, and little brown bats (Fujita and Kunz 1984).

Because the tricolored bat hibernates longer than most bats, spring migration is later and fall migration is earlier than other species (LaVal and LaVal 1980). Tricolored bats emerge from hibernation in May and migrate to summer habitat (Davis and Mumford 1962, Vincent and Whitaker 2007). Migration varies from relatively short distances (53 km [33 mi]; Griffin 1940) to long latitudinal migrations, with males migrating farther than females (Fraser et al. 2012).

Females give birth to two offspring between May and July (USFWS 2021b) and young are independent five to six weeks after birth (Whitaker 1998). Tricolored bats migrate back to hibernacula as early as August for subadults (LaVal and LaVal 1980) and as late as September for some individuals (Fraser et al. 2012). Mating occurs in fall before hibernation and again during spring ovulation (Fujita and Kunz 1984).

3.5 Occurrence in the Permit Area

3.5.1 Pre-construction Risk Assessment

Pre-construction acoustic surveys for bats were conducted from August 18 to October 10, 2009, and from April 5 to July 8, 2010 (Stantec 2020). Calls were not identified to species but of the 105 bat passes recorded within the rotor-swept zone, only 11 were high-frequency calls (i.e., potentially Covered Species). At the time, the Project was deemed to pose a relatively low risk to the Covered Species, and the Applicant planned to conduct two years of post-construction fatality monitoring per the USFWS' *Land-based Wind Energy Guidelines* (USFWS 2012).

Based on a habitat assessment conducted in 2020, there were approximately 143 ha of suitable summer habitat within the Permit Area for Indiana or northern long-eared bats (Stantec 2020); suitability was not assessed for little brown or tricolored bats. Summer habitat for little brown and tricolored bats may overlap with Indiana bat and northern-long eared bat summer habitat as all four species use woodland areas for summer roosting and feeding.

3.5.2 Post-construction Monitoring

Fatality monitoring has been conducted each year since the Project began operating in 2020. In the first year of operations, no Covered Species were found from July 15 – October 15, 2020, during weekly searches of access roads and turbine pads (Stantec 2021a). In the second year of operations, standardized carcass searches were conducted twice weekly from July 12 – October 15, 2021, at all turbines. For a subset of 10 turbines, cleared plots were searched out to 80 m. During the 2021 searches, three Indiana bats were found (Chodachek et al. 2022). In 2022, standardized carcass searches were conducted twice weekly from August 1 – October 15 on access roads and turbine pads at all turbines, and one Indiana bat was found (Chodachek et al. 2023). No northern long-eared, little brown, or tricolored bats were found during the first three years of fatality monitoring.

The first Indiana bat fatality (adult male of unknown reproductive condition) was discovered August 22, 2021, when turbines were fully curtailed below a cut-in speed of 4.0 m/s from a half hour before sunset to a half hour after sunrise as a voluntary conservation measure. In response to this first fatality, the Project began additional curtailment (fully curtailed turbines until a wind speed of 6.9 m/s had been reached for a rolling average of 10 minutes) on August 27, 2021, at all turbines from

a half hour before sunset to a half hour after sunrise, as a voluntary measure to avoid additional Indiana bat fatalities. Based on the USFWS guidelines,[22] curtailment to 6.9 m/s from sunset to sunrise is "currently accepted as a measure to make take of Indiana bats unlikely during [fall migration]." The second and third fatalities were discovered on September 10, 2021 (adult female of unknown reproductive condition), and September 18, 2021 (adult female of unknown reproductive condition), while the Project was operating according to the USFWS guidelines.

The taking of two additional Indiana bats under the conventional avoidance strategy prompted the Applicant to propose additional avoidance and adaptive management measures beyond what is recommended in the Draft Guidelines. Per measures proposed in a request for a technical assistance letter (TAL) dated September 27, 2021, the Project curtailed turbines below 7.5 m/s (10-minute rolling average wind speed) from one hour before sunset to one hour after sunrise for the remainder of the active season (September 27 – October 15, 2021). The USFWS issued a TAL on September 30, 2021, for the remainder of the 2021 fall migratory season. No additional Indiana bats were taken during the remainder of the fall season.

In a subsequent TAL dated April 27, 2022, the Applicant again committed to the curtailment measures established in the previous TAL. Curtailment (nightly pausing below 7.5 m/s) and fatality monitoring for the fall season began August 1, 2022. Acoustic detectors were also placed throughout the Permit Area as an additional means of assessing risk to the Covered Species. On August 9, 2022, an Indiana bat carcass (male of unknown age and reproductive condition) was discovered while the Project was operating under the approved avoidance strategy. To better assess risk to Covered Species, the Applicant also conducted acoustic monitoring during the fall. Sixteen acoustic detectors were deployed throughout the Permit Area using a combination of ground-based and nacelle-mounted detectors from July 15 – October 31, 2022. All recordings were run through Kaleidoscope's automated bat identification software. All calls that were identified by the software as potential Covered Species calls were then reviewed by a qualified bat biologist. This biologist confirmed the presence of Indiana, little brown, and tricolored bats at the Project; no northern long-eared bat calls were confirmed (Western EcoSystems Technology, Inc. [WEST], *unpublished data*, 2022). These data were used to develop the minimization measures proposed in this HCP (Section 6.2).

3.5.3 Summary of Expected Seasonal Occurrence

Migrating Covered Species are expected to occur within the Permit Area during the spring and fall. The Covered Species are not expected to occur within the Permit Area during the summer maternity season based on the limited amount of suitable habitat, although this will be confirmed through monitoring during the ITP term (Section 6.4). The Covered Species are not expected to occur within the Permit Area during the staging/swarming season based on the distance of the Permit Area from the nearest known hibernacula. The Covered Species are not expected to occur within the Permit Area during the winter hibernation season when they are not active.

[22] U.S. Fish and Wildlife Service. 2017. Draft Guidelines for Wind Facilities Seeking a "Technical Assistance Letter." Illinois/Iowa Ecological Services Field Office, Moline, Illinois.

4 ENVIRONMENTAL SETTING AND BIOLOGICAL RESOURCES

The Project is located approximately 13 km northwest of Macomb, Illinois (Figure 1.1). The Permit Area is dominated by row crops, with pasturelands, rural residences, and farmsteads scattered throughout (Table 4.1). There are 13 named streams within the Permit Area along with a five-hectare state conservation area, the Sciota Railroad Prairie (Figure 4.1). Many of the streams originate in the Permit Area and flow out of the Permit Area to the east or west. Natural areas that provide potential habitat for bats, such as forest and open water, account for less than 1% of the Permit Area.

Table 4.1. Land cover types, coverage, and percent composition within the Cardinal Point Wind Project Permit Area, McDonough and Warren counties, Illinois.

Land Cover Type	Coverage (hectares)	Coverage (acres)	Percent Composition
Cultivated Crops	17,340	42,849	92.8
Developed	788	1,948	4.2
Hay/Pasture	420	1,039	2.3
Forest	124	306	0.7
Barren Land	4	9	<0.1
Open Water	1	3	<0.1
Herbaceous	<1	1	<0.1
Total[1]	**18,678**	**46,155**	**100**

[1] Sums can differ from total values shown due to rounding.

Source: National Land Cover Database 2019.

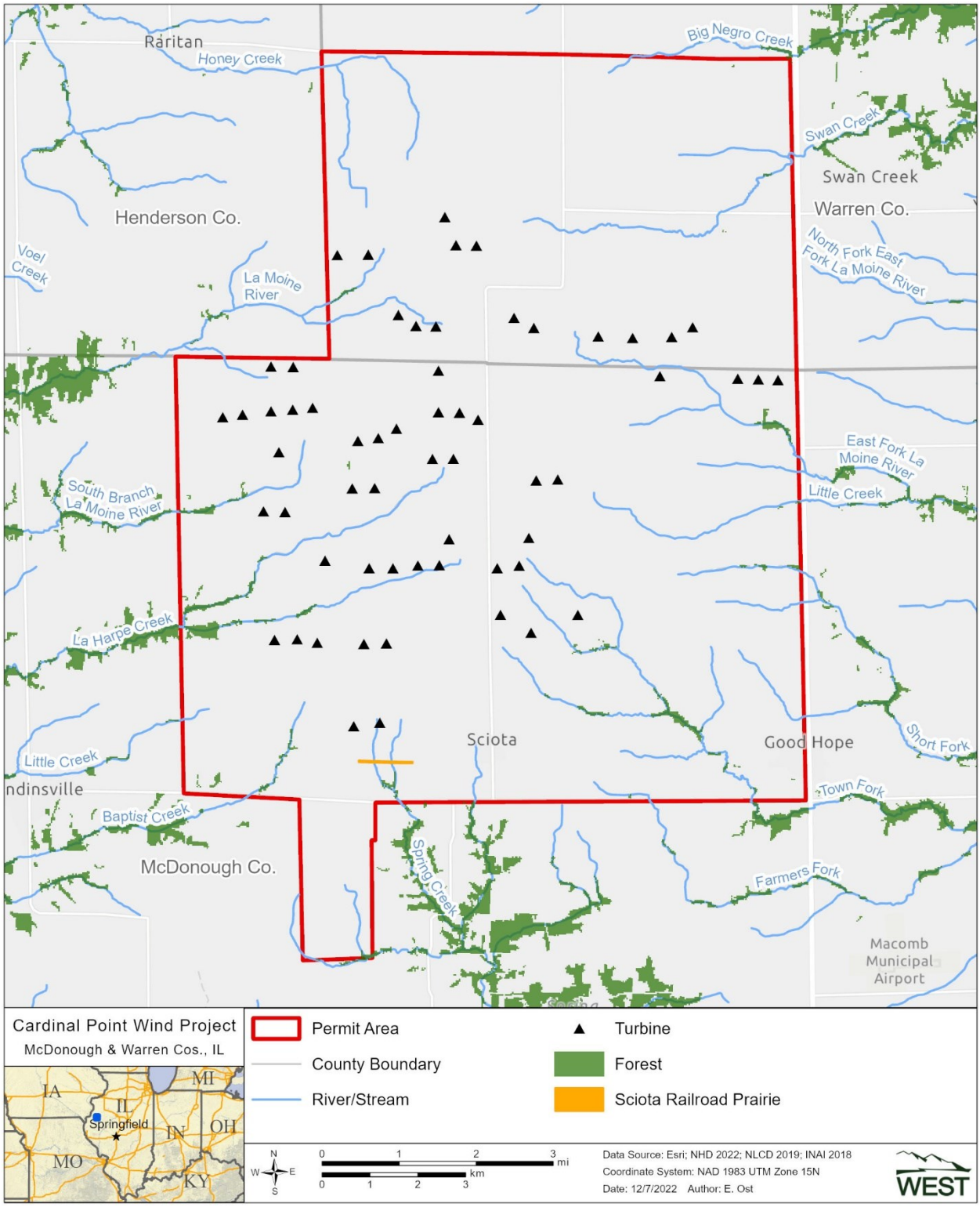


Figure 4.1. Natural areas within the Permit Area that provide potential habitat for bats.

5 POTENTIAL BIOLOGICAL IMPACT AND TAKE ASSESSMENT

5.1 Anticipated Take of Each Covered Species

The Applicant used Evidence of Absence (EoA) to generate take requests (Table 5.1) using data collected at the Project in 2020 (Stantec 2020) and 2021 (Chodachek et al. 2022). EoA is a statistical approach for estimating take that can be used when zero or very few observations are available for the target species (Huso et al. 2015). The monitoring results from the Project represent a mix of search effort and turbine operations (i.e., different curtailment regimes), as will be the case under the ITP. In these two survey periods, when turbines operated at different cut-in speeds between and within years (3.0 m/s without curtailment, or 4.0, 6.9, or 7.5 m/s with curtailment), searchers found three Indiana bats and none of the other three Covered Species. The overall detection probability (*g*) across both years was 0.04. This detection probability was low owing to the level of search effort, and results in a take rate distribution with a wide range of values (high variability). The inputs used to generate take distributions are included in Appendix A.

Given this variability and the objectives of this HCP, the Applicant has chosen two quantiles of the take rate (lambda in EoA) distribution around which to structure their minimization approach and take request for Indiana bats. The Applicant chose the 30th quantile of the take rate distribution (i.e., the "implementation take") for Indiana bats as a value to "manage to" while the Applicant tests out different approaches for long-term minimization. The Applicant has chosen the 50th quantile as the authorized take request (i.e., the "authorized take") for Indiana bats to capture possible variability in the take rate. The take request for Indiana bats is designed to be large enough that there is a low risk of hitting an avoidance (long-term) trigger in EoA in the first three years of the permit term. Operating under avoidance would defeat the purpose of the research study and would not contribute to the Applicant's ability to identify a long-term minimization strategy.

For little brown and tricolored bats, the Applicant chose the 50th quantile as the authorized take request. Due to concerns about the rarity of the northern long-eared bat, and because this species has not been detected acoustically in 2022 or as fatalities in any year, the Applicant revised the authorized take rate down to a single individual per year. Due to the relatively low predicted take for these species, no implementation-level of take or management is proposed.

Table 5.1. Take requests under the incidental take permit for the Cardinal Point Wind Project.

Species	Implementation / Authorized Annual Take	Implementation / Authorized[1] Permitted Take
Indiana bat	29.25 [1] / 39.91 [2]	176 / 240
Northern long-eared bat	NA / 1	NA / 6
Little brown bat	NA / 2.86 [2]	NA / 18
Tricolored bat	NA / 2.86 [2]	NA / 18

[1] Implementation take for the Indiana bat is based on the 30th quantile of the take estimates from 2020 and 2021 data from the Project, which was searched at variable effort and operated at variable cut-in speeds between the two years. No implementation take rate is proposed for the other three Covered Species.

[2] Authorized take is based on the 50th quantile of the take estimates for the Indiana bat, little brown bat, and tricolored bat. Because turbine operations will change, at a minimum, for the first three years of the ITP, these values represent a reasonable range of take the Applicant can manage to while testing out different curtailment approaches. The authorized take rate for northern long-eared bats was set at one per year, due to relative rarity of the species.

NA = not applicable

5.2 Anticipated Impacts of the Taking

5.2.1 Impacts to Indiana Bats

Female Indiana bats disperse into maternity colonies across the landscape during the summer and coalesce into a relatively small number of hibernacula during the winter (Section 3.1). The nearest known hibernaculum, of unknown status, is approximately 43 km southwest of the Project. Sodalis Nature Preserve, housing the largest Indiana bat hibernaculum in the country, is located approximately 120 km to the southwest of the Project. The Blackball Mine in LaSalle County, designated critical habitat for the Indiana bat, is located approximately 158 km northeast of the Project. As shown in Figure 3.2, there are more than 30 Indiana bat hibernacula within the maximum known migration distance for this species. While detailed migration pathways have not been described for Indiana bats, it is likely that fatalities of Indiana bats at the Project are of bats from multiple hibernacula. The Project's location is beyond the presumed 32-km swarming for a Priority 1 or Priority 2 Indiana bat hibernaculum (USFWS 2011, 2014), meaning that this Project is not likely to disproportionately affect any single overwintering site.

Females migrate between maternity colonies and hibernacula, while males generally remain near hibernacula throughout the active season (Section 3.1). Based on the distances from the Project to the nearest hibernacula, it is possible that the summer ratio could skew higher towards females if males from the hibernacula do not travel to the Project area during summer. Following USFWS guidance and precedent from other Midwest HCPs (e.g., Meadow Lake, Indiana, 2021; Hog Creek, Ohio, 2020; MidAmerican Energy Company, Iowa, 2019), a 3:1 ratio of female to male Indiana bats at the Project is a conservative assumption. Therefore, for the purposes of calculating impacts of the Project, approximately 75% of the Indiana bats that are likely to be taken are assumed to be reproductive females. This ratio may be an overestimate of the proportion of take attributable to females, but based on available data, it represents a conservative approach for assessing the impact of take.

The Applicant requests an average take of 40 Indiana bats each year during the 6-year ITP term. Approximately 75% of the incidental take is expected to be attributable to females, which equals an average annual take of 30 females. The predicted loss in reproductive capacity over the ITP term is 180 adult females and 287 female offspring, resulting in a total estimated impact of 467 female Indiana bats (Table 5.2). Thus, the impact of the take is approximately 78 female Indiana bats annually (467 female Indiana bats ÷ 6 years = approximately 78 female Indiana bats per year).

Table 5.2. The inputs and results of the resource equivalency analysis for female Indiana bats (Model version: USFWS 2016b).

Input Parameters	Value	Data Type
Permit start year	2023	User-supplied
Injured adult females annually	30	
Permitted take years	6 years to 2028	
Lambda condition (population trajectory)	Declining	
Adult female breeding rate	0.562 pups/female/year	Fixed
Juvenile female breeding rate	0.130 pups/female/year	
Pup survival to juvenile	0.585	
Juvenile annual survival	0.674	
Adult annual survival	0.857	
Results		
Direct take	180 female adults	Model-generated
Total lost reproduction	287 female pups	
Total lost	467 female Indiana bats	

The annual loss of 78 female Indiana bats would be negligible for the rangewide population, based on the most recent estimated population of 537,297 Indiana bats (USFWS 2019b). The annual loss of 78 females is also negligible for the Ozark-Central Recovery Unit population of 276,317 individuals (USFWS 2019b). Finally, this annual loss also equates to much less than one percent of the most recent estimated population of 78,403 Indiana bats in Illinois (USFWS 2019b), the population most likely to be impacted by the Project. These losses represent small fractions of the rangewide, recovery unit, and state populations of Indiana bats. Given the expected minimal impact of incidental take on population levels, and because mitigation actions are designed to fully offset the impacts of incidental take, the Applicant does not expect the Project to have an impact on this species at current population levels.

5.2.2 Impacts to Northern Long-Eared Bats

The locations of most northern long-eared bat hibernacula are unknown (Section 3.2). Since the Project is not located near any known hibernacula, male and female northern long-eared bats are assumed equally likely to occur in the Permit Area during migration. Given these biological considerations, USFWS guidance, and precedent from other wind HCPs, the Applicant assumes that 50% of the take at the Project will be attributed to reproductive females.

The Applicant predicts that up to one northern long-eared bat will be taken each year during the ITP term. Assuming an even sex ratio results in an annual take of 0.5 females. The predicted loss in reproductive capacity over the ITP term is three adult females and five female offspring, resulting in a total estimated impact of eight female northern long-eared bats (Table 5.3).

Table 5.3. The inputs and results of the resource equivalency analysis for female northern long-eared bats (Model version: USFWS 2016c).

Input Parameters	Value	Data Type
Permit start year	2023	User-supplied
Injured adult females annually	0.5	
Permitted take years	6 years to 2028	
Lambda condition (population trajectory)	Declining	
Adult female breeding rate	0.562 pups/female/year	Fixed
Juvenile female breeding rate	0.130 pups/female/year	
Pup survival to juvenile	0.585	
Juvenile annual survival	0.674	
Adult annual survival	0.857	
Results		
Direct take	3 female adults	Model-generated
Total lost reproduction	5 female pups	
Total lost	8 female northern long-eared bats	

The northern long-eared bat's tendency to hibernate individually or in small groups and hidden in crevices makes it difficult to obtain accurate winter population counts. Thus, limited data are available to evaluate the population-level impacts of this take. The estimated rangewide pre-WNS northern long-eared bat population was 6.5 million individuals (USFWS 2016a). Given estimated population declines (Cheng et al. 2021), there may be as few as 65,000 northern long-eared bats left rangewide. However, the annual loss of 0.5 female northern long-eared bats equates to much less than one percent of a post-WNS population.

Given the relatively short migration distance for this species (Section 3.2), the Illinois population is most likely to be impacted by the Project. The Illinois population is estimated at 2,132–53,317 northern long-eared bats (USFWS 2021). Given the expected minimal impact of incidental take on population levels, and because mitigation actions are designed to fully offset the impacts of incidental take, the Applicant does not expect the Project to have an impact on the rangewide or Illinois populations of the species at their current levels.

5.2.3 Impacts to Little Brown Bats

The locations of most little brown bat hibernacula are unknown (Section 3.3). Since the Project is not located near any known hibernacula, male and female little brown bats are assumed equally likely to occur in the Permit Area during migration. This species is not thought to occur at the Project in the summer, but this will be confirmed through monitoring (Section 3.5). Given these biological considerations, USFWS guidance, and precedent from other wind HCPs (e.g., California Ridge, Illinois 2021; High Prairie, Missouri 2021; MidAmerican Energy Company, Iowa 2019), the Applicant assumes that 50% of the take at the Project will be attributed to reproductive females.

The Applicant predicts that up to three little brown bats will be taken each year during the 6-year ITP term. Assuming an even sex ratio results in an annual take of 1.5 females. The predicted loss in reproductive capacity over the ITP term is nine adult females and eight female offspring, resulting in a total estimated impact of 17 female little brown bats (Table 5.4).

Table 5.4. The inputs and results of the resource equivalency analysis for female little brown bats (Model version: USFWS 2016d).

Input Parameters	Value	Data Type
Permit start year	2023	User-supplied
Injured adult females annually	1.5	
Permitted take years	6 years to 2028	
Lambda condition (population trajectory)	Declining	
Adult female breeding rate	0.6 pups/female/year	Fixed
Juvenile female breeding rate	0.3 pups/female/year	
Pup survival to juvenile	0.2	
Juvenile annual survival	0.7	
Adult annual survival	0.7	
Results		
Direct take	9 female adults	Model-generated
Total lost reproduction	8 female pups	
Total lost	17 female little brown bats	

Given the relatively short migration distance for this species (Section 3.3), the Illinois population is most likely to be impacted by the Project. The population size in Illinois is unknown, but there are at least 3,000 little brown bats overwintering in the state based on recent hibernacula surveys (Kath 2022a). Given the expected minimal impact of incidental take on population levels, and because mitigation actions are designed to fully offset the impacts of incidental take, the Applicant does not expect the Project to have an impact on the rangewide or Illinois populations of the species at their current levels.

5.2.4 Impacts to Tricolored Bats

The locations of most tricolored bat hibernacula are unknown (Section 3.4). Since the Project is not located near any known hibernacula, male and female tricolored bats are assumed equally likely to occur in the Permit Area during migration. This species is not thought to occur at the Project in the summer, but this will be confirmed through monitoring (Section 3.5). Given these biological considerations, USFWS guidance, and precedent from other wind HCPs (e.g., California Ridge, Illinois 2021; MidAmerican Energy Company, Iowa 2019), the Applicant assumes that 50% of the take at the Project will be attributed to reproductive females.

The Applicant predicts that up to three tricolored bats will be taken each year during the 6-year ITP term. Assuming an even sex ratio results in an annual take of 1.5 females. The predicted loss in reproductive capacity over the ITP term is nine adult females and 27 female offspring, resulting in a total estimated impact of 36 female tricolored bats (Table 5.5).

Table 5.5. The inputs and results of the resource equivalency analysis for female tricolored bats (Model version: USFWS 2022d).

Input Parameters	Value	Data Type
Permit term (years)	6	User-supplied
Injured adult females annually	1.5	
Adult female breeding rate	0.399 pups/female/year	Fixed
Juvenile female breeding rate	0.179 pups/female/year	
Pup survival to juvenile	0.478	
Juvenile annual survival	0.373	
Adult annual survival	0.877	
Results		
Direct take	9 female adults	Model-generated
Total lost reproduction	27 female pups	
Total lost	36 female tricolored bats	

Given the relatively short migration distance for this species (Section 3.4), the Illinois population is most likely to be impacted by the Project. The population size in Illinois is unknown, but it is estimated there are more than 9,000 tricolored bats overwintering in the state (Kath 2022b). Given the expected minimal impact of incidental take on population levels, and because mitigation actions are designed to fully offset the impacts of incidental take, the Applicant does not expect the Project to have an impact on the rangewide or Illinois populations of the species at their current levels.

6 BAT CONSERVATION PROGRAM

The Applicant's bat conservation program focuses on minimizing potential impacts to the Covered Species in the Permit Area and mitigating the impacts of the take through the protection or enhancement of high-quality bat habitat in the Plan Area. Monitoring will be used to verify the effectiveness of these measures in meeting the biological goals and objectives of this HCP and to provide information necessary to assess ITP compliance.

6.1 Biological Goals and Objectives

The biological goals of an HCP are the guiding principles for the operation of the bat conservation program described in the HCP and form the rationale behind the minimization and mitigation strategies employed. The biological objectives represent the steps through which the biological goals will be achieved, and provide a basis for measuring progress towards achieving the biological goals (USFWS 2016a). The Applicant's minimization and mitigation measures corresponding to each biological goal and objective are discussed in greater detail in Sections 6.2 and 6.3. The biological goals and objectives of this HCP are:

Goal 1: Contribute to maintaining the integrity of the populations of the Covered Species in Illinois by minimizing mortality of individuals migrating through the Permit Area.

Objective 1: Implement an operational strategy (either via optimized smart curtailment or blanket curtailment) in each permit year that minimizes Covered Species' collision risk (as approximated by acoustic activity) by at least 50% compared to what would have been anticipated under non-curtailed operations, while also maintaining take within the permitted levels. The optimized smart curtailment algorithm will be based on Project-specific acoustic and weather data collected both before and during the permit term (Section 6.2).

Goal 2: Contribute to long-term persistence of the Covered Species by developing mitigation that will support the survival and recovery of the Covered Species in Illinois or, in the case of the Indiana bat, elsewhere in the Ozark-Central Recovery Unit.

Objective 2: Protect sufficient summer and/or swarming habitat within the range of known Covered Species maternity colonies/hibernacula, and/or implement gating, stabilization, or protection of hibernacula used by sufficient numbers of the Covered Species, to fully offset the impact of the take on the Covered Species as indicated by USFWS guidance (Section 6.3).

Goal 3: Increase understanding of Covered Species mortality at wind energy facilities and of novel minimization measures.

> **Objective 3:** Conduct a mortality monitoring program with the primary goal of demonstrating compliance with the requested ITP, and a secondary goal of testing emerging minimization technology. Specifically, conduct experiments that compare optimized smart curtailment to blanket curtailment.

Goal 4: Use survey and study results to inform a long-term habitat conservation plan for this Project.

> **Objective 4:** Gather additional Project-specific acoustic and fatality data to inform risk to Covered Species at the Project. Establish whether there is summer risk for the Covered Species and, if so, the geographic and temporal extent of that risk for each species. Iteratively improve and test optimized smart curtailment algorithms in the first three years of the ITP.

6.2 Measures to Minimize Take

The Applicant will minimize potential impacts to Covered Species from the Project by curtailing turbines during the periods of greatest collision risk, as identified by WEST's optimized smart curtailment (OSC) algorithm (Table 6.1). "Blanket curtailment" (curtailing every turbine based on a threshold wind speed, every night for an entire season) is effective at reducing bat fatalities (Arnett et al. 2011, Adams et al. 2021, Good et al. 2022); however, it comes with associated losses in energy production. "Smart curtailment" can be defined as adjusting the cut-in speed schedule based on the activity patterns of bats near turbine blades with respect to temporal and weather variables, effectively achieving or exceeding the conservation value of blanket curtailment while minimizing turbine down-time. The general approach of using site-specific bat activity data to predict risk at individual facilities is still being tested, and is the subject of several ongoing research projects (Peterson et al. 2021, Hayes et al. 2023). WEST's OSC model advances smart curtailment by explicitly accounting for power losses in the algorithm decision process. Because the power generated by a wind turbine increases by the cube of wind speed, increasing curtailment threshold wind speeds from 3.0 to 5.0 m/s results in a 4.6-fold increase in lost renewable energy production. WEST's OSC incorporates the tradeoff between power loss and conservation benefit and can be tuned to achieve a target risk reduction while minimizing power losses. The model predicts potential risk to bats based on time, date, and atmospheric conditions, and curtails turbines according to rules designed to achieve this target risk reduction.

WEST's OSC is based on Bayesian classification and regression tree models (Chipman et al. 1998) and uses bat activity as the basis for classifying risk. For this HCP, potential predictor data included temperature, wind speed, day of the year, time of night, although other factors can be incorporated. The outcome and predictor data are measured over 10-minute intervals. To incorporate the cost of curtailment in terms of lost power production, the model weights each outcome according to the amount of bat activity and the potential power produced within the 10-minute interval.

Table 6.1. Operational minimization plan for the Cardinal Point Habitat Conservation Plan.

Dates	Turbines	Cut-in Speed	Temperature Threshold	Curtailing Below Cut-in[1]?
Spring and summer March 15 – July 14	All	3.0 m/s [3]	10 °C	Yes
July 15 – October 1	All	Optimized smart curtailment	Variable[4]	Yes
October 1 – November 15	All	3.0 m/s [3]	10 °C	Yes
November 16 – March 14	All	3.0 m/s	None	No

[1] Curtailing means that turbine blades will be pitched into the wind such that they spin at approximately one rotation per minute.

[2] While curtailment will end October 1, monitoring will continue through October 15 in Years 1 and 2 of the incidental take permit.

[3] Turbines will be curtailed below the manufacturer's rated cut-in speed.

[4] The optimized smart curtailment algorithm for Year 1 does not include temperature.

° = degree; C = Celsius; m/s = meters per second

Project turbines will be individually monitored and controlled based on weather (i.e., the entire Project will not alter cut-in wind speed of all turbines at the same time, but cut-in speeds will be altered based on weather conditions measured at each turbine). Turbine blades will be curtailed when the 10-minute rolling average, as monitored at individual turbines, meets the weather thresholds specified by the algorithm (wind speed, temperature) during the course of the night. Turbines will be released to run normally when the 10-minute rolling average weather conditions no longer meet the threshold.

The first three years of the ITP will be used to test alternate minimization strategies and choose one for implementation (and potential continued refinement, per adaptive management assessments) in the final three years of the ITP. In all years, turbines will be curtailed below the manufacturer's cut-in speed of 3.0 m/s in the spring and summer, unless adaptive management indicates otherwise (Table 6.1). In addition to fatality monitoring, acoustic monitoring will occur during the active season for at least the first two years of the ITP. Because Covered Species fatalities are expected to be relatively rare, tests for differences in efficacy between treatments will be conducted using all-bat fatality rates estimated with GenEst (Dalthorp et al. 2018) or another method as agreed upon by the USFWS.

Year 1 Objectives: In the first year of the ITP, the Applicant will test assumptions about relative energy production and rates of all-bat fatalities for OSC and standard blanket minimization measures. Optimized smart curtailment will capitalize on the relationship between acoustic calls (bat activity) and a suite of potential predictors including, but not limited to, wind speed, temperature, time of night, and date. The Applicant will assess the degree of summer risk for the Covered Species using acoustic and fatality data. With the goal of ensuring that take of Indiana bats does not exceed the implementation take rate in the first year, the Applicant will include some turbines operating at 7.5 m/s to limit risk to this and other Covered Species while OSC is being tested for the first time.

Year 1 Minimization Design: From July 15 – October 1, the Applicant will operate 20 turbines under 7.5 m/s blanket curtailment, 20 turbines under OSC (designed to avoid at least 50% of collision risk), and 20 turbines under 5.0 m/s blanket curtailment. The Applicant will compare fatality rates between 5.0 m/s blanket and OSC groups, but not the 7.5 m/s blanket group (Section 6.4.2.2).

The Year 1 OSC algorithm was based on acoustic and weather data gathered in fall 2022 (Section 3.5.2). The OSC model generated hundreds of algorithms from which a final algorithm was selected. This algorithm maximized power potential while covering at least 50% of all bat activity (Figure 6.1), and included curtailment rules based on date and wind speed (Figure 6.1). There may be some logistical constraints with programming curtailment rules based on time of night. If it is possible to program multiple cut-in speeds for curtailment within a night in Year 1, time of night will be included as well.

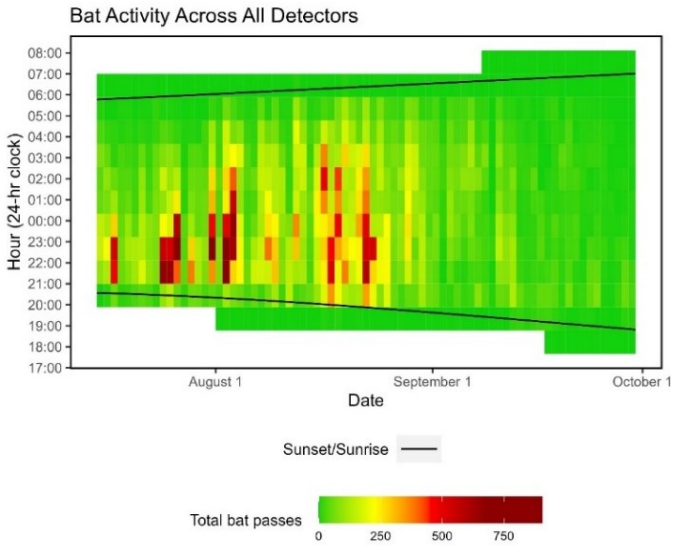


Figure 6.1. Bat activity data from fall 2022 used in designing the curtailment algorithm.

Year 2 Objective: The Applicant will test assumptions about the generality of the OSC algorithm. That is, how well does an algorithm based on one year of acoustic data perform in the next compared to an algorithm based on two years of data? The Applicant will assess the degree of summer risk for the Covered Species using all available acoustic and fatality data from the Project.

Year 2 Potential Minimization Design: The actual minimization measures and study design in Year 2 will be based on the results of Year 1, in coordination with the USFWS. One potential minimization approach is to operate 30 turbines at optimized Design 1 (using one year of acoustic data) and 30 turbines at optimized Design 2 (incorporating acoustic data from both years). The Applicant will compare fatality rates between these curtailment groups (Section 6.4.2.2).

Year 3 Objective: The Applicant will choose the best OSC approach based on three years of acoustic, energy, and fatality data. The chosen OSC algorithm will avoid at least 50% of the collision risk based on acoustic data and will be selected in coordination with the USFWS (Section 6.1).

Year 3 Potential Minimization Design: The actual minimization measures and study design implemented in Year 3 will be based on the results of Year 2, in coordination with the USFWS. The Applicant proposes to implement the chosen OSC algorithm at all turbines. If indicated by

adaptive management, the Applicant will cease acoustic monitoring and summer fatality monitoring (Section 6.5).

Years 4–6: The Applicant will implement the chosen OSC strategy across all turbines, unless otherwise indicated by adaptive management. The Applicant will continue to monitor for take compliance and adjust conservation measures as indicated by adaptive management.

6.3 Measures to Mitigate Impacts from Unavoidable Take

The Applicant will implement measures that are expected to reduce take of the Covered Species, and thereby minimize the impact of take on Covered Species' populations. However, some incidental take of the Covered Species may still occur. To provide conservation benefits to the Covered Species, the Applicant will fund and implement mitigation that fully offsets the impact of the take. The Applicant will provide funding assurances for mitigation sufficient to offset the impact of the *authorized* take within 30 days of the take authorization becoming effective. The Applicant will provide upfront mitigation sufficient to offset at least 50% of the *authorized* take of Indiana bats and 100% of the *authorized* take for the remaining Covered Species. A mitigation true-up to offset up to the *authorized* level of take of Indiana bats will be implemented if triggered under adaptive management. Mitigation credits for the Covered Species will be calculated using the USFWS resource equivalency analyses (REA; Section 5.2). Mitigation requirements will be discounted for projects benefiting multiple species, using a USFWS-approved approach.

The timeline for implementing mitigation varies by method and is identified for each option below. The Applicant, in some cases, may wish to secure mitigation in anticipation of and prior to issuance of an ITP for a final HCP. Such voluntary advance actions must be coordinated with the USFWS Field Office and meet all compensatory mitigation standards set forth below. The Applicant will provide clear evidence that the voluntary action was undertaken to fulfill mitigation requirements for a particular HCP. Technical assistance provided by the USFWS related to voluntary advance mitigation actions does not guarantee that the USFWS will eventually issue an ITP or that the Project will fulfill mitigation requirements. The USFWS will determine at the time of permit issuance whether and how much to credit voluntary advance mitigation actions.

The mitigation options outlined below are intended to provide streamlined and expeditious means to offset take. Regardless of the option selected, summer habitat mitigation lands will either include or be contiguous with a minimum of 46 protected acres per the requirements of the REA models.

Option 1: Purchase of credits from a conservation bank for the Covered Species. The conservation bank must be approved by the USFWS and have sufficient credits available to meet the mitigation need. A Credit Sale Agreement will be completed with the bank sponsor prior to permit issuance and a copy provided to USFWS. The funds for the credit purchase will be transmitted to the bank sponsor within 90 calendar days of permit issuance. Once funds have been transmitted, a copy of the Bill of Sale will be provided to USFWS.

Option 2: Contribution to an in-lieu fee (ILF) mitigation fund for the Covered Species. The ILF must be approved by the USFWS. A Verification Letter will be completed with the fund sponsor prior to permit issuance and a copy provided to USFWS. The funds being contributed to the ILF will be transmitted to the fund sponsor within 90 calendar days of permit issuance. Once funds have been transmitted, a copy of the receipt will be provided to USFWS.

Option 3: Use of a Permittee-Responsible Mitigation (PRM) project. PRM projects must be pre-approved by the USFWS and include appropriate real estate assurances (i.e., conservation easement), financial assurances (i.e., management endowment), and a management plan approved by the local Field Office. Acceptable PRM projects can be summer habitat protection, summer habitat restoration, swarming habitat protection, winter habitat protection, or a combination of these project types. A stand-alone PRM project must individually meet the 46-acre threshold for summer habitat, or, for projects that will provide less than 46 acres of mitigation, must be part of a suitable habitat complex that is at least 46 acres, for example established adjacent to existing conservation lands. The use of cave-gating or other measures to protect winter habitat/hibernacula of the Covered Species must be approved by the USFWS and must be conducted through a USFWS-approved mitigation entity (or entities). Winter habitat protection measures should be designed and funded to be maintained by the mitigation entity in perpetuity. The PRM project will be completed within one year of permit issuance.

Option 4: Research on conservation measures for hibernacula. Research projects must be pre-approved by the USFWS and include a study plan approved by the Illinois-Iowa Ecological Services Field Office. Research studies will be targeted to answer key areas of uncertainty regarding the impacts of hibernaculum modifications on Covered Species, with the goal of identifying implementable approaches that can lead to a measureable benefit to the Covered Species. Any project implemented under this option will have a clear benefit to the Covered Species. Guidance from the USFWS related to the use of a research project as mitigation may be forthcoming either before permit issuance or during the proposed ITP term. Any project conducted under this option will follow those guidelines, if and when they become available.

Mitigation requirements for PRM were calculated using the USFWS's species-specific REA models using the parameters and assumptions in Section 5.2.

Upfront mitigation will be completed to offset the impact of taking 100% of northern long-eared, little brown, and tricolored bats and 50% of Indiana bats. Upfront mitigation acres for each Covered Species, as well as all species combined, using stacking ratios provided by the USFWS, are shown in Table 6.2.

Table 6.2. Upfront mitigation acres for each Covered Species and stacked acreages.

Covered Species	Summer Habitat Protection Hectares (Acres)	Summer Habitat Restoration Hectares (Acres)
Indiana bat[1]	130.7 (323)	98.7 (244)
Northern long-eared bat[2]	4.5 (11)	4.9 (12)
Little brown bat[2]	13.8 (34)	10.1 (25)
Tricolored bat[2]	15.0 (37)	15.0 (37)

Table 6.2. Upfront mitigation acres for each Covered Species and stacked acreages.

Covered Species	Summer Habitat Protection Hectares (Acres)	Summer Habitat Restoration Hectares (Acres)
All Covered Species (Stacked)[3]	134.0 (331.2)	101.7 (251.4)

[1] Sufficient to offset 50% of the authorized take

[2] Sufficient to offset 100% of the authorized take

[3] Stacking ratios only apply to mitigation projects providing mitigation credit for multiple Covered Species; stacking is calculated as: X acres for Species A + (X acres for Species B * 0.10) + (X acres for Species C * 0.10) + (X acres for Species D * 0.10) = total stacked acres, where Species A is the Covered Species with the higher mitigation requirement and Species B-D are the Covered Species with the lower mitigation requirement (if mitigation requirements are equal, either species may be Species A or Species B-D). The stacked acreages shown here assume that any mitigation projects will provide habitat for all four species.

Under the mitigation true-up (if needed), additional acres could be needed to mitigate for the impact of taking up 20 additional Indiana bats per year (120 additional bats beyond the initial 120, for a total of 240 Indiana bats over the 6-year ITP term). The total potential mitigation acres for the full authorized take for Indiana bat are shown in Table 6.3.

Table 6.3. Total mitigation acreages for the authorized take amounts and true-up mitigation acres for Indiana bat.

Covered Species	Summer Habitat Protection Hectares (Acres)	Summer Habitat Restoration Hectares (Acres)
Indiana bat only (to offset authorized take)	261.4 (646)	197.1 (487)
Indiana bat only (potential true-up amount = authorized - upfront)[1]	130.7 (323)	98.7 (244)
All Covered Species (authorized = upfront + Indiana bat true-up)	264.7 (654.2)	200.5 (495.4)

[1] Note that the actual true-up acreage may be different based on adaptive management (Section 6.5)

The following information shall be contained within the Project Development Plan for each PRM Project, to be developed together with the USFWS once the mitigation parcel(s) is identified. The plan will include a description of the property and detail preservation or restoration measures needed on the site, including:

1. Goals and Objectives: A description of the habitat resource type(s) and amount(s) that will be provided in acres or other metrics where appropriate (e.g., cave gating) and the functions targeted for preservation or restoration.
2. Site Selection: An assessment of the factors considered during the site selection process with guidance from a provided checklist.
3. Site Protection Instrument: A description of the legal arrangements and instrument that will ensure the long-term protection of the compensatory mitigation site.
4. Determination of Habitat Acres: A description of the number of habitat acres to be provided from the Mitigation Project, including a brief explanation of the rationale for this determination. The area determined to provide the acreage must be clearly delineated. Delineation must also identify features that would not be considered for mitigation acres such as developed areas within the property, prior mitigation projects, and previously implemented restoration projects.

5. Cost and Timeline of Implementation: The Mitigation Project Provider will provide a full cost estimate for acquiring, restoring (if applicable), monitoring, and managing in the long-term and a timeline for completion.
6. Baseline Site Information: A description of the ecological characteristics of the proposed site, including last known occurrence of Covered Species on the site.
7. Performance Criteria: Assessment of which ecological and measurable standards will need to be reached to achieve functional habitat objectives.
8. Compensatory Mitigation Work Plan: If applicable, provide detailed written specifications and work descriptions for the Mitigation Project to reach suitable habitat function, including geographic boundaries; restoration methods, timing, and sequence of work; including methods for establishing the desired tree and plant community; and plans to control invasive plant species; etc.
9. Maintenance Plan: A description and schedule of maintenance requirements to ensure the continued viability of the habitat resource once initial construction is completed to meet ecological performance standards.
10. Monitoring Requirements: A description of parameters to be monitored in order to determine if the Mitigation Project is on track to meet Performance Standards and if Adaptive Management is needed. A schedule for monitoring and reporting on monitoring results will also be included.
11. Long-term Management Plan: A description of how the Mitigation Project will be managed after achievement of Performance Standards to ensure the long-term sustainability of the resource, including long-term financing mechanisms and appointing the Long-term Steward responsible for long-term management.
12. Adaptive Management Plan: A management strategy to address unforeseen changes in site conditions or other components of the project, including the party or parties responsible for implementing adaptive management measures. The Adaptive Management Plan will guide decisions for revising Project Development Plans and implementing measures to address Changed Circumstances that adversely affect the Mitigation Project's success.
13. If the proposed Mitigation Project is less than 46 acres, other information, such as: a) nearby mitigation or restoration projects or other existing protected lands and how the proposed Mitigation Project may complement them; b) adjacent (generally within 4.0 km or 8.0 km) land uses and potential effects of adjacent land uses on the Mitigation Project, or c) other information as identified by the USFWS as necessary for inclusion in the Project Development Plan to demonstrate that the proposed Mitigation Project is contiguous with a minimum of 46 protected acres.

6.4 Monitoring

The Applicant will conduct monitoring to track compliance with the HCP and the requested ITP. In addition, monitoring allows the Applicant and USFWS to track progress being made towards the HCP's biological goals and objectives, evaluate if the HCP's bat conservation program is

effective at minimizing and mitigating impacts to Covered Species, and evaluate the need for adaptive management measures to improve the HCP's conservation strategy.

6.4.1 Mitigation Monitoring

As a requirement of mitigation implemented through a contract with a mitigation provider or execution of an easement (i.e., PRM), a Project Development Plan acceptable to the USFWS will be developed prior to implementation of the mitigation. The Project Development Plan will describe: the mitigation project's monitoring protocol, the entity responsible for periodic evaluation of the mitigation project according to the monitoring protocol, the frequency of periodic evaluation, adaptive management actions to be taken if the periodic evaluation indicates that the habitat quality of the mitigation project has been compromised by a natural disaster and no longer meets its success criteria, and the reporting process.

If mitigation is implemented through a USFWS-approved conservation bank, ILF fund, or WNS treatment fund, monitoring and reporting will be conducted by the managing entity according to the requirements established during the USFWS's approval process for the bank or fund.

6.4.2 Compliance Monitoring

The purpose of monitoring the Project is threefold: to estimate Covered Species take using EoA, to test the efficacy of OSC using GenEst, and to assess risk to the Covered Species throughout the active season. The Applicant will test different OSC algorithms based on acoustic data and predictor variables collected at the Project (starting with the data gathered in 2022), and will revise these in the initial years of the ITP. The results of monitoring under the short-term ITP are designed to inform risk and identify appropriate minimization measures under a long-term HCP and ITP.

6.4.2.1 Estimating Covered Species Take

The Applicant's compliance monitoring protocol will consist of two components: 1) post-construction fatality monitoring in Years 1–3 of the ITP term designed to achieve a minimum detection probability (*g*) of 0.15 using a mix of full and road-and-pad plots during the seasons of assumed risk for each study period (see below); and 2) post-construction fatality monitoring in Years 4–6 of the ITP term with searches conducted on roads and pads during the active season (April 1 – October 15), unless adaptive management indicates otherwise.

Table 6.4 provides the proposed monitoring protocol for Year 1 of the ITP; monitoring protocols for Years 2–6 will be designed based on data from the previous years of monitoring using the EoA model to ensure the target *g* value will be achieved. In Year 1 of the ITP, the Applicant will conduct weekly road-and-pad searches at the group of 20 turbines implementing 7.5 m/s blanket curtailment. Acoustic data will be gathered throughout the Project in Years 1 and 2, spring through fall, to inform the Year 2 and 3 minimization regimes. If the ITP is received in summer 2023, the Year 1 study protocol would be modified to only include the approach described below for the fall season of 2023; acoustic data will be gathered from spring through fall of 2023 regardless of timing of the ITP.

Table 6.4. Proposed minimization and monitoring protocol for Year 1 of the ITP.

Monitoring Season	Curtailment Treatment Group	Plot Type (# of Turbines Searched)	Plot Radius	Search Interval in Days
Spring (April 1 - May 15)	3.0 m/s blanket	Road and pad (60)	100 m	14
Summer (May 16 - July 14)[1]	3.0 m/s blanket	Road and pad (20)	100	3.5
		Cleared (10)	70 m	3.5
		Uncleared (10)	70 m	3.5
Fall (July 15 - October 1)	7.5 m/s blanket[2]	Road and pad (20)	100 m	7
	5.0 m/s blanket and smart curtailment	Road and pad (20)	100 m	3.5
		Cleared (10)	70 m	3.5
		Uncleared (10)	70 m	3.5

[1] Data from summer surveys will not be used to contribute to the *g* of 0.15, which will be accomplished through spring and fall surveys alone.

[2] Surveys at these turbines will not be used to contribute to the *g* of 0.15, which will be accomplished through surveys at the other curtailment treatment groups

The EoA model and software (Huso et al. 2015, Dalthorp et al. 2017) will be used to assess take of the Covered Species (with the exception of northern long-eared bats, see Section 6.5) and compliance with the requested ITP. EoA combines all search data into a single, site-wide detection probability for the entire study period. To accomplish this, EoA requires estimates of the weights (rho), which are proportional to the fraction of fatality risk within each search stratum. Search strata are defined by time (e.g., season or year), search plot type (e.g., road-and-pad or cleared plot) and treatment regime (e.g., wind turbine cut-in speed). Two initial assumptions for the Project are that there is no risk to Covered Species during the summer, and that a 7.5 m/s cut-in speed represents curtailment under which Covered Species is not reasonably certain to occur. This is supported by analysis of the 2022 acoustic data, which shows that 82% of all bat activity was recorded below 7.5 m/s (WEST, *unpublished data*, 2022). Consequently, EoA weights (rho) for summer and for turbines operated at 7.5 m/s cut-in speed will be assumed to be zero, unless Project data demonstrate otherwise (see below). “Baseline” weights for turbines operating normally in spring and with 5.0 m/s cut-in speeds in the fall will be assumed based on previously published data on *Myotis* (USFWS 2016). In the Midwest, it is generally assumed that 7% of risk to the Covered Species occurs in the spring, 36% in the summer, and 57% in the fall (USFWS 2016a). Assuming no summer risk, the rescaled spring and fall risk assumed for the Project are 11% and 89%, respectively. These baseline weights will be adjusted annually to account for operational adjustments to turbines (such as the operation of 20 turbines with 7.5 m/s cut-in speed during fall in Year 1). Weights associated with OSC operating regimes, or cut-in speeds between 5.0 and 7.5 m/s will be determined based on the fraction of bat calls that would potentially be exposed to rotating turbine blades, given the curtailment regime.

Should Covered Species be detected as fatalities in the summer or at turbines operated with a 7.5 m/s cut-in speed, the assumptions above will be proved incorrect. If a Covered Species is detected during summer, assumptions about seasonal risk stated above (7%, 36% and 57% in spring, summer, and fall, respectively) will be substituted for the previous assumption of no summer risk (11% risk in spring, 89% risk in fall). Acoustic data will be considered as well when revising these seasonal proportions. If Covered Species are determined to have collided with

turbines operated at 7.5 m/s, the percent risk reduction associated with that wind-cut-in speed will be determined in consultation with USFWS. Adjusting seasonal or treatment weights will impact the detection probabilities (and fatality estimates) for all years of the study; consequently, if it becomes necessary to change assumptions about the weights, detection probabilities for any past monitoring efforts during the ITP term will be re-estimated. These revised detection probabilities will be applied to the current monitoring year's take estimates and adaptive management triggers; permit compliance will not be determined retroactively based on revisions to assumptions about detection probabilities.

Fatality monitoring in Years 1–3 will be designed to meet a target *g* value of 0.15 across the search strata with non-zero EoA weights. Searches conducted in the summer and at turbines operating a 7.5 m/s will not influence the EoA *g* due to the zero weights. Fatality monitoring in all years will provide all necessary inputs required for EoA, including the total number of carcasses of the Covered Species found during searches; the results of searcher efficiency trials, carcass persistence trials, and an area correction model that will be used for bias correction. The EoA model will be used to estimate the annual take rate (lambda) and cumulative take (M*) for use in testing adaptive management triggers to ensure compliance with the ITP.[23] The annual take rate and cumulative take will be estimated in each year of the ITP.

During the Project's fatality monitoring, all bat carcasses located within the standardized search area will be recorded. The following information will be recorded for each carcass: a unique identification code; sex and age when possible; date and time collected: observer; carcass condition (i.e., intact, scavenged, dismembered, or injured); injuries; scavenging; estimated time of death; Universal Transverse Mercator location, distance and bearing from the turbine; and any relevant comments. All carcasses will be photographed as found and plotted on a map of the search area. Bat carcasses will be collected and species identification will be verified by bat biologists permitted by the USFWS to survey for Indiana bat and northern long-eared bat. Skin and tissue samples from bat carcasses too decomposed to be identified and that cannot be ruled out as a Covered Species by permitted bat biologists will be sent to a qualified lab for identification via deoxyribonucleic acid (commonly, DNA) sampling. All bat carcasses or genetic samples from all bat carcasses will be provided to USFWS, upon request. Carcasses found outside of the standardized search area will be recorded following the above protocol, but labeled as incidental finds and incorporated into the EoA estimate by modifying the Bayesian prior (Dalthorp et al. 2020).

Searcher efficiency and carcass persistence trials will be conducted to provide bias correction factors for the EoA model. The objective of the searcher efficiency trials is to estimate the proportion of available carcasses found by searchers. Searcher efficiency trials will be conducted in the same areas as carcass searches and will be estimated by search area type (cleared plot or road and pad) and season. Approximately 45 bat carcasses or bat surrogate carcasses will be placed in roughly even numbers across search area types (i.e., approximately 15 carcasses per

[23] EoA will be used to estimate the cumulative take for Indiana, little brown, and tricolored bats. A "bats-in-hand" approach will be used for northern long-eared bats (Section 6.5).

search area type, per season). Carcasses of non-listed bat species found on-site, and carcasses of non-listed bat species that are available from labs or other sources, will be used in the trials. If an insufficient number of bat carcasses is available, brown or black mice (*Mus musculus*) carcasses may be used as surrogate bat carcasses. The person placing the carcasses will not inform the personnel conducting the searches when the trial is being conducted or where trial carcasses are placed.

The objective of carcass persistence trials is to estimate the average probability a carcass is available to be found after an interval of time. Carcasses will be placed within search area boundaries. Carcass persistence trials will be conducted throughout the monitoring period to incorporate the effects of varying weather, climatic conditions, and scavenger densities. Species used for carcass persistence trials will be the same as used for searcher efficiency trials. Approximately 15 bat carcasses or bat surrogate carcasses will be placed during the carcass persistence trials per search type. Field personnel will monitor carcass persistence trials for 30 days. Trial carcasses will be checked every day for the first four days, and then on day 7, 10, 14, 20, and 30 after placement. At the end of the 30-day period, any remaining evidence of the carcass will be removed.

6.4.2.2 Curtailment Effectiveness

As noted above, the Applicant is testing the effectiveness of the proposed minimization regime (OSC) at the Project in the first year of the ITP. Intensive standardized carcass searches will be conducted in order to compare the effectiveness of the curtailment regimes (5.0 m/s blanket and OSC) in Year 1 of the ITP. Fatality rates for both treatments will be estimated using GenEst; an all-bat fatality rate will not be estimated for the 7.5 m/s blanket group. The same process will be repeated in any subsequent ITP years in which multiple minimization approaches are being compared.

6.4.3 Acoustic Monitoring

The Applicant will conduct acoustic monitoring for at least the first two years of the ITP term. In Year 1 of the ITP, acoustic detectors will be distributed throughout the Permit Area using a combination of nacelle- and ground-mounted detectors (Appendix B). The detectors will be set to record throughout the active season. The acoustic data will be used to make updates to the OSC algorithm (Section 6.2) and for certain adaptive management triggers (Section 6.5). In Year 2, the acoustic monitoring plan may be modified depending on the results of the Year 1 study, through coordination with the USFWS.

6.5 Adaptive Management

Adaptive management is a method to address uncertainty in natural resources management. Broadly defined, it means to examine strategies for meeting biological goals and objectives, and then, if necessary, adjusting future conservation management actions according to what is learned. The Applicant will utilize adaptive management to ensure that the Project's bat conservation program is effective in meeting the biological goals and objectives of this HCP and that the take of Covered Species at the Project does not exceed the permitted level of take (Table 6.5).

Table 6.5. Adaptive management plan for the Cardinal Point Wind Project.

Trigger	Action	Monitoring
Mitigation		
For Indiana bats, the cumulative take (M* in EoA) is equal to or greater than 80% of the take used to calculate the upfront mitigation amount	1) Conduct a mitigation true-up based on the median projected take for the remainder of the permit term (using the projection tool in EoA), and/or 2) the smart curtailment algorithm will be modified to reduce take to stay within the amount already mitigated for.	Monitor to g = 0.15 any year in which a new curtailment regime is implemented
A mitigation true-up has been triggered, and 10 or more Indiana bat carcasses have been discovered at the Project to date	Use the observed sex ratio to determine any remaining mitigation offsets.	NA
Take Estimates		
Starting in Year 3 and using EoA, the median projected life of permit take exceeds what is expected for Indiana bats, based on the *implementation* take	Revise smart curtailment algorithm such that it is designed to keep future fatalities at or below the *implementation* take rate.	Monitor to g = 0.15 any year in which a new curtailment regime is implemented
Starting in Year 3 and using EoA, the median projected life of permit take exceeds what is expected for little brown and tricolored bats, based on the *authorized* take	Revise smart curtailment algorithm such that it is designed to keep future fatalities at or below the *authorized* take rate.	Monitor to g = 0.15 any year in which a new curtailment regime is implemented
In any year, if one or more northern long-eared bat carcasses are discovered at the Project	Coordinate with the USFWS about the need for additional minimization measures or another appropriate response.	Coordinate with the USFWS about the need for additional monitoring
In any year and using EoA, the cumulative take estimate has exceeded the *authorized* take amount for Indiana, little brown, or tricolored bats	Implement curtailment measures such that take is unlikely based on the best available acoustic activity data from the Project.	Road-and-pad monitoring because no take is expected to occur under the turbine operational adjustment
Seasonal Risk		
No Covered Species fatalities are detected in the summer of Year 1 or Year 2	In coordination with the USFWS, the Applicant may choose to: 1) continue acoustic monitoring in the summer in Year 3; or 2) analyze acoustic data to refine assumptions about seasonal arrival proportions in EoA, which would then be used to inform take estimates.	Drop summer fatality and acoustic monitoring for the remainder of the permit term
1) A Covered Species carcass is found during the summer, or 2) acoustic data indicate that summer curtailment is needed to maintain the minimization standard of avoiding 50% of collision risk	Assess which turbines have summer risk using all available acoustic and fatality data, update assumptions about summer risk for EoA-based detection probabilities for take estimates and adaptive management assessments moving forward (Section 6.4.2.1), and revise the smart curtailment algorithm to include summer at some or all turbines. Decisions will be made based on the biological goals and objectives.	Continue summer fatality monitoring at any curtailed turbines; the Applicant may discontinue acoustic monitoring

Table 6.5. Adaptive management plan for the Cardinal Point Wind Project.

Trigger	Action	Monitoring
No Covered Species fatalities are detected in the last two weeks of fall (October 1 – 15) in Year 1 or Year 2 and acoustic data indicate that no curtailment is needed in this time period to maintain the minimization standard of avoiding 50% of collision risk	NA	Discontinue monitoring in October starting in Year 3 so that the revised fall end date for monitoring is October 1
Minimization Approach		
The Applicant no longer wishes to implement optimized smart curtailment, either because use of this approach no longer meets the "maximum extent practicable" requirement, or because an alternative technology better meets the biological goals and objectives of the HCP	Implement blanket curtailment or some other minimization approach, as agreed upon by the USFWS, and manage to the *implementation* take amount for Indiana bats (and to the *authorized* take for the other three species)	Monitor to g = 0.15 any year in which a new minimization regime is implemented

EoA = Evidence of Absence, g = detection probability, HCP = Habitat Conservation Plan, NA = not applicable, USFWS = US Fish and Wildlife Service

6.6 Reporting

The Applicant will provide the USFWS with an HCP report by February 15 each year of the ITP term. The report will include, but will not be limited to, the following results of compliance monitoring conducted during the previous year:

- Take estimates of Indiana bats, little brown bats, and tricolored bats and the methods and inputs used to calculate the EoA estimates, as described in Section 6.4.2.1;
- Raw carcass counts of northern long-eared bats, as described in Section 6.4.2.1;
- Take estimates for all bats (overall fatality rate) by treatment group and the methods and inputs used to calculate the GenEst estimates, as described in Section 6.4.2.2;
- Representative data summarized to demonstrate turbine operations;
- Summary of acoustic data collection (start and end dates, any issues that may have occurred with the detectors);
- Curtailment algorithm for the current year as well as a heat map of the bat calls used to generate the algorithm;
- Review of the adaptive management triggers and which trigger was met (if any);
- Actions implemented or planned for implementation in response to adaptive management triggers;
- Description of mitigation implemented to date;
- Results of mitigation effectiveness monitoring conducted during the previous year, if applicable;

- Description of adaptive management implemented at the mitigation project(s), if applicable; and
- Description of any Changed Circumstances triggered and the response implemented, if applicable.

Additionally, although permitted, in the event that a Covered Species fatality is documented during the compliance monitoring, the USFWS will be notified by phone and/or email within 24 hours once positive species identification has been determined or within 72 hours for suspected Covered Species carcasses. Carcasses of listed bat species will be provided to the USFWS.

7 CHANGED AND UNFORESEEN CIRCUMSTANCES

Implementing regulations for Section 10 of the ESA recognize that revisions to the original HCP may be required as circumstances and information may change.

7.1 Changed Circumstances

Changed Circumstances are changes in circumstances affecting a listed species or geographic area covered by an HCP that can reasonably be anticipated by plan developers and the USFWS and that can be planned for.[24] Per the HCP Handbook, to the extent practicable, the Applicant should identify potential Changed Circumstances in advance and identify specific strategies or responses in the HCP for addressing them, so that adjustments can be made as necessary without the need to amend the HCP. Pursuant to the "No Surprises" Rule[25], if the USFWS determines that additional conservation and mitigation measures are necessary as the result of a Changed Circumstance and the circumstance has been addressed in this HCP, implementation of the response to the Changed Circumstance is required.

Foreseeable Changed Circumstances warranting planning considerations include the following:

- ESA listing of a new bat species as threatened or endangered that occurs within the Permit Area and is reasonably certain to experience take from the Project;
- New technology or information that improves monitoring bat mortality or estimating mortality;
- Change in Covered Species' migration dates;
- Changes in a mitigation project's ability to meet success criteria during the ITP term[26];
- Hibernaculum research study is unable to be completed; or
- Unavoidable delay of mitigation project implementation beyond one year of ITP issuance.

The specific triggers and responses for each of the above listed Changed Circumstances are presented in Table 7.1.

[24] 50 CFR 17.3 (1975)

[25] 63 FR 8859 (February 23, 1998)

[26] Note that this Changed Circumstance does not apply if mitigation is provided by a conservation bank or ILF fund.

Table 7.1. Changed circumstances and incidental take permit holder response.

Changed Circumstance	Rationale	Trigger	Response
ESA listing of a new bat species as threatened or endangered that occurs within the Permit Area and is reasonably certain to experience take from the Project.	As a result of current population declines due primarily to WNS, other bat species may become listed under the ESA as threatened or endangered during the ITP term.	The USFWS notifies the Applicant of a proposed rule to list under the ESA any bat species that occurs within the Permit Area and is reasonably certain to experience take from the Project, but is not covered by the HCP.	The Applicant may choose to modify its operations in coordination with the USFWS to ensure that incidental take of the species will be unlikely to occur. Alternatively, the Applicant may choose to seek to include the species under the ITP through an ITP Amendment (see Section 9.2).
New technology or information that improves monitoring bat mortality or estimating mortality.	Over the course of the ITP term, new information on Covered Species and bat/wind power interactions may become available; new methods for monitoring and/or estimating mortality may be developed. The Applicant may wish to incorporate new information or methods into the monitoring plans outlined in the HCP.	The Applicant notifies the USFWS of the intent to utilize alternative monitoring or mortality estimation that have been demonstrated, based on the best available science, to be as effective as, or more effective than, the methods described in this HCP and available at equal or lower cost. New methods and technologies will only be considered if the methods have been demonstrated to be at least as effective as the methods in this HCP, are considered the best available science, and are approved by the USFWS.	The Applicant will work with the USFWS to ensure that any new methods or technologies that are used are compatible with the Biological Goal and Objectives in this HCP. If the Applicant decides to proceed with implementing the new measures, they will propose an administrative change (Section 9.1).
Change in Covered Species' migration dates	Temperature increases associated with climate change may disrupt annual or seasonal events important to Covered Species by altering seasonal cues that trigger behaviors such as mating and migration. These changes could result in changes in the timing of spring and fall migration of the Covered Species.	The USFWS announces through an official, public medium (such as in a revised recovery plan, 5-year status review, or the USFWS Region 3 website) of a change in the dispersal and migration dates of a Covered Species, and notifies the Applicant of the documented change in migration patterns.	The Applicant will propose an administrative change to adjust the timing of minimization measures and monitoring such that the measures encompass the earlier migration start date and/or later migration end date for the Covered Species. Changes to the operational protocol and the monitoring will take effect in the first migration season after the USFWS notifies the Applicant.

Table 7.1. Changed circumstances and incidental take permit holder response.

Changed Circumstance	Rationale	Trigger	Response
Changes in a mitigation project's ability to meet success criteria.[27]	One or more of a range of natural phenomena (such as tornadoes, drought, wildfire, floods, or invasive species), are reasonably foreseeable during the ITP term and may impact mitigation lands.	A natural disaster occurring within the mitigation area causes any mitigation success criterion (e.g., tree density, snag size-class densities, understory composition) to be >25% below the target values defined by the Project Development Plan.	Within one year of confirmation of the trigger, the Applicant will coordinate with the USFWS to calculate the remaining amount of take (i.e., the amount of take that is no longer being offset by the mitigation currently in place). The Applicant will then implement one of the following options to offset the remaining amount of take. • Restore the mitigation project using one or more of the following restoration actions (Note: restoration actions will not be implemented during any ongoing natural disaster, such as in the case of prolonged drought): • Tree planting in areas where the tree density is >25% below the mitigation metric target value • Non-native woody invasive species control in areas where the native understory composition is >25% below the mitigation metric target value • Secure an additional mitigation project to offset the remaining amount of take • Purchase credits (in the amount of the remaining take) from a conservation bank or ILF fund approved by the USFWS

[27] Note that this Changed Circumstance does not apply if mitigation is provided by a conservation bank, ILF fund, or research fund.

Table 7.1. Changed circumstances and incidental take permit holder response.

Changed Circumstance	Rationale	Trigger	Response
Hibernaculum research study (if used as part of a mitigation true-up) is unable to be completed.	The USFWS or other responsible wildlife agency may need to call a halt to research activities, either because of restrictions on working in hibernacula or because the research activities have been deemed to have a detrimental effect on the Covered Species	Through circumstances outside of the Applicant's control, the research project cannot be completed (e.g., USFWS imposes restrictions on cave work due to concerns about disease transmission)	Any research funds that have already been spent will count towards mitigation offsets. In coordination with the USFWS, the Applicant will work to calculate any remaining mitigation offsets and implement alternate mitigation, if needed.
Unavoidable delay of mitigation project implementation beyond one year of ITP issuance.	Despite the good-faith efforts of the Applicant to secure PRM, mitigation may not be in place within one year of ITP issuance due to circumstances outside of the Applicant's control. A good-faith effort is demonstrated by written agreement from the USFWS Field Office that one or more areas under consideration may qualify as potential mitigation and active coordination between the Applicant and the USFWS to develop the Project Development Plan.	The Project Development Plan has not begun to be implemented within one year of the ITP being issued due to circumstances outside the Applicant's control and despite the Applicant's good-faith efforts.	The REA model will be used to recalculate the mitigation acreage using the new Project start year. A new PRM project will be implemented in Year 2 of the ITP with the newly calculated mitigation acreage. Alternatively, the Applicant may choose to pursue other mitigation options (i.e., paying into a USFWS-approved ILF program or buying credits from a USFWS-approved conservation bank). In that case, the Applicant has 90 calendar days from the Changed Circumstance trigger to secure mitigation.

ESA = Endangered Species Act of 1973, HCP = Habitat Conservation Plan, ILF = in-lieu fee, ITP = Incidental Take Permit, PRM = Permittee-Responsible Mitigation, REA = resource equivalency analysis, USFWS = US Fish and Wildlife Service, WNS = white-nose syndrome

7.2 Unforeseen Circumstances

Unforeseen Circumstances are changes in circumstances affecting a listed species or the geographic area covered by an HCP that could not have been reasonably anticipated by plan developers and the USFWS at the time of development of the HCP, and that result in a substantial and adverse change in the status of the Covered Species.[28] The No Surprises Rule stipulates that if Unforeseen Circumstances arise, the USFWS will not require, without the consent of the ITP holder, the commitment of additional mitigation in the form of land, water, or funds, nor will it require additional restrictions on the use of land, water, or funds from any ITP holder who is adequately implementing or has implemented an approved HCP.

Notwithstanding these assurances, nothing in the No Surprises Rule will be construed to limit or constrain the USFWS, any federal agency, or a private entity from taking additional actions, at its own expense, to protect or conserve a species included in an HCP.

[28] 50 CFR 17.3 (1975)

8 FUNDING

An HCP submitted in support of an ITP must establish "the funding that will be available to implement such steps the Applicant will take to monitor, minimize, and mitigate the impacts from the proposed taking".[29] In order to issue an ITP, the USFWS must find that the applicant will ensure adequate funding for the HCP.[30] The ITP is subject to full or partial suspension, or revocation, should the Applicant fail to ensure funding for mitigation and conservation measures, including Changed Circumstances and other measures, outlined in this HCP.

The implementation of this HCP will be funded through the Applicant's annual budget. Costs to implement this HCP include general ITP/HCP administration and management costs; mitigation, compliance, and effectiveness monitoring; and the Changed Circumstances and Contingency Fund (Table 8.1).

Table 8.1. Costs/budget for the Cardinal Point Habitat Conservation Plan implementation and bat conservation program.

Budget Item	ITP Year(s)[1]	Annual Cost	Total Estimated Cost[2]
ITP/HCP Administration			
Administration and Overhead	1–6	$4,000	$25,874
Mitigation			
Initial Upfront Mitigation	1	stacked: $1,959,000	stacked: $1,959,000
Mitigation True-up	2, 3, 4 ,5 or 6	stacked: $1,910,250	stacked: $1,910,250
Changed Circumstance and Contingency Fund	1	$191,025	$191,025
Monitoring			
Compliance, *g* of 0.15	1–3 [3]	$185, 000	$571,250
Compliance, road-and-pad searches	4–6	$130,000	$401,419
Total			**$5,058,818**

[1] The ITP year in which the costs are expected to be incurred.

[2] Total estimated cost calculated based on 2023 estimates; average annual inflation of 2.9% was used to project cost estimates for future years.

[3] Monitoring at a *g* of 0.15 may be continued in Years 4–6 per the adaptive management framework (Table 6.5).

g= detection probability, HCP = Habitat Conservation Plan, ITP= incidental take permit

Funding assurances for this HCP were structured based on the relationship between Project revenue production and take of the Covered Species. Specifically, the Project's revenue-generating activity (i.e., operation of the Project turbines) is also the only Project activity that may result in take of the Covered Species. If the Project ceases operation, although the Project would cease to produce revenue, take of the Covered Species would also cease and therefore costs associated with the HCP/ITP would no longer be incurred. The basis of the cost estimates and the funding assurances for each of these items is described below.

[29] 16 USC 1531-1544 (1973), 50 CFR 17.22(b)(1) (1985), and 50 CFR 17.32(b)(1) (1985)

[30] 50 CFR 17.22(b)(2), 17.32(b)(2)

8.1 ITP/HCP Administration

8.1.1 Cost Basis

The ITP/HCP administrative costs for this HCP include bat conservation plan management and oversight, reporting to the USFWS, travel costs for USFWS meetings, and other miscellaneous expenses additive to the Applicant's normal (non-HCP) operational budget, calculated with 2.9% inflation[31] over the 6-year ITP term. The Applicant intends to use existing staff to provide management and oversight for HCP and ITP compliance. Personnel costs associated with this HCP are included in the Applicant's staff overhead expenses and are funded as annual operating expenditures.

8.1.2 Funding Assurance

To provide assurance that HCP administration will occur, the Applicant will submit to the USFWS, within 30 days of permit issuance and by March 1 of each year following ITP issuance, a letter signed by a representative with authority to bind the Applicant stating that budget has been allocated for Project staff time to administer the HCP.

8.2 Compliance Monitoring

8.2.1 Cost Basis

Annual compliance monitoring costs were estimated assuming that monitoring will be conducted to a *g* of 0.15 for any turbines operating at risk in Years 1–3 and using road-and-pad searches in Years 4–6, with 2.9% inflation applied for Years 2–6. The monitoring costs were based on past post-construction monitoring conducted at the Project.

8.2.2 Funding Assurance

To provide assurance that compliance monitoring will occur, the Applicant will submit to the USFWS within 30 days of permit issuance, and by March 1 of each year following ITP issuance, a letter signed by a representative with authority to bind the Applicant stating that the Applicant has executed a contract(s) with a qualified party(s) to complete the year's required compliance monitoring activities.

8.3 Mitigation

8.3.1 Cost Basis

Mitigation costs for this HCP include funding to execute a contract with a mitigation provider, to execute an easement for a mitigation project and implement the Project Development Plan (i.e., PRM), contribution to a USFWS-approved conservation bank, contribution to a USFWS-approved ILF fund, or contribution to hibernacula research. The estimated mitigation costs include the cost of mitigation project implementation (including development and implementation of the Project Development Plan, mitigation effectiveness monitoring, mitigation adaptive management, and reporting) and Changed Circumstances impacting the mitigation. Funding assurances will be

[31] Based on the Consumer Price Index Inflation Calculator's average inflation rate of 2.9% over the past 30 years, rounded up (US Bureau of Labor Statistics 2022)

provided based on the estimated cost of mitigation that would fully offset the impact of the permitted amount of take, assuming both the upfront mitigation and the true-up will be implemented, although mitigation may only be required for 50% of the authorized amount of take depending on the results of compliance monitoring. The mitigation costs were based on the cost to purchase credits from the Siloam Springs Conservation Bank in Pike and Adams counties, Illinois; actual mitigation costs may be less, particularly under the PRM option. An inflation rate of 2.9% was applied to the cost of mitigation over six years to calculate the costs of the mitigation true-up because, if needed, the true-up may be implemented as late as Year 6 of the ITP if a true-up is not indicated prior (Table 6.5).

While it is difficult to accurately estimate the funds required to ameliorate an issue of mitigation project success criteria resulting from a Changed Circumstance, it is unlikely that a mitigation effort would fail and require complete replacement or restoration during a 6-year permit term. Additionally, the early funding of the upfront mitigation aids early implementation of mitigation, which will help ensure that mitigation stays ahead of the impact of take. This makes it likely that the impact of only a fractional amount of take would remain to be offset after a Changed Circumstance, and the Applicant is already providing funding assurance for contingencies given that the mitigation funding assurance cost-basis includes the mitigation bank contingency costs. As such, the total cost estimated for the Changed Circumstance and Contingency Fund was calculated as a 10% buffer on the true-up mitigation cost (which could be for a PRM project). The 10% buffer will be maintained in the funding assurance mechanism for the duration of the permit (i.e., any withdrawal of this 10% would be replenished). However, if a conservation bank, ILF fund, or research fund (if approved by the USFWS) is used to provide mitigation, the bank or fund, not the Applicant, will be responsible for ensuring that mitigation projects meet their success criteria and the change in mitigation project ability to meet success criteria Changed Circumstance will not apply.

8.3.2 Funding Assurance

Funding assurances will be provided for these mitigation costs (upfront, true-up, and Changed Circumstance and Contingency Fund) through a letter of credit; a bond; cash; execution of a mitigation contract or easement; and/or the purchase of credits from a bank/fund. Bonds and irrevocable, non-transferable standby letters of credit must be issued by (i) a US commercial bank; or (ii) a US branch of a foreign commercial bank with sufficient assets in the US, as determined by the USFWS, with either such bank having a credit rating of at least A from Standard and Poor's or A3 from Moody's.

The take authorization in the ITP will not become effective until the funding assurance has been provided to the USFWS. Implementation of the mitigation will then take place in accordance with the time frame specified in Section 6.3. If the primary funding assurance mechanism is the execution of a mitigation contract or easement or the purchase of credits from a bank or fund but the Applicant desires take authorization before such mitigation can be implemented, the Applicant can provide the USFWS a letter of credit, cash, or bond as an interim financial assurance, in an amount to be determined based on the Applicant's mitigation plan. If the Applicant elects to provide upfront mitigation for less than the total authorized take, as discussed in Section 6.3, then

the Applicant must also provide cash or a letter of credit for the estimated costs of mitigation true-up that would offset the total authorized take. The amount of the funding assurances required will depend on the estimated costs of the proposed mitigation plan, including both upfront and true-up mitigation and financial assurances that are part of a Project Development Plan for a PRM Project, if any.

8.4 Changed Circumstance and Contingency Fund

Per the HCP Handbook, the costs associated with additional contingency actions (e.g., default by the ITP holder, non-performance, etc.) are based on the size and complexity of the Project, the estimate required to remediate the proposed mitigation project(s), and monitoring requirements. These funds would be used if the Project does not uphold its HCP funding commitments in regards to Changed Circumstances or HCP activities. For this HCP, the costs associated with the Changed Circumstance and Contingency Fund address scenarios when habitat mitigation projects have failed and need to be replaced or rectified. Although other Changed Circumstance responses may require additional analysis and/or monitoring costs, these costs are expected to be less than the response to failed mitigation. This response to failed mitigation is estimated as part of the mitigation costs and included in the funding assurance for mitigation (Section 8.3).

9 ITP/HCP ADMINISTRATION

9.1 Administrative Changes

Administrative changes are internal changes or corrections to the HCP. The USFWS or the Applicant may propose administrative changes to the HCP by providing notice to the other party. Such notice must include a statement of the reason for the proposed changes, as well as any supporting documentation. The USFWS and the Applicant will use reasonable efforts to respond to proposed administrative changes within 30 days of receipt of such notice. Proposed administrative changes will become effective upon written approval of the USFWS and the Applicant. USFWS-approved changes will be documented in a note to the Project file.

The USFWS will not propose or approve administrative changes to this HCP if the USFWS determines that such modifications would:

- Result in effects to a Covered Species that are new or different than those analyzed in this HCP, NEPA review, or the USFWS Biological Opinion;
- Result in take beyond that analyzed in this HCP;
- Negatively alter the effectiveness of the HCP; or
- Have consequences to aspects of the human environment that have not been evaluated.

Administrative changes to the HCP processed pursuant to this subsection may include, but are not limited to the following:

- Correction of typographic, grammatical, and similar editing errors that do not change the intended meaning;
- Correction of any maps or exhibits to correct minor errors or to reflect previously approved changes in the ITP or HCP; or
- Minor changes to survey, monitoring, or reporting protocols.

9.2 ITP Amendments

An ITP Amendment is any proposed change or modification that does not satisfy the criteria for an administrative change.

The HCP and ITP may be modified upon the Applicant's submission of a formal ITP Amendment application and the required application fee to the USFWS, which will be processed in the same manner as the original ITP application. Such application generally will require submittal of a revised HCP, and preparation of an environmental review document in accordance with NEPA. The specific document requirement for the application may vary based on the substance of the amendment.

Upon submission of a complete application package, the USFWS will publish a notice of the receipt of the application in the Federal Register, initiating the NEPA and HCP Amendment public comment process. After the close of the public comment period, the USFWS may approve or deny the proposed amendment application.

9.3 ITP Transfer

In the event of a sale or transfer of ownership of the Project during the ITP term, the following will be submitted to the USFWS by the new owner(s): 1) a new ITP application, 2) the ITP application fee, 3) and written documentation providing assurances pursuant to 50 CFR 13.25 (b)(2) (1999) that the new owner will provide sufficient funding for the HCP and will implement the relevant terms and conditions of the ITP and HCP, including any outstanding minimization and mitigation. The new owner(s) will commit to all requirements regarding the take authorization and mitigation obligations of this HCP, unless otherwise specified in writing and agreed to in advance by the USFWS.

10 REFERENCES

Adams, E. M., J. Gulka, and K. A. Williams. 2021. A Review of the Effectiveness of Operational Curtailment for Reducing Bat Fatalities at Terrestrial Wind Farms in North America. PLoS ONE 16(11): e0256382.

Amelon, S. and D. Burhans. 2006. Conservation Assessment: *Myotis septentrionalis* (Northern Long-eared Bat) in the Eastern United States. Pp. 69-82. *In:* F. R. Thompson, III, ed. Conservation Assessments for Five Forest Bat Species in the Eastern United States. General Technical Report NC-260. US Department of Agriculture, Forest Service, North Central (NC) Research Station, St. Paul, Minnesota.

Arnett, E. B., M. M. P. Huso, M. R. Schirmacher, and J. P. Hayes. 2011. Changing Wind Turbine Cut-in Speed Reduces Bat Fatalities at Wind Facilities. Frontiers in Ecology and the Environment 9(4): 209-214.

Auteri, G. G. and L. L. Knowles. 2020. Decimated Little Brown Bats Show Potential for Adaptive Change. Scientific Reports: 10(1): 3023.

Barbour, R. A. and W. H. Davis. 1969. Bats of America. University Press of Kentucky, Lexington, Kentucky. 286 pp.

Bergeson, S. M., T. C. Carter, and M. D. Whitby. 2013. Partitioning of Foraging Resources between Sympatric Indiana and Little Brown Bats. Journal of Mammalogy 94: 1311-1320.

Bergeson, S. M., T. Cate-Carter, and M.D. Whitby. 2015. Adaptive Roosting Gives Little Brown Bats an Advantage over Endangered Indiana Bats. American Midland Naturalist 174(2): 321-330.

Blehert, D. S., A. Hicks, M. Behr, C. U. Meteyer, B. Berlowski-Zier, E. Buckles, J. Coleman, S. R. Darling, A. Gargas, R. Niver, J. Okoniewski, R. Rudd, and W. B. Stone. 2009. Bat White-nose Syndrome: An Emerging Fungal Pathogen? Science 323: 227.

Boyles, J. G., J. C. Timpone, and L. W. Robbins. 2009. Bats of Missouri. Indiana State University Center for North American Bat Research and Conservation, Publication Number 3. Indiana State University Press, Terre Haute, Indiana.

Brack, V., Jr. 2004. The Biology and Life History of the Indiana Bat: Hibernacula. Pp. 7-14. *In:* K. C. Vories and A. Harrington, eds. Indiana Bat and Coal Mining: A Technical Interactive Forum. US Department of Interior, Office of Surface Mining, Alton, Illinois Coal Research Center, Southern Illinois University, Carbondale, Illinois, Louisville, Kentucky.

Caceres, M. C. and R. Barclay. 2000. *Myotis septentrionalis*. Mammalian Species 634: 1-4.

Caire, W., R. K. LaVal, M. L. LaVal, and R. Clawson. 1979. Notes on the Ecology of *Myotis keenii* (Chiroptera, Vespertilionidae) in Eastern Missouri. The American Midland Naturalist 102(2): 404-407.

Cheng T. L., A. Gerson, M. S. Moore, J. D. Reichard, J. DeSimone, C. K. R. Willis, W. F. Frick, and A.M. Kilpatrick. 2019. Higher Fat Stores Contribute to Persistence of Little Brown Bat Populations with White-nose Syndrome. Journal of Animal Ecology 88(4): 591–600.

Cheng, T. L., J. D. Reichard, J. T. H. Coleman, T. J. Weller, W. E. Thogmartin, B. E. Reichert, A. B. Bennett, H. G. Broders, J. Campbell, K. Etchison, D. J. Feller, R. Geboy, T. Hemberger, C. Herzog, A. C. Hicks, S. Houghton, J. Humber, J. A. Kath, R. A. King, S. C. Loeb, A. Massé, K. M. Morris, H. Niederriter, G. Nordquist, R. W. Perry, R. J. Reynolds, D. B. Sasse, M. R. Scafini, R. C. Stark, C. W. Stihler, S. C. Thomas, G. G. Turner, S. Webb, B. J. Westrich, and W. F. Frick. 2021. The Scope and Severity of White-nose Syndrome on Hibernating Bats in North America. Conservation Biology 35(5): 1586-1597.

Chipman, H. A., E. I. George, and R. E. McCulloch. 1998. Bayesian CART Model Search. Journal of the American Statistical Association, 93(443), 935-948.

Chodachek, K., J. Pickle, and K. Nasman. 2022. Post-Construction Bat Fatality Monitoring Study, Cardinal Point Wind Project, McDonough and Warren Counties, Illinois. Final July 2021 – October 2021. Prepared for the Capital Power Corporation, Calgary, Alberta. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. March 3, 2022.

Chodachek, K., J. Pickle, and K. Nasman. 2023. Post-construction Bat Mortality Monitoring Study, Cardinal Point Wind Project, McDonough and Warren Counties, Illinois. Final Report: August 2022 – October 2022. Prepared for Capital Power Corporation, Calgary, Alberta. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota. February 8, 2023.

Clawson, R. L. 2002. Trends in Population Size and Current Status. Pp. 2-8. *In:* A. Kurta and J. Kennedy, eds. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Cope, J. B. and S. R. Humphrey. 1977. Spring and Autumn Swarming Behavior in the Indiana Bat, *Myotis sodalis*. Journal of Mammalogy 58(1): 93-95.

Crampton, L.H. and R.M.R. Barclay. 1998. Selection of Roosting and Foraging Habitat by Bats in Different-aged Aspen Mixedwood Stands. Conservation Biology 12: 1347-1358.

Culver, D. C., H. H. Hobbs III, M. C. Christman, and L. L. Master. 1999. Distribution Map of Caves and Cave Animals in the United States. Journal of Cave and Karst Studies 61: 139-140.

Dalthorp, D., M. M. P. Huso, and D. Dail. 2017. Evidence of Absence (V2.0) Software User Guide. US Geological Survey (USGS) Data Series 1055. USGS, Reston, Virginia. 109 pp. doi: 10.3133/ds1055. Available online: https://pubs.usgs.gov/ds/1055/ds1055.pdf

Dalthorp, D. H., J. Simonis, L. Madsen, M. M. Huso, P. Rabie, J. M. Mintz, R. Wolpert, J. Studyvin, and F. Korner-Nievergelt. 2018. Generalized Mortality Estimator (GenEst) - R Code & GUI. US Geological Survey (USGS) Software Release. doi: 10.5066/P9O9BATL. Available online: https://www.usgs.gov/software/genest-a-generalized-estimator-mortality

Dalthorp, D., P. Rabie, M. Huso, and A. Tredennick. 2020. Some Approaches to Accounting for Incidental Carcass Discoveries in Non-monitored Years Using the Evidence of Absence Model. US Geological Survey Open-File Report 2020-1027. 24 pp. doi: 10.3133/ofr20201027.

Davis, W. H. and R. E. Mumford. 1962. Ecological Notes on the Bat *Pipistrellus subflavus*. American Midland Naturalist 68(2): 394-398.

Dobony, C. A. and J. B. Johnson. 2018. Observed Resiliency of Little Brown Myotis to Long-term White-nose Syndrome Exposure. Journal of Fish and Wildlife Management 9(1): 168-179.

Fenton, M. B. and R. M. R. Barclay. 1980. *Myotis lucifugus*. Mammalian Species 142: 1-8.

Ford, W. M., S. F. Owen, J. W. Edwards, and J. L. Rodrigue. 2006. *Robinia pseudoacacia* (Black Locust) as Day-roosts of Male *Myotis septentrionalis* (Northern Bats) on the Fernow Experimental Forest, West Virginia. Northeastern Naturalist 13(1): 15-24.

Frank, C. L., A. D. Davis, and C. Herzog. 2019. The Evolution of a Bat Population with White-nose Syndrome (WNS) Reveals a Shift from an Epizootic to an Enzootic Phase. Frontiers in Zoology 16(40):2019.

Fraser, E. E., L. P. McGuire, J. L. Eger, F. J. Longstaffe, and M. B. Fenton. 2012. Evidence of Latitudinal Migration in Tricolored Bats, *Perimyotis subflavus*. PLoS ONE 7(2): e31419.

Frick, W. F., J. F. Pollock, A. Hicks, K. Langwig, D. S. Reynolds, G. G. Turner, C. Butchowski, and T. H. Kunz. 2010. A Once Common Bat Faces Rapid Extinction in the Northeastern United States from a Fungal Pathogen. Science 329:679-682.

Fujita, M. S. and T. H. Kunz. 1984. *Pipistrellus subflavus*. Mammalian Species 228: 1-6.

Gignoux-Wolfsohn, S. A., M. L. Pinsky, K. Kerwin, C. Herzog, M. Hall, A. B. Bennett, N. H. Fefferman, and B. Maslo. 2021. Genomic Signatures of Selection in Bats Surviving White-nose Syndrome. Molecular Ecology 30(22): 5643-5657.

Good, R. E., G. Iskali, J. Lombardi, T. McDonald, K. Dubridge, M. Azeka, and A. Tredennick. 2022. Curtailment and Acoustic Deterrents Reduce Bat Mortality at Wind Farms. Journal of Wildlife Management 86(6): e22244.

Griffin, D. R. 1940. Notes on the Life Histories of New England Cave Bats. Journal of Mammalogy 21: 181-187.

Harvey, M. J. 2002. Status and Ecology in the Southern United States. Pp. 29-34. *In:* A. Kurta and J. Kennedy, eds. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Havens, A. 2006. *Myotis lucifugus* (On-line), Animal Diversity Web. Accessed April 2022. Available online: https://animaldiversity.org/accounts/Myotis_lucifugus

Hayes, M. A., S. R. Lindsay, S. R., D. I. Solick, and C. M. Newman. 2023. Simulating the Influences of Bat Curtailment on Power Production at Wind Energy Facilities. Wildlife Society Bulletin, 47(1), e1399.Henderson. L. E., L. J. Farrow, and H. G. Broders. 2009. Summer Distribution and Status of the Bats of Prince Edward Island, Canada. Northeastern Naturalist 16: 131-140.

Hog Creek Wind Project, LLC. Indiana Bat and Northern Long-eared Bat Habitat Conservation Plan, Hog Creek Wind Project, Hardin County, Ohio. Prepared by Hog Creek Wind Project, LLC, a subsidiary of EDP Renewables North America LLC. Prepared in consultation with Western EcoSystems Technology, Inc. February 2020. Available online: https://www.regulations.gov/document/FWS-R3-ES-2020-0046-0002

Huso, M. M. P., D. Dalthorp, D. Dail, and L. Madsen. 2015. Estimating Wind-Turbine-Caused Bird and Bat Fatality When Zero Carcasses Are Observed. Ecological Applications 25: 1213-1255.

Huso, M., D. Dalthorp, and F. Korner-Nievergelt. 2017. Statistical Principles of Post-Construction Fatality Monitoring Design. *In:* M. Perrow, ed. Wildlife and Wind Farms, Conflicts and Solutions. Pelagic Publishing, Exeter, United Kingdom. Vol. 2, Onshore: Monitoring and Mitigation.

Illinois Department of Natural Resources (IDNR). 2017. Conservation Guidance for Indiana Bat (*Myotis sodalis*). Illinois Department of Natural Resources, Division of Natural Heritage. University of Illinois. Available online: https://www.ideals.illinois.edu/bitstream/handle/2142/97940/INHS2017_26.pdf

Illinois Department of Natural Resources (IDNR). 2020. Little Brown Bat *Myotis lucifugus*. Biodiversity of Illinois. Available online: https://www2.illinois.gov/dnr/education/CDIndex/LittleBrownBat.pdf

Ineson, K. 2020. Demography of a Recovery: Tracking the Rebound of the Little Brown Bat (*Myotis lucifugus*) Populations. Dissertation. University of New Hampshire, Durham. Available online. https://scholars.unh.edu/dissertation/2529

Kalcounis, M. C. and K. R. Hecker. 1996. Intraspecific Variation in Roost-site Selection by Little Brown Bats (*Myotis lucifugus*). Pp. 81-90. *In:* R. M. R. Barclay and R. M. Brigham, eds. Bats and Forests Symposium. British Columbia Ministry of Forests, Victoria, Canada.

Kath, J. A. 2022a. Species Status Assessment for Little Brown Bat (*Myotis lucifugus*). Illinois Department of Natural Resources, Division of Natural Heritage. June 2022. 15 pages. Available online: https://www2.illinois.gov/sites/naturalheritage/speciesconservation/Recovery/Documents/LittleBrownBatSSA_Kath.pdf

Kath, J. A. 2022b. Species Status Assessment for Tricolored Bat (*Perimyotis subflavus*). Illinois Department of Natural Resources, Division of Natural Heritage. June 2022. 14 pages. Available online: https://www2.illinois.gov/sites/naturalheritage/speciesconservation/Recovery/Documents/TricoloredBatSSA_Kath.pdf

Krochmal, A. R. and D. W. Sparks. 2007. Timing of Birth and Estimation of Age of Juvenile *Myotis septentrionalis* and *Myotis lucifugus* in West-Central Indiana. Journal of Mammalogy 88(3): 649-656.

Kunz, T. H., J. A. Wrazen, and C. D. Burnett. 1998. Changes in Body Mass and Body Composition in Prehibernating Little Brown Bats (*Myotis lucifugus*). Ecoscience 5: 8-17.

Kunz, T. H. and J. D. Reichard. 2010. Status Review of the Little Brown Myotis (*Myotis lucifugus*) and Determination that Immediate Listing under the Endangered Species Act is Scientifically and Legally Warranted. Boston University's Center for Ecology and Conservation Biology. Available online: https://www.biologicaldiversity.org/campaigns/bat_crisis_white-nose_syndrome/pdfs/Final-Status-Review.pdf

Kurta, A., and H. Rice. 2002. Ecology and Management of the Indiana Bat in Michigan. Michigan Academician 33:361–376.

Kurta, A., R. W. Foster, B. A. Daly, A. K. Wilson, R. M. Slider, C. D. Rockey, H. M. Rockey, B. L. Long, G. G. Auteri, J. D. Collins, J. P. White, H. M. Kaarakka, J. A. Redell, and D. M. Reeder. 2020. Exceptional Longevity in Little Brown Bats Still Occurs, Despite Presence of White-nose Syndrome. Journal of Fish and Wildlife Management. 11 (2): 583-587.

LaVal, R. K. and M. L. LaVal. 1980. Ecological Studies and Management of Missouri Bats with Emphasis on Cave-dwelling Species. Missouri Department of Conservation Terrestrial Series No. 8: 1-52.

Lemen, C. A., P. W. Freeman, and J. A. White. 2016. Acoustic Evidence of Bats Using Rock Crevices in Winter: A Call for More Research on Winter Roosts in North America. Transaction of the Nebraska Academy of Sciences 36: 9-13.

Meadow Lake Wind Farm I-VI, LLCs. 2021. Indiana Bat and Northern Long-eared Bat Final Habitat Conservation Plan for the Meadow Lake Wind Resource Area, White and Benton Counties, Indiana. Prepared by Meadow Lake Wind Farm LLC, Meadow Lake Wind Farm II LLC, Meadow Lake Wind Farm III LLC, Meadow Lake Wind Farm IV LLC, Meadow Lake Wind Farm V LLC, and Meadow Lake Wind Farm VI LLC; subsidiaries of EDP Renewables North America LLC. Prepared in consultation with Western EcoSystems Technology, Inc. February 2021. Available online: https://ecos.fws.gov/docs/plan_documents/thcp/thcp_3347.pdf

MidAmerican Energy Company (MidAmerican). 2019. Final Habitat Conservation Plan: MidAmerican Energy Company Iowa Wind Energy Project Portfolio. MidAmerican, Des Moines, Iowa. April 2019. 182 pp. + appendices and addenda. Available online: https://downloads.regulations.gov/FWS-R3-ES-2018-0037-0107/attachment_1.pdf

Nagorsen, D. W. and R. M. Brigham. 1993. Northern Long-eared Myotis (*Myotis septentrionalis*). Bats of British Columbia. Royal British Columbia Museum Handbook. University of British Columbia Press, Vancouver, British Columbia.

Norquay, K. J. O., F. Martinez-Nuñez, J. E. Dubois, K. M. Monson, and C. K. R. Willis. 2013. Long-distance Movements of Little Brown Bats (*Myotis lucifugus*). Journal of Mammalogy 94(2): 506-515.

Olson, C. R. and R. M. Barclay. 2013. Concurrent Changes in Group Size and Roost Use by Reproductive Female Little Brown Bats (*Myotis lucifugus*). Canadian Journal of Mammalogy 94: 506-515.

Pearson, E. W. 1962. Bats Hibernating in Silica Mines in Southern Illinois. Journal of Mammalogy 43(1): 27-33.

Peterson, T. S., B. McGill, C. D. Hein, and A. Rusk. 2021. Acoustic Exposure to Turbine Operation Quantifies Risk to Bats at Commercial Wind Energy Facilities. Wildlife Society Bulletin, 45(4), 552-565.

Pettit, J. L. and J. M. O'Keefe. 2017. Day of Year, Temperature, Wind, and Precipitation Predict Timing of Bat Migration. Journal of Mammalogy 98(5): 1236-1248.

Reimer, J. P., C. L. Lausen, R. M. Barclay, S. Irwin, and M. K. Vassal. 2014. Bat Activity and Use of Hibernacula in Wood Buffalo National Park, Alberta. Northwestern Naturalist 95(3): 277-289.

Roby, P. L., M. W. Gumbert, and M. J. Lacki. 2019. Nine Years of Indiana Bat (*Myotis sodalis*) Spring Migration Behavior. Journal of Mammalogy 100(5): 1501-1511.

Stantec Consulting Services, Inc. (Stantec). 2020. Bird and Bat Conservation Strategy, Cardinal Point Wind Energy Project, McDonough and Warren Counties, Illinois. Prepared for Capital Power Corporation. Prepared by Stantec. February 13, 2020.

Stantec Consulting Services, Inc. (Stantec). 2021a. 2020 Post-construction Mortality Monitoring Report, Cardinal Point Wind Project, McDonough and Warren Counties, Illinois. Prepared for Capital Power Corporation. Prepared by Stantec. May 26, 2021.

Stantec Consulting Services Inc. (Stantec). 2021b. California Ridge Wind Energy Project: Draft Habitat Conservation Plan for Indiana Bat, Northern Long-eared Bat, Little Brown Bat, and Tricolored Bat. Prepared for California Ridge Wind Energy LLC. Prepared by Stantec, Independence, Iowa. May 7, 2021. Available online: https://www.regulations.gov/document/FWS-R3-ES-2021-0042-0002

Stantec Consulting Services Inc. (Stantec). 2021c. Final Habitat Conservation Plan for the High Prairie Renewable Energy Center. Prepared for Ameren Missouri, St. Louis, Missouri. Prepared by Stantec, Independence, Iowa. May 6, 2021. Available online: https://www.fws.gov/sites/default/files/documents/High%20Prairie%20HCP%20final_508%20compliant_20210705_0.pdf

Stones, R. C. 1981. Endangered and Threatened Species Program: Survey of Winter Bat Populations in Search of the Indiana Bat in the Western Upper Peninsula of Michigan. Michigan Department of Natural Resources.

Thomas, D. W., M. B. Fenton, and R. M. R. Barclay. 1979. Social Behavior of the Little Brown Bat, *Myotis lucifugus:* I. Mating Behavior. Behavioral Ecology and Sociobiology 6(2): 129-136.

Thogmartin, W. E., R. A. King, P. C. McKann, J. A. Szymanski, and L. Pruitt. 2012. Population-level Impact of White-nose Syndrome on the Endangered Indiana Bat. Journal of Mammalogy 93(4): 1086-1098.

Turner, G. G., D. M. Reeder, and J. T. H. Coleman. 2011. A Five-year Assessment of Mortality and Geographic Spread of White-nose Syndrome in North American Bats and a Look to the Future. Bat Research News 52: 13-27.

Tuttle, M. D. and J. Kennedy. 2002. Thermal Requirements during Hibernation. Pp. 68-78. *In:* A. Kurta and J. Kennedy, eds. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

US Environmental Protection Agency (USEPA). 2021. Energy and the Environment Greenhouse Gas Equivalencies Calculator. Updated March 2021. Available online: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

US Fish and Wildlife Service (USFWS). 1967. The Endangered Species List - 1967. 32 Federal Register 48: 4001. March 11, 1967.

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

US Fish and Wildlife Service (USFWS). 2011. Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects. Revised October 26, 2011. Available online: https://esadocs.defenders-cci.org/ESAdocs/misc/inbaS7and10WindGuidanceFinal26Oct2011.pdf

US Fish and Wildlife Service (USFWS). 2012. Land-Based Wind Energy Guidelines. March 23, 2012. 82 pp. Available online: https://www.fws.gov/sites/default/files/documents/WEG_final.pdf

US Fish and Wildlife Service (USFWS). 2014. Northern Long-Eared Bat Interim Conference and Planning Guidance. USFWS Regions 2, 3, 4, 5, and 6. January 6, 2014. Available online: https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={3AC05753-A500-4D07-B26F-7F0CA662CA8E}&documentTitle=20177-133472-02

US Fish and Wildlife Service (USFWS). 2016a. Programmatic Biological Opinion on the Final 4(d) Rule for the Northern Long-Eared Bat and Activities Expected from Take Prohibitions. USFWS Regions 2, 3, 4, 5, and 6. Bloomington, Minnesota. January 5, 2016. Available online: https://www.fws.gov/media/programmatic-biological-opinion-final-4d-rule-northern-long-eared-bat-and-activities-excepted

US Fish and Wildlife Service (USFWS). 2016b. Region 3 Indiana Bat Resource Equivalency Analysis Model for Wind Energy Projects, Public Version 1. Bloomington Field Office, Bloomington, Indiana. December 2016.

US Fish and Wildlife Service (USFWS). 2016c. Region 3 Northern Long-eared Bat Resource Equivalency Analysis Model for Wind Energy Projects, Public Version 1. Bloomington Field Office, Bloomington, Indiana. December 2016.

US Fish and Wildlife Service (USFWS). 2016d. Region 3 Little Brown Bat Resource Equivalency Analysis Model for Wind Energy Projects, Public Version 1. Bloomington Field Office, Bloomington, Indiana. December 2016.

US Fish and Wildlife Service (USFWS). 2019a. Indiana Bat (*Myotis sodalis*) 5-Year Review: Summary and Evaluation. USFWS, Midwest Region, Region 3, Bloomington Ecological Field Office, Bloomington, Indiana. September 2019. Available online: https://ecos.fws.gov/docs/tess/species_nonpublish/2918.pdf

US Fish and Wildlife Service (USFWS). 2019b. 2019 Indiana Bat (*Myotis sodalis*) Population Status Update. USFWS Endangered Species Program: Midwest Region. Compiled by A. King, Ecological Services Field Office, USFWS, Bloomington, Indiana, from data gathered from bat biologists throughout the species' range. Revised June 27, 2019. Available online: https://www.fws.gov/sites/default/files/documents/2019_IBat_Pop_Estimate_6_27_2019a.pdf

US Fish and Wildlife Service (USFWS). 2021a. Final Environmental Assessment for Proposed Habitat Conservation Plan and Incidental Take Permit. California Ridge Wind Energy Project, Vermilion and Champaign Counties, Illinois. USFWS, Iowa-Illinois Ecological Services Field Office. August 2021. Available online: https://ecos.fws.gov/docs/plan_documents/neas/neas_3385.pdf

US Fish and Wildlife Service. 2021b. Species Status Assessment (SSA) Report for the Tricolored Bat (*Perimyotis subflavus*), Version 1.1. December 2021. U.S. Fish and Wildlife Service. Northeast Region, Hadley, Massachusetts. Available online: https://ecos.fws.gov/ServCat/Reference/Profile/147364

US Fish and Wildlife Service (USFWS). 2022a. Species Status Assessment Report for the Northern Long-eared Bat (*Myotis septentrionalis*), Version 1.1. March 22, 2022. USFWS Great Lakes Region, Bloomington, Minnesota. Available online: https://ecos.fws.gov/ServCat/Reference/Profile/149539

US Fish and Wildlife Service (USFWS). 2022b. Northern Long-eared Bat (*Myotis septentrionalis*). Last updated April 18, 2022. Available online: https://ecos.fws.gov/ecp/species/9045

US Fish and Wildlife Service (USFWS). 2022c. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Tricolored Bat. Department of the Interior, Fish and Wildlife Service, 50 CFR 17. 87 Federal Register 177: 56381-56393. September 14, 2022.

US Fish and Wildlife Service (USFWS). 2022d. USFWS Region 3 Tricolored Bat Resource Equivalency Analysis (REA) Model, Version 1. Prepared by M. Stephenson, A. Rusk, and A. Schorg. Prepared for USFWS. November 22, 2022.

US Fish and Wildlife Service (USFWS). 2023. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Northern Long-Eared Bat; Delay of Effective Date. 87 Federal Register 73488. January 26, 2023.

US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service. 2016. Habitat Conservation Planning and Incidental Take Permit Processing Handbook. December 21, 2016. Available online: https://www.fws.gov/sites/default/files/documents/habitat-conservation-planning-handbook-entire.pdf

Vincent, E. A. and J. O. Whitaker, Jr. 2007. Hibernation of the Eastern Pipistrelle, *Perimyotis subflavus*, in an Abandoned Mine in Vermillion County, Indiana, with Some Information on *Myotis lucifugus.* Proceedings of the Indiana Academy of Science 116: 58-65.

Waag, A. G., J. J. Treanor, J. N. Kropczynski, and J .S. Johnson. 2022. Population Sizes and Activity Patterns of Little Brown Myotis in Yellowstone National Park. Journal of Mammalogy 103(4): 805-813.

Whitaker, J. O., Jr. 1998. Life History and Roost Switching in Six Summer Colonies of Eastern Pipistrelles in Buildings. Journal of Mammalogy 79(2): 651-659.

Whitaker, J. O., Jr. and V. Brack. 2002. Distribution and Summer Ecology in Indiana. Pp. 48-54. *In:* A. Kurta and J. Kennedy, eds. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Whitaker, J. O. and R. E. Mumford, eds. 2009. *Myotis septentrionalis*/Northern Myotis. Pp. 207-214. *In:* Mammals of Indiana. Indiana University Press, Bloomington, Indiana.

White-Nose Syndrome (WNS) Response Team. 2022. Spread Map. Accessed May 25, 2022. Available online: https://www.whitenosesyndrome.org/where-is-wns

Winhold, L. and A. Kurta. 2006. Aspects of Migration by the Endangered Indiana Bat, *Myotis sodalis*. Bat Research News 47: 1-6.

Appendix A. Inputs for Single Class and Multiple Class Modules in Evidence of Absence

Appendix Table A1. Inputs needed to run Evidence of Absence: Single Class Module.*

Season	Plot Type	Year	Search Interval (I)	Number of Searches	Spatial Coverage (a)	Temporal Coverage	Searcher Efficiency: Carcasses Available	Searcher Efficiency: Carcasses Found	Carcass Persistence**: Shape (α)	Carcass Persistence**: Scale (β)
Fall	100-m road and pad	2020	7	14	0.077	1	38	38	-	1.60
Fall	100-m road and pad	2021	3.5	27	0.088	1	36	29	0.75	4.42
Fall	70-m full plot	2021	5	19	0.806	1	39	9	0.75	4.42

* *k* was assumed to equal 0.67 for all strata, per Huso et al. (2017). A loglogistic distribution was assumed for carcass persistence.

** An exponential distribution was used for carcass persistence in 2020. The 90% upper and lower confidence intervals on β were set to 1.12, 2.25. A Weibull distribution was used for carcass persistence in 2021. The 95% upper and lower confidence intervals on β were set to 3.06, 6.39.

m = meter

Appendix Table A2. Inputs needed to run Evidence of Absence model to combine across seasons: Multiple Class Module.

Season	Ba	Bb	Weights (DWP)
Fall 2021 100-m road and pad	125.339	2495.476	0.833
Fall 2021 70-m full plot	10.925	69.367	0.167

DWP = Density-weighted proportion

Appendix Table A3. Inputs needed to run Evidence of Absence model to combine across years: Multiple Years Module.

Year	Ba	Bb	Weights (ρ)
2020	25.517	1439.763	1
2021	69.511	1038.530	1

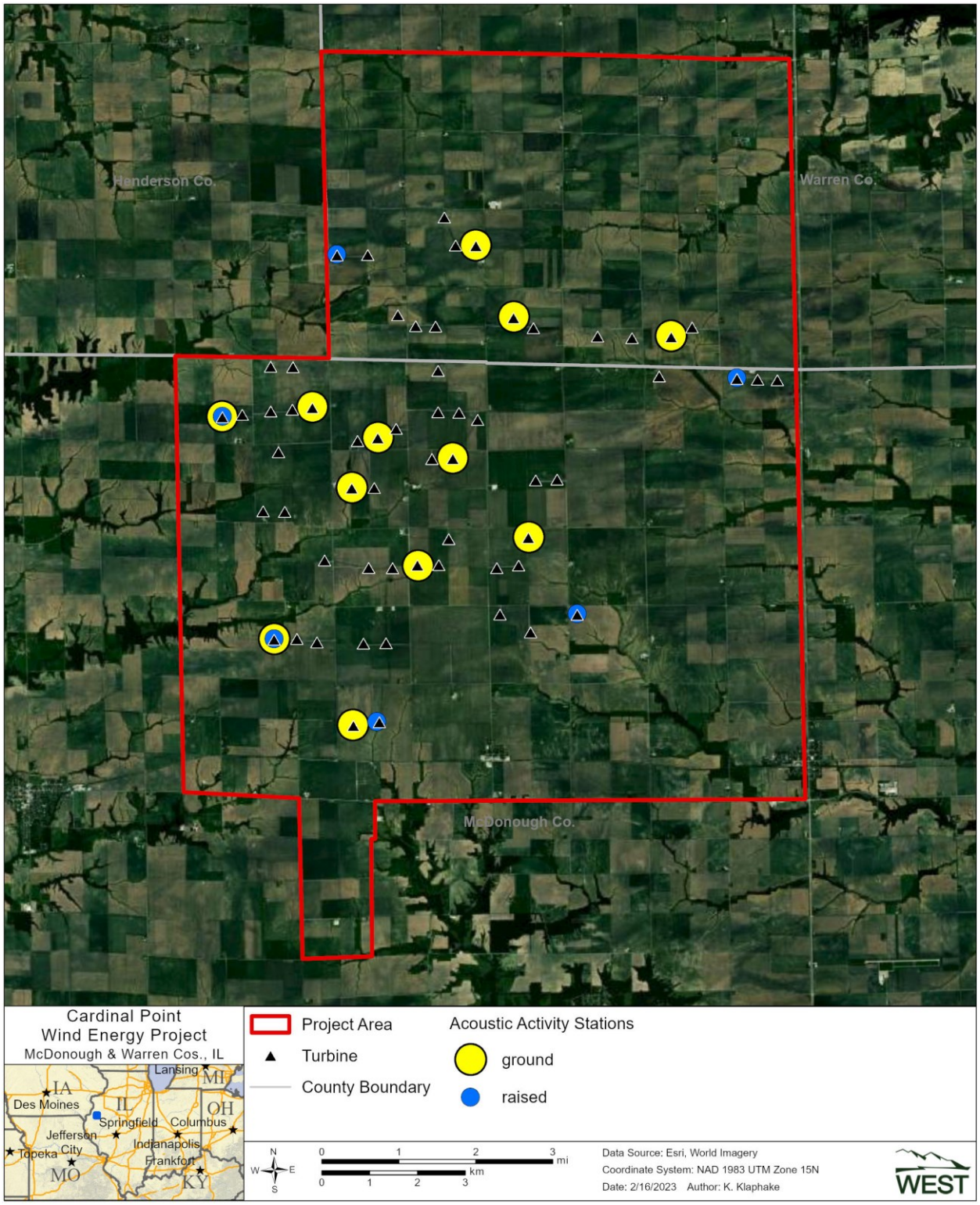
Appendix B. 2023 Acoustic Monitoring Plan

The objectives of the bat acoustic activity surveys are to determine seasonal and temporal variation in bat activity at the Project. An additional objective will be to review acoustic data for evidence of tricolored bat (*Perimyotis subflavus*), northern long-eared bat (*Myotis septentrionalis*), Indiana bat (*M. sodalis*), and little brown bat (*M. lucifugus*) within the Project. These results will be used to inform conservation measures at the Project, including refining the 2022 smart curtailment algorithm.

Full-spectrum Song Meter SM3Bat and SM4BAT ultrasonic detectors (hereafter "detectors"; Wildlife Acoustics, Maynard, Massachusetts) will be used. Surveys will be conducted from March 15 – October 15, 2023. Surveys will be conducted at the same locations within the Project area used in 2022, which are spatially balanced throughout the Project area within habitat strata at six nacelle-mounted (raised) detectors and 12 ground detectors (Appendix Appendix Figure B.*1*). The microphones of ground detectors will be elevated three meters off the ground. Detectors will be serviced once every other week to change batteries and data cards, as well as to check for disturbance and normal functioning. SM4 detectors utilize broadband high-frequency omnidirectional microphones to detect the echolocation calls of foraging and commuting bats. These echolocation calls are recorded and stored on Secure Digital cards for later analysis.

The metric of interest for this study will be the number of bat calls, or passes. Data on bat pass rates represent indices of bat activity and do not represent numbers of individuals. A bat pass is defined as a sequence of echolocation calls produced by an individual bat and consists of a series of more than two calls (pulses) with no pause of greater than one second between calls. The total number of bat passes, regardless of species, will be used as an index of bat use. However, if there are enough detections of Indiana bat calls or calls of other species to be covered under the Habitat Conservation Plan, those calls can be analyzed separately. All data files collected by the detectors will be analyzed and bat calls will be separated from non-bat noise files. Bat calls will be grouped according to call frequency, and bat calls will be identified by comparing visual metrics (e.g., minimum frequency, slope, duration) to reference calls of known bat species. In addition, species identification will be completed using the Bats of North America classifier 5.4.0 in the call analysis program Kaleidoscope Pro 5.4.7 (Wildlife Acoustics, Massachusetts) on all files identified to contain a bat pass.

All calls identified as Indiana bats by automated identification software will then be examined and verified by a qualified biologist with extensive acoustic identification experience. If call sequences are not characteristic of Indiana bats, contain distinct calls produced by another species, or are of insufficient quality, they will be reclassified. Additionally, calls identified as northern long-eared bat, little brown bat, or tricolored bat will be reviewed to further tailor conservation measures for these species.



Appendix Figure B.1. Locations of acoustic detectors in 2023.