

**Post-construction Monitoring Study for the
Ford County Wind Farm (fka Ford Ridge)
Ford County, Illinois**

**Draft Report
April 1 – October 15, 2022**



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EXECUTIVE SUMMARY

Ford County Wind Farm (Ford County) is currently operating the Ford County Wind Farm (Project) in Ford County, Illinois. The Project became operational in March 2022 and consists of 43 General Electric (GE) 2.82-megawatt (MW) wind turbines that have an 89-meter (m; 292-ft) hub height, and a 127-m (417-ft) rotor diameter. This report details the post-construction monitoring studies conducted in 2022, consistent with Section 6.6 of the Project's Habitat Conservation Plan (HCP) and the Incidental Take Permit (ITP; ESPE0041915) for Indiana bats (*Myotis sodalis*) and northern long-eared bats (*M. septentrionalis*); hereafter, Covered Species).

All turbines are within the migratory range of the Covered Species. Per the HCP, all Project turbines will be feathered at wind speeds below the manufacturer's rated cut-in speed, down to a minimum of 3.0 meters per second (m/s; 9.8 ft/s), from sunset to sunrise for the entire bat-active season (March 15 – November 15) when the temperature is above 10 degrees Celsius (°C; 50° Fahrenheit). Additionally, during the fall migration (August 1 – October 15), all Project turbines will be feathered below wind speeds of 5.0 m/s (16.4 ft/s) from sunset to sunrise on nights when temperatures are above 10°C to minimize impacts to migrating Covered Species.

Post-construction fatality monitoring was completed in accordance with the study plan, which was submitted to the US Fish and Wildlife Service (USFWS) on July 13, 2022. The study plan was designed to achieve a probability of detection, or *g*, of 0.20. The overall goal of this post-construction fatality monitoring study was to generate fatality estimates for the Covered Species and to evaluate compliance with the incidental take authorization granted under the Project's ITP. More specifically, the objectives of this study were to estimate take of Covered Species using the Evidence of Absence (EoA) framework as outlined in the HCP and provide the necessary data to determine if adaptive management is triggered.

Standardized carcass searches occurred at all turbines in the spring (April 1 – May 15) and fall (August 1 – October 15). In the spring, a technician searched the gravel road and pad areas (roads and pads) at all 43 turbines weekly to a distance of 100-meters (m; 328-feet [ft]) from the turbine base. In the fall, a technician searched 100-m roads and pads twice weekly at 35 turbines, and a dog-handler team searched four turbines twice weekly where crops were cleared (cleared plot) to a distance of 70-m (230-ft) radius from the turbine base and four turbines twice weekly where standing soybeans were present (uncleared plot) to a distance of 70-m radius from the turbine base.

No Covered Species were found at the Project. Three hundred and forty-six bat carcasses were found during the study. The most commonly found bat species were silver-haired bat (*Lasionycteris noctivagans*; 155 carcasses; 44.8%) and eastern red bat (*Lasiurus borealis*; 136; 39.3%), followed by hoary bat (*L. cinereus*; 32; 9.2%) and big brown bat (*Eptesicus fuscus*; 10; 2.8%). The overall *g* value was 0.141 (90% CI: 0.132–0.149). The EoA model estimated the mean annual fatality rate at the Project was 3.52 Indiana bats and 3.52 northern long-eared bats. No adaptive management was triggered.

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INTRODUCTION

Ford County Wind Project (Ford County), a subsidiary of Ørsted Onshore North America, LLC (Ørsted), is operating the Ford County Wind Farm Project (Project) in Ford County, Illinois (Figure 1). Ford County Wind obtained an Incidental Take Permit (ITP; ESPE0041915) for the federally endangered Indiana bat (*Myotis sodalis*) and northern long-eared bat (*M. septentrionalis*; hereafter Covered Species) from the US Fish and Wildlife Service (USFWS) dated April 29, 2022. Compliance monitoring is required by the ITP to determine if the level of take of the Covered Species is in compliance with the authorized take and to evaluate the need for adaptive management measures.

Western EcoSystems Technology, Inc. (WEST) completed a post-construction fatality monitoring study designed to achieve a probability of detection, or *g*, of 0.20. The objectives of this study were to estimate take of Covered Species using the Evidence of Absence (EoA) framework as outlined in the HCP and provide the necessary data to determine if adaptive management is triggered. This report presents the results of the first year of the post-construction fatality monitoring conducted within the Project from April 1 – May 15 and August 1 – October 15, 2022.

STUDY AREA

The Project is located in Ford County, Illinois, 1.6 kilometers (1.0 mile) east of Sibley, Illinois (Figure 1). The Project covers approximately 23,954 acres (ac; 9,693 hectares [ha]). According to the National Land Cover Database (2019), the primary land cover type within the Project is cultivated crops, which covers 94.7% or 22,706 ac (9,188 ha), followed by developed land, which makes up 4.7% of the Project. Individually, all other land cover types account for 1.0% or less of the Project. The Project’s Permit Area, defined as the geographic area where the impacts of the activities occur for which incidental take coverage is requested, covers 13,806 ac (5,587 ha) within the Project (Figure 1). Approximately 99% of the Permit Area is covered by cultivated crop or developed land (Table 1; Figure 1).

Table 1 Land cover types, areas, and percent compositions in the Permit Area of the Ford County Wind Farm Project in Ford County, Illinois.

Land Cover	Acres	% Composition
Cultivated Crops	13,120	95.0
Developed	624	4.5
Pasture/Hay	46	0.3
Deciduous Forest	7	<0.1
Barren Land	4	<0.1
Mixed Forest	3	<0.1
Emergent Herbaceous Wetlands	2	<0.1
Open Water	1	<0.1
Total	13,806	100

¹Source: National Land Cover Database 2016.
Sums may not equal total values shown due to rounding.

The Project became operational in March of 2022 and consists of 43 General Electric (GE) 2.82-megawatt (MW) wind turbines that have an 89-meter (m; 292-foot [ft]) hub height and a 127-m (417-ft) rotor diameter. All turbines are within the migratory range of the Covered Species. During the spring, summer and fall, Ford County Wind adjusted turbine operations to minimize impacts to the Covered Species during migration (Table 2).

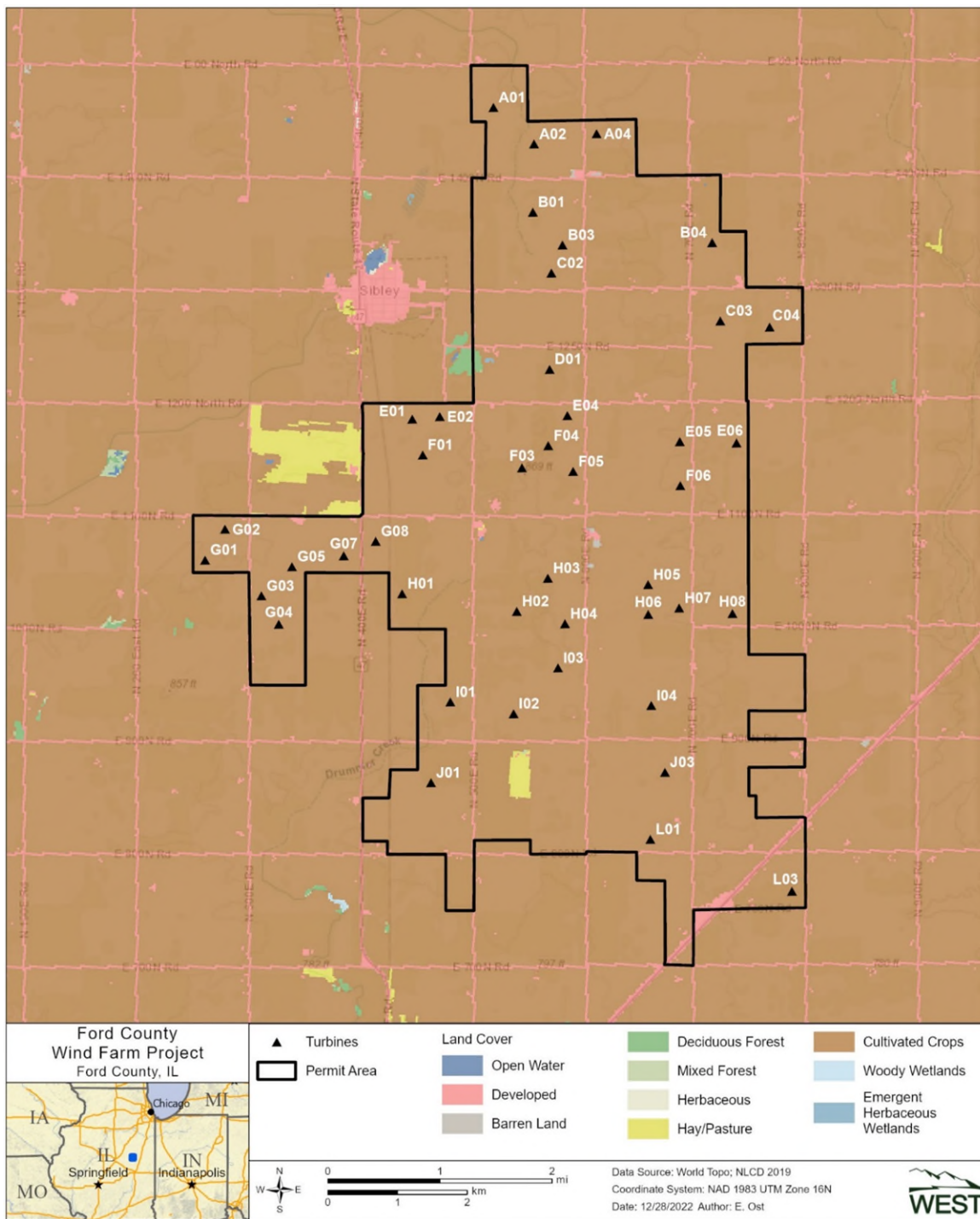


Figure 1. Turbine locations and surrounding land cover at the Ford County Wind Farm Project in Ford County, Illinois.

Table 2. Seasonal curtailment regime at the Ford County Wind Farm Project’s Permit Area in Ford County, Illinois.

Season	Turbines	Time of Day	Cut-In Speed	Feathering Below Cut-In ¹ ?	Temperature Threshold ²
March 15 – July 31	All	Sunrise to sunset	3.0 m/s (9.8 ft/s) ²	Yes	10° C (50° F)
August 1 – October 15	All	Sunrise to sunset	5.0 m/s (16.4 ft/s)	Yes	10° C (50° F)
October 16 – November 15	All	Sunrise to sunset	3.0 m/s (9.8 ft/s) ²	Yes	10° C (50° F)
November 16 – March 14	All	N/A	Manufacturer’s setting	No	None

¹ Feathering means that turbine blades will be pitched into the wind such that they spin at less than one rotation per minute.

² Turbines will be feathered below the manufacturer’s rated cut-in speed, unless the manufacturer’s rated cut-in speed is less than 3.0 m/s in which case turbines will be feathered below 3.0 m/s.

° = degree; C = Celsius; F = Fahrenheit; ft/s = feet per second; m/s = meters per second.

METHODS

To meet the monitoring commitments in the HCP, WEST developed a study plan that targeted a *g* of 0.20 using values for searcher efficiency, carcass persistence (CP), and area correction from data collected in 2020 from publicly available data at nearby wind facilities. WEST submitted a study plan to the USFWS on July 13, 2022. The USFWS did not provide comments or questions on the study plan.

Standardized Carcass Searches

Number of Turbines Sampled, Search Frequency, and Plot Size

Technicians and dog-handler teams conducted standardized carcass searches from April 1 – May 15 and August 1 – October 15, 2022. Search effort varied by season (Table 3), and was designed to maximize effort when take of the Covered Species was considered most likely to occur, during the fall migration period.

Table 3. Search Effort by Season and Plot Type at the Ford County Wind Farm Project in Ford County, Illinois.

Season	Plot Type	Search Interval	Number of Turbines	Search Team
Spring (April 1 – May 15)	100-m road and pad	7.0 days	43	Human
Fall (August 1 – October 15)	100-m road and pad	3.5 days	35	Human
	70-m cleared plot	3.5 days	4	Dog-detection
	70-m uncleared plot	3.5 days	4	Dog-detection

m = meter.

Once a week during the spring, a technician searched the gravel road and pad areas under all 43 turbines to a distance of 100 m (328 ft; 100-m roads and pads) from the turbine, (Table 3, Figure 2). In the fall, a technician searched 35 turbines at roads and pads to a distance of 100 m from the turbine twice a week (Table 2, Figure 2). Additionally, in the fall a dog-detection team searched four turbines where the crops were regularly mowed within a 70-m (230-ft) radius (70-m cleared

plots) and four turbines as uncleared plots with a 70-m radius (70-m uncleared plots) twice per week (Table 3, and Figures 3 and 4).

During the fall season, vegetation at 70-m cleared plots was mowed and maintained by Project contractors to 10 to 15 centimeters (four to six inches) in height to enhance detectability of carcasses (Figure 3). Uncleared plots were planted in soybeans (*Glycine max*; Figure 4). A cross pattern approximately 1.5 m (4.9 ft) wide was mowed into the uncleared soy plots to assist with plot access.



Figure 2. Representative photo of conditions of a 100-meter road and pad plot at the Ford County Wind Farm Project in Ford County, Illinois.



Figure 3. Representative photo of the dog-detection team and vegetation conditions in a 70-meter cleared plot at the Ford County Wind Farm Project in Ford County, Illinois.



Figure 4. Representative photo of vegetation conditions and dog detection team in a 70-meter uncleared plot of soybeans at the Ford County Wind Farm Project in Ford County, Illinois.

Search Methods

WEST used two types of search methods: a human only visual search, and a detection dog team for an olfactory search, with the detection dog team consisting of one technician/handler and one trained detection dog. All personnel were trained to follow the Project's study plan, including proper handling and reporting of carcasses. Carcass searches were conducted during the day, beginning as early as first light. Detection dogs were tested to verify detection rates prior to initiating their first search.

Road and Pad Searches — Technician Searches

Technicians walked transects spaced 5 m (16 ft) apart at a rate of approximately 45–60 m per minute (m/min; 148–197 ft/min) on all gravel road and pad areas within 100 m of the turbine [and within 70-m of turbine bases on cleared plots]. The technicians scanned the area for fatalities on both sides of the transects out to 2.5 m (8.2 ft) to ensure full visual coverage of each search area. Technician searches were only conducted for road and pad plot types.

Plot Searches — Dog-handler Team

Dog-handler teams searched 70-m cleared and uncleared plots for bat carcasses. Prior to each search, handlers determined the survey start points and the number of transects needed to cover the plot after taking into account wind speed and direction, as well as crop row direction and density (when applicable). Handlers oriented the detection dog to start searches perpendicular to the wind to maximize scent detection. Both wind speed and crop density can affect dispersal of the target odor (i.e., bat carcasses) across the search area. To maximize detection rates during an olfactory search, transect width varied with vegetation density, ranging from 5 to 10 m (16 to 33 ft) apart in densely vegetated areas, to 10–15 m (33–49 ft) in shorter vegetation. Detection dogs were rewarded with either a food reward or a short play session when they correctly alerted the handler to the presence of a bird or bat carcass.

Dog-Handler Team Evaluation

Detection dogs were considered candidates for carcass searches if they met temperament, basic obedience, and ability to detect bird and/or bat carcasses requirements. Temperament characteristics that are sought after are high-energy dogs, with a high food or toy drive. Prior to conducting searches at the Project, handlers trained their detection dogs on the scent of bat carcasses following methods derived from search and rescue programs and drug detection (Kay 2012, Helfers 2017). Dogs were initially trained on cotton scent swabs that had been rubbed on or stored in a container with bat carcasses and progressed to bat carcasses at increasing distances over a period of three to four weeks. Once the dog achieved a passing grade of 80% or higher in a scent recognition test, consisting of ten blind trial lineups using bat carcasses, the dog and handler were evaluated in the field to measure their performance. The detection dog coordinator conducted a two day field evaluation of each dog-handler team; after teams achieved a searcher efficiency of 75% or greater for 15–30 bats during evaluation trials, the teams were approved to conduct standardized carcass searches. Because the objective of the study was to document bat carcasses, dogs were not explicitly trained on native bird carcasses; however, all detection dogs alerted on birds in the field, and handlers rewarded bird finds in the field to

encourage future alerts to bird carcasses. Breeds used at the Project as detection dogs included a German shepherd (primary) and a border collie (substitute).

Data Collection

Technicians recorded the date, start and end times, technician name, turbine number, type of search and if any fatalities were found for each scheduled search. When a carcass was found, technicians placed a flag near it and continued the search. After searching the entire plot, the technician returned to record information for each carcass on a fatality data sheet, including the date and time, species, sex and age (when possible), technician name, turbine number, measured distance from turbine, azimuth from turbine, location of carcass as Universal Transverse Mercator coordinates, habitat surrounding the carcass, carcass condition, and estimated time of death (e.g., less than one day, two days).

The condition of each carcass found was recorded using the following categories:

- Intact—a complete carcass, not badly decomposed, and shows no sign of being fed upon by a predator or scavenger.
- Scavenged—an entire carcass showing signs of being fed upon by a predator or scavenger, or a portion(s) of a carcass in one location (e.g., wings, skeletal remains, portion of a carcass, etc.), or a carcass that has been heavily infested by insects.
- Dismembered—a carcass found in multiple pieces distributed more than 1.0 m (3.3 ft) apart from one another due to scavenging or other reasons.
- Injured—a bat or bird found alive.

For bird carcasses, the following category was also used:

- Feather spot—Ten or more feathers (excluding down), or two or more primary feathers at one location indicating predation or scavenging of a bird carcass.

Technicians took digital photographs of each fatality, including any visible injuries, and surrounding habitat. No bird carcasses were collected, but a marker was placed next to each bird carcass to avoid duplicate counting. Bat carcasses were collected under the Project's ITP (ESPER0041915), WEST's Federal Native Endangered and Threatened Species Recovery Permit (TE234121-9), and WEST's State of Illinois Scientific Collection Permit (15131). Technicians placed each bat carcasses in a re-sealable plastic bag labeled with the unique carcass identification number, turbine number, and date, for storage in a freezer on site. Leather and nitrile gloves were used to handle all bat carcasses to eliminate possible transmission of rabies or other diseases. Live, injured bats were recorded and considered fatalities for analysis purposes when observed in search areas, and were handled in accordance with permit conditions (left in place).

Carcasses found in non-search areas (e.g., outside of a plot boundary) or outside of the scheduled study period, were recorded as incidental discoveries and documented following the same protocol for those found during standard searches, but were not included in the analysis. Carcasses found either during scheduled searches or incidental observations (within the plots) between scheduled searches were included in the analysis.

Carcass Identification and Agency Notification

Identification of bird carcasses were verified by biologists with significant field experience in identification of birds and their feathers. A federally permitted bat biologist (ESPER0039249) identified all bat carcasses in hand at the end of the surveys. The USFWS and the Illinois Department of Natural Resources would have been notified within 24 hours of positive identification any state or federally listed species..

Tissue samples were collected from heavily scavenged or decomposed carcasses that could not be positively identified and had potential to be a Covered Species were submitted to a USFWS-approved laboratory (East Stroudsburg University Wildlife Genetics Institute) for genetic identification of the species.

Bat carcasses that were heavily scavenged but did not have potential to be a Covered Species (i.e., fur was present on the wing or forearms measured >41mm) were identified to the closest genus or group possible and were not sent off for further identification.

Bias Trials

Searcher Efficiency Trials

The objective of the searcher efficiency trials was to estimate the probability searchers found a carcass. Searcher efficiency trials were conducted in the same areas where carcass searches occurred. Technicians conducting carcass surveys did not know when searcher efficiency trials were being conducted or the location of the trial carcasses. Trial carcasses consisted of eastern red bats (*Lasiurus borealis*), hoary bats (*L. cinereus*), big brown bats (*Eptesicus fuscus*), Seminole bats (*L. seminolus*), and silver haired bats (*Lasionycteris noctivagans*), that had previously been found on site or were provided by studies at nearby wind facilities. At the start of the study, commercial mice (*Mus* spp.) were used when bat carcasses were not available. A total of 153 bat or bat-surrogate carcasses were placed across all seasons and plot types to account for differences in search conditions by plot type and season. Only bat carcasses were used to evaluate dog detection searcher efficiency rates.

Multiple trials were conducted in each season to measure potential changes in plot conditions on searcher efficiency over time. Each trial carcass was discreetly marked with a black zip-tie and/or a piece of electrical tape around the upper forelimb for identification as a study carcass after it was found. Carcasses were dropped from waist-height or higher and allowed to land in a random posture. The trial administrator walked in a meandering path and dropped trials for detection dogs the day or morning prior to the next search to allow time for the scent to pool and disperse prior to scheduled searches.

Searchers had one chance to locate trial carcasses during the first search after carcass placement. The number and location of trial carcasses found during the subsequent search were recorded, and the number of trial carcasses available for detection during each search was determined immediately after each trial by the person responsible for distributing the carcasses. Following searches, any carcasses that were not detected were checked to confirm availability. 61 trial carcasses were left in place and used for carcass persistence trials.

Carcass Persistence Trials

The objective of carcass persistence trials was to estimate the length of time (in days) a carcass would persist, or be available for detection, in the field. Carcasses could be removed by scavenging or rendered undetectable by typical farming activities. A minimum of 25 trial carcasses were placed in each season and plot type to incorporate the effects of varying weather and scavenger densities on carcass persistence. No more than two trial carcasses were placed on a plot to avoid potential over-seeding and attracting scavengers.

Technicians monitored the trial carcasses over a 30-day period according to the following schedule, as closely as possible. Carcasses were checked daily for the first four days, then on day 7, 10, 14, 21, and 30. Trial carcasses were monitored until they were completely removed or the trial period ended. Dog-handler teams were used on the uncleared and cleared plots to determine when carcasses were removed, while technicians determined the status of carcasses placed on 100-m roads and pads.

Search Area Mapping

Technicians recorded the boundaries of 100-m roads and pads and 70-m cleared plots in the field using an Eos sub-meter global positioning satellite unit. Unsearchable areas within plot boundaries were also mapped. The plot boundaries were used to verify if carcasses were found inside the search areas and to inform the distribution of carcasses around turbines to estimate the number of carcasses that fell inside or outside of search areas. No radius projection was applied to the 70 m for the uncleared plots.

Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) measures were implemented at all stages of the study, including in the field, during data entry and analysis, and report writing. Following field surveys, technicians were responsible for inspecting data forms for completeness, accuracy, and legibility. Potentially erroneous data were identified using a series of database queries. Irregular codes or data suspected as questionable were discussed with the technician and/or project manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw data forms, and appropriate changes and measures were implemented. WEST's Microsoft® SQL database was used to store, organize, and retrieve survey data. All paper data forms and electronic data files were retained for reference.

Statistical Analysis

The Evidence of Absence (EoA; Dalthorp et al. 2017) modeling framework was used to estimate take of the Covered Species. To estimate take, EoA used data collected in the field to estimate the overall probability of detecting a bat fatality, the arrival distribution of bats (described below), and the number of Covered Species detections. Data used in the EoA model included number of Covered Species fatalities, fatality spatial data from all bats found during surveys, and the results of searcher efficiency and carcass persistence trials.

Searcher Efficiency Estimation

Searcher efficiency was estimated separately for technicians and dog-handler teams to account for different modes of detection (i.e., technicians use sight while dogs use scent). EoA uses raw searcher efficiency data (e.g. number of found and available trial carcasses) to inform overall probability of detection. However, to determine if searcher efficiency data should be pooled, or separated by strata such as season and/or plot type, we modeled searcher efficiency using logistic regression, while accounting for the detection reduction factor k (Dalthorp et al. 2018). For both technician and dog-handler team models, selection was completed using an information theoretic approach using the corrected Akaike Information Criterion (AICc; Burnham and Anderson 2002). The best-supported model was selected as the most parsimonious model (fewest parameters) within two AICc units of the top model (lowest AICc value). Searcher efficiency values were input into the EoA software according to the model selection results.

The change in searcher efficiency between successive searches was defined by a parameter called the detection reduction factor (k) that can range from zero to one. When k is zero, it implies a carcass that was missed on the first search would never be found on subsequent searches. A k of one implies searcher efficiency remained constant no matter how many times a carcass was missed. Huso et al. (2017) estimated a value of $k = 0.67$ for bats, and this value was used to calculate estimates for the Covered Species in EoA.

Carcass Persistence Rate Estimation

Data collected during CPT were used to estimate the amount of time in days that carcasses remained available to be located by the searcher. Estimates of carcass persistence were used to adjust carcass counts for removal bias. The carcass persistence adjustment estimated the average probability a carcass persisted through the search interval (i.e., the time between scheduled searches). The persistence of a carcass was modeled using an interval-censored survival regression for each size class using exponential, log-logistic, lognormal, and Weibull distributions (Dalthorp 2018, Kalbfleisch and Prentice 2002). Covariates (explanatory variables of interest) were fit to each of the parameters of the distributions. Covariates considered in the models were season and plot type. The best-supported model was selected as the most parsimonious model (fewest parameters) within two AICc units of the top model (lowest AICc value).

Search Area Adjustment Estimate

The search area adjustment accounted for unsearched areas beneath turbines, and was calculated as a probability that ranged from zero to one. The area adjustment was estimated as the product of the searched area around each turbine and a carcass-density distribution. A truncated weighted maximum likelihood (TWL) modeling approach (Khokan et al. 2013) was used to estimate the carcass-density distribution using site-specific fatality locations. The TWL approach uses weight-based probability of detection and the proportion of area searched in each 1.0-m annulus around the turbine. Distributions considered were normal, gamma, Gompertz, and Weibull (parameterized according to R Development Core Team [2016] and Yee [2010]). The best-supported model was selected using AICc. The proportion of area searched was calculated in a Geographic Information System as the amount of area searched divided by the total area searched at each 1.0-m annulus around the turbine.

Carcasses Excluded from Area Adjustment

Fatalities were excluded from the area adjustment used in EoA when the carcass was discovered outside of the spatial and temporal scope of the survey design. For example, carcasses found outside a designated plot were not included in the analysis because the area adjustment accounts for the carcass by adjusting for unsearched areas. Carcasses found prior to the start of surveys (e.g., a carcass found on a plot in the summer that is not searched until the fall) were also excluded because the carcass occurred outside of the study period. Note that carcasses found on a plot incidentally were included in the analysis if that plot had a scheduled search during the next round of surveys. If a fatality of a Covered Species had been found outside of the spatial or temporal scope of the survey design it would still be excluded from the area correction estimate, but would be included in the EoA fatality estimate following Dalthorp et al. 2020.

Covered Species Take and Detection Probability Estimates

EoA was used to estimate the mean annual take rate (λ) for the Covered Species and the probability of detection (g). Estimates were calculated using the EoA method (Dalthorp et al. 2017), using the Single Class and Multiple Class modules of EoA.

The probability of detection (g) was estimated using the bias corrections for searcher efficiency, CP, and area searched, as well as the assumed seasonality of risk for the Covered Species, which was 11% in spring and 89% in fall per the Project's study plan. The EoA Single Class module was used to estimate the distribution of detection probability in each search stratum (plot), with the strata including the 70-m cleared plots, 70-m uncleared plots, and the 100-m roads and pads plots. Area correction was included in the Single Class module for each stratum. This resulted in alpha and beta parameters that defined the beta distribution of detection probability in each stratum. The EoA Multiple Class module was then used to combine detection probability distributions across three plot strata, with weights for each class defined by the sampling fraction and arrival proportions. Per the HCP, adaptive management triggers will not be evaluated using EoA until Year 3.

RESULTS

Standardized Carcass Searches

Two hundred and ninety searches were completed in the spring season, and 912 searches were completed in the fall season. Nineteen searches were missed in the spring (6.5%) and 35 searches (3.8%) were missed in the fall due to turbine maintenance, weather, and/or safety hazards from road maintenance and agricultural practices.

Three hundred and forty-six bat carcasses and 63 bird carcasses were found during surveys and incidentally (Appendix A). No Covered Species and no *Myotis* species were observed. Three bats were found in the spring, and 343 bats were found in the fall. The most commonly found bat species were silver-haired bat (155 carcasses; 44.8%) and eastern red bat (136 carcasses; 39.3%), followed by hoary bat (32; 9.2%) and big brown bat (10; 2.8%). Four eastern red or Seminole bats (1.1%), three Seminole bats (0.8%), three unidentified *Lasiurus* bats (0.8%), two unidentified non-*Myotis* bats (0.5%), and one unidentified bat (0.2%) were also found. (Appendix A). Over the course of the monitoring period, 11 heavily scavenged bats (e.g., wing membrane only, bones, or partial carcasses) were sent to a laboratory for identification via deoxyribonucleic acid (commonly, DNA) analysis; they were identified as seven silver-haired bats, one hoary bat, two eastern red bats, and one inconclusive result. The majority of bat carcasses were recorded on plots searched by the dog detection teams.

Statistical Analysis

Bias Trials

Searcher Efficiency Trials

Searcher efficiency trials were conducted on 11 separate dates across all plot types and months of the study, and included 153 carcasses placed with 122 carcasses available for search teams to find. Searcher efficiency rates ranged from 86.67% on full plots with dog detection team to 96.55% road and pad (Table 4). The best-supported model for searcher efficiency on 70-m plots did not support the inclusion of plot type as a covariate, meaning there was not a substantial difference between searcher efficiency rates on uncleared and cleared plots or between seasons (Appendix B). The best-supported model for searcher efficiency on roads and pads did not support the inclusion of season as a covariate (Appendix B).]

Table 4. Searcher efficiency results for all plot types as a function of season at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Season	Search Area Type	# Placed	# Available	# Found	% Found	Aided Search
Spring	road and pad	34	29	28	96.55	no
Fall	road and pad	43	33	29	87.88	no
Fall	full plot	75	60	52	86.67	yes*

* Dog aided search.

Carcass Persistence Trials

Sixty-one carcasses were placed to estimate CP. The best-fit model for CP rates had a Weibull distribution and included season as a location covariate, which suggests CP rates varied by season (Appendix B). Estimated median removal times for spring and fall were 2.74 and 5.79 days, respectively (Appendix B).

The average probability that a carcass persisted through a 7-day search interval in the spring was 0.49 (90% CI: 0.34–0.63; Figure 5). The average probability that a carcass persisted through a 3.5-day search interval in the fall was 0.76 (90% CI: 0.67–0.83; Figure 5).

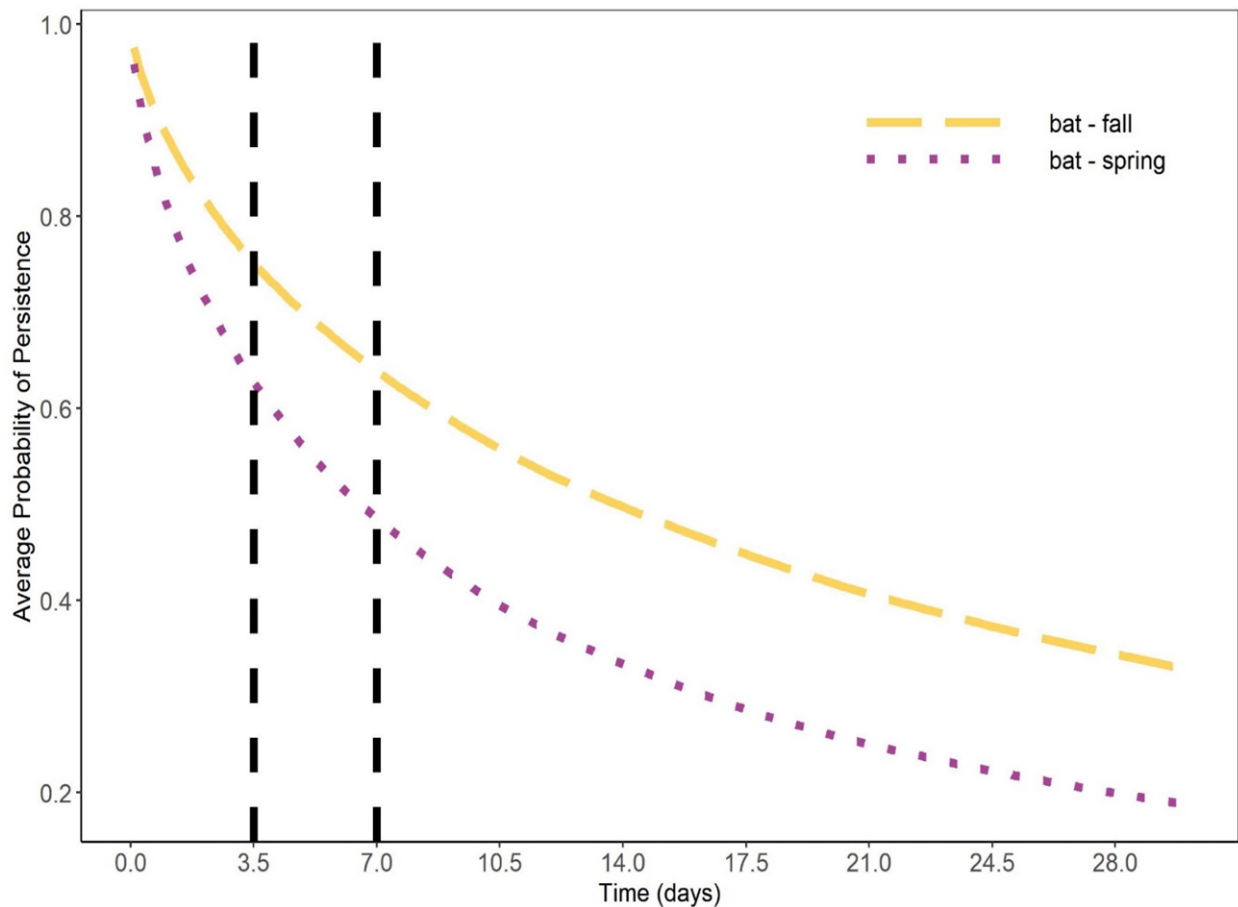


Figure 5. Average probability of carcass persistence as a function of time (days) for bat carcasses placed at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022. Average search interval was 3.5 and 7 days, and is represented by a vertical line on the figure.

Area Adjustment

Twenty-five of the 346 bats found were excluded from modeling the area correction for EoA. Seventeen bat carcasses were excluded because they were located outside of the search area, with another eight excluded because the time of death was estimated to occur prior to the start of surveys (Appendix B).

The best-fit model for the distribution of bats with respect to distance from turbine base was a Gompertz distribution (Appendix B). The estimated TWL area adjustment for bats was 0.99 for cleared plots, 0.97 for uncleared plots, and 0.05 for roads and pads (Appendix B; Figures 6 and 7).

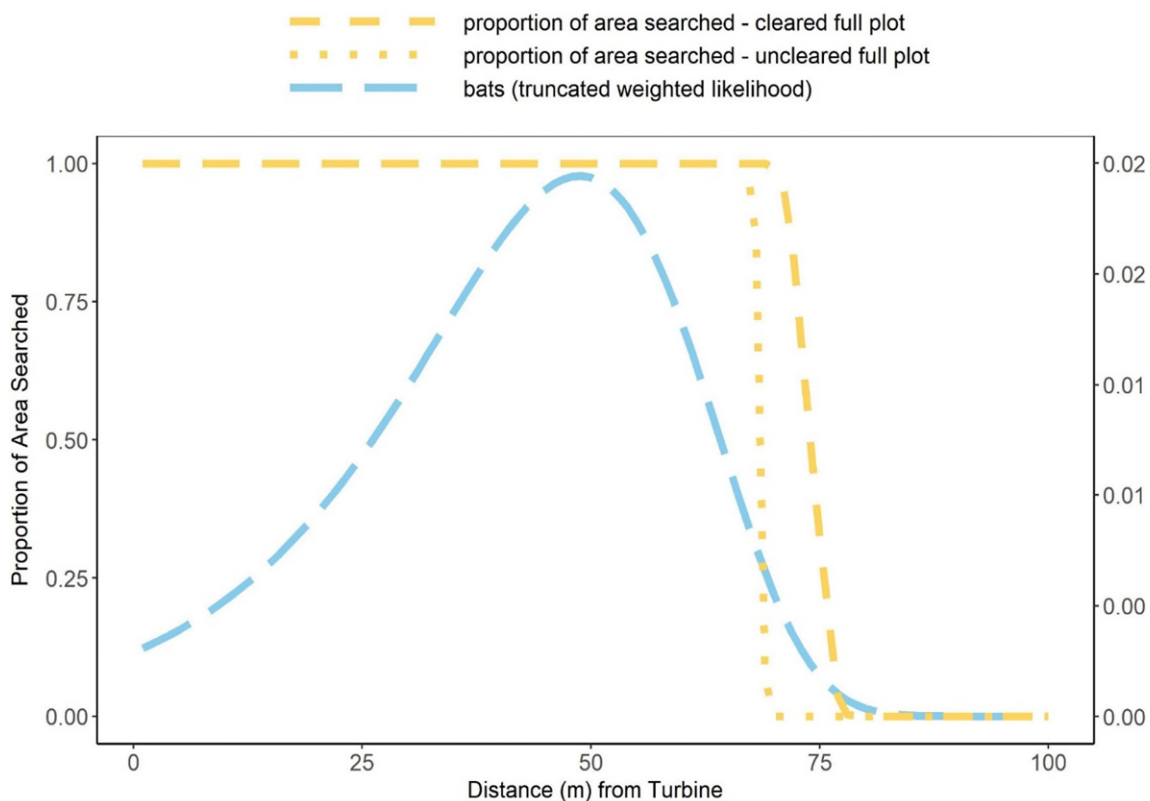


Figure 6. Estimated bat full plots carcass-density distribution, and proportion of area searched by distance from turbine at Ford County Wind Energy Project, Ford County County, Illinois, from April 1 to October 15, 2022.

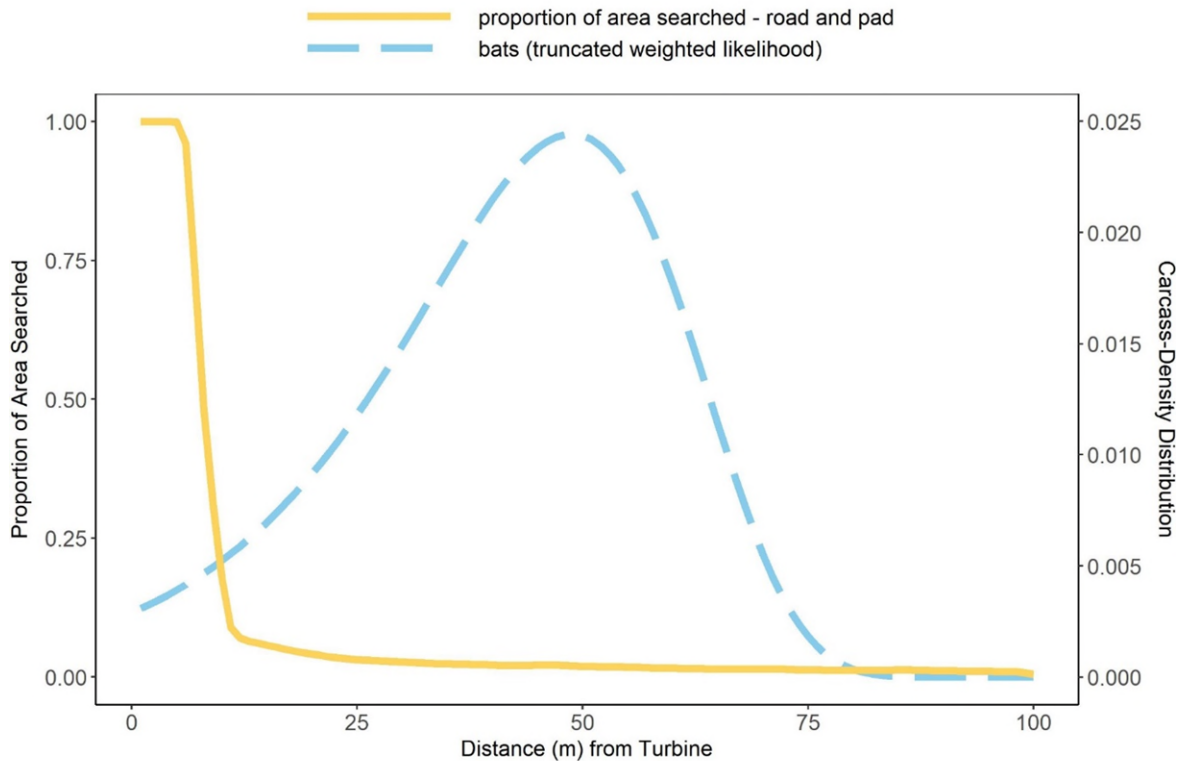


Figure 7. Estimated bat road pad carcass-density distribution, and proportion of area searched by distance from turbine at Ford County Wind Energy Project, Ford County County, Illinois, from April 1 to October 15, 2022.

Evidence of Absence Framework

Indiana Bat and Northern Long-eared Bat Take Estimates

No Covered Species carcasses were found during the study; thus, the adaptive management trigger for Years 1–2 was not met and no adaptive management was necessary. The overall *g* achieved for the 2022 monitoring period had a mean of 0.14 (95% CI: 0.13–0.15). Mean annual take rates were estimated to be 3.5 (95% CI = 0.003–17.7) for Covered Species per year from April 1 – May 15 and August 1 – October 15, 2021. Inputs required to run the EoA Single Class module and stratum-specific *g* distribution values and inputs required for the Multiple Class module are described in Appendix C.

Conclusions

The overall *g* achieved for the 2022 monitoring period was below that required to attain an average minimum *g* of 0.2 for Years 1–3. The lower than expected *g* value for 2022 is attributed to a lower than expected search area correction for the road and pad plots. Calculated estimates will be used to formally update the search strategies employed during the Year 2 monitoring. Monitoring

completed during 2022 is consistent with the expected rate of take of Covered Species during the ITP term. Adaptive management triggers will not be formally evaluated using the EoA results until Year 3; however, no adaptive management actions were triggered this year because no Covered Species were found.

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Appendix A. Carcasses found during the 2022 Post-construction Monitoring Surveys at the Ford County Wind Farm Project in Ford County, Illinois from April 1 to October 15, 2022.

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area Type	Physical Condition	Aided Search
04/27/2022	silver-haired bat	69	E02	carcass search	road and pad	intact	no
04/27/2022	silver-haired bat	26	F03	carcass search	road and pad	intact	no
05/11/2022	hoary bat	56	E02	carcass search	road and pad	intact	no
08/01/2022	eastern red bat	36	G05	carcass search	cleared full plot	scavenged	yes*
08/01/2022	eastern red bat	7	J03	carcass search	road and pad	intact	no
08/01/2022	eastern red bat	40	L03	carcass search	cleared full plot	scavenged	yes*
08/01/2022	unidentified non-myotis	40	H04	carcass search	road and pad	dismembered	no
08/02/2022	eastern red bat	14	B04	carcass search	cleared full plot	scavenged	yes*
08/03/2022	big brown bat	50	J03	carcass search**	n/a	dismembered	yes*
08/03/2022	eastern red bat	0	I03	carcass search	road and pad	intact	no
08/03/2022	silver-haired bat	19	E01	carcass search	road and pad	intact	no
08/04/2022	big brown bat	44	G05	carcass search	cleared full plot	scavenged	yes*
08/04/2022	eastern red bat	46	G05	carcass search	cleared full plot	dismembered	yes*
08/04/2022	eastern red bat	44	L01	carcass search	uncleared full plot	scavenged	yes*
08/04/2022	eastern red bat	58	L01	carcass search	uncleared full plot	scavenged	yes*
08/04/2022	eastern red bat	30	L03	carcass search	cleared full plot	scavenged	yes*
08/04/2022	hoary bat	7	G08	carcass search	road and pad	feather spot	no
08/04/2022	silver-haired bat	14	G05	carcass search	cleared full plot	dismembered	yes*
08/06/2022	hoary bat	6	E04a	incidental	road and pad	intact	no
08/08/2022	big brown bat	4	G01b	carcass search	road and pad	scavenged	no
08/08/2022	big brown bat	42	J01	carcass search	uncleared full plot	scavenged	yes*
08/08/2022	eastern red bat	22	G03a	carcass search	road and pad	scavenged	no
08/08/2022	eastern red bat	23	G05	carcass search	cleared full plot	intact	yes*
08/08/2022	eastern red bat	24	G05	carcass search	cleared full plot	scavenged	yes*
08/08/2022	eastern red bat	365	H05	incidental**	road and pad	intact	no
08/08/2022	eastern red bat	58	J01	carcass search	uncleared full plot	scavenged	yes*
08/08/2022	eastern red bat	21	L01	carcass search	uncleared full plot	intact	yes*
08/08/2022	eastern red bat	49	L03	carcass search	cleared full plot	intact	yes*
08/08/2022	eastern red bat	19	L03	carcass search	cleared full plot	scavenged	yes*
08/08/2022	eastern red bat	53	L03	carcass search	cleared full plot	scavenged	yes*
08/08/2022	hoary bat	18	G05	carcass search	cleared full plot	scavenged	yes*
08/09/2022	eastern red bat	17	A01	carcass search	uncleared full plot	scavenged	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
08/09/2022	eastern red bat	56	B04	carcass search	cleared full plot		intact	yes*
08/09/2022	eastern red bat	73	F05	carcass search**	cleared full plot		intact	yes*
08/09/2022	eastern red bat	66	F05	carcass search	cleared full plot		dismembered	yes*
08/09/2022	eastern red bat	73	F05	carcass search**	cleared full plot		intact	yes*
08/09/2022	eastern red bat	16	F06	carcass search	uncleared full plot		scavenged	yes*
08/09/2022	hoary bat	25	F05	carcass search	cleared full plot		intact	yes*
08/11/2022	eastern red bat	0	G05	carcass search	cleared full plot		intact	yes*
08/11/2022	eastern red bat	43	J01	carcass search	uncleared full plot		feather spot	yes*
08/11/2022	eastern red bat	80	L01	carcass search**	uncleared full plot		dismembered	yes*
08/11/2022	eastern red bat	31	L03	carcass search	cleared full plot		scavenged	yes*
08/11/2022	eastern red bat	38	L03	carcass search	cleared full plot		dismembered	yes*
08/11/2022	eastern red bat or Seminole bat	62	G05	carcass search	cleared full plot		intact	yes*
08/11/2022	hoary bat	23	J01	carcass search	uncleared full plot		scavenged	yes*
08/11/2022	hoary bat	52	L03	carcass search	cleared full plot		dismembered	yes*
08/12/2022	eastern red bat	43	B04	carcass search	cleared full plot		scavenged	yes*
08/12/2022	eastern red bat	42	F06	carcass search	uncleared full plot		scavenged	yes*
08/12/2022	eastern red bat	53	F06	carcass search	uncleared full plot		scavenged	yes*
08/12/2022	eastern red bat or Seminole bat	51	F05	carcass search	cleared full plot		scavenged	yes*
08/12/2022	hoary bat	65	B04	carcass search	cleared full plot		intact	yes*
08/15/2022	big brown bat	37	G05	carcass search	cleared full plot		scavenged	yes*
08/15/2022	eastern red bat	62	G05	carcass search	cleared full plot		scavenged	yes*
08/15/2022	eastern red bat	76	G05	carcass search**	cleared full plot		dismembered	yes*
08/15/2022	eastern red bat	45	G05	carcass search	cleared full plot		scavenged	yes*
08/15/2022	eastern red bat	64	G05	carcass search	cleared full plot		intact	yes*
08/15/2022	eastern red bat	10	J01	carcass search	uncleared full plot		dismembered	yes*
08/15/2022	eastern red bat	20	L01	carcass search	uncleared full plot		intact	yes*
08/15/2022	eastern red bat	57	L01	carcass search	uncleared full plot		intact	yes*
08/15/2022	hoary bat	65	J01	carcass search	uncleared full plot		scavenged	yes*
08/15/2022	hoary bat	51	J01	carcass search	uncleared full plot		intact	yes*
08/16/2022	eastern red bat	52	A01	carcass search	uncleared full plot		intact	yes*
08/16/2022	eastern red bat	8	A01	carcass search	uncleared full plot		feather spot	yes*
08/16/2022	eastern red bat	0	A04	carcass search	road and pad		intact	no
08/16/2022	eastern red bat	2	C03	carcass search	road and pad		scavenged	no

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area Type	Physical Condition	Aided Search
08/16/2022	eastern red bat	48	F05	carcass search	cleared full plot	intact	yes*
08/16/2022	eastern red bat	46	F06	carcass search	uncleared full plot	scavenged	yes*
08/16/2022	hoary bat	23	B04	carcass search	cleared full plot	intact	yes*
08/16/2022	hoary bat	47	E02	carcass search	road and pad	scavenged	no
08/18/2022	big brown bat	61	L01	carcass search	uncleared full plot	scavenged	yes*
08/18/2022	eastern red bat	20	G05	carcass search	cleared full plot	intact	yes*
08/18/2022	eastern red bat	45	J01	carcass search	uncleared full plot	scavenged	yes*
08/19/2022	eastern red bat	41	A01	carcass search	uncleared full plot	scavenged	yes*
08/19/2022	eastern red bat	17	A01	carcass search	uncleared full plot	scavenged	yes*
08/19/2022	eastern red bat	55	A01	carcass search	uncleared full plot	dismembered	yes*
08/19/2022	hoary bat	5	C03	carcass search	road and pad	intact	no
08/19/2022	hoary bat	46	F06	carcass search	uncleared full plot	intact	yes*
08/22/2022	big brown bat	16	H01	carcass search	road and pad	intact	no
08/22/2022	eastern red bat	28	J01	carcass search	uncleared full plot	dismembered	yes*
08/22/2022	eastern red bat	24	L01	carcass search	uncleared full plot	injured	yes*
08/22/2022	eastern red bat	3	L01	carcass search	uncleared full plot	intact	yes*
08/22/2022	eastern red bat	22	L03	carcass search	cleared full plot	scavenged	yes*
08/22/2022	hoary bat	351	H05	carcass search**	road and pad	intact	no
08/22/2022	hoary bat	54	J01	carcass search	uncleared full plot	dismembered	yes*
08/22/2022	hoary bat	0	J03	carcass search	road and pad	scavenged	no
08/23/2022	eastern red bat	152	F04	carcass search**	road and pad	scavenged	no
08/23/2022	eastern red bat	50	F05	carcass search	cleared full plot	scavenged	yes*
08/23/2022	eastern red bat	19	F06	carcass search	uncleared full plot	scavenged	yes*
08/23/2022	hoary bat	40	F05	carcass search	cleared full plot	scavenged	yes*
08/25/2022	eastern red bat	17	G05	incidental	cleared full plot	dismembered	yes*
08/25/2022	eastern red bat	0	I04	carcass search	road and pad	intact	no
08/26/2022	eastern red bat	45	A04	carcass search	road and pad	intact	no
08/26/2022	eastern red bat	0	G05	carcass search	cleared full plot	intact	yes*
08/26/2022	eastern red bat	6	G05	carcass search	cleared full plot	intact	yes*
08/26/2022	eastern red bat	56	L03	carcass search	cleared full plot	scavenged	yes*
08/27/2022	eastern red bat	7	A01	incidental	uncleared full plot	intact	yes*
08/27/2022	eastern red bat	17	F06	carcass search	uncleared full plot	intact	yes*
08/29/2022	big brown bat	54	G05	carcass search	cleared full plot	scavenged	yes*

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Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
08/29/2022	eastern red bat	24	J01	carcass search	uncleared full plot		scavenged	yes*
08/29/2022	eastern red bat	40	J01	carcass search	uncleared full plot		dismembered	yes*
08/29/2022	eastern red bat	20	J01	carcass search	uncleared full plot		scavenged	yes*
08/29/2022	eastern red bat	41	J01	carcass search	uncleared full plot		dismembered	yes*
08/29/2022	hoary bat	50	L01	carcass search	uncleared full plot		dismembered	yes*
08/30/2022	eastern red bat	49	F05	carcass search	cleared full plot		dismembered	yes*
08/30/2022	eastern red bat	15	F06	carcass search	uncleared full plot		dismembered	yes*
08/30/2022	silver-haired bat	24	F05	carcass search	cleared full plot		dismembered	yes*
08/30/2022	unidentified lasiurus bat	11	F06	carcass search	uncleared full plot		injured	yes*
09/01/2022	big brown bat	1	G05	carcass search	cleared full plot		scavenged	yes*
09/01/2022	big brown bat	4	L01	incidental	uncleared full plot		intact	yes*
09/01/2022	eastern red bat	3	H05	carcass search	road and pad		dismembered	no
09/01/2022	eastern red bat	17	J01	carcass search	uncleared full plot		dismembered	yes*
09/01/2022	eastern red bat	21	L01	carcass search	uncleared full plot		scavenged	yes*
09/01/2022	eastern red bat	32	L03	carcass search	cleared full plot		intact	yes*
09/01/2022	eastern red bat or Seminole bat	15	H04	carcass search	road and pad		intact	no
09/01/2022	eastern red bat or Seminole bat	3	H05	carcass search	road and pad		dismembered	no
09/01/2022	hoary bat	62	G05	carcass search	cleared full plot		scavenged	yes*
09/01/2022	hoary bat	48	J01	carcass search	uncleared full plot		intact	yes*
09/01/2022	hoary bat	33	L03	carcass search	cleared full plot		scavenged	yes*
09/01/2022	hoary bat	17	L03	carcass search	cleared full plot		intact	yes*
09/01/2022	Seminole bat	11	L03	carcass search	cleared full plot		scavenged	yes*
09/01/2022	silver-haired bat	6	G01b	carcass search	road and pad		injured	no
09/01/2022	silver-haired bat	57	G05	carcass search	cleared full plot		intact	yes*
09/01/2022	silver-haired bat	23	G05	carcass search	cleared full plot		scavenged	yes*
09/01/2022	silver-haired bat	47	G05	carcass search	cleared full plot		intact	yes*
09/01/2022	silver-haired bat	50	I01	carcass search	road and pad		scavenged	no
09/01/2022	silver-haired bat	24	J01	carcass search	uncleared full plot		dismembered	yes*
09/01/2022	silver-haired bat	18	L01	carcass search	uncleared full plot		scavenged	yes*
09/01/2022	silver-haired bat	24	L01	carcass search	uncleared full plot		dismembered	yes*
09/01/2022	silver-haired bat	29	L01	carcass search	uncleared full plot		intact	yes*
09/02/2022	eastern red bat	80	A01	carcass search**	uncleared full plot		scavenged	yes*
09/02/2022	eastern red bat	56	A01	carcass search	uncleared full plot		intact	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/02/2022	eastern red bat	54	A01	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	eastern red bat	12	B01	carcass search	road and pad		scavenged	no
09/02/2022	eastern red bat	49	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	eastern red bat	46	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	eastern red bat	8	D01	carcass search	road and pad		intact	no
09/02/2022	eastern red bat	15	F06	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	hoary bat	42	A01	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	38	A01	carcass search	uncleared full plot		intact	yes*
09/02/2022	silver-haired bat	9	A01	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	26	A01	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	54	A01	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	49	A01	carcass search	uncleared full plot		injured	yes*
09/02/2022	silver-haired bat	18	A01	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	2	A02	carcass search	road and pad		scavenged	no
09/02/2022	silver-haired bat	21	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	38	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	54	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	49	B04	carcass search	cleared full plot		intact	yes*
09/02/2022	silver-haired bat	53	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	59	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	56	B04	carcass search	cleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	6	D01	carcass search	road and pad		scavenged	no
09/02/2022	silver-haired bat	44	E01	carcass search	road and pad		intact	no
09/02/2022	silver-haired bat	40	F01	carcass search	road and pad		intact	no
09/02/2022	silver-haired bat	55	F03	carcass search	road and pad		scavenged	no
09/02/2022	silver-haired bat	15	F05	carcass search	cleared full plot		intact	yes*
09/02/2022	silver-haired bat	41	F06	carcass search	uncleared full plot		dismembered	yes*
09/02/2022	silver-haired bat	32	F06	carcass search	uncleared full plot		scavenged	yes*
09/02/2022	silver-haired bat	62	F06	carcass search	uncleared full plot		scavenged	yes*
09/03/2022	eastern red bat	0	E06	carcass search	road and pad		intact	no
09/06/2022	eastern red bat	55	J01	carcass search	uncleared full plot		scavenged	yes*
09/06/2022	eastern red bat	23	L01	carcass search	uncleared full plot		scavenged	yes*
09/06/2022	eastern red bat	48	L03	carcass search	cleared full plot		injured	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/06/2022	eastern red bat	67	L03	carcass search	cleared full plot		scavenged	yes*
09/06/2022	eastern red bat	39	L03	carcass search	cleared full plot		scavenged	yes*
09/06/2022	hoary bat	27	J01	carcass search	uncleared full plot		intact	yes*
09/06/2022	hoary bat	30	L01	carcass search	uncleared full plot		dismembered	yes*
09/06/2022	silver-haired bat	47	G05	carcass search	cleared full plot		scavenged	yes*
09/06/2022	silver-haired bat	5	H05	carcass search	road and pad		scavenged	no
09/06/2022	silver-haired bat	5	H07	carcass search	road and pad		scavenged	no
09/06/2022	silver-haired bat	43	J01	carcass search	uncleared full plot		intact	yes*
09/06/2022	silver-haired bat	24	L01	carcass search	uncleared full plot		dismembered	yes*
09/06/2022	silver-haired bat	45	L01	carcass search	uncleared full plot		scavenged	yes*
09/06/2022	silver-haired bat	15	L01	carcass search	uncleared full plot		scavenged	yes*
09/06/2022	silver-haired bat	35	L03	carcass search	cleared full plot		scavenged	yes*
09/06/2022	silver-haired bat	9	L03	carcass search	cleared full plot		intact	yes*
09/06/2022	silver-haired bat	26	L03	carcass search	cleared full plot		scavenged	yes*
09/06/2022	silver-haired bat	5	L03	carcass search	cleared full plot		intact	yes*
09/06/2022	unidentified non-myotis	32	L01	carcass search	uncleared full plot		dismembered	yes*
09/07/2022	eastern red bat	9	A01	incidental	uncleared full plot		scavenged	yes*
09/07/2022	eastern red bat	1	E04a	carcass search	road and pad		intact	no
09/07/2022	eastern red bat	28	F05	carcass search	cleared full plot		scavenged	yes*
09/07/2022	eastern red bat	64	F05	carcass search	cleared full plot		scavenged	yes*
09/07/2022	eastern red bat	11	F06	carcass search	uncleared full plot		scavenged	yes*
09/07/2022	eastern red bat	40	F06	carcass search	uncleared full plot		scavenged	yes*
09/07/2022	Seminole bat	53	F04	carcass search	road and pad		intact	no
09/07/2022	silver-haired bat	53	B04	carcass search	cleared full plot		dismembered	yes*
09/07/2022	silver-haired bat	20	B04	carcass search	cleared full plot		scavenged	yes*
09/07/2022	silver-haired bat	6	D01	carcass search	road and pad		scavenged	no
09/07/2022	silver-haired bat	50	F05	carcass search	cleared full plot		dismembered	yes*
09/07/2022	silver-haired bat	47	F05	carcass search	cleared full plot		feather spot	yes*
09/07/2022	silver-haired bat	66	F05	carcass search	cleared full plot		scavenged	yes*
09/07/2022	silver-haired bat	37	F06	carcass search	uncleared full plot		scavenged	yes*
09/07/2022	silver-haired bat	10	H01	incidental	road and pad		intact	no
09/08/2022	eastern red bat	54	L03	carcass search	cleared full plot		scavenged	yes*
09/08/2022	silver-haired bat	20	L01	carcass search	uncleared full plot		scavenged	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/08/2022	silver-haired bat	37	L01	carcass search	uncleared full plot		scavenged	yes*
09/08/2022	silver-haired bat	48	L03	carcass search	cleared full plot		dismembered	yes*
09/08/2022	unidentified lasiurus bat	59	L01	carcass search	uncleared full plot		dismembered	yes*
09/09/2022	eastern red bat	40	G05	carcass search	cleared full plot		scavenged	yes*
09/13/2022	eastern red bat	58	J01	carcass search	uncleared full plot		intact	yes*
09/13/2022	eastern red bat	9	L03	carcass search	cleared full plot		scavenged	yes*
09/13/2022	hoary bat	15	L03	carcass search	cleared full plot		intact	yes*
09/13/2022	hoary bat	42	L03	carcass search	cleared full plot		intact	yes*
09/13/2022	silver-haired bat	35	B04	carcass search	cleared full plot		scavenged	yes*
09/13/2022	silver-haired bat	5	C02	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	37	C02	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	3	C03	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	13	D01	carcass search	road and pad		dismembered	no
09/13/2022	silver-haired bat	22	E04a	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	6	E06	carcass search	road and pad		injured	no
09/13/2022	silver-haired bat	4	F04	carcass search	road and pad		injured	no
09/13/2022	silver-haired bat	11	F04	carcass search	road and pad		injured	no
09/13/2022	silver-haired bat	3	F05	carcass search	cleared full plot		injured	yes*
09/13/2022	silver-haired bat	53	F05	carcass search	cleared full plot		scavenged	yes*
09/13/2022	silver-haired bat	188	G07	incidental**	road and pad		intact	no
09/13/2022	silver-haired bat	7	G08	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	6	H01	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	2	H06a	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	28	I04	carcass search	road and pad		intact	no
09/13/2022	silver-haired bat	35	J01	carcass search	uncleared full plot		intact	yes*
09/13/2022	silver-haired bat	55	L03	carcass search	cleared full plot		scavenged	yes*
09/13/2022	silver-haired bat	48	L03	carcass search	cleared full plot		dismembered	yes*
09/13/2022	silver-haired bat	75	L03	carcass search**	cleared full plot		scavenged	yes*
09/13/2022	silver-haired bat	49	L03	carcass search	cleared full plot		scavenged	yes*
09/14/2022	silver-haired bat	22	A01	carcass search	uncleared full plot		intact	yes*
09/14/2022	silver-haired bat	52	F06	carcass search	uncleared full plot		scavenged	yes*
09/15/2022	eastern red bat	29	G05	carcass search	cleared full plot		scavenged	yes*
09/15/2022	eastern red bat	64	L01	carcass search	uncleared full plot		scavenged	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/15/2022	eastern red bat	65	L03	carcass search	cleared full plot		scavenged	yes*
09/15/2022	silver-haired bat	57	G05	carcass search	cleared full plot		scavenged	yes*
09/15/2022	silver-haired bat	15	L03	carcass search	cleared full plot		scavenged	yes*
09/16/2022	silver-haired bat	38	F05	carcass search	cleared full plot		scavenged	yes*
09/16/2022	silver-haired bat	62	F06	carcass search	uncleared full plot		scavenged	yes*
09/16/2022	silver-haired bat	1	F06	carcass search	uncleared full plot		scavenged	yes*
09/16/2022	silver-haired bat	34	F06	carcass search	uncleared full plot		scavenged	yes*
09/19/2022	eastern red bat	53	L03	carcass search	cleared full plot		scavenged	yes*
09/19/2022	silver-haired bat	67	G05	carcass search	cleared full plot		scavenged	yes*
09/19/2022	silver-haired bat	55	L03	carcass search	cleared full plot		scavenged	yes*
09/19/2022	silver-haired bat	44	L03	carcass search	cleared full plot		scavenged	yes*
09/19/2022	silver-haired bat	20	L03	carcass search	cleared full plot		scavenged	yes*
09/20/2022	silver-haired bat	55	B04	carcass search	cleared full plot		scavenged	yes*
09/20/2022	silver-haired bat	64	F05	carcass search	cleared full plot		dismembered	yes*
09/21/2022	eastern red bat	61	E05	carcass search	road and pad		intact	no
09/22/2022	eastern red bat	72	F06	incidental**	uncleared full plot		scavenged	yes*
09/22/2022	eastern red bat	28	L03	carcass search	cleared full plot		dismembered	yes*
09/22/2022	hoary bat	51	G05	carcass search	cleared full plot		scavenged	yes*
09/22/2022	silver-haired bat	20	G05	carcass search	cleared full plot		dismembered	yes*
09/22/2022	silver-haired bat	15	G05	carcass search	cleared full plot		scavenged	yes*
09/22/2022	silver-haired bat	65	L01	incidental	uncleared full plot		scavenged	yes*
09/22/2022	silver-haired bat	44	L01	incidental	uncleared full plot		scavenged	yes*
09/22/2022	silver-haired bat	21	L03	carcass search	cleared full plot		dismembered	yes*
09/22/2022	silver-haired bat	44	L03	carcass search	cleared full plot		dismembered	yes*
09/22/2022	silver-haired bat	40	L03	carcass search	cleared full plot		scavenged	yes*
09/23/2022	eastern red bat	7	E04a	carcass search	road and pad		intact	no
09/23/2022	silver-haired bat	24	B04	carcass search	cleared full plot		intact	yes*
09/23/2022	silver-haired bat	30	B04	carcass search	cleared full plot		intact	yes*
09/23/2022	silver-haired bat	58	B04	carcass search	cleared full plot		dismembered	yes*
09/23/2022	silver-haired bat	67	B04	carcass search	cleared full plot		dismembered	yes*
09/23/2022	silver-haired bat	59	B04	carcass search	cleared full plot		scavenged	yes*
09/23/2022	silver-haired bat	30	B04	carcass search	cleared full plot		dismembered	yes*
09/23/2022	silver-haired bat	62	B04	carcass search	cleared full plot		scavenged	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/23/2022	silver-haired bat	9	C04	carcass search	road and pad		scavenged	no
09/23/2022	unidentified lasiurus bat	58	F05	carcass search	cleared full plot		scavenged	yes*
09/24/2022	eastern red bat	30	F06	carcass search	uncleared full plot		scavenged	yes*
09/24/2022	eastern red bat	40	L01	carcass search	uncleared full plot		scavenged	yes*
09/24/2022	silver-haired bat	39	F06	carcass search	uncleared full plot		scavenged	yes*
09/24/2022	silver-haired bat	36	J01	carcass search	uncleared full plot		scavenged	yes*
09/24/2022	silver-haired bat	25	J01	carcass search	uncleared full plot		scavenged	yes*
09/24/2022	silver-haired bat	60	L01	carcass search	uncleared full plot		scavenged	yes*
09/26/2022	eastern red bat	0	G04	carcass search	road and pad		intact	no
09/26/2022	eastern red bat	32	G05	carcass search	cleared full plot		scavenged	yes*
09/26/2022	eastern red bat	67	J01	carcass search	uncleared full plot		dismembered	yes*
09/26/2022	eastern red bat	69	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	eastern red bat	62	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	eastern red bat	64	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	eastern red bat	34	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	eastern red bat	36	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	hoary bat	4	J03	carcass search	road and pad		intact	no
09/26/2022	Seminole bat	57	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	silver-haired bat	56	L03	carcass search	cleared full plot		scavenged	yes*
09/26/2022	silver-haired bat	0	L03	carcass search	cleared full plot		dismembered	yes*
09/27/2022	eastern red bat	28	A01	carcass search	uncleared full plot		scavenged	yes*
09/27/2022	eastern red bat	16	F05	carcass search	cleared full plot		intact	yes*
09/27/2022	silver-haired bat	40	A01	carcass search	uncleared full plot		dismembered	yes*
09/27/2022	silver-haired bat	5	A01	carcass search	uncleared full plot		intact	yes*
09/27/2022	silver-haired bat	16	A01	carcass search	uncleared full plot		scavenged	yes*
09/27/2022	silver-haired bat	52	B04	carcass search	cleared full plot		scavenged	yes*
09/27/2022	silver-haired bat	46	B04	carcass search	cleared full plot		scavenged	yes*
09/27/2022	silver-haired bat	41	B04	carcass search	cleared full plot		scavenged	yes*
09/27/2022	silver-haired bat	57	B04	carcass search	cleared full plot		dismembered	yes*
09/27/2022	silver-haired bat	69	B04	carcass search	cleared full plot		scavenged	yes*
09/27/2022	silver-haired bat	24	F05	carcass search	cleared full plot		scavenged	yes*
09/29/2022	eastern red bat	63	G05	carcass search	cleared full plot		scavenged	yes*
09/29/2022	eastern red bat	44	L03	carcass search	cleared full plot		injured	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/29/2022	silver-haired bat	65	G05	carcass search	cleared full plot		scavenged	yes*
09/29/2022	silver-haired bat	35	G05	carcass search	cleared full plot		intact	yes*
09/29/2022	silver-haired bat	63	G05	carcass search	cleared full plot		dismembered	yes*
09/29/2022	silver-haired bat	53	J01	carcass search	uncleared full plot		dismembered	yes*
09/29/2022	silver-haired bat	79	L01	carcass search**	uncleared full plot		dismembered	yes*
09/29/2022	silver-haired bat	66	L03	carcass search	cleared full plot		scavenged	yes*
09/29/2022	silver-haired bat	74	L03	carcass search**	cleared full plot		dismembered	yes*
09/30/2022	eastern red bat	64	A01	carcass search	uncleared full plot		scavenged	yes*
09/30/2022	eastern red bat	49	B03	carcass search	road and pad		injured	no
09/30/2022	eastern red bat	66	F06	carcass search	uncleared full plot		scavenged	yes*
09/30/2022	eastern red bat	44	F06	carcass search	uncleared full plot		scavenged	yes*
09/30/2022	silver-haired bat	52	B04	carcass search	cleared full plot		intact	yes*
09/30/2022	silver-haired bat	15	F06	carcass search	uncleared full plot		scavenged	yes*
10/03/2022	silver-haired bat	62	G05	carcass search	cleared full plot		dismembered	yes*
10/03/2022	silver-haired bat	53	J01	carcass search	uncleared full plot		dismembered	yes*
10/03/2022	silver-haired bat	66	L03	carcass search	cleared full plot		scavenged	yes*
10/03/2022	silver-haired bat	69	L03	carcass search	cleared full plot		dismembered	yes*
10/04/2022	eastern red bat	76	A01	carcass search**	uncleared full plot		scavenged	yes*
10/04/2022	eastern red bat	49	B04	carcass search	cleared full plot		intact	yes*
10/04/2022	eastern red bat	55	C03	carcass search	road and pad		injured	no
10/04/2022	eastern red bat	66	F05	carcass search	cleared full plot		dismembered	yes*
10/04/2022	silver-haired bat	49	A01	carcass search	uncleared full plot		scavenged	yes*
10/04/2022	silver-haired bat	24	B04	carcass search	cleared full plot		intact	yes*
10/04/2022	silver-haired bat	58	F05	carcass search	cleared full plot		scavenged	yes*
10/05/2022	eastern red bat	48	F06	carcass search	uncleared full plot		scavenged	yes*
10/05/2022	eastern red bat	17	F06	carcass search	uncleared full plot		dismembered	yes*
10/05/2022	eastern red bat	75	L01	carcass search**	uncleared full plot		scavenged	yes*
10/05/2022	eastern red bat	74	L01	carcass search**	uncleared full plot		scavenged	yes*
10/05/2022	hoary bat	18	F06	carcass search	uncleared full plot		scavenged	yes*
10/05/2022	silver-haired bat	40	F06	carcass search	uncleared full plot		scavenged	yes*
10/05/2022	silver-haired bat	57	F06	carcass search	uncleared full plot		scavenged	yes*
10/06/2022	silver-haired bat	9	G05	carcass search	cleared full plot		dismembered	yes*
10/06/2022	silver-haired bat	6	G05	carcass search	cleared full plot		dismembered	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
10/06/2022	silver-haired bat	58	L01	carcass search	uncleared full plot		dismembered	yes*
10/07/2022	hoary bat	35	F06	carcass search	uncleared full plot		dismembered	yes*
10/07/2022	silver-haired bat	41	A01	carcass search	uncleared full plot		intact	yes*
10/07/2022	silver-haired bat	49	F06	carcass search	uncleared full plot		scavenged	yes*
10/07/2022	silver-haired bat	36	F06	carcass search	uncleared full plot		injured	yes*
10/10/2022	eastern red bat	42	J01	carcass search	uncleared full plot		scavenged	yes*
10/10/2022	eastern red bat	53	J01	carcass search	uncleared full plot		dismembered	yes*
10/10/2022	silver-haired bat	20	G05	carcass search	cleared full plot		dismembered	yes*
10/10/2022	silver-haired bat	2	G07	carcass search	road and pad		scavenged	no
10/10/2022	silver-haired bat	67	L01	carcass search	uncleared full plot		dismembered	yes*
10/10/2022	silver-haired bat	68	L03	carcass search	cleared full plot		injured	yes*
10/11/2022	eastern red bat	51	A01	carcass search	uncleared full plot		dismembered	yes*
10/11/2022	silver-haired bat	49	A01	carcass search	uncleared full plot		dismembered	yes*
10/11/2022	silver-haired bat	54	B04	carcass search	cleared full plot		intact	yes*
10/11/2022	unidentified bat	22	A01	carcass search	uncleared full plot		dismembered	yes*
10/13/2022	silver-haired bat	55	G05	carcass search	cleared full plot		scavenged	yes*
10/13/2022	silver-haired bat	40	G05	carcass search	cleared full plot		scavenged	yes*
04/27/2022	northern shoveler	13	E01	carcass search**	road and pad		intact	no
05/09/2022	warbling vireo	21	H08	carcass search	road and pad		intact	no
08/08/2022	turkey vulture	86	H06a	carcass search	road and pad		dismembered	no
08/24/2022	cliff swallow	13	B04	carcass search	cleared full plot		intact	yes*
08/24/2022	horned lark	52	B04	carcass search	cleared full plot		intact	yes*
08/26/2022	unidentified small bird	9	G05	carcass search	cleared full plot		dismembered	yes*
08/26/2022	yellow-rumped warbler	64	A04	carcass search	road and pad		intact	no
08/27/2022	unidentified passerine	38	F05	carcass search	cleared full plot		scavenged	yes*
08/30/2022	unidentified large bird	61	F05	carcass search	cleared full plot		feather spot	yes*
09/02/2022	Lapland longspur	29	F05	carcass search	cleared full plot		scavenged	yes*
09/06/2022	Tennessee warbler	31	L01	carcass search	uncleared full plot		dismembered	yes*
09/06/2022	unidentified passerine	61	L03	carcass search	cleared full plot		dismembered	yes*
09/06/2022	yellow-billed cuckoo	45	L01	carcass search	uncleared full plot		scavenged	yes*
09/07/2022	American redstart	44	B04	carcass search	cleared full plot		dismembered	yes*
09/07/2022	red-eyed vireo	15	A01	carcass search	uncleared full plot		dismembered	yes*
09/07/2022	red-eyed vireo	26	B04	carcass search	cleared full plot		scavenged	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
09/07/2022	red-eyed vireo	61	F05	carcass search	cleared full plot		scavenged	yes*
09/07/2022	Tennessee warbler	50	B04	carcass search	cleared full plot		dismembered	yes*
09/07/2022	unidentified passerine	40	B04	carcass search	cleared full plot		feather spot	yes*
09/08/2022	unidentified passerine	56	L03	carcass search	cleared full plot		dismembered	yes*
09/08/2022	unidentified warbler	38	L03	carcass search	cleared full plot		scavenged	yes*
09/09/2022	unidentified flycatcher	67	G05	carcass search	cleared full plot		scavenged	yes*
09/09/2022	unidentified passerine	29	B04	carcass search	cleared full plot		scavenged	yes*
09/09/2022	unidentified passerine	75	G05	carcass search**	cleared full plot		scavenged	yes*
09/09/2022	unidentified warbler	36	L03	incidental	cleared full plot		dismembered	yes*
09/13/2022	horned lark	16	F05	carcass search	cleared full plot		dismembered	yes*
09/13/2022	horned lark	16	F05	carcass search	cleared full plot		dismembered	yes*
09/13/2022	red-eyed vireo	56	L03	carcass search	cleared full plot		dismembered	yes*
09/13/2022	Tennessee warbler	41	J01	carcass search	uncleared full plot		scavenged	yes*
09/13/2022	unidentified wren	49	G05	carcass search	cleared full plot		intact	yes*
09/15/2022	red-eyed vireo	31	G05	carcass search	cleared full plot		scavenged	yes*
09/16/2022	horned lark	9	F05	carcass search	cleared full plot		dismembered	yes*
09/16/2022	horned lark	32	F05	carcass search	cleared full plot		scavenged	yes*
09/20/2022	Lapland longspur	22	F05	carcass search	cleared full plot		scavenged	yes*
09/22/2022	chestnut-sided warbler	55	H06a	carcass search	road and pad		scavenged	no
09/23/2022	chestnut-sided warbler	23	B04	carcass search	cleared full plot		dismembered	yes*
09/23/2022	magnolia warbler	44	F05	carcass search	cleared full plot		scavenged	yes*
09/26/2022	yellow-billed cuckoo	67	L03	carcass search	cleared full plot		scavenged	yes*
09/29/2022	golden-crowned kinglet	69	L03	carcass search	cleared full plot		scavenged	yes*
09/29/2022	red-breasted nuthatch	66	G05	carcass search	cleared full plot		scavenged	yes*
09/30/2022	horned lark	5	F05	carcass search	cleared full plot		injured	yes*
09/30/2022	killdeer	61	F05	carcass search	cleared full plot		dismembered	yes*
09/30/2022	unidentified small bird	55	F06	carcass search	uncleared full plot		feather spot	yes*
10/03/2022	ruby-crowned kinglet	58	L03	carcass search	cleared full plot		scavenged	yes*
10/03/2022	ruby-crowned kinglet	43	L03	carcass search	cleared full plot		scavenged	yes*
10/03/2022	unidentified passerine	58	L03	carcass search	cleared full plot		dismembered	yes*
10/03/2022	unidentified small bird	55	G05	carcass search	cleared full plot		dismembered	yes*
10/03/2022	unidentified small bird	57	L03	carcass search	cleared full plot		dismembered	yes*
10/04/2022	American redstart	35	A01	carcass search	uncleared full plot		dismembered	yes*

Appendix A. Complete listing of carcasses found at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Found Date	Species	Distance from Turbine	Turbine	Search Type	Search Area	Type	Physical Condition	Aided Search
10/04/2022	black-throated blue warbler	9	B04	carcass search	cleared full plot		scavenged	yes*
10/04/2022	Tennessee warbler	8	F04	carcass search	road and pad		scavenged	no
10/04/2022	unidentified passerine	44	A01	carcass search	uncleared full plot		feather spot	yes*
10/05/2022	unidentified passerine	15	L01	carcass search	uncleared full plot		dismembered	yes*
10/05/2022	unidentified passerine	41	L01	carcass search	uncleared full plot		dismembered	yes*
10/07/2022	American redstart	69	B04	carcass search	cleared full plot		dismembered	yes*
10/07/2022	unidentified passerine	64	B04	carcass search	cleared full plot		dismembered	yes*
10/07/2022	unidentified small bird	49	F06	carcass search	uncleared full plot		feather spot	yes*
10/10/2022	golden-crowned kinglet	53	G05	carcass search	cleared full plot		intact	yes*
10/10/2022	unidentified passerine	71	L03	carcass search**	cleared full plot		scavenged	yes*
10/11/2022	unidentified passerine	12	F04	carcass search	road and pad		dismembered	no
10/13/2022	golden-crowned kinglet	72	L03	carcass search**	cleared full plot		scavenged	yes*
10/13/2022	unidentified warbler	77	L03	carcass search**	cleared full plot		dismembered	yes*
10/14/2022	golden-crowned kinglet	66	B04	carcass search	cleared full plot		scavenged	yes*

* dog assisted search.

** Carcass was found outside the search area

Appendix B. Searcher Efficiency, Carcass Persistence and Truncated Weighted Likelihood Area Adjustment Estimate Model Fitting Results

Appendix B1. Searcher efficiency models for bats from the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022 (n = 60).

Covariates	k Value	AICc	Delta AICc
No Covariates	k fixed at 0.67	49.19	0*
Plot Search Type BT	k fixed at 0.67	50.58	1.39

* Selected model

AICc = Corrected Akaike Information Criterion

Delta AICc = Change in AICc

Appendix B2. Searcher efficiency models for bats from the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022 (n = 62).

Covariates	k Value	AICc	Delta AICc
No Covariates	k fixed at 0.67	36.83	0*
Season	k fixed at 0.67	37.28	0.45

* Selected model

AICc = Corrected Akaike Information Criterion

Delta AICc = Change in AICc

Appendix B3. Carcass persistence models with covariates and distributions for bats at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022 (n = 61).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Plot Search Type	No Covariates	Weibull	263.90	0
Season	No Covariates	Weibull	265.69	1.79*
Season + Plot Search Type	No Covariates	Weibull	265.78	1.88
No Covariates	No Covariates	Weibull	266.09	2.19
Plot Search Type	No Covariates	lognormal	266.55	2.65
No Covariates	No Covariates	lognormal	267.01	3.11
Season	No Covariates	lognormal	267.34	3.44
Plot Search Type	No Covariates	loglogistic	267.45	3.55
No Covariates	No Covariates	loglogistic	267.83	3.93
Season	Season	Weibull	267.89	3.99
No Covariates	Season	Weibull	268.10	4.20
Season + Plot Search Type	Season	Weibull	268.23	4.33
Plot Search Type	Plot Search Type	Weibull	268.36	4.46
Season	No Covariates	loglogistic	268.53	4.63
Season + Plot Search Type	No Covariates	lognormal	268.58	4.68
No Covariates	Plot Search Type	Weibull	268.61	4.71
No Covariates	Season	lognormal	268.99	5.09
No Covariates	Plot Search Type	lognormal	269.38	5.48
Season	Season	lognormal	269.46	5.56
Plot Search Type	-	exponential	269.60	5.70
Season + Plot Search Type	No Covariates	loglogistic	269.66	5.76
No Covariates	Season	loglogistic	269.94	6.04
Season + Plot Search Type	Plot Search Type	Weibull	270.44	6.54
No Covariates	Plot Search Type	loglogistic	270.53	6.63
Plot Search Type	Plot Search Type	lognormal	270.57	6.67
Plot Search Type	Season + Plot Search Type	Weibull	270.69	6.79
Season	Season	loglogistic	270.74	6.84
No Covariates	Season + Plot Search Type	Weibull	270.86	6.96
Season + Plot Search Type	Season	lognormal	270.97	7.07
Season + Plot Search Type	-	exponential	271.13	7.23
Season	Season + Plot Search Type	Weibull	271.46	7.56
Plot Search Type	Plot Search Type	loglogistic	271.60	7.70

Appendix B3. Carcass persistence models with covariates and distributions for bats at the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022 (n = 61).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
No Covariates	Season + Plot Search Type	lognormal	271.75	7.85
Season + Plot Search Type	Season	loglogistic	272.11	8.21
Season + Plot Search Type	Plot Search Type	lognormal	272.81	8.91
No Covariates	Season + Plot Search Type	loglogistic	272.86	8.96
Season	Season + Plot Search Type	lognormal	272.97	9.07
Season + Plot Search Type	Season + Plot Search Type	Weibull	273.02	9.12
Plot Search Type	Season + Plot Search Type	lognormal	273.12	9.22
Season	-	exponential	273.32	9.42
Season + Plot Search Type	Plot Search Type	loglogistic	274.01	10.11
Plot Search Type	Season + Plot Search Type	loglogistic	274.11	10.21
Season	Season + Plot Search Type	loglogistic	274.32	10.42
No Covariates	-	exponential	275.40	11.50
Season + Plot Search Type	Season + Plot Search Type	lognormal	275.46	11.56
Season + Plot Search Type	Season + Plot Search Type	loglogistic	276.60	12.70

* Selected model

AICc = Corrected Akaike Information Criterion

Delta AICc = Change in AICc

Appendix B4. Carcass persistence top models with covariates, distributions, and model parameters for the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Season	Distribution	Predicted Median Removal Times (days)	Parameter 1	Parameter 2
Fall	Weibull*	5.79	shape = 0.6916	scale = 9.8355
Spring	Weibull*	2.74	shape = 0.6916	scale = 4.6553

* Parameterization follows the base R parameterization for this distribution.

Appendix B5. Number and percent (%) of bat carcasses by species included and excluded from analysis at the Ford County Wind Farm Project in Ford County, Illinois from April 1 to October 15, 2022.

Species	Included in Fatality Estimate		Outside Search Area*		Outside Study Period*		Other		Total	
	Total	%	Total	%	Total	%	Total	%	Total	%
silver-haired bat	150	46.73	4	23.53	1	12.50	0	0	155	44.80
eastern red bat	120	37.38	11	64.71	5	62.50	0	0	136	39.31
hoary bat	31	9.66	1	5.88	0	0	0	0	32	9.25
big brown bat	8	2.49	1	5.88	1	12.50	0	0	10	2.89
eastern red bat or Seminole bat	4	1.25	0	0	0	0	0	0	4	1.16
Seminole bat	3	0.93	0	0	0	0	0	0	3	0.87
unidentified lasiurus bat	3	0.93	0	0	0	0	0	0	3	0.87
unidentified non-myotis	1	0.31	0	0	1	12.50	0	0	2	0.58
unidentified bat	1	0.31	0	0	0	0	0	0	1	0.29
Overall Bats	321	100	17	100	8	100	0	0	346	100

* Carcasses not included in analysis

Appendix B6. Search area adjustment models for bats from the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022.

Distribution	AICc	Delta AICc
Gompertz	13,600.42	0*
normal	13,866.75	266.33
Weibull	14,054.20	453.78
gamma	14,335.43	735.01

* Selected model

Appendix B7. Truncated weighted maximum likelihood search area adjustment estimates for the Ford County Wind Farm Project in Ford County, Illinois, from April 1 to October 15, 2022 (n = 321).

Search Area Type	Distribution	Parameter 1	Parameter 2	Area Adjustment
cleared full plot	Gompertz	0.0633	0.0029	0.99
uncleared full plot	Gompertz	0.0633	0.0029	0.97
road and pad	Gompertz	0.0633	0.0029	0.05

**Appendix C. Inputs for Single Class and Multiple Class Modules in Evidence of Absence
for 2022**

Appendix C1. Inputs needed to run Evidence of Absence (EoA): Single Class Module for the Ford County Wind Farm Project in Ford County, Illinois, from April 1 – May 15 (spring), and August 1 – October 15 (fall), 2022..

Season	Plot Type	Search interval (I)	Number of searches ²	Spatial Coverage (a)	Searcher Efficiency		Carcass Persistence ¹			
					Carcasses available	Carcasses found	Shape (α)	Scale (β)	Scale Lower Limit (β)	Scale UpperLimit (β)
spring	100-m road and pad	7	8	0.05	62	57	0.69	4.66	2.19	9.89
fall	100-m road and pad	3.5	22	0.05	62	57	0.69	9.84	6.25	15.52
fall	70-m cleared	3.5	22	0.99	60	52	0.69	9.84	6.24	15.52
fall	70-m uncleared	3.5	20	0.97	60	52	0.69	9.84	6.24	15.52

^{1.} A Weibull distribution was used for all plot types carcass persistence distribution.

^{2.} Includes one additional search beyond what was conducted in the field to account for the EoA GUI assumption that a clearing search is included in the number of searches.

m = meters.

Appendix C2. Inputs needed to run Evidence of Absence: Multiple Class Module for the calculation of seasonal detection probabilities at Ford County Wind Farm Project in Ford County, Illinois, from April 1 – May 15 (spring) and August 1 – October 15 (fall), 2022

Season	Plot Type	Ba	Bb	Within-season Sampling Fraction (DWP)
Spring	100-m road and pad	29.4151	1,286.888	1
Fall	70-m cleared	101.1105	44.7952	0.093
Fall	70-m uncleared	100.5314	47.5039	0.093
Fall	100-m road and pad	322.8954	8,725.0211	0.814

Appendix C3. Inputs needed to run Evidence of Absence: Multiple Class Module for the classification of the annual detection probability at Ford County Wind Farm Project in Ford County, Illinois, from April 1 – May 15 (spring), and August 1 – October 15 (fall), 2022.

Season	Ba	Bb	Sampling factor	Temporal Coverage (v)	Weights (p)
spring	29.415	1,286.888			0.11
fall	747.12	4,021.22			0.89

Appendix C4. Inputs needed to run Evidence of Absence: Multiple Years Module for the Ford County Wind Farm Project in Ford County, Illinois from 2022.

Year	g	90% Confidence Interval	Ba	Bb	Weights (p)
2022	0.141	(0.134–0.149)	780.12	4717.41	1.0

EoA, v2.0.7 - Single Class Module

Edit Help

Detection Probability (g)

Search Schedule

Start of monitoring (yyyy-mm-dd)

Formula

Search interval (I)

Number of searches

Custom

span = 182, I (mean) = 7

Spatial coverage (a)

Temporal coverage (v)

Searcher Efficiency

Carcasses available for several searches

95% CI: $p \in [0.532, 0.673]$, $k \in [0.656, 0.816]$

$\hat{p} = 0.62$, $k = 0.737$

Carcasses removed after one search

Carcasses available

Carcasses found

$\hat{p} = 0.919$ with 95% CI = [0.832, 0.969]

Factor by which searcher efficiency changes with each search (k)

Persistence Distribution

Use field trials to estimate parameters

Distribution: Lognormal with shape (α) = 4.078 and scale (β) = 1.171

$r = 0.531$ for $lr = 7$, with 95% CI: $r \in [0.421, 0.643]$, $\beta \in [0.488, 1.854]$

Enter parameter estimates manually

Parameters

Exponential

Weibull

Log-Logistic

Lognormal

shape (α)

scale (β) lwr upr

$r = 0.486$ for $lr = 7$, with 95% CI: $r \in [0.32, 0.641]$

Fatality estimation (M, λ)

Carcass Count (X) One-sided CI (M*) Two-sided CI

Credibility level (1 - α)

Estimated detection probability (g)

Summary statistics for estimation of detection probability (g)

Results:

Full site for full year

Estimated g = 0.0227, 95% CI = [0.0152, 0.0315]

Fitted beta distribution parameters for estimated g: Ba = 28.7621, Bb = 1240.8827

Full site for monitored period, 01-Apr-2022 through 27-May-2022

Estimated g = 0.0227, 95% CI = [0.0152, 0.0315]

Fitted beta distribution parameters for estimated g: Ba = 28.7621, Bb = 1240.8827

Temporal coverage (Within year) = 1

Searched area for monitored period, 01-Apr-2022 through 27-May-2022

Estimated g = 0.453, 95% CI = [0.297, 0.614]

Fitted beta distribution parameters for estimated g: Ba = 16.4563, Bb = 19.8734

Input:

Search parameters

trial carcasses placed = 62, carcasses found = 57

estimated searcher efficiency: $p = 0.919$, 95% CI = [0.832, 0.969]

$k = 0.67$

Search schedule: Search interval (I) = 7, number of searches = 8, span = 56

spatial coverage: 0.05 temporal coverage: 1

Carcass persistence:

Weibull persistence distribution

shape (α) = 0.69 and scale (β) = 4.66

95% CI $\beta = [2.19, 9.89]$

$r = 0.486$ for $lr = 7$ with 95% CI = [0.32, 0.641]

Parameters entered manually

Uniform arrivals

Appendix C5. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Spring 2022, 100-meter road and pad searches at 43 turbines with a 63-m blade length, searched at a 7-day interval.

EoA, v2.0.7 - Single Class Module

Edit Help

Detection Probability (g)

Search Schedule

Start of monitoring (yyyy-mm-dd)

Formula

Search interval (I)

Number of searches

Custom

span = 182, I (mean) = 7

Spatial coverage (a)

Temporal coverage (v)

Searcher Efficiency

Carcasses available for several searches

95% CI: $p \in [0.532, 0.673]$, $k \in [0.656, 0.816]$

$\hat{p} = 0.62$, $\hat{k} = 0.737$

Carcasses removed after one search

Carcasses available

Carcasses found

$\hat{p} = 0.867$, with 95% CI = [0.764, 0.935]

Factor by which searcher efficiency changes with each search (k)

Persistence Distribution

Use field trials to estimate parameters

Distribution: Lognormal with shape (α) = 4.078 and scale (β) = 1.171

$r = 0.653$ for $I_r = 3.5$, with 95% CI: $r \in [0.549, 0.771]$, $\beta \in [0.488, 1.854]$

Enter parameter estimates manually

Parameters

Exponential

Weibull

Log-Logistic

Lognormal

shape (α)

scale (β) lwr upr

$r = 0.755$ for $I_r = 3.5$, with 95% CI: $r \in [0.683, 0.813]$

Fatality estimation (M, λ)

Carcass Count (X) One-sided CI (M*) Two-sided CI

Credibility level (1 - α)

Estimated detection probability (g)

```

Summary statistics for estimation of detection probability (g)
=====
Results:

Full site for full year
  Estimated g = 0.692, 95% CI = [0.615, 0.764]
  Fitted beta distribution parameters for estimated g: Ba = 101.1575, Bb = 45.0832

Full site for monitored period, 01-Aug-2022 through 17-Oct-2022
  Estimated g = 0.692, 95% CI = [0.615, 0.764]
  Fitted beta distribution parameters for estimated g: Ba = 101.1575, Bb = 45.0832
  Temporal coverage (within year) = 1

Searched area for monitored period, 01-Aug-2022 through 17-Oct-2022
  Estimated g = 0.699, 95% CI = [0.621, 0.771]
  Fitted beta distribution parameters for estimated g: Ba = 98.8147, Bb = 42.6104

=====
Input:
Search parameters
  trial carcasses placed = 60, carcasses found = 52
  estimated searcher efficiency: p = 0.867, 95% CI = [0.764, 0.935]
  k = 0.67
  Search schedule: Search interval (I) = 3.5, number of searches = 22, span = 77
  spatial coverage: 0.99   temporal coverage: 1

Carcass persistence:
Weibull persistence distribution
  shape (alpha) = 0.69 and scale (beta) = 9.84
  95% CI beta = [6.24, 15.52]
  r = 0.755 for I_r = 3.5 with 95% CI = [0.683, 0.813]
  Parameters entered manually
Uniform arrivals

```

Appendix C6. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Fall 2022, 70-meter cleared plot searches at four turbines with a 63-m blade length, searched at a 3.5-day interval.

EoA, v2.0.7 - Single Class Module

Edit Help

Detection Probability (g)

Search Schedule

Start of monitoring (yyyy-mm-dd)

Formula

Search interval (I)

Number of searches

Custom

span = 182, I (mean) = 7

Spatial coverage (a)

Temporal coverage (v)

Searcher Efficiency

Carcasses available for several searches

95% CI: $p \in [0.532, 0.673]$, $k \in [0.656, 0.816]$

$\hat{p} = 0.62$, $\hat{k} = 0.737$

Carcasses removed after one search

Carcasses available

Carcasses found

$\hat{p} = 0.867$, with 95% CI = [0.764, 0.935]

Factor by which searcher efficiency changes with each search (k)

Persistence Distribution

Use field trials to estimate parameters

Distribution: Lognormal with shape (α) = 4.078 and scale (β) = 1.171

$r = 0.653$ for $Ir = 3.5$, with 95% CI: $r \in [0.549, 0.771]$, $\beta \in [0.488, 1.854]$

Enter parameter estimates manually

Parameters

Exponential

Weibull

Log-Logistic

Lognormal

shape (α)

scale (β) lwr upr

$r = 0.755$ for $Ir = 3.5$, with 95% CI: $r \in [0.683, 0.813]$

Fatality estimation (M, λ)

Carcass Count (X) One-sided CI (M*) Two-sided CI

Credibility level (1 - α)

Estimated detection probability (g)

Summary statistics for estimation of detection probability (g)

Results:

Full site for full year

Estimated $g = 0.679$, 95% CI = [0.6, 0.753]

Fitted beta distribution parameters for estimated g : $Ba = 95.0792$, $Bb = 44.9569$

Full site for monitored period, 01-Aug-2022 through 10-Oct-2022

Estimated $g = 0.679$, 95% CI = [0.6, 0.753]

Fitted beta distribution parameters for estimated g : $Ba = 95.0792$, $Bb = 44.9569$

Temporal coverage (within year) = 1

Searched area for monitored period, 01-Aug-2022 through 10-Oct-2022

Estimated $g = 0.7$, 95% CI = [0.618, 0.776]

Fitted beta distribution parameters for estimated g : $Ba = 88.7018$, $Bb = 38.0217$

Input:

Search parameters

trial carcasses placed = 60, carcasses found = 52

estimated searcher efficiency: $p = 0.867$, 95% CI = [0.764, 0.935]

$k = 0.67$

Search schedule: Search interval (I) = 3.5, number of searches = 20, span = 70

spatial coverage: 0.97 temporal coverage: 1

Carcass persistence:

Weibull persistence distribution

shape (α) = 0.69 and scale (β) = 9.84

95% CI β = [6.24, 15.52]

$r = 0.755$ for $Ir = 3.5$ with 95% CI = [0.683, 0.813]

Parameters entered manually

Uniform arrivals

Appendix C7. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Fall 2022, 70-meter uncleared plot searches at four turbines with a 63-m blade length, searched at a 3.5-day interval.

EoA, v2.0.7 - Single Class Module

Edit Help

Detection Probability (g)

Search Schedule

Start of monitoring (yyyy-mm-dd)

Formula

Search interval (I)

Number of searches

Custom

span = 182, I (mean) = 7

Spatial coverage (a)

Temporal coverage (v)

Searcher Efficiency

Carcasses available for several searches

95% CIs: $p \in [0.532, 0.673]$, $k \in [0.656, 0.816]$

$\hat{p} = 0.62$, $\hat{k} = 0.737$

Carcasses removed after one search

Carcasses available

Carcasses found

$\hat{p} = 0.919$, with 95% CI = [0.832, 0.969]

Factor by which searcher efficiency changes with each search (k)

Persistence Distribution

Use field trials to estimate parameters

Distribution: Lognormal with shape (α) = 4.078 and scale (β) = 1.171

$r = 0.653$ for $I_r = 3.5$, with 95% CIs: $r = [0.549, 0.771]$, $\beta = [0.488, 1.854]$

Enter parameter estimates manually

Parameters

Exponential

Weibull

Log-Logistic

Lognormal

shape (α)

scale (β) lwr upr

$r = 0.755$ for $I_r = 3.5$, with 95% CI: $r \in [0.683, 0.813]$

Fatality estimation (M, λ)

Carcass Count (X) One-sided CI (M*) Two-sided CI

Credibility level (1 - α)

Estimated detection probability (g)

Summary statistics for estimation of detection probability (g)

Results:

Full site for full year

Estimated $g = 0.0361$, 95% CI = [0.0326, 0.0396]

Fitted beta distribution parameters for estimated g : $B_a = 390.5014$, $B_b = 10441.5305$

Full site for monitored period, 01-Aug-2022 through 17-Oct-2022

Estimated $g = 0.0361$, 95% CI = [0.0326, 0.0396]

Fitted beta distribution parameters for estimated g : $B_a = 390.5004$, $B_b = 10441.5324$

Temporal coverage (within year) = 1

Searched area for monitored period, 01-Aug-2022 through 17-Oct-2022

Estimated $g = 0.721$, 95% CI = [0.648, 0.788]

Fitted beta distribution parameters for estimated g : $B_a = 112.3105$, $B_b = 43.4559$

Input:

Search parameters

trial carcasses placed = 62, carcasses found = 57

estimated searcher efficiency: $p = 0.919$, 95% CI = [0.832, 0.969]

$k = 0.67$

Search schedule: Search interval (I) = 3.5, number of searches = 22, span = 77

spatial coverage: 0.05 temporal coverage: 1

Carcass persistence:

Weibull persistence distribution

shape (α) = 0.69 and scale (β) = 9.84

95% CI $\beta = [6.24, 15.52]$

$r = 0.755$ for $I_r = 3.5$ with 95% CI = [0.683, 0.813]

Parameters entered manually

Uniform arrivals

Appendix C8. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Fall 2022, 100-meter road and pad searches at 35 turbines with a 63-m blade length, searched at a 3.5-day interval.

EoA, v2.0.7 - Multiple Class Module

Edit Help

Options

Overall

Estimate total mortality (M)

Credibility level (1 - α)

One-sided CI (M^*)

Two-sided CI

Estimate overall detection probability (g)

Individual classes

Calculate g parameters from monitoring data

Enter g parameters manually

Actions

Add class Calculate Clear Close

Class	dwp	X	Ba	Bb	\hat{g}	95% CI
unsearched	0	0	---	---	0	[0, 0]
road and pad	1	0	29.4151	1286.888	0.02235	[0.0151, 0.031]

Estimated detection probability (g) for multiple classes

Summary statistics for multiple class estimate

Input: Detection probability, by search class

Search coverage = 1

Class	DWP	X	Ba	Bb	ghat	95% CI
unsearched	0	0	---	---	0	[0, 0]
road and pad	1	0	29.42	1287	0.022	[0.015, 0.031]

Results for full site

Detection probability

Estimated g = 0.022, 95% CI = [0.015, 0.031]

Fitted beta distribution parameters for estimated g: Ba = 29.4151, Bb = 1286.888

Mortality

Test of assumed relative weights (rho)

Class	Assumed	Fitted (95% CI)
unsearched	0.000	NA
road and pad	1.000	[1.000, 1.000]

p = 1 for likelihood ratio test of H0: assumed rho = true rho

Appendix C9. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for Spring 2022 searched at a 7-day interval.

EoA, v2.0.7 - Multiple Class Module

Edit Help

Options

Overall

Estimate total mortality (M)

Credibility level (1 - α)

One-sided CI (M*)

Two-sided CI

Estimate overall detection probability (g)

Individual classes

Calculate g parameters from monitoring data

Enter g parameters manually

Actions

Add class Calculate Clear Close

Class	dwp	X	Ba	Bb	\hat{g}	95% CI
unsearched	0	0	---	---	0	[0, 0]
FP - cleared	0.093	0	101.1105	44.7952	0.693	[0.616, 0.765]
FP - uncleared	0.093	0	100.5314	47.5039	0.6791	[0.602, 0.752]
Road and Pad	0.814	0	322.8954	8725.021	0.03569	[0.032, 0.0396]

Estimated detection probability (g) for multiple classes

Summary statistics for multiple class estimate

Input: Detection probability, by search class

Search coverage = 1

Class	DWP	X	Ba	Bb	ghat	95% CI
unsearched	0	0	---	---	0	[0, 0]
FP - cleared	0.093	0	101.1	44.8	0.693	[0.616, 0.765]
FP - uncleared	0.093	0	100.5	47.5	0.679	[0.602, 0.752]
Road and Pad	0.814	0	322.9	8725	0.036	[0.032, 0.040]

Results for full site

Detection probability

Estimated g = 0.157, 95% CI = [0.146, 0.167]

Fitted beta distribution parameters for estimated g: Ba = 747.1945, Bb = 4022.5251

Mortality

Test of assumed relative weights (rho)

Class	Assumed	Fitted (95% CI)
unsearched	0.000	NA
FP - cleared	0.093	[0.000, 0.741]
FP - uncleared	0.093	[0.000, 0.775]
Road and Pad	0.814	[0.038, 0.997]

p = 1 for likelihood ratio test of H0: assumed rho = true rho

Appendix C10. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for Fall 2022 searched at a 3.5-day interval.

EoA, v2.0.7 - Multiple Class Module

Edit Help

Options

Overall

Estimate total mortality (M)

Credibility level (1 - α)

One-sided CI (M*)

Two-sided CI

Estimate overall detection probability (g)

Individual classes

Calculate g parameters from monitoring data

Enter g parameters manually

Actions

Add class Calculate Clear Close

Class	dwp	X	Ba	Bb	\hat{g}	95% CI
unsearched	0	0	---	---	0	[0, 0]
Spring	0.11	0	29.41513	1286.888	0.02235	[0.0151, 0.031]
Fall	0.89	0	747.1241	4021.226	0.1567	[0.147, 0.167]

Estimated detection probability (g) for multiple classes

Summary statistics for multiple class estimate

Input: Detection probability, by search class
Search coverage = 1

Class	DWP	X	Ba	Bb	ghat	95% CI
unsearched	0	0	---	---	0	[0, 0]
Spring	0.11	0	29.42	1287	0.022	[0.015, 0.031]
Fall	0.89	0	747.1	4021	0.157	[0.147, 0.167]

Results for full site

Detection probability
Estimated g = 0.142, 95% CI = [0.133, 0.151]
Fitted beta distribution parameters for estimated g: Ba = 780.1413, Bb = 4717.4159

Mortality

Test of assumed relative weights (rho)

Class	Assumed	Fitted (95% CI)
unsearched	0.000	NA
Spring	0.110	[0.047, 0.999]
Fall	0.890	[0.001, 0.949]

p = 1 for likelihood ratio test of H0: assumed rho = true rho

Appendix C11. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for Spring and Fall 2022 searched at a 7-day interval in the spring and a 3.5-day interval in the fall.