

**Post-construction Monitoring Study for the
Indiana Crossroads Wind Farm
White County, Indiana**

Final Report

April 1 – May 15 and August 1 – October 15, 2023



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EXECUTIVE SUMMARY

Indiana Crossroads Wind Farm, LLC is operating the Indiana Crossroads Wind Farm (Project) in White County, Indiana. The Project became operational in 2021 and consists of 72 4.2-megawatt (MW) Vestas V150 wind turbines that have a 105-meter (m; 344-foot [ft]) hub height and a 150-m (492-ft) rotor diameter. This report details the second year of post-construction monitoring studies conducted in 2023, consistent with Section 6.6 of the Project's Habitat Conservation Plan (HCP) and the Incidental Take Permit (ITP; ESPer0036249) for Indiana bats and northern long-eared bats (Covered Species). Turbines were feathered below manufacturer cut-in speed (3.0 m [9.8 ft] per second) March 15–July 31 and October 16–November 15 and below 5.0 m (16.4 ft) per second in the fall (August 1–October 15) sunset to sunrise, when the temperature was above 10 degrees (°) Celsius (50 °Fahrenheit) to minimize direct impacts to Covered Species.

Post-construction monitoring was completed in accordance with the Project's Study Plan, which was approved by the US Fish and Wildlife Service on February 16, 2023. The Study Plan was designed to achieve a probability of detection, or *g*, of 0.20. The overall goal of this post-construction 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 framework as outlined in the HCP and provide the necessary data to determine if adaptive management is triggered.

Standardized carcass searches were completed for bat carcasses at three plot types: cleared plots, uncleared plots, and roads and pads. Technicians searched all 72 turbines as roads and pads to a distance of 100-m (328 ft) from the turbine, weekly during the spring (April 1 – May 15). In the fall (August 1 – October 15), a technician searched 53 turbines as roads and pads to a distance of 100-m from the turbine, weekly. Detection-dog teams searched 10 turbines as cleared plots with a 70-m (230-ft) radius and nine turbines as uncleared plots with a 70-m radius, twice weekly during the fall. Cleared turbine plots were typically located in agricultural fields cleared of corn or soybeans and uncleared plots were located in soybean fields. Searcher efficiency and carcass persistence trials were also conducted across plot types during each season to correct for detection and scavenger bias.

No Covered Species were found at the Project. Four evening bats, a state-listed endangered species, were documented at the Project on August 8 and 11, and October 6 and 9. Six hundred sixty bats were found during the study. The most commonly found bat species were eastern red bat (362 carcasses; 54.8%) and silver-haired bat (146 carcasses; 22.1%), followed by big brown bat (82 carcasses; 12.4%) and hoary bat (*Lasiurus cinereus*; 60 carcasses; 9.1%). The overall *g* value for 2023 was 0.277 (95% CI: 0.255–0.299). The EoA model estimated the median annual take rate at the Project across 2022–2023 was 0.51 Indiana bats and 0.51 northern long-eared bats. No adaptive management was triggered.

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INTRODUCTION

Indiana Crossroads Wind Farm, LLC (Indiana Crossroads), a subsidiary of Northern Indiana Public Service Company, is operating the Indiana Crossroads Wind Farm (Project) in White County, Indiana. Indiana Crossroads obtained an Incidental Take Permit (ITP; ESPE0036249) 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 March 2, 2022. Post-construction 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 monitoring study designed to achieve a probability of detection, or *g*, of 0.20 to be consistent with the Project's Habitat Conservation Plan (HCP). The objectives of this study were to: estimate take of Covered Species using the Evidence of Absence 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 second year of the post-construction monitoring conducted at the Project from April 1 – May 15 and August 1 – October 15, 2023.

PERMIT AREA

The Project is located in White County, Indiana, 1.1 kilometer (0.7 mile) southwest of Reynolds, Indiana (Figure 1). The Project's Permit Area, defined as the Project's leased lands in which all turbines are located, covers approximately 13,259 hectares (32,763 acres). Approximately 95% of the Permit Area is composed of cultivated cropland and developed areas.

The Project became fully operational in December 2021 and consists of 72 4.2-megawatt (MW) Vestas 150 wind turbines that have a 105-meter (m; 344-foot [ft]) hub height and a 150-m (492-ft) rotor diameter. All turbines are within the migratory range of the Covered Species. During the spring, summer, and fall, Indiana Crossroads adjusted turbine operations to minimize impacts to the Covered Species (Table 1).

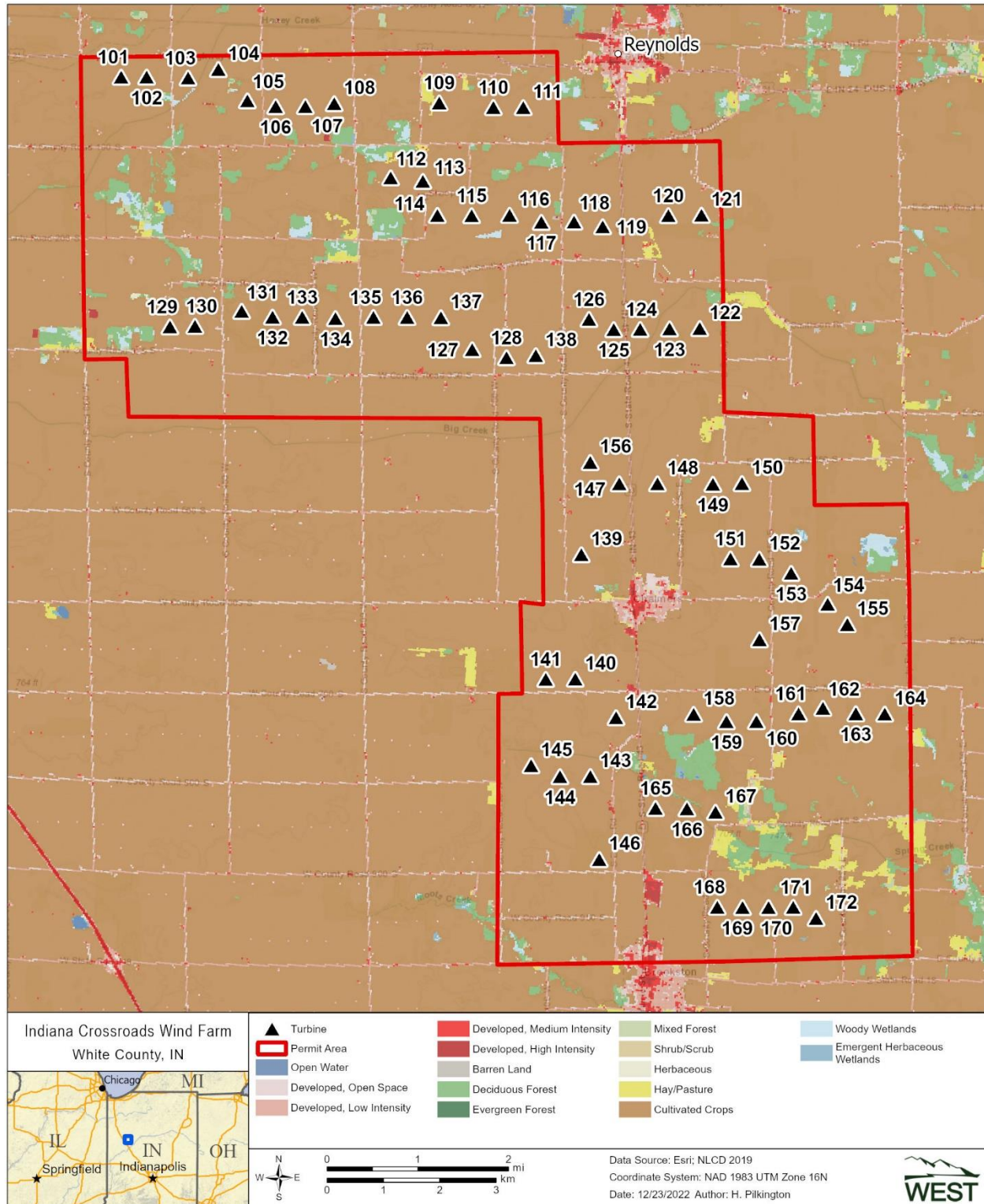


Figure 1. Turbine locations at the Indiana Crossroads Wind Farm, White County, Indiana.

Table 1. Seasonal curtailment regime at the Indiana Crossroads Wind Farm, White County, Indiana.

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

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

^b Turbines will be feathered below cut-in when temperatures are above the threshold.

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

METHODS

To meet the monitoring commitments in the HCP, WEST developed a Study Plan that targeted a *g* value of 0.20 using publicly available values for searcher efficiency, carcass persistence, and area correction from data collected at the Project (Rodriguez et al. 2023). WEST submitted a study plan to the USFWS on January 30, 2023; the study plan was approved by USFWS on February 16, 2023 (J. Kemnitz, USFWS, pers. comm.).

Standardized Carcass Searches

Number of Turbines Sampled, Search Frequency, and Plot Size

Technicians and detection-dog teams conducted standardized carcass searches from April 1 – May 15 and August 1 – October 15, 2023. Search effort varied by season (Table 2, Figure 2) and was designed to maximize effort when take of the Covered Species was considered most likely to occur.

Table 2. Search effort by season and plot type at the Indiana Crossroads Wind Farm, White County, Indiana.

Season	Plot Type	Search Interval	Number of Turbines	Search Team
Spring (April 1 – May 15)	100-m road and pad	7 days	72	Technician
	70-m cleared plot	3.5 days	10	Detection-dog
Fall (August 1 – October 15)	70-m uncleared plot	3.5 days	9	Detection-dog
	100-m road and pad	7 days	53	Technician

m = meter.

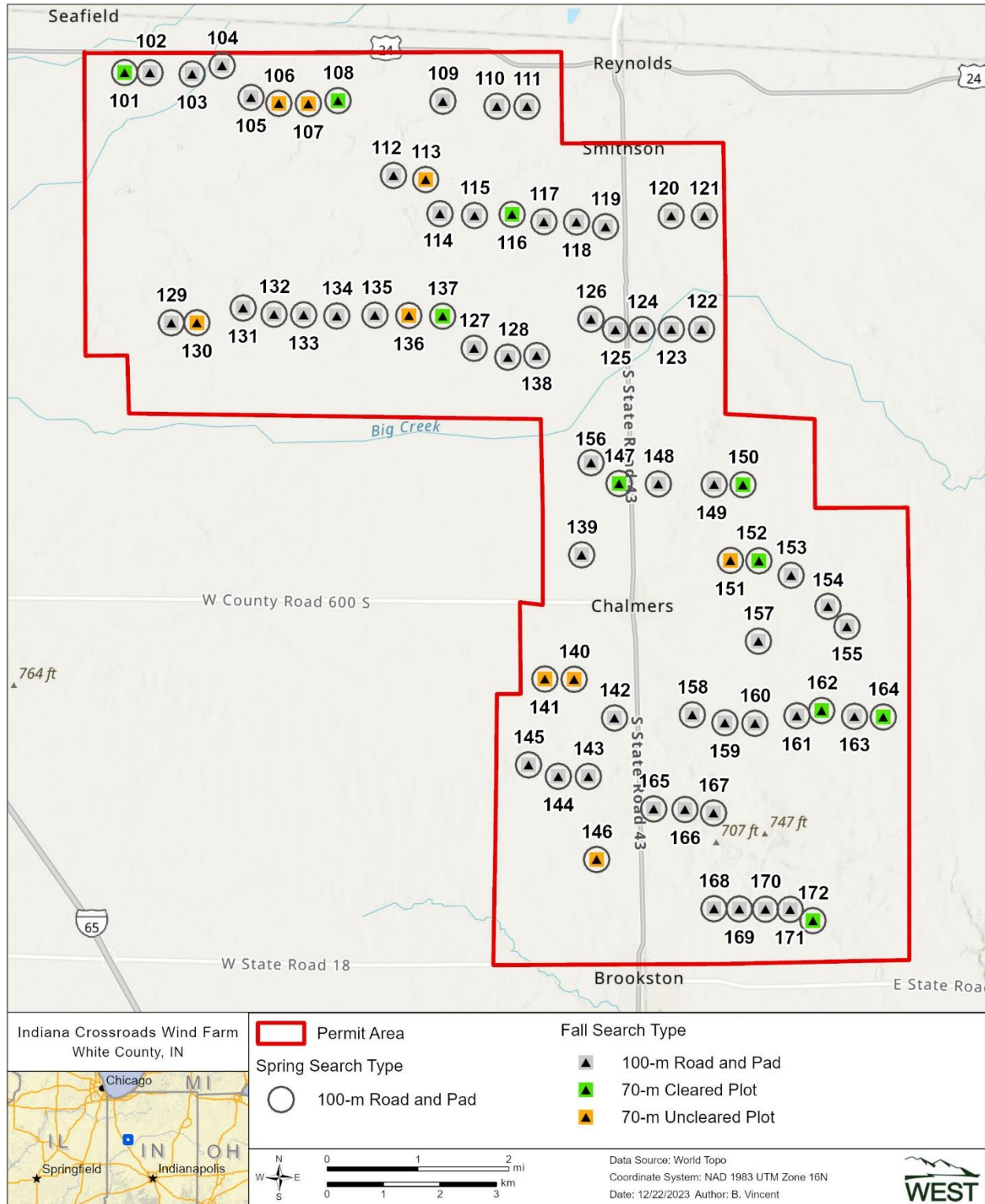


Figure 2. Turbine locations by plot type at the Indiana Crossroads Wind Farm, White County, Indiana.

During spring (April 1 – May 15; Table 2, Figure 3), a technician searched the gravel roads and pads weekly at all 72 turbines to a distance of 100-m (328 ft; 100-m roads and pads). During fall (August 1 – October 15), roads and pads were searched weekly by a technician at 53 turbines (Table 2, Figure 2). Detection-dog teams searched 70-m (230-ft) plots at 19 turbines twice weekly during fall. Ten turbines had crops cleared to a distance of 70-m (70-m cleared plots) and nine turbines had standing soybean (i.e., 70-m uncleared plots [*Glycine max*]).

During fall, vegetation at the 70-m cleared plots was mowed by Project staff to enhance detectability of carcasses (Figure 4). The 70-m uncleared plots were planted with soybean (Figure 5). A cross pattern approximately 1.5 m (4.9 ft) wide was mowed into the uncleared soy plots to assist detection-dog teams with plot access.



Figure 3. Representative photograph of conditions of a 100-meter road and pad plot at the Indiana Crossroads Wind Farm, White County, Indiana.



Figure 4. Representative photograph of vegetation conditions in a 70-meter cleared plot at the Indiana Crossroads Wind Farm, White County, Indiana.



Figure 5. Representative photograph of vegetation conditions in a 70-meter uncleared plot at the Indiana Crossroads Wind Farm, White County, Indiana.

Search Methods

WEST used two types of search methods: a technician search, which was visual, and searches by a detection-dog team, which were olfactory, where the team consisted of one dog handler and one detection dog. All technicians and dog handlers were trained to follow the Project's Study Plan, including proper handling and reporting of carcasses. Standardized carcass searches were conducted during the day, beginning as early as first light.

Road and Pad Searches – Technician Searches

During road and pad searches, the technician started at 100 m from the turbine and searched the access road while walking at a rate of approximately 45–60 m per minute (m/min; 148–197 ft/min) toward the turbine, around the turbine, along the gravel pad, and back towards the starting point. The technician searched out to 2.5 m (8.2 ft) on each side as they walked until the entire road/access pad was searched to ensure full visual coverage of each road and pad.

70-meter Plot Searches – Detection-dog Teams

Detection-dog teams searched 70-m cleared and uncleared plots for bat carcasses. Prior to each search, dog handlers determined the search start point and the number of transects needed to cover the plot after accounting for wind speed and direction, as well as crop row direction and density (when applicable). Dog 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 plot. To maximize detection rates during an olfactory search, transect width varied with vegetation density, ranging from five to 10 m (16 to 33 ft) apart in densely vegetated areas, to 10 to 15-m (33 to 49 ft) apart in shorter vegetation. Detection dogs were rewarded with either food or a short play session when they correctly alerted their handler to a bird or bat carcass.

Detection-dog Team Evaluation

Detection dogs were considered candidates for standardized carcass searches if they met basic temperament and obedience criteria and demonstrated the trainability 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, dog 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). Detection dogs were initially trained on cotton scent swabs 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 detection dog achieved a passing grade of 80% or higher in a scent recognition test, consisting of 10 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 detection-dog team. After a detection-dog team achieved a searcher efficiency of 75% or greater for 15–30 bats during evaluation trials, the team was approved to conduct standardized carcass searches. Because the objective of the study was to document bat carcasses, detection dogs were not explicitly trained on native bird carcasses; however, all detection dogs alerted their handler when they found birds in the field, and handlers rewarded bird finds in the field to

encourage future alerts to bird carcasses. Breeds used at the Project included an Australian shepherd, border collie, and Belgian Malinois.

Data Collection

Technicians and dog handlers recorded the date, search start and end times, technician or dog handler name, turbine number, type of search, and if any carcasses were found during each scheduled search. When a bird or bat carcass was found, a flag was placed near it and the search continued. After searching the entire plot, the technician or dog handler returned to record information for each carcass on a carcass information form, including the date and time the carcass was found, species (or best possible field identification), sex and age (when possible), technician or dog handler name, turbine number, measured distance from turbine (m), azimuth from turbine, location of the carcass as latitude and longitude, 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 carcass was complete, not badly decomposed, and showed no sign of being fed upon by a predator or scavenger.
- Scavenged—an entire carcass that showed 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), or a carcass that was heavily infested by insects.
- Dismembered—a carcass that was 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 that was found alive.

For bird carcasses, the following category was also used:

- Feather spot—10 or more feathers (excluding down), or two or more primary feathers, found at one location (i.e., one square m [10 square ft]), indicating predation or scavenging of a bird carcass.

Digital photographs were taken of each carcass, 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 (ESPER0036249), WEST's Federal Native Endangered and Threatened Species Recovery Permit (ES234121), and WEST's Special Purpose Salvage Permit (2263). Technicians or dog handlers placed all 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 rubber 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 left in place.

Bird and bat 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 analysis.

Carcass Identification and Agency Notification

Field identifications of bird carcasses were reviewed by biologists with extensive field experience in identification of Midwestern birds and feathers. Federally permitted bat biologists (ESPER0039249, ES234121) identified all bat carcasses via photographs or in hand. Bat carcasses that were heavily scavenged but did not have potential to be a Covered Species (i.e., fur was present on the wing and/or forearms measured greater than >41 millimeter [1.6 inches]) were identified to the closest genus or group possible and were not sent off for further identification. In accordance with the Project's ITP and WEST's state and federal salvage permits, the USFWS would have been notified within 24 hours of positive identification of a federally listed species, and the Indiana Department of Natural Resources (IDNR) was notified within three working days of positive identification of state-listed species. Fur and tissue samples were delivered to the USFWS Indiana Field Office at the end of the study, and all bat carcasses were submitted to the Illinois Natural History Survey repository.

Tissue samples were collected from heavily scavenged or decomposed bat carcasses that could not be positively identified and had potential to be a Covered Species based upon available identifiable physical characteristics and were submitted to a USFWS-approved laboratory, East Stroudsburg University Wildlife Genetics Institute, for identification on September 20 and October 24, 2023.

Bias Trials

Searcher Efficiency Trials

The objective of searcher efficiency trials was to estimate the probability that a carcass was found by searchers. Searcher efficiency trials were conducted in the same areas where standardized carcass searches occurred. Technicians or detection-dog teams conducting standardized carcass searches did not know when searcher efficiency trials were being conducted or the location of the trial carcasses. Trial carcasses consisted of mice, eastern red bats (*Lasiurus borealis*), big brown bats (*Eptesicus fuscus*), and silver-haired bats (*Lasionycteris noctivagans*) that had previously been found at the Project. In accordance with the Study Plan, brown and black house mice (*Mus musculus*) were also used for 24 trials in the spring when sufficient bat carcasses were not available. Ninety-six carcasses were placed across all seasons and plot types to account for differences in search conditions by plot type and season.

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 around the upper forelimb for identification as a trial 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-dog teams the day 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 during each search was determined immediately after each trial.

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 15 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 three trial carcasses were placed on a plot at a time to avoid potential over-seeding and attracting scavengers. Forty-one trials of the 96 placed trial carcasses were left in place and used for carcass persistence trials, and an additional 19 trial carcasses were dropped, for a total of 60 trial carcasses placed across all seasons and plot types.

Technicians monitored the trial carcasses over a 14-day period according to the following schedule, as closely as possible. Carcasses were checked daily for the first four days, then on days 7, 10, and 14. Trial carcasses were monitored until they were completely removed, or the trial period ended, whichever occurred first. At the end of the 14-day period, any remaining carcasses were removed. Detection-dog teams were used on all 70-m 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 70-m cleared plots using a Trimble sub-meter Global Positioning System unit. Unsearchable areas within plot boundaries were also mapped. 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 search areas. A 72-m (236-ft) radius projection was applied to 70-m uncleared plots. The additional 2.0 m (6.6 ft) were added to the radius to account for the width of the turbine tower. Road and pad boundaries mapped in Year 1 (2022) were used for spatial verification of carcasses found on 100-m roads and pads.

Quality Assurance and Quality Control

Quality assurance and quality control measures were implemented at all stages of the study, including in the field, during data entry and analysis, and report writing. Following field searches, 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. A Microsoft® SQL

database was developed to store, organize, and retrieve search data. All data forms and electronic data files were retained for reference.

Statistical Analysis

The EoA (Dalthorp et al. 2017) modeling framework was used to estimate take of the Covered Species. Data used in the EoA model included number of found Covered Species carcasses, fatality spatial data from all bats found during searches, and the results of searcher efficiency and carcass persistence trials.

Searcher Efficiency Estimation

Searcher efficiency was estimated separately for technicians and detection-dog 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, searcher efficiency was modeled using logistic regression. Season was included as a potential covariate for the technician model, and plot type was included as a potential covariate for the detection-dog team model. For both the technician and detection-dog team models, selection was completed using an information theoretic approach known as AICc, or corrected Akaike Information Criterion (Burnham and Anderson 2002). The best model for EoA was selected as the most parsimonious model within two AICc units of the model with the 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 carcass persistence trials were used to estimate the amount of time, in days, carcasses remained available to be located by the technician or detection-dog team. The average probability a carcass persisted through the search interval (i.e., the time between scheduled searches) was estimated using an interval-censored survival regression with four potential distributions: exponential, loglogistic, lognormal, and Weibull distributions (Kalbfleisch and Prentice 2002, Dalthorp et al. 2018). As with searcher efficiency, carcass persistence models were estimated separately by search team (i.e., plots searched by technicians vs. plots searched by detection-dog teams) to account for different modes of detection. Season was included as a potential covariate for the technician model, and plot type was included as a potential covariate for the detection-dog team model. The best-supported model was selected as the most parsimonious model within two AICc units of the model with the lowest AICc value. The parameter estimates of the selected model (shape and scale, including the 95% CI of scale) were used as inputs in the EoA Single Class Module.

Search Area Adjustment

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. 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. 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). Although the spring and fall seasons have the potential to have different carcass density distributions due to differences in turbine operation, there was insufficient sample size in the spring to examine these effects. Therefore, the only models considered were those that pooled data from both turbine operation regimes and seasons. The best-supported model was selected using AICc.

Carcasses Excluded from Fatality Estimates

Fatalities were excluded from the area adjustment used in EoA when the carcass was discovered outside of the spatial and temporal scope of the study 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 searches (e.g., a carcass on a plot in the summer that was 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 searches. If a fatality of a Covered Species had been found outside of the spatial or temporal scope of the study design, it would have been 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, Multiple Class, and Multiple Years modules of EoA.

The probability of detection (g) was estimated using the bias corrections for searcher efficiency, carcass persistence, 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. 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 strata within a season, with weights for each class defined by the sampling fraction for each stratum. The Multiple Class Module was used again to combine the strata across seasons using seasonal arrival proportions to define the weights for each class to get a single annual Beta distribution.

For this study, cross-season relative turbine operations were calculated as the number of operational nights in each season, during which turbines were operating, divided by the total number of operational nights in each season. Given that nominal turbine operations at the Project includes downtime for regular maintenance, operations were considered normal unless the proportion of operational turbine-nights was less than 90% of total turbine-nights during the study period. Cross-season relative turbine operations and the arrival proportions were multiplied and then re-scaled to sum to one across seasons. These values defined the weights for combining the Beta distribution parameters across seasons.

Furthermore, the Multiple Years Module was used to combine detection probabilities across years. The Multiple Years Module requires the input p , which weights the years appropriately for combining Beta distribution parameters. The proportion of operational-turbine nights was greater than 0.9, so p was set to 1 for the 2023 study. As described in the 2022 study report, the relative risk of the entire 2022 search period represented only 0.838 of the risk of a fully operational year (Rodriguez et al. 2023). Due to limitations with the EoA graphical user interface, it was necessary to rescale the EoA-produced estimates for estimates of λ to represent a full year of operation. Details of this calculation are described in Appendix C10. Per the HCP, adaptive management triggers will not be evaluated using EoA until Year 3; “bat in hand” adaptive management triggers that could apply in Year 1 – Year 2 are discussed below.

RESULTS

Standardized Carcass Searches

Four hundred seventeen searches were completed in the spring, and 925 searches were completed in the fall. Forty-nine searches (3.7%) were missed due to turbine maintenance, weather constraints, and/or safety hazards. Six hundred sixty bat carcasses and 134 bird carcasses were found during searches and incidentally (Appendix A). No Covered Species were found. Four evening bats (*Nycticeius humeralis*), a state-endangered species, were documented at the Project at turbines 116, 163, 101, and 162, on August 8, 11, October 6, and 9, respectively. The IDNR was notified within three working days of positive identification, per permit conditions (on August 11, September 7, October 6 and 11, 2023). No other state- or federally listed species were recorded during the ITP monitoring effort.

Twenty-six bats were found in the spring and 634 bats were found in the fall (Appendix A). The most commonly found bat species were eastern red bat (362 carcasses; 54.8%), and silver-haired bat (146 carcasses; 22.1%) followed by big brown bat (82 carcasses; 12.4%) and hoary bat (*Lasiurus cinereus*; 60 carcasses; 9.1%). Four evening bats (0.6%), as well as two Seminole bats (*Lasiurus seminolus*; 0.3%), two unidentified *Lasiurus* spp. (0.3%), one eastern red or Seminole bat (0.2%), and one big brown bat or silver-haired bat (0.2%) were also found. (Appendices A and B). Over the course of the monitoring period, 14 heavily scavenged bats (e.g., wing membrane only, bones, or partial carcasses) were sent off for identification via deoxyribonucleic acid (DNA) analysis, and were identified as eight big brown bats and six silver-haired bats. The majority of bat carcasses were recorded on 70-m plots by detection-dog teams (Appendix A).

Statistical Analysis

Bias Trials

Searcher Efficiency Trials

Ninety-six bat carcasses were placed for searcher efficiency trials on nine separate dates across all plot types and months of the study and 89 were available to find. The best-supported model for searcher efficiency for detection-dog teams did not support the inclusion of plot type as a covariate, meaning there was not a substantial difference between searcher efficiency rates on 70-m cleared and uncleared plots. The best-supported model for searcher efficiency on roads and pads did not support the inclusion of season as a covariate, meaning there was not a substantial difference in searcher efficiency rates for roads and pads between seasons. Searcher efficiency rates ranged from 78.0% on 70-m plots to 95.3% on roads and pads (Table 3).

Table 3. Searcher efficiency results by plot type at the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Plot Type	Number Placed	Number Available	Number Found	% Found
70-meter plots	48	41	32	78.0
100-meter roads and pads	48	43	41	95.3

Carcass Persistence Trials

Sixty carcasses were placed during the study period to estimate carcass persistence. The best-fit model for carcass persistence rates on 70-m cleared and uncleared plots searched by detection-dog teams had an exponential distribution and did not include any covariates, which suggests carcass persistence rates did not vary substantially by 70-m plot type (Figure 6; Appendix B). The best-fit model for carcass persistence rates on plots searched by technicians (i.e., 100-m roads and pads) had an exponential distribution and did not include any covariates, meaning that carcass persistence on roads and pads did not vary substantially by season (Figure 6; Appendix B). Estimated median carcass persistence times were 18.04 days on 70-m plots and 5.59 days on roads and pads (Appendix B).

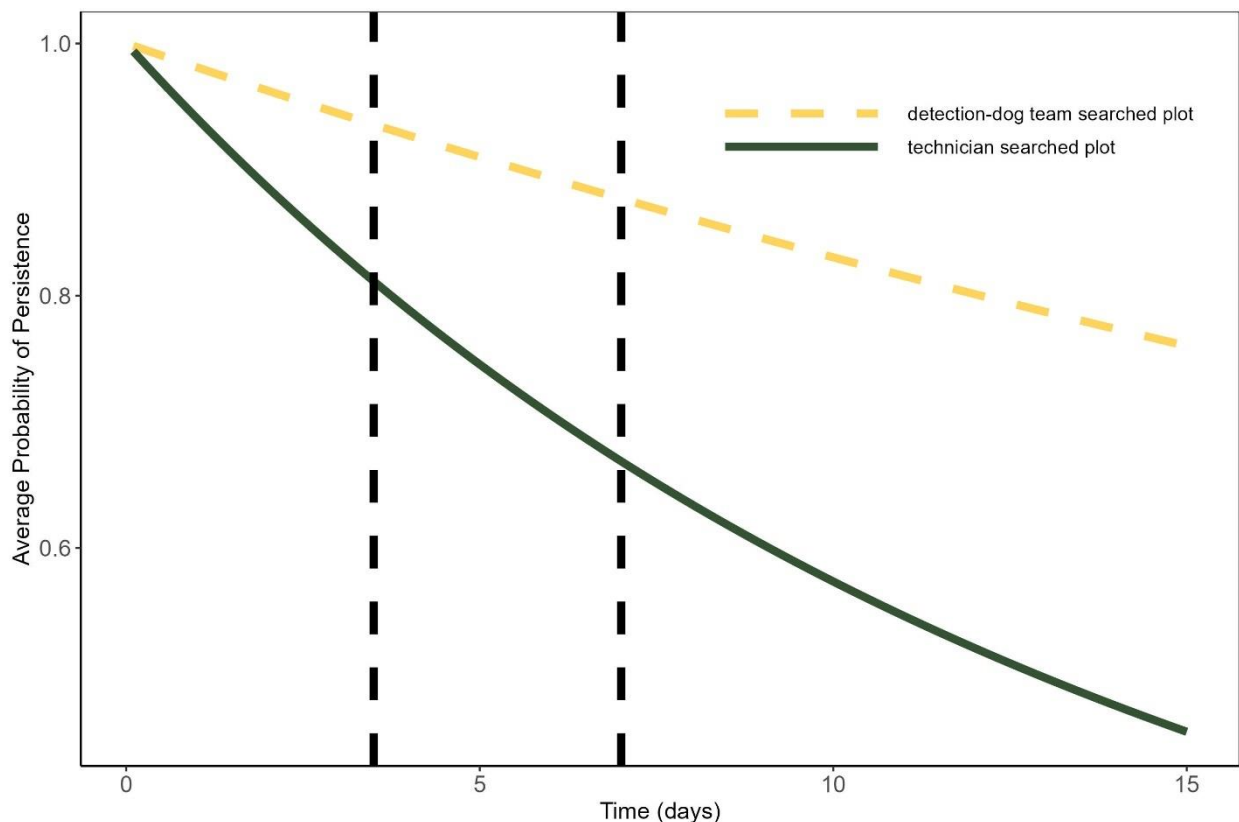


Figure 6. The average probability of persistence of bats on over time (in days) at Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Note: The vertical dashed lines indicate the 3.5- and 7-day search intervals used in this study.

Search Area Adjustment

Fifty-one of the 660 bats found were excluded from modeling the carcass-density distribution for EoA. Six bat carcasses were excluded from analysis because they were found off plot, while another 45 bats were excluded because their estimated time of death was prior to the start of searches (Appendix B6).

The best-fit model for the distribution of bats with respect to distance from turbine base was a Weibull distribution (Appendix B7). The estimated TWL area adjustment for bats was 0.21 for 100-m roads and pads and 0.86 for 70-m plots (Appendix B8; Figure 7).

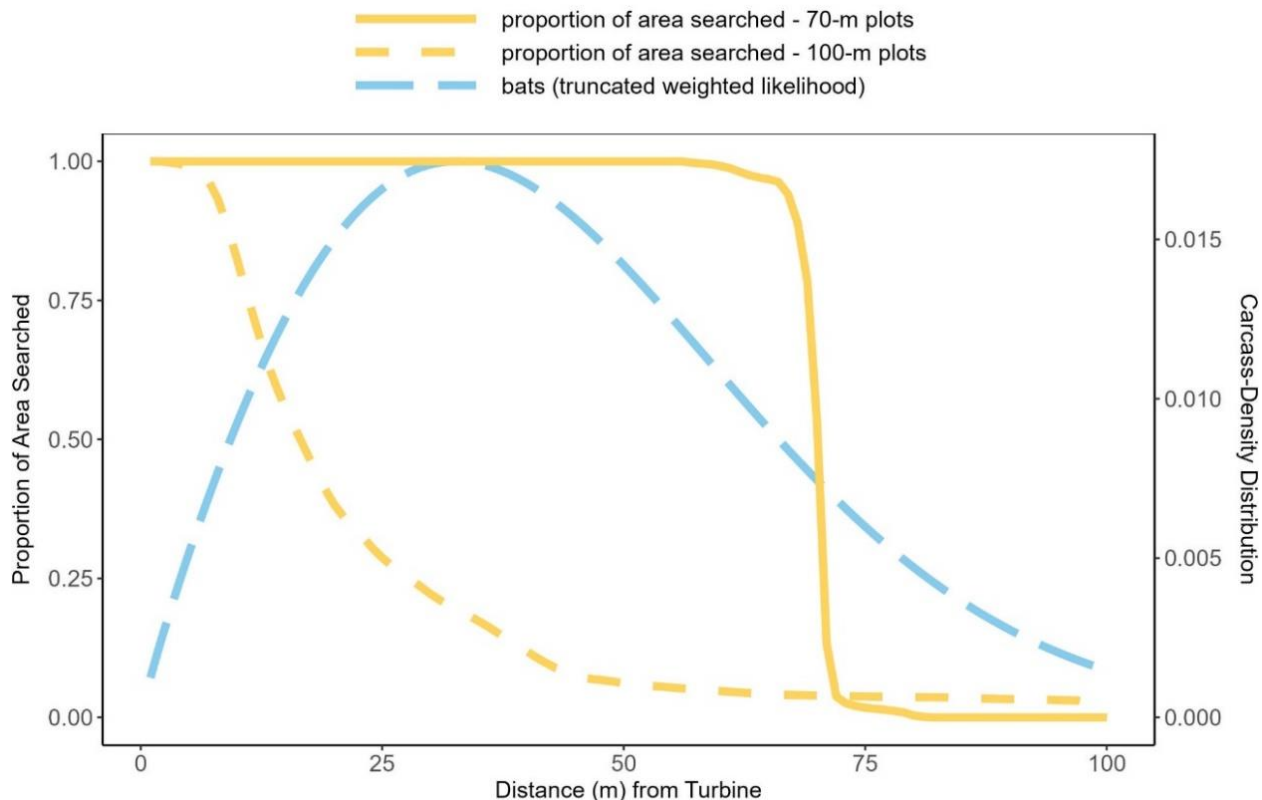


Figure 7. Density of bat carcasses per area searched at all plots at the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Covered Species Take Estimates

No Covered Species carcasses were found during the 2023 study. Furthermore, no Covered Species were found in 2022; thus, no adaptive management triggers, as laid out in Table 6.5 of the HCP (two carcasses found of either Covered Species in Year 1 and Year 2, or one Covered Species carcass found in spring or summer of any year), were met and no adaptive management action is necessary. The overall *g* achieved for the 2023 monitoring period had a mean of 0.277 (95% CI: 0.255–0.299). The average overall *g* achieved for the 2022 and 2023 monitoring years had a mean of 0.242 (95% CI: 0.224–0.261; Table 4). Median annual take rates from 2022–2023 were estimated to be 0.51 (95% CI: 0.00–5.66) Indiana bats and northern long-eared bats per year from April 1 – May 15 and August 1 – October 15, 2023. 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. The median annual take rate will be tested in Year 3, per Table 6.5 of the HCP, to determine if any adaptive management threshold has been met and therefore what action will occur.

Table 4. Probability of detection (g), Ba , and Bb , and ρ for the Indiana Crossroads Wind Farm, White County, Indiana, from 2022–2023.

Year	Ba^*	Bb^*	ρ	g	95% CI
2022	122.085	485.401	0.838	0.201	0.170–0.234
2023	444.494	1,161.188	1.000	0.277	0.255–0.299
Overall	484.443	1,515.407		0.242	0.224–0.261

* Ba and Bb are the parameters for the beta distribution used to characterize the probability of detection. The g value is the mean of that distribution.

CI = confidence interval

CONCLUSIONS

The overall g achieved for the 2023 monitoring period keeps the Project on track to meet the minimum average g of 0.2 for Year 1 through Year 3. The ITP compliance monitoring completed during 2023 provided evidence that the rate of take of Covered Species is compatible with ITP compliance over the duration of the ITP permit term. Adaptive management triggers using the EoA results will not be formally evaluated until Year 3, and no bats-in-hand adaptive management actions were triggered this year because no Covered Species were found in Year 1 or Year 2.

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**Appendix A. Carcasses Found during the 2023 Post-construction Monitoring Searches at
the Indiana Crossroads Wind Farm**

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
Bat Carcasses							
4-Apr-23	eastern red bat	132	casualty search	100-m road and pad	intact	40.70876	-86.9458
11-Apr-23	silver-haired bat	153	casualty search	100-m road and pad	intact	40.66769	-86.8376
12-Apr-23	eastern red bat	159	casualty search	100-m road and pad	intact	40.64398	-86.8509
12-Apr-23	eastern red bat	169	casualty search	100-m road and pad	dismembered	40.61418	-86.8478
12-Apr-23	silver-haired bat	160	casualty search	100-m road and pad	intact	40.64412	-86.8457
12-Apr-23	silver-haired bat	162	casualty search	100-m road and pad	intact	40.64602	-86.8308
12-Apr-23	silver-haired bat	172	casualty search	100-m road and pad	intact	40.61236	-86.8326
17-Apr-23	eastern red bat	112	casualty search	100-m road and pad	intact	40.73106	-86.9209
17-Apr-23	silver-haired bat	120	casualty search	100-m road and pad	intact	40.7251	-86.8629
17-Apr-23	silver-haired bat	123	casualty search	100-m road and pad	intact	40.70674	-86.8625
18-Apr-23	eastern red bat	134	casualty search	100-m road and pad	intact	40.70859	-86.9329
19-Apr-23	silver-haired bat	146	casualty search	100-m road and pad	scavenged	40.62217	-86.8775
25-Apr-23	silver-haired bat	111	casualty search	100-m road and pad	scavenged	40.74237	-86.894
25-Apr-23	silver-haired bat	149	casualty search	100-m road and pad	intact	40.68221	-86.8524
25-Apr-23	silver-haired bat	150	casualty search	100-m road and pad	intact	40.68206	-86.847
26-Apr-23	silver-haired bat	142	casualty search	100-m road and pad	scavenged	40.64469	-86.874
26-Apr-23	silver-haired bat	143	casualty search	100-m road and pad	scavenged	40.63545	-86.8803
26-Apr-23	silver-haired bat	145	casualty search	100-m road and pad	scavenged	40.63717	-86.8911
9-May-23	eastern red bat	129	casualty search	100-m road and pad	intact	40.7073	-86.9676
9-May-23	silver-haired bat	103	casualty search	100-m road and pad	intact	40.74705	-86.9642
9-May-23	silver-haired bat	131	casualty search	100-m road and pad	intact	40.70933	-86.9526
9-May-23	silver-haired bat	151	casualty search	100-m road and pad	scavenged	40.67029	-86.8501
10-May-23	eastern red bat	141	casualty search	100-m road and pad	scavenged	40.65073	-86.8887
10-May-23	hoary bat	142	casualty search	100-m road and pad	scavenged	40.64456	-86.874
10-May-23	hoary bat	154	casualty search	100-m road and pad	scavenged	40.6627	-86.8295
10-May-23	silver-haired bat	169	casualty search	100-m road and pad	intact	40.61426	-86.8478
1-Aug-23	big brown bat	107	casualty search	70-m uncleared plot	scavenged	40.74272	-86.9398
1-Aug-23	big brown bat	107	casualty search	70-m uncleared plot	scavenged	40.74271	-86.9391
1-Aug-23	big brown bat	107	casualty search	70-m uncleared plot	injured	40.74253	-86.9388
1-Aug-23	big brown bat	141	casualty search	70-m uncleared plot	injured	40.65128	-86.8879
1-Aug-23	big brown bat	147	casualty search	70-m cleared plot	scavenged	40.6822	-86.8741
1-Aug-23	big brown bat	162	casualty search	70-m cleared plot	scavenged	40.6463	-86.8299
1-Aug-23	big brown bat	162	casualty search	70-m cleared plot	scavenged	40.64615	-86.8304
1-Aug-23	big brown bat	164	casualty search	70-m cleared plot	scavenged	40.64487	-86.8177
1-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.65086	-86.8886

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
1-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62198	-86.877
1-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62223	-86.8779
1-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68205	-86.873
1-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68227	-86.8734
1-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68246	-86.8739
1-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64609	-86.83
1-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64632	-86.8308
1-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64611	-86.8306
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64526	-86.8174
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64549	-86.8179
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64515	-86.818
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64515	-86.8176
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64535	-86.818
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64509	-86.8176
1-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64497	-86.8174
1-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	intact	40.6125	-86.8324
1-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61288	-86.8322
1-Aug-23	hoary bat	147	casualty search	70-m cleared plot	scavenged	40.6816	-86.8729
1-Aug-23	hoary bat	164	casualty search	70-m cleared plot	scavenged	40.64523	-86.8176
1-Aug-23	hoary bat	172	casualty search	70-m cleared plot	scavenged	40.61269	-86.8323
2-Aug-23	big brown bat	108	casualty search	70-m cleared plot	scavenged	40.74272	-86.9329
2-Aug-23	big brown bat	116	casualty search	70-m cleared plot	scavenged	40.72488	-86.8963
2-Aug-23	big brown bat	116	casualty search	70-m cleared plot	scavenged	40.72464	-86.896
2-Aug-23	big brown bat	130	casualty search	70-m uncleared plot	scavenged	40.7073	-86.9627
2-Aug-23	big brown bat	130	casualty search	70-m uncleared plot	scavenged	40.70719	-86.9627
2-Aug-23	big brown bat	150	casualty search	70-m cleared plot	scavenged	40.68176	-86.8478
2-Aug-23	big brown bat	150	casualty search	70-m cleared plot	scavenged	40.68198	-86.8477
2-Aug-23	big brown bat	151	casualty search	70-m uncleared plot	scavenged	40.66993	-86.8503
2-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.7429	-86.9334
2-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72495	-86.8962
2-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72556	-86.8963
2-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72515	-86.8968
2-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72511	-86.8957
2-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70716	-86.962
2-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70714	-86.9625
2-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68207	-86.848

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
2-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68219	-86.8478
2-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.6822	-86.8471
2-Aug-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.67045	-86.85
2-Aug-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.66998	-86.8499
2-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67027	-86.8436
2-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67015	-86.8438
2-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.6702	-86.8444
2-Aug-23	hoary bat	108	casualty search	70-m cleared plot	scavenged	40.74321	-86.9325
2-Aug-23	hoary bat	116	casualty search	70-m cleared plot	scavenged	40.72522	-86.8963
2-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68166	-86.8478
2-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68157	-86.8475
2-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68196	-86.8478
2-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68233	-86.8473
4-Aug-23	big brown bat	119	casualty search	100-m road and pad	scavenged	40.72312	-86.8771
4-Aug-23	big brown bat	135	casualty search	100-m road and pad	scavenged	40.70867	-86.9249
4-Aug-23	big brown bat	169	casualty search	100-m road and pad	scavenged	40.61454	-86.8457
4-Aug-23	big brown bat	170	casualty search	100-m road and pad	scavenged	40.61414	-86.8419
4-Aug-23	eastern red bat	119	casualty search	100-m road and pad	scavenged	40.72298	-86.8767
4-Aug-23	eastern red bat	119	casualty search	100-m road and pad	scavenged	40.72297	-86.8767
4-Aug-23	eastern red bat	153	casualty search	100-m road and pad	scavenged	40.66764	-86.8374
4-Aug-23	eastern red bat	153	casualty search	100-m road and pad	scavenged	40.66758	-86.8372
4-Aug-23	eastern red bat	153	casualty search	100-m road and pad	scavenged	40.6676	-86.8374
4-Aug-23	eastern red bat	161	casualty search	100-m road and pad	scavenged	40.64512	-86.8362
4-Aug-23	eastern red bat	167	casualty search	100-m road and pad	scavenged	40.62974	-86.853
4-Aug-23	eastern red bat	171	casualty search	100-m road and pad	scavenged	40.61407	-86.8366
4-Aug-23	hoary bat	119	casualty search	100-m road and pad	scavenged	40.72295	-86.8771
5-Aug-23	eastern red bat	102	casualty search	100-m road and pad	scavenged	40.74715	-86.9727
5-Aug-23	eastern red bat	121	casualty search	100-m road and pad	scavenged	40.72497	-86.8558
5-Aug-23	eastern red bat	132	casualty search	100-m road and pad	scavenged	40.70891	-86.9457
5-Aug-23	eastern red bat	138	casualty search	100-m road and pad	scavenged	40.70238	-86.8915
5-Aug-23	eastern red bat	138	casualty search	100-m road and pad	scavenged	40.70259	-86.8909
5-Aug-23	eastern red bat	154	casualty search	100-m road and pad	scavenged	40.66307	-86.8294
5-Aug-23	hoary bat	129	casualty search	100-m road and pad	scavenged	40.70729	-86.9671
5-Aug-23	hoary bat	129	casualty search	100-m road and pad	scavenged	40.70716	-86.9672
7-Aug-23	big brown bat	162	casualty search	70-m cleared plot	scavenged	*	*
7-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74266	-86.9332

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
7-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68175	-86.873
7-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64488	-86.8176
7-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64518	-86.8176
7-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61207	-86.8323
7-Aug-23	hoary bat	140	casualty search	70-m uncleared plot	scavenged	40.65074	-86.8827
7-Aug-23	hoary bat	172	casualty search	70-m cleared plot	scavenged	40.61214	-86.8328
7-Aug-23	silver-haired bat	140	casualty search	70-m uncleared plot	scavenged	40.6513	-86.8823
7-Aug-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.6122	-86.8322
8-Aug-23	big brown bat	136	casualty search	70-m uncleared plot	scavenged	40.70886	-86.9178
8-Aug-23	big brown bat	151	casualty search	70-m uncleared plot	scavenged	40.67001	-86.8495
8-Aug-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73061	-86.9145
8-Aug-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70868	-86.9179
8-Aug-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70868	-86.9184
8-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68235	-86.8478
8-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68242	-86.8481
8-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68188	-86.848
8-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67027	-86.8446
8-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66954	-86.8441
8-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66938	-86.8441
8-Aug-23	evening bat	116	casualty search	70-m cleared plot	scavenged	40.7249	-86.896
9-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74704	-86.978
9-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74665	-86.978
10-Aug-23	big brown bat	146	casualty search	70-m uncleared plot	scavenged	40.62199	-86.8775
10-Aug-23	big brown bat	162	casualty search	70-m cleared plot	scavenged	40.64632	-86.8299
10-Aug-23	eastern red bat	111	casualty search	100-m road and pad	intact	40.74237	-86.8927
10-Aug-23	eastern red bat	122	casualty search	100-m road and pad	scavenged	40.7068	-86.8561
10-Aug-23	eastern red bat	123	casualty search	100-m road and pad	dismembered	40.70678	-86.8628
10-Aug-23	eastern red bat	142	casualty search	100-m road and pad	scavenged	40.64459	-86.8739
10-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62251	-86.8776
10-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62196	-86.878
10-Aug-23	hoary bat	107	casualty search	70-m uncleared plot	scavenged	40.7427	-86.9392
10-Aug-23	hoary bat	122	casualty search	100-m road and pad	scavenged	40.70701	-86.8562
11-Aug-23	big brown bat	132	casualty search	100-m road and pad	injured	40.70874	-86.946
11-Aug-23	big brown bat	145	casualty search	100-m road and pad	scavenged	40.63697	-86.8918
11-Aug-23	big brown bat	157	casualty search	100-m road and pad	scavenged	40.65714	-86.844
11-Aug-23	big brown bat	166	casualty search	100-m road and pad	intact	40.63024	-86.8587

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
11-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72471	-86.896
11-Aug-23	eastern red bat	128	casualty search	100-m road and pad	scavenged	40.70229	-86.891
11-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70719	-86.9619
11-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70717	-86.9626
11-Aug-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70881	-86.9172
11-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	injured	40.6704	-86.8443
11-Aug-23	evening bat	163	casualty search	100-m road and pad	scavenged	40.64513	-86.8237
11-Aug-23	hoary bat	144	casualty search	100-m road and pad	scavenged	40.63521	-86.8856
11-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68238	-86.8469
11-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68212	-86.8474
11-Aug-23	hoary bat	152	casualty search	70-m cleared plot	scavenged	40.66984	-86.8435
11-Aug-23	hoary bat	157	casualty search	100-m road and pad	injured	40.65714	-86.8436
11-Aug-23	hoary bat	168	casualty search	100-m road and pad	scavenged	40.61427	-86.8531
11-Aug-23	silver-haired bat	151	casualty search	70-m uncleared plot	scavenged	40.67025	-86.85
14-Aug-23	big brown bat	106	casualty search	70-m uncleared plot	scavenged	40.74249	-86.9455
14-Aug-23	big brown bat	108	casualty search	70-m cleared plot	scavenged	40.74285	-86.933
14-Aug-23	big brown bat	141	casualty search	70-m uncleared plot	scavenged	40.65053	-86.8887
14-Aug-23	big brown bat	141	casualty search	70-m uncleared plot	scavenged	40.65073	-86.8883
14-Aug-23	big brown bat	152	casualty search	70-m cleared plot	scavenged	40.66999	-86.8434
14-Aug-23	big brown bat	162	casualty search	70-m cleared plot	scavenged	40.64599	-86.8301
14-Aug-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61261	-86.8328
14-Aug-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61268	-86.832
14-Aug-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61185	-86.8324
14-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74708	-86.9779
14-Aug-23	eastern red bat	104	casualty search	100-m road and pad	scavenged	40.74846	-86.9576
14-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74261	-86.9456
14-Aug-23	eastern red bat	111	casualty search	100-m road and pad	intact	40.74223	-86.8932
14-Aug-23	eastern red bat	111	casualty search	100-m road and pad	intact	40.74237	-86.8938
14-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72509	-86.8961
14-Aug-23	eastern red bat	126	casualty search	100-m road and pad	scavenged	40.70826	-86.8795
14-Aug-23	eastern red bat	126	casualty search	100-m road and pad	intact	40.70826	-86.8796
14-Aug-23	eastern red bat	131	casualty search	100-m road and pad	intact	40.70975	-86.9526
14-Aug-23	eastern red bat	132	casualty search	100-m road and pad	scavenged	40.70889	-86.9459
14-Aug-23	eastern red bat	132	casualty search	100-m road and pad	intact	40.70883	-86.946
14-Aug-23	eastern red bat	132	casualty search	100-m road and pad	scavenged	40.70883	-86.9457
14-Aug-23	eastern red bat	138	casualty search	100-m road and pad	injured	40.70235	-86.8908

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
14-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62201	-86.8771
14-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62184	-86.8774
14-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68225	-86.8735
14-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68231	-86.8735
14-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68172	-86.8729
14-Aug-23	hoary bat	116	casualty search	70-m cleared plot	scavenged	40.72508	-86.8967
14-Aug-23	hoary bat	131	casualty search	100-m road and pad	scavenged	40.70965	-86.9525
14-Aug-23	hoary bat	152	casualty search	70-m cleared plot	scavenged	40.66993	-86.8441
14-Aug-23	silver-haired bat	132	casualty search	100-m road and pad	scavenged	40.7089	-86.9459
16-Aug-23	big brown bat	139	casualty search	100-m road and pad	scavenged	40.67064	-86.881
16-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70723	-86.9617
16-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70741	-86.9618
16-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70731	-86.9621
16-Aug-23	eastern red bat	143	casualty search	100-m road and pad	intact	40.63544	-86.8785
16-Aug-23	eastern red bat	145	casualty search	100-m road and pad	scavenged	40.63694	-86.8918
16-Aug-23	eastern red bat	149	casualty search	100-m road and pad	scavenged	40.68216	-86.8536
16-Aug-23	eastern red bat	153	casualty search	100-m road and pad	scavenged	40.66756	-86.8373
16-Aug-23	eastern red bat	165	casualty search	100-m road and pad	scavenged	40.63032	-86.8645
16-Aug-23	eastern red bat	170	casualty search	100-m road and pad	scavenged	40.61431	-86.8422
16-Aug-23	hoary bat	171	casualty search	100-m road and pad	scavenged	40.61427	-86.8371
16-Aug-23	Seminole bat	155	casualty search	100-m road and pad	scavenged	40.65969	-86.8255
17-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74738	-86.9778
17-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74719	-86.9778
17-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74708	-86.9774
17-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.7423	-86.9447
17-Aug-23	eastern red bat	107	casualty search	70-m uncleared plot	scavenged	40.74189	-86.9391
17-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68234	-86.8737
17-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64469	-86.8171
17-Aug-23	hoary bat	101	casualty search	70-m cleared plot	scavenged	40.7474	-86.9779
17-Aug-23	hoary bat	162	casualty search	70-m cleared plot	scavenged	40.64653	-86.8311
17-Aug-23	hoary bat	172	casualty search	70-m cleared plot	injured	40.61271	-86.8319
17-Aug-23	hoary bat	172	casualty search	70-m cleared plot	scavenged	40.61266	-86.8318
17-Aug-23	silver-haired bat	106	casualty search	70-m uncleared plot	scavenged	40.74257	-86.9455
18-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72502	-86.8959
18-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72502	-86.8966
18-Aug-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70864	-86.9181

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
18-Aug-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70865	-86.918
18-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68212	-86.8469
18-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68193	-86.8476
18-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.6824	-86.8475
18-Aug-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.67003	-86.8495
18-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66966	-86.8436
18-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66951	-86.8435
18-Aug-23	hoary bat	108	casualty search	70-m cleared plot	scavenged	40.74324	-86.9331
18-Aug-23	hoary bat	116	casualty search	70-m cleared plot	scavenged	40.72533	-86.8965
18-Aug-23	hoary bat	136	casualty search	70-m uncleared plot	scavenged	40.70866	-86.9181
18-Aug-23	silver-haired bat	108	casualty search	70-m cleared plot	scavenged	40.74302	-86.9327
18-Aug-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68245	-86.8481
21-Aug-23	big brown bat	140	casualty search	70-m uncleared plot	scavenged	40.65082	-86.8823
21-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	intact	40.74232	-86.9457
21-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74295	-86.9452
21-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.65068	-86.8882
21-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68215	-86.873
21-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64664	-86.8308
21-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64522	-86.8176
21-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64538	-86.8182
21-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64502	-86.8178
21-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61297	-86.8325
21-Aug-23	silver-haired bat	141	casualty search	70-m uncleared plot	scavenged	40.65073	-86.8888
21-Aug-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64498	-86.8176
21-Aug-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61289	-86.832
22-Aug-23	big brown bat	130	casualty search	70-m uncleared plot	intact	40.70726	-86.9622
22-Aug-23	big brown bat	137	casualty search	70-m cleared plot	scavenged	40.70834	-86.9105
22-Aug-23	big brown bat	152	casualty search	70-m cleared plot	scavenged	40.66985	-86.844
22-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74672	-86.9777
22-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74745	-86.9783
22-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74759	-86.978
22-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70742	-86.9621
22-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70746	-86.9627
22-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68177	-86.8477
22-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68162	-86.8478
22-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68195	-86.8474

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
22-Aug-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72466	-86.8963
22-Aug-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72456	-86.8964
22-Aug-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68218	-86.8477
23-Aug-23	eastern red bat	168	casualty search	100-m road and pad	scavenged	40.61423	-86.8532
23-Aug-23	eastern red bat	168	casualty search	100-m road and pad	intact	40.61415	-86.853
23-Aug-23	eastern red bat	169	casualty search	100-m road and pad	scavenged	40.6141	-86.8478
23-Aug-23	eastern red bat	169	casualty search	100-m road and pad	scavenged	40.61426	-86.8477
24-Aug-23	big brown bat	119	casualty search	100-m road and pad	scavenged	40.723	-86.8769
24-Aug-23	big brown bat	139	casualty search	100-m road and pad	intact	40.67072	-86.8813
24-Aug-23	big brown bat	144	casualty search	100-m road and pad	scavenged	40.63517	-86.8855
24-Aug-23	eastern red bat	112	casualty search	100-m road and pad	intact	40.73101	-86.9212
24-Aug-23	eastern red bat	121	casualty search	100-m road and pad	scavenged	40.7255	-86.8543
24-Aug-23	eastern red bat	124	casualty search	100-m road and pad	intact	40.70707	-86.8688
24-Aug-23	eastern red bat	132	casualty search	100-m road and pad	intact	40.70875	-86.9458
24-Aug-23	eastern red bat	133	casualty search	100-m road and pad	scavenged	40.70872	-86.9399
24-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.65046	-86.8886
24-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.65094	-86.8887
24-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.6506	-86.8891
24-Aug-23	eastern red bat	144	casualty search	100-m road and pad	scavenged	40.63545	-86.8846
24-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62201	-86.8776
24-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68216	-86.8731
24-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.6819	-86.8735
24-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68221	-86.8736
24-Aug-23	eastern red bat	149	casualty search	100-m road and pad	scavenged	40.68207	-86.8532
24-Aug-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.67024	-86.8501
24-Aug-23	eastern red bat	156	casualty search	100-m road and pad	scavenged	40.68536	-86.8794
24-Aug-23	eastern red bat	156	casualty search	100-m road and pad	scavenged	40.68497	-86.8788
24-Aug-23	eastern red bat	156	casualty search	100-m road and pad	scavenged	40.68499	-86.8787
24-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64622	-86.8308
24-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64489	-86.8174
24-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64516	-86.8176
24-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64517	-86.8175
24-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64553	-86.8178
24-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61278	-86.8326
24-Aug-23	silver-haired bat	158	casualty search	100-m road and pad	scavenged	40.64494	-86.8576
24-Aug-23	silver-haired bat	162	casualty search	70-m cleared plot	intact	40.64585	-86.8312

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
25-Aug-23	big brown bat	150	casualty search	70-m cleared plot	scavenged	40.68176	-86.8471
25-Aug-23	big brown bat	152	casualty search	70-m cleared plot	scavenged	40.66985	-86.8438
25-Aug-23	big brown bat	170	casualty search	100-m road and pad	scavenged	40.61431	-86.8423
25-Aug-23	big brown bat	171	casualty search	100-m road and pad	scavenged	40.61417	-86.8372
25-Aug-23	big brown bat	171	casualty search	100-m road and pad	scavenged	40.61421	-86.8371
25-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74739	-86.9779
25-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74698	-86.9784
25-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74684	-86.9777
25-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74264	-86.9336
25-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74292	-86.9324
25-Aug-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73065	-86.9147
25-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.7249	-86.8965
25-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72477	-86.8963
25-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72519	-86.8962
25-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.7256	-86.8961
25-Aug-23	eastern red bat	129	casualty search	100-m road and pad	scavenged	40.70719	-86.9676
25-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70747	-86.9624
25-Aug-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.7088	-86.9178
25-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68251	-86.8472
25-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68256	-86.8476
25-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68233	-86.8474
25-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68231	-86.8482
25-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68213	-86.8472
25-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68198	-86.847
25-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	intact	40.66998	-86.8438
25-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66986	-86.8436
25-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66993	-86.8435
25-Aug-23	eastern red bat	171	casualty search	100-m road and pad	scavenged	40.61423	-86.837
25-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68201	-86.847
25-Aug-23	hoary bat	152	casualty search	70-m cleared plot	scavenged	40.66977	-86.8437
25-Aug-23	hoary bat	152	casualty search	70-m cleared plot	scavenged	40.67004	-86.8437
25-Aug-23	silver-haired bat	130	casualty search	70-m uncleared plot	scavenged	40.7071	-86.9618
25-Aug-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68148	-86.8472
28-Aug-23	big brown bat	162	casualty search	70-m cleared plot	scavenged	40.64611	-86.8306
28-Aug-23	big brown bat	164	casualty search	70-m cleared plot	scavenged	40.6452	-86.8179
28-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74252	-86.9447

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
28-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74219	-86.9448
28-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	intact	40.74308	-86.9328
28-Aug-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65024	-86.8825
28-Aug-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.6505	-86.8824
28-Aug-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65054	-86.8831
28-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.65087	-86.8882
28-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.622	-86.8776
28-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62172	-86.8774
28-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.6823	-86.8729
28-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68228	-86.8731
28-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68196	-86.8737
28-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68257	-86.8737
28-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68182	-86.8739
28-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68172	-86.8735
28-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64612	-86.8309
28-Aug-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64566	-86.8176
28-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61251	-86.8318
28-Aug-23	hoary bat	146	casualty search	70-m uncleared plot	scavenged	40.62242	-86.8776
28-Aug-23	silver-haired bat	107	casualty search	70-m uncleared plot	scavenged	40.74285	-86.9394
28-Aug-23	silver-haired bat	141	casualty search	70-m uncleared plot	scavenged	40.65078	-86.8885
29-Aug-23	big brown bat	116	casualty search	70-m cleared plot	scavenged	40.72458	-86.8967
29-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74715	-86.9781
29-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	intact	40.74701	-86.978
29-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	intact	40.74668	-86.9783
29-Aug-23	eastern red bat	101	casualty search	70-m cleared plot	intact	40.74762	-86.9778
29-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74236	-86.9331
29-Aug-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74274	-86.9327
29-Aug-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73048	-86.9143
29-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72458	-86.8965
29-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72451	-86.8964
29-Aug-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.7245	-86.8964
29-Aug-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70714	-86.9623
29-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68228	-86.8467
29-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68214	-86.8477
29-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68201	-86.848
29-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68192	-86.848

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
29-Aug-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68157	-86.8471
29-Aug-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.66997	-86.8499
29-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67042	-86.8438
29-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66962	-86.8446
29-Aug-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.6693	-86.8441
29-Aug-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68208	-86.8474
29-Aug-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9784
29-Aug-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9783
29-Aug-23	silver-haired bat	152	casualty search	70-m cleared plot	scavenged	40.66933	-86.844
30-Aug-23	big brown bat or silver-haired bat	161	casualty search	100-m road and pad	intact	40.64526	-86.8361
30-Aug-23	eastern red bat	124	casualty search	100-m road and pad	scavenged	40.70674	-86.8689
30-Aug-23	eastern red bat	148	casualty search	100-m road and pad	scavenged	40.68155	-86.8651
30-Aug-23	eastern red bat	155	casualty search	100-m road and pad	scavenged	40.65951	-86.8254
30-Aug-23	eastern red bat	166	casualty search	100-m road and pad	scavenged	40.63015	-86.859
30-Aug-23	eastern red bat	168	casualty search	100-m road and pad	scavenged	40.6141	-86.8528
30-Aug-23	eastern red bat	169	casualty search	100-m road and pad	intact	40.6141	-86.848
30-Aug-23	silver-haired bat	167	casualty search	100-m road and pad	scavenged	40.62933	-86.853
31-Aug-23	big brown bat	102	casualty search	100-m road and pad	dismembered	40.74698	-86.9725
31-Aug-23	big brown bat	102	casualty search	100-m road and pad	scavenged	40.74705	-86.9726
31-Aug-23	big brown bat	106	casualty search	70-m uncleared plot	scavenged	40.74259	-86.9457
31-Aug-23	big brown bat	132	casualty search	100-m road and pad	scavenged	40.70878	-86.9461
31-Aug-23	big brown bat	147	casualty search	70-m cleared plot	scavenged	40.68217	-86.8734
31-Aug-23	big brown bat	164	casualty search	70-m cleared plot	scavenged	40.64515	-86.8182
31-Aug-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74205	-86.9462
31-Aug-23	eastern red bat	118	casualty search	100-m road and pad	intact	40.72377	-86.8829
31-Aug-23	eastern red bat	118	casualty search	100-m road and pad	scavenged	40.7233	-86.8824
31-Aug-23	eastern red bat	119	casualty search	100-m road and pad	scavenged	40.7228	-86.8773
31-Aug-23	eastern red bat	119	casualty search	100-m road and pad	scavenged	40.72291	-86.8769
31-Aug-23	eastern red bat	132	casualty search	100-m road and pad	scavenged	40.70885	-86.9458
31-Aug-23	eastern red bat	135	casualty search	100-m road and pad	scavenged	40.7088	-86.9249
31-Aug-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.651	-86.8831
31-Aug-23	eastern red bat	141	casualty search	70-m uncleared plot	scavenged	40.65059	-86.889
31-Aug-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62163	-86.877
31-Aug-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68163	-86.874
31-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64565	-86.8301
31-Aug-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64604	-86.8301

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
31-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61219	-86.8326
31-Aug-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61229	-86.8329
31-Aug-23	eastern red bat or Seminole bat	106	casualty search	70-m uncleared plot	intact	40.7423	-86.9455
31-Aug-23	hoary bat	141	casualty search	70-m uncleared plot	scavenged	40.65074	-86.8887
31-Aug-23	hoary bat	156	casualty search	100-m road and pad	scavenged	40.68543	-86.8793
31-Aug-23	silver-haired bat	106	casualty search	70-m uncleared plot	scavenged	40.74184	-86.9455
31-Aug-23	silver-haired bat	111	casualty search	100-m road and pad	scavenged	40.74236	-86.8937
31-Aug-23	silver-haired bat	140	casualty search	70-m uncleared plot	scavenged	40.65065	-86.8831
31-Aug-23	silver-haired bat	156	casualty search	100-m road and pad	scavenged	40.68521	-86.8794
31-Aug-23	silver-haired bat	162	casualty search	70-m cleared plot	scavenged	40.64556	-86.8308
1-Sep-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.7429	-86.9328
1-Sep-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73025	-86.9144
1-Sep-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73035	-86.9145
1-Sep-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73037	-86.9149
1-Sep-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72457	-86.8967
1-Sep-23	eastern red bat	137	casualty search	70-m cleared plot	scavenged	40.70849	-86.911
1-Sep-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68168	-86.8471
1-Sep-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74703	-86.9778
1-Sep-23	silver-haired bat	108	casualty search	70-m cleared plot	scavenged	40.74289	-86.9337
1-Sep-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72471	-86.8966
1-Sep-23	silver-haired bat	152	casualty search	70-m cleared plot	scavenged	40.6699	-86.844
4-Sep-23	big brown bat	147	casualty search	70-m cleared plot	scavenged	40.68194	-86.8736
4-Sep-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61259	-86.8319
4-Sep-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61264	-86.8318
4-Sep-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74213	-86.9457
4-Sep-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74294	-86.9455
4-Sep-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65019	-86.8829
4-Sep-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62211	-86.8772
4-Sep-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62178	-86.8777
4-Sep-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62199	-86.8779
4-Sep-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68206	-86.8734
4-Sep-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64582	-86.8311
4-Sep-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64636	-86.8305
4-Sep-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64536	-86.8175
4-Sep-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61193	-86.8324
4-Sep-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74708	-86.9774

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
4-Sep-23	silver-haired bat	107	casualty search	70-m uncleared plot	scavenged	40.74269	-86.9394
4-Sep-23	silver-haired bat	141	casualty search	70-m uncleared plot	scavenged	40.65097	-86.8887
4-Sep-23	silver-haired bat	146	casualty search	70-m uncleared plot	scavenged	40.62234	-86.8777
4-Sep-23	silver-haired bat	162	casualty search	70-m cleared plot	scavenged	40.64625	-86.8308
4-Sep-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64516	-86.8178
4-Sep-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64548	-86.818
4-Sep-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61257	-86.8319
4-Sep-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61246	-86.8325
5-Sep-23	big brown bat	113	casualty search	70-m uncleared plot	scavenged	40.72991	-86.9146
5-Sep-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73008	-86.9145
5-Sep-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72516	-86.8965
5-Sep-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72498	-86.8959
5-Sep-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70737	-86.9626
5-Sep-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70727	-86.9627
5-Sep-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68221	-86.8475
5-Sep-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68139	-86.8477
5-Sep-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.67035	-86.85
5-Sep-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67024	-86.8445
5-Sep-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67002	-86.8444
5-Sep-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67001	-86.8433
5-Sep-23	hoary bat	150	casualty search	70-m cleared plot	scavenged	40.68252	-86.8474
5-Sep-23	Seminole bat	150	casualty search	70-m cleared plot	scavenged	40.68216	-86.8478
5-Sep-23	silver-haired bat	113	casualty search	70-m uncleared plot	scavenged	40.72999	-86.9145
5-Sep-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72483	-86.8965
5-Sep-23	silver-haired bat	130	casualty search	70-m uncleared plot	scavenged	40.70733	-86.9629
5-Sep-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68266	-86.8477
5-Sep-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68208	-86.8477
5-Sep-23	silver-haired bat	152	casualty search	70-m cleared plot	scavenged	40.66995	-86.8439
6-Sep-23	eastern red bat	161	casualty search	100-m road and pad	scavenged	40.64526	-86.8359
6-Sep-23	eastern red bat	168	casualty search	100-m road and pad	scavenged	40.61413	-86.853
6-Sep-23	eastern red bat	168	casualty search	100-m road and pad	scavenged	40.6142	-86.853
6-Sep-23	hoary bat	139	casualty search	100-m road and pad	scavenged	40.6706	-86.8812
6-Sep-23	hoary bat	161	casualty search	100-m road and pad	scavenged	40.64519	-86.836
6-Sep-23	silver-haired bat	139	casualty search	100-m road and pad	scavenged	40.67071	-86.8812
7-Sep-23	big brown bat	146	casualty search	70-m uncleared plot	scavenged	40.62208	-86.8781
7-Sep-23	eastern red bat	106	casualty search	70-m uncleared plot	scavenged	40.74245	-86.9446

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
7-Sep-23	eastern red bat	110	casualty search	100-m road and pad	intact	40.74235	-86.8997
7-Sep-23	eastern red bat	122	casualty search	100-m road and pad	scavenged	40.70682	-86.8565
7-Sep-23	eastern red bat	124	casualty search	100-m road and pad	scavenged	40.70696	-86.869
7-Sep-23	eastern red bat	129	casualty search	100-m road and pad	intact	40.70732	-86.9672
7-Sep-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68219	-86.8479
7-Sep-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.67011	-86.8502
7-Sep-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66988	-86.8438
7-Sep-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64639	-86.831
7-Sep-23	hoary bat	106	casualty search	70-m uncleared plot	intact	40.74271	-86.9451
7-Sep-23	hoary bat	107	casualty search	70-m uncleared plot	scavenged	40.74256	-86.9392
7-Sep-23	hoary bat	109	casualty search	100-m road and pad	intact	40.74299	-86.911
7-Sep-23	hoary bat	156	casualty search	100-m road and pad	scavenged	40.6853	-86.8795
7-Sep-23	silver-haired bat	128	casualty search	100-m road and pad	scavenged	40.70225	-86.8973
7-Sep-23	silver-haired bat	146	casualty search	70-m uncleared plot	scavenged	40.62182	-86.8775
8-Sep-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74348	-86.9329
8-Sep-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72538	-86.8959
8-Sep-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72552	-86.8966
8-Sep-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.7086	-86.9176
8-Sep-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68222	-86.8735
8-Sep-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68176	-86.8731
8-Sep-23	hoary bat	172	casualty search	70-m cleared plot	scavenged	40.61281	-86.8324
8-Sep-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74728	-86.9779
8-Sep-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9778
8-Sep-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72495	-86.8957
8-Sep-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72512	-86.8961
8-Sep-23	silver-haired bat	147	casualty search	70-m cleared plot	scavenged	40.6826	-86.8731
11-Sep-23	big brown bat	107	casualty search	70-m uncleared plot	scavenged	40.74231	-86.9392
11-Sep-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62237	-86.8773
11-Sep-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.68177	-86.8734
11-Sep-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64606	-86.8308
11-Sep-23	silver-haired bat	147	casualty search	70-m cleared plot	scavenged	40.68218	-86.8734
11-Sep-23	silver-haired bat	162	casualty search	70-m cleared plot	scavenged	40.64568	-86.8307
12-Sep-23	big brown bat	113	casualty search	70-m uncleared plot	scavenged	40.73012	-86.915
12-Sep-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74721	-86.9776
12-Sep-23	eastern red bat	108	casualty search	70-m cleared plot	scavenged	40.74244	-86.9332
12-Sep-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72472	-86.8969

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
12-Sep-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68178	-86.8469
12-Sep-23	hoary bat	152	casualty search	70-m cleared plot	scavenged	40.66963	-86.8438
12-Sep-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74701	-86.9776
12-Sep-23	silver-haired bat	108	casualty search	70-m cleared plot	scavenged	40.74286	-86.9336
12-Sep-23	silver-haired bat	130	casualty search	70-m uncleared plot	scavenged	40.70727	-86.9623
13-Sep-23	eastern red bat	154	casualty search	100-m road and pad	scavenged	40.663	-86.8295
13-Sep-23	eastern red bat	163	casualty search	100-m road and pad	scavenged	40.64513	-86.8236
13-Sep-23	eastern red bat	171	casualty search	100-m road and pad	scavenged	40.61416	-86.8369
13-Sep-23	silver-haired bat	169	casualty search	100-m road and pad	scavenged	40.61416	-86.8478
13-Sep-23	silver-haired bat	169	casualty search	100-m road and pad	scavenged	40.61412	-86.8481
14-Sep-23	big brown bat	121	casualty search	100-m road and pad	scavenged	40.72504	-86.8556
14-Sep-23	big brown bat	164	casualty search	70-m cleared plot	scavenged	40.64478	-86.818
14-Sep-23	eastern red bat	119	casualty search	100-m road and pad	intact	40.72259	-86.8764
14-Sep-23	eastern red bat	132	casualty search	100-m road and pad	scavenged	40.70889	-86.9457
14-Sep-23	eastern red bat	132	casualty search	100-m road and pad	scavenged	40.70873	-86.946
14-Sep-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62188	-86.8776
14-Sep-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.66971	-86.8494
14-Sep-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64626	-86.8306
14-Sep-23	hoary bat	132	casualty search	100-m road and pad	scavenged	40.70867	-86.9457
14-Sep-23	silver-haired bat	131	casualty search	100-m road and pad	scavenged	40.7093	-86.9524
15-Sep-23	big brown bat	116	casualty search	70-m cleared plot	scavenged	40.72497	-86.8965
15-Sep-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.67009	-86.8447
15-Sep-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68235	-86.8478
18-Sep-23	big brown bat	152	casualty search	70-m cleared plot	scavenged	40.66976	-86.8445
18-Sep-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70822	-86.9179
18-Sep-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68158	-86.8475
18-Sep-23	hoary bat	130	casualty search	70-m uncleared plot	scavenged	40.7068	-86.9622
18-Sep-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74699	-86.9779
18-Sep-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72468	-86.8961
18-Sep-23	silver-haired bat	130	casualty search	70-m uncleared plot	intact	40.70732	-86.9617
18-Sep-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68196	-86.848
19-Sep-23	big brown bat	141	casualty search	70-m uncleared plot	scavenged	40.65066	-86.8887
19-Sep-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65025	-86.8825
19-Sep-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64507	-86.8184
19-Sep-23	eastern red bat	164	casualty search	70-m cleared plot	scavenged	40.64567	-86.8176
19-Sep-23	silver-haired bat	147	casualty search	70-m cleared plot	scavenged	40.68179	-86.8736

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
19-Sep-23	silver-haired bat	162	casualty search	70-m cleared plot	scavenged	40.64596	-86.8303
19-Sep-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64456	-86.818
19-Sep-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64454	-86.8175
21-Sep-23	big brown bat	112	casualty search	100-m road and pad	scavenged	40.73097	-86.9212
21-Sep-23	big brown bat	112	casualty search	100-m road and pad	scavenged	40.73102	-86.9211
21-Sep-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61236	-86.8323
21-Sep-23	eastern red bat	118	casualty search	100-m road and pad	scavenged	40.72362	-86.8829
21-Sep-23	eastern red bat	121	casualty search	100-m road and pad	scavenged	40.7249	-86.856
21-Sep-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65087	-86.8822
21-Sep-23	hoary bat	119	casualty search	100-m road and pad	scavenged	40.72303	-86.8767
21-Sep-23	silver-haired bat	104	casualty search	100-m road and pad	intact	40.74821	-86.9574
21-Sep-23	silver-haired bat	109	casualty search	100-m road and pad	intact	40.74304	-86.9112
21-Sep-23	silver-haired bat	141	casualty search	70-m uncleared plot	scavenged	40.65063	-86.8884
21-Sep-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68195	-86.8476
21-Sep-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61238	-86.8323
21-Sep-23	unidentified <i>Lasiurus</i> bat	150	casualty search	70-m cleared plot	scavenged	40.6818	-86.8478
22-Sep-23	big brown bat	152	casualty search	70-m cleared plot	scavenged	40.66946	-86.8441
22-Sep-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9781
22-Sep-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9783
22-Sep-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74735	-86.9778
22-Sep-23	eastern red bat	130	casualty search	70-m uncleared plot	intact	40.70741	-86.9621
22-Sep-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72487	-86.8961
22-Sep-23	silver-haired bat	132	casualty search	100-m road and pad	intact	40.7088	-86.9457
22-Sep-23	silver-haired bat	136	casualty search	70-m uncleared plot	scavenged	40.70862	-86.9181
22-Sep-23	silver-haired bat	151	casualty search	70-m uncleared plot	scavenged	40.66966	-86.8499
22-Sep-23	silver-haired bat	151	casualty search	70-m uncleared plot	scavenged	40.66986	-86.8502
22-Sep-23	unidentified <i>Lasiurus</i> bat	136	casualty search	70-m uncleared plot	scavenged	40.70868	-86.9178
25-Sep-23	big brown bat	171	casualty search	100-m road and pad	dismembered	40.61409	-86.8372
25-Sep-23	big brown bat	172	casualty search	70-m cleared plot	scavenged	40.61231	-86.8323
25-Sep-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70733	-86.9625
25-Sep-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65076	-86.8829
25-Sep-23	eastern red bat	152	casualty search	70-m cleared plot	scavenged	40.66941	-86.8435
25-Sep-23	eastern red bat	169	casualty search	100-m road and pad	intact	40.61407	-86.8482
25-Sep-23	silver-haired bat	152	casualty search	70-m cleared plot	scavenged	40.67041	-86.8443
25-Sep-23	silver-haired bat	162	casualty search	70-m cleared plot	scavenged	40.64598	-86.8314
25-Sep-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61232	-86.8325

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
26-Sep-23	big brown bat	113	casualty search	70-m uncleared plot	scavenged	40.7298	-86.9149
26-Sep-23	big brown bat	153	casualty search	100-m road and pad	dismembered	40.66766	-86.8372
26-Sep-23	eastern red bat	136	casualty search	70-m uncleared plot	scavenged	40.70888	-86.9179
26-Sep-23	eastern red bat	137	casualty search	70-m cleared plot	scavenged	40.70882	-86.9101
26-Sep-23	eastern red bat	163	casualty search	100-m road and pad	scavenged	40.6452	-86.8237
26-Sep-23	silver-haired bat	123	casualty search	100-m road and pad	scavenged	40.7067	-86.8627
26-Sep-23	silver-haired bat	136	casualty search	70-m uncleared plot	scavenged	40.70901	-86.9175
26-Sep-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68221	-86.848
26-Sep-23	silver-haired bat	160	casualty search	100-m road and pad	scavenged	40.64407	-86.845
27-Sep-23	eastern red bat	128	casualty search	100-m road and pad	scavenged	40.70227	-86.897
27-Sep-23	eastern red bat	169	casualty search	100-m road and pad	scavenged	40.61428	-86.8478
28-Sep-23	big brown bat	164	casualty search	70-m cleared plot	scavenged	40.64547	-86.8179
28-Sep-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74707	-86.9786
28-Sep-23	silver-haired bat	106	casualty search	70-m uncleared plot	scavenged	40.74209	-86.9457
28-Sep-23	silver-haired bat	141	casualty search	70-m uncleared plot	scavenged	40.65101	-86.8886
28-Sep-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.6121	-86.8325
28-Sep-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61241	-86.8324
29-Sep-23	eastern red bat	130	casualty search	70-m uncleared plot	intact	40.70825	-86.9625
29-Sep-23	silver-haired bat	137	casualty search	70-m cleared plot	scavenged	40.70853	-86.9111
2-Oct-23	eastern red bat	147	casualty search	70-m cleared plot	scavenged	40.6817	-86.874
2-Oct-23	eastern red bat	172	casualty search	70-m cleared plot	scavenged	40.61274	-86.833
2-Oct-23	hoary bat	172	casualty search	70-m cleared plot	scavenged	40.61236	-86.8322
2-Oct-23	silver-haired bat	147	casualty search	70-m cleared plot	scavenged	40.68242	-86.8737
2-Oct-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64487	-86.8174
2-Oct-23	silver-haired bat	164	casualty search	70-m cleared plot	scavenged	40.64456	-86.8182
3-Oct-23	big brown bat	116	casualty search	70-m cleared plot	scavenged	40.72523	-86.8966
3-Oct-23	eastern red bat	116	casualty search	70-m cleared plot	scavenged	40.72477	-86.8968
3-Oct-23	eastern red bat	130	casualty search	70-m uncleared plot	scavenged	40.70716	-86.963
3-Oct-23	eastern red bat	150	casualty search	70-m cleared plot	scavenged	40.68214	-86.8475
3-Oct-23	eastern red bat	151	casualty search	70-m uncleared plot	scavenged	40.66972	-86.8507
3-Oct-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74686	-86.9779
3-Oct-23	silver-haired bat	113	casualty search	70-m uncleared plot	scavenged	40.73047	-86.9144
3-Oct-23	silver-haired bat	130	casualty search	70-m uncleared plot	scavenged	40.70702	-86.9621
4-Oct-23	eastern red bat	157	casualty search	100-m road and pad	intact	40.65706	-86.8438
4-Oct-23	silver-haired bat	154	casualty search	100-m road and pad	scavenged	40.66304	-86.8296
4-Oct-23	silver-haired bat	161	casualty search	100-m road and pad	scavenged	40.64496	-86.8364

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
5-Oct-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62179	-86.8778
5-Oct-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64585	-86.8309
5-Oct-23	hoary bat	119	casualty search	100-m road and pad	scavenged	40.72298	-86.8768
5-Oct-23	hoary bat	120	casualty search	100-m road and pad	scavenged	40.72499	-86.8628
5-Oct-23	hoary bat	164	casualty search	70-m cleared plot	scavenged	40.64536	-86.818
5-Oct-23	silver-haired bat	112	casualty search	100-m road and pad	intact	40.73114	-86.9212
5-Oct-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61229	-86.8327
6-Oct-23	eastern red bat	101	casualty search	70-m cleared plot	intact	40.74691	-86.9774
6-Oct-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74737	-86.9774
6-Oct-23	eastern red bat	108	casualty search	70-m cleared plot	intact	40.74316	-86.9324
6-Oct-23	eastern red bat	113	casualty search	70-m uncleared plot	scavenged	40.73	-86.9142
6-Oct-23	eastern red bat	130	casualty search	70-m uncleared plot	intact	40.70725	-86.9622
6-Oct-23	evening bat	101	casualty search	70-m cleared plot	scavenged	40.74718	-86.9783
6-Oct-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74735	-86.9771
6-Oct-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74699	-86.9773
6-Oct-23	silver-haired bat	108	casualty search	70-m cleared plot	scavenged	40.7431	-86.9324
6-Oct-23	silver-haired bat	108	casualty search	70-m cleared plot	scavenged	40.74311	-86.9323
6-Oct-23	silver-haired bat	113	casualty search	70-m uncleared plot	scavenged	40.72999	-86.9143
6-Oct-23	silver-haired bat	113	casualty search	70-m uncleared plot	scavenged	40.73006	-86.9143
6-Oct-23	silver-haired bat	113	casualty search	70-m uncleared plot	scavenged	40.73042	-86.9144
6-Oct-23	silver-haired bat	116	casualty search	70-m cleared plot	scavenged	40.72488	-86.8957
6-Oct-23	silver-haired bat	137	casualty search	70-m cleared plot	intact	40.70853	-86.91
6-Oct-23	silver-haired bat	137	casualty search	70-m cleared plot	intact	40.70844	-86.9107
6-Oct-23	silver-haired bat	151	casualty search	70-m uncleared plot	scavenged	40.66999	-86.8497
6-Oct-23	silver-haired bat	151	casualty search	70-m uncleared plot	scavenged	40.66994	-86.8498
6-Oct-23	silver-haired bat	151	casualty search	70-m uncleared plot	injured	40.67001	-86.8495
9-Oct-23	eastern red bat	140	casualty search	70-m uncleared plot	scavenged	40.65068	-86.8834
9-Oct-23	eastern red bat	146	casualty search	70-m uncleared plot	scavenged	40.62213	-86.8773
9-Oct-23	eastern red bat	162	casualty search	70-m cleared plot	scavenged	40.64576	-86.8302
9-Oct-23	evening bat	162	casualty search	70-m cleared plot	scavenged	40.6458	-86.8302
9-Oct-23	hoary bat	101	casualty search	70-m cleared plot	scavenged	40.74695	-86.9774
9-Oct-23	hoary bat	107	casualty search	70-m uncleared plot	intact	40.74287	-86.9396
9-Oct-23	silver-haired bat	101	casualty search	70-m cleared plot	scavenged	40.74685	-86.9777
9-Oct-23	silver-haired bat	146	casualty search	70-m uncleared plot	scavenged	40.62216	-86.8768
9-Oct-23	silver-haired bat	146	casualty search	70-m uncleared plot	scavenged	40.622	-86.8773
9-Oct-23	silver-haired bat	146	casualty search	70-m uncleared plot	scavenged	40.62231	-86.8773

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
9-Oct-23	silver-haired bat	162	casualty search	70-m cleared plot	scavenged	40.64607	-86.8304
9-Oct-23	silver-haired bat	172	casualty search	70-m cleared plot	scavenged	40.61197	-86.8321
11-Oct-23	eastern red bat	154	casualty search	100-m road and pad	scavenged	40.66267	-86.8295
11-Oct-23	eastern red bat	155	casualty search	100-m road and pad	intact	40.65953	-86.8254
11-Oct-23	eastern red bat	170	casualty search	100-m road and pad	intact	40.6142	-86.8418
11-Oct-23	silver-haired bat	142	casualty search	100-m road and pad	scavenged	40.64465	-86.8739
11-Oct-23	silver-haired bat	148	casualty search	100-m road and pad	intact	40.68147	-86.8649
12-Oct-23	silver-haired bat	109	casualty search	100-m road and pad	scavenged	40.74302	-86.911
12-Oct-23	silver-haired bat	147	casualty search	70-m cleared plot	scavenged	40.68179	-86.8733
12-Oct-23	silver-haired bat	150	casualty search	70-m cleared plot	scavenged	40.68169	-86.8469
12-Oct-23	silver-haired bat	152	casualty search	70-m cleared plot	scavenged	40.66943	-86.8436
13-Oct-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74725	-86.9773
13-Oct-23	eastern red bat	101	casualty search	70-m cleared plot	scavenged	40.74675	-86.9779
3-Apr-23	red-winged blackbird	118	casualty search	100-m road and pad	dismembered	40.72394	-86.8828
4-Apr-23	brown-headed cowbird	134	casualty search	100-m road and pad	intact	40.70863	-86.9334
4-Apr-23	golden-crowned kinglet	152	casualty search	100-m road and pad	dismembered	40.67041	-86.8441
5-Apr-23	brown-headed cowbird	172	casualty search	100-m road and pad	scavenged	40.61237	-86.8319
11-Apr-23	brown-headed cowbird	134	casualty search	100-m road and pad	intact	40.70855	-86.933
11-Apr-23	chipping sparrow	123	casualty search	100-m road and pad	intact	40.7069	-86.8627
11-Apr-23	red-tailed hawk	122	casualty search	100-m road and pad	dismembered	40.70677	-86.8563
12-Apr-23	American robin	168	casualty search	100-m road and pad	dismembered	40.61419	-86.8528
12-Apr-23	brown-headed cowbird	154	casualty search	100-m road and pad	intact	40.66265	-86.8296
19-Apr-23	brown-headed cowbird	161	casualty search	100-m road and pad	scavenged	40.64498	-86.8353
25-Apr-23	golden-crowned kinglet	133	casualty search	100-m road and pad	scavenged	40.70856	-86.9394
26-Apr-23	European starling	143	casualty search	100-m road and pad	dismembered	40.63527	-86.8793
27-Apr-23	European starling	114	casualty search	100-m road and pad	intact	40.72478	-86.9115
3-May-23	great blue heron	155	casualty search	100-m road and pad	dismembered	40.65952	-86.8253
9-May-23	indigo bunting	113	casualty search	100-m road and pad	intact	40.73026	-86.9145
9-May-23	indigo bunting	133	casualty search	100-m road and pad	intact	40.70876	-86.9395
9-May-23	ruby-crowned kinglet	131	casualty search	100-m road and pad	intact	40.70897	-86.9532
1-Aug-23	Canada goose	107	casualty search	70-m uncleared plot	scavenged	40.74306	-86.9398
1-Aug-23	horned lark	162	casualty search	70-m cleared plot	scavenged	40.64633	-86.8299
1-Aug-23	unidentified bird (unknown size)	147	casualty search	70-m cleared plot	scavenged	40.68189	-86.8727
2-Aug-23	American crow	113	casualty search	70-m uncleared plot	scavenged	40.73012	-86.9143
2-Aug-23	barn swallow	116	casualty search	70-m cleared plot	scavenged	40.72483	-86.8965

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
2-Aug-23	mourning dove	116	casualty search	70-m cleared plot	feather spot	40.7245	-86.8961
2-Aug-23	turkey vulture	108	casualty search	70-m cleared plot	scavenged	40.74319	-86.9336
2-Aug-23	unidentified passerine	152	casualty search	70-m cleared plot	scavenged	40.67051	-86.8439
2-Aug-23	unidentified small bird	108	casualty search	70-m cleared plot	scavenged	40.74342	-86.9333
2-Aug-23	unidentified small bird	130	casualty search	70-m uncleared plot	scavenged	40.70698	-86.9623
4-Aug-23	brown-headed cowbird	168	casualty search	100-m road and pad	scavenged	40.61432	-86.8529
5-Aug-23	barn swallow	110	casualty search	100-m road and pad	scavenged	40.74221	-86.8994
5-Aug-23	red-tailed hawk	134	casualty search	100-m road and pad	scavenged	40.70839	-86.9328
7-Aug-23	horned lark	162	casualty search	70-m cleared plot	scavenged	40.64637	-86.8299
7-Aug-23	horned lark	164	casualty search	70-m cleared plot	scavenged	40.64562	-86.8177
8-Aug-23	horned lark	152	casualty search	70-m cleared plot	scavenged	40.67006	-86.8434
9-Aug-23	turkey vulture	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9787
9-Aug-23	unidentified small bird	101	casualty search	70-m cleared plot	scavenged	40.74713	-86.9774
10-Aug-23	unidentified flycatcher	156	casualty search	100-m road and pad	scavenged	40.68516	-86.8792
11-Aug-23	unidentified passerine	116	casualty search	70-m cleared plot	scavenged	40.72479	-86.8963
14-Aug-23	red-tailed hawk	164	casualty search	70-m cleared plot	scavenged	40.64569	-86.8177
16-Aug-23	European starling	130	casualty search	70-m uncleared plot	intact	40.70724	-86.9623
16-Aug-23	unidentified small bird	149	casualty search	100-m road and pad	scavenged	40.68225	-86.8538
17-Aug-23	horned lark	147	casualty search	70-m cleared plot	scavenged	40.6822	-86.8733
17-Aug-23	horned lark	162	casualty search	70-m cleared plot	scavenged	40.64571	-86.8314
17-Aug-23	horned lark	164	casualty search	70-m cleared plot	scavenged	40.64483	-86.8182
18-Aug-23	barn swallow	150	casualty search	70-m cleared plot	scavenged	40.68213	-86.8469
21-Aug-23	horned lark	147	casualty search	70-m cleared plot	scavenged	40.68178	-86.8736
22-Aug-23	chimney swift	150	casualty search	70-m cleared plot	scavenged	40.68246	-86.8471
22-Aug-23	horned lark	150	casualty search	70-m cleared plot	scavenged	40.68203	-86.8477
22-Aug-23	mourning dove	116	casualty search	70-m cleared plot	scavenged	40.72497	-86.8963
24-Aug-23	pine warbler	172	casualty search	70-m cleared plot	scavenged	40.61228	-86.8327
24-Aug-23	turkey vulture	140	casualty search	70-m uncleared plot	scavenged	40.65038	-86.8833
25-Aug-23	unidentified warbler	137	casualty search	70-m cleared plot	scavenged	40.70826	-86.9113
25-Aug-23	unidentified warbler	150	casualty search	70-m cleared plot	scavenged	40.68205	-86.8481
28-Aug-23	European starling	106	casualty search	70-m uncleared plot	scavenged	40.74261	-86.946
28-Aug-23	horned lark	147	casualty search	70-m cleared plot	scavenged	40.68213	-86.8734
28-Aug-23	mourning dove	147	casualty search	70-m cleared plot	scavenged	40.6821	-86.8734
28-Aug-23	unidentified passerine	147	casualty search	70-m cleared plot	scavenged	40.68152	-86.8733
28-Aug-23	unidentified warbler	147	casualty search	70-m cleared plot	scavenged	40.68222	-86.8741
29-Aug-23	horned lark	108	casualty search	70-m cleared plot	scavenged	40.74291	-86.9331

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
29-Aug-23	pine warbler	152	casualty search	70-m cleared plot	scavenged	40.66972	-86.8446
29-Aug-23	unidentified warbler	152	casualty search	70-m cleared plot	scavenged	40.66969	-86.8437
30-Aug-23	unidentified small bird	154	casualty search	100-m road and pad	dismembered	40.66307	-86.8297
31-Aug-23	unidentified small bird	118	casualty search	100-m road and pad	scavenged	40.72328	-86.8829
31-Aug-23	yellow rail	107	casualty search	70-m uncleared plot	scavenged	40.74232	-86.9387
1-Sep-23	horned lark	108	casualty search	70-m cleared plot	intact	40.74298	-86.9328
1-Sep-23	horned lark	116	casualty search	70-m cleared plot	scavenged	40.72515	-86.896
1-Sep-23	pine warbler	113	casualty search	70-m uncleared plot	scavenged	40.73039	-86.9151
4-Sep-23	killdeer	162	casualty search	70-m cleared plot	scavenged	40.64628	-86.8312
4-Sep-23	ruby-throated hummingbird	172	casualty search	70-m cleared plot	scavenged	40.61237	-86.8327
4-Sep-23	turkey vulture	162	casualty search	70-m cleared plot	scavenged	40.64597	-86.831
4-Sep-23	yellow-bellied flycatcher	140	casualty search	70-m uncleared plot	scavenged	40.65051	-86.8829
5-Sep-23	unidentified hummingbird	151	casualty search	70-m uncleared plot	scavenged	40.66993	-86.85
7-Sep-23	cliff swallow	146	casualty search	70-m uncleared plot	scavenged	40.62223	-86.8775
7-Sep-23	unidentified small bird	114	casualty search	100-m road and pad	intact	40.72482	-86.9107
7-Sep-23	unidentified small bird	135	casualty search	100-m road and pad	intact	40.70855	-86.9243
8-Sep-23	Blackburnian warbler	116	casualty search	70-m cleared plot	scavenged	40.72449	-86.8964
8-Sep-23	Blackburnian warbler	116	casualty search	70-m cleared plot	scavenged	40.72454	-86.8959
11-Sep-23	Blackburnian warbler	172	casualty search	70-m cleared plot	scavenged	40.61271	-86.8317
11-Sep-23	horned lark	164	casualty search	70-m cleared plot	scavenged	40.64528	-86.8179
11-Sep-23	magnolia warbler	107	casualty search	70-m uncleared plot	scavenged	40.74259	-86.9397
11-Sep-23	Tennessee warbler	106	casualty search	70-m uncleared plot	scavenged	40.74212	-86.9452
12-Sep-23	chestnut-sided warbler	101	casualty search	70-m cleared plot	scavenged	40.74666	-86.9774
12-Sep-23	horned lark	101	casualty search	70-m cleared plot	scavenged	40.74729	-86.9775
12-Sep-23	horned lark	152	casualty search	70-m cleared plot	scavenged	40.66997	-86.8443
12-Sep-23	Tennessee warbler	101	casualty search	70-m cleared plot	scavenged	40.74734	-86.9772
12-Sep-23	unidentified passerine	101	casualty search	70-m cleared plot	scavenged	40.74685	-86.978
12-Sep-23	unidentified small bird	101	casualty search	70-m cleared plot	scavenged	40.74717	-86.9774
12-Sep-23	unidentified small bird	101	casualty search	70-m cleared plot	scavenged	40.747	-86.9774
12-Sep-23	unidentified small bird	130	casualty search	70-m uncleared plot	scavenged	40.70709	-86.9621
13-Sep-23	common yellowthroat	161	casualty search	100-m road and pad	intact	40.64519	-86.836
13-Sep-23	Cooper's hawk	166	casualty search	100-m road and pad	scavenged	40.63025	-86.8585
13-Sep-23	unidentified warbler	151	casualty search	70-m uncleared plot	scavenged	40.66974	-86.8495
13-Sep-23	unidentified warbler	171	casualty search	100-m road and pad	scavenged	40.61408	-86.8368
14-Sep-23	European starling	106	casualty search	70-m uncleared plot	scavenged	40.74287	-86.9457
14-Sep-23	horned lark	147	casualty search	70-m cleared plot	scavenged	40.68214	-86.8734

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
14-Sep-23	horned lark	147	casualty search	70-m cleared plot	scavenged	40.6821	-86.8734
14-Sep-23	red-eyed vireo	128	casualty search	100-m road and pad	intact	40.70207	-86.8972
15-Sep-23	ruby-throated hummingbird	108	casualty search	70-m cleared plot	scavenged	40.74294	-86.9331
18-Sep-23	American redstart	130	casualty search	70-m uncleared plot	scavenged	40.7073	-86.9623
19-Sep-23	European starling	106	casualty search	70-m uncleared plot	scavenged	40.74246	-86.9454
19-Sep-23	unidentified hummingbird	147	casualty search	70-m cleared plot	scavenged	40.68195	-86.873
20-Sep-23	European starling	122	casualty search	100-m road and pad	scavenged	40.70686	-86.8559
20-Sep-23	European starling	122	casualty search	100-m road and pad	scavenged	40.70679	-86.8559
21-Sep-23	unidentified sparrow	162	casualty search	70-m cleared plot	scavenged	40.64552	-86.8302
22-Sep-23	black-throated green warbler	130	casualty search	70-m uncleared plot	scavenged	40.70718	-86.9623
22-Sep-23	black-throated green warbler	137	casualty search	70-m cleared plot	scavenged	40.70843	-86.911
22-Sep-23	brown-headed cowbird	113	casualty search	70-m uncleared plot	scavenged	40.7303	-86.915
22-Sep-23	chestnut-sided warbler	116	casualty search	70-m cleared plot	scavenged	40.72488	-86.8965
22-Sep-23	chimney swift	116	casualty search	70-m cleared plot	scavenged	40.725	-86.8969
22-Sep-23	cliff swallow	101	casualty search	70-m cleared plot	intact	40.74753	-86.978
22-Sep-23	palm warbler	101	casualty search	70-m cleared plot	scavenged	40.74687	-86.9774
25-Sep-23	horned lark	162	casualty search	70-m cleared plot	scavenged	40.64586	-86.8308
25-Sep-23	indigo bunting	106	casualty search	70-m uncleared plot	intact	40.74247	-86.9454
26-Sep-23	European starling	123	casualty search	100-m road and pad	scavenged	40.70678	-86.8627
26-Sep-23	magnolia warbler	116	casualty search	70-m cleared plot	scavenged	40.72495	-86.8962
26-Sep-23	northern parula	116	casualty search	70-m cleared plot	scavenged	40.72545	-86.8962
26-Sep-23	unidentified passerine	137	casualty search	70-m cleared plot	scavenged	40.70867	-86.9115
26-Sep-23	unidentified passerine	137	casualty search	70-m cleared plot	scavenged	40.70904	-86.9108
26-Sep-23	unidentified warbler	136	casualty search	70-m uncleared plot	scavenged	40.70859	-86.918
27-Sep-23	unidentified small bird	168	casualty search	100-m road and pad	scavenged	40.61431	-86.8533
27-Sep-23	unidentified warbler	134	casualty search	100-m road and pad	scavenged	40.70838	-86.9333
28-Sep-23	mourning dove	147	casualty search	70-m cleared plot	scavenged	40.68219	-86.8733
28-Sep-23	unidentified wren	147	casualty search	70-m cleared plot	scavenged	40.68234	-86.8742
29-Sep-23	magnolia warbler	108	casualty search	70-m cleared plot	scavenged	40.74294	-86.9332
29-Sep-23	unidentified warbler	108	casualty search	70-m cleared plot	scavenged	40.74328	-86.9334
3-Oct-23	killdeer	130	casualty search	70-m uncleared plot	scavenged	40.70733	-86.963
3-Oct-23	killdeer	152	casualty search	70-m cleared plot	scavenged	40.66991	-86.8444
4-Oct-23	northern rough-winged swallow	158	casualty search	100-m road and pad	intact	40.64487	-86.8577
5-Oct-23	red-eyed vireo	107	casualty search	70-m uncleared plot	intact	40.74275	-86.9396
5-Oct-23	unidentified large bird	134	casualty search	100-m road and pad	dismembered	40.70835	-86.9328
6-Oct-23	unidentified passerine	130	casualty search	70-m uncleared plot	scavenged	40.70723	-86.9626

Appendix A. Carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1–May 15 and August 1–October 15, 2023.

Found Date	Common Name	Turbine	Search Type	Plot Type	Physical Condition	Latitude¹	Longitude¹
9-Oct-23	American redstart	172	casualty search	70-m cleared plot	scavenged	40.61201	-86.832
12-Oct-23	unidentified passerine	107	casualty search	70-m uncleared plot	scavenged	40.74272	-86.9386
12-Oct-23	unidentified passerine	107	casualty search	70-m uncleared plot	scavenged	40.74278	-86.9389
13-Oct-23	golden-crowned kinglet	137	casualty search	70-m cleared plot	intact	40.7085	-86.9114

*Coordinates were not collected for this carcasses due to technological failure.

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

Appendix B1. Searcher efficiency models for 70-meter plots at the Indiana Crossroads Wind Farm, White County, Indiana, August 1 – October 15, 2023.

Covariates	k Value	AICc	Delta AICc
Plot type	0.67	44.05	0
No covariates	0.67	45.26	1.21*

* Selected model.

AICc is corrected Akaike Information Criterion; Delta AICc is the difference between the AICc of a given model and the lowest AICc value.

Appendix B2. Searcher efficiency models for 100-meter roads and pads at the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Covariates	k Value	AICc	Delta AICc
No covariates	0.67	18.28	0*
Season	0.67	18.31	0.03

* Selected model.

AICc is corrected Akaike Information Criterion; Delta AICc is the difference between the AICc of a given model and the lowest AICc value.

Appendix B3. Carcass persistence models with covariates and distributions for 70-meter plots at the Indiana Crossroads Wind Project, White County, Indiana, August 1 – October 15, 2023.

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
No covariates	-	exponential	90.87	0*
No covariates	No covariates	lognormal	91.64	0.77
No covariates	No covariates	loglogistic	92.56	1.69
Plot type	-	exponential	92.63	1.76
No covariates	No covariates	Weibull	93.06	2.19
Plot type	No covariates	lognormal	93.45	2.58
No covariates	Plot type	lognormal	93.80	2.93
Plot type	No covariates	loglogistic	94.44	3.57
No covariates	Plot type	loglogistic	94.75	3.88
Plot type	No covariates	Weibull	95.00	4.13
No covariates	Plot type	Weibull	95.12	4.25
Plot type	Plot type	lognormal	96.11	5.24
Plot type	Plot type	loglogistic	97.08	6.21
Plot type	Plot type	Weibull	97.61	6.74

* Selected model.

AICc is corrected Akaike Information Criterion; Delta AICc is the difference between the AICc of a given model and the lowest AICc value.

Appendix B4. Carcass persistence top models with covariates, distributions, and model parameters for the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Plot Type	Distribution ¹	Estimated Median	
		Removal Times (days)	Parameter 1 ² Parameter 2
70-meter plots	exponential	18.04	0.0384 --
100-meter roads and pads	exponential	5.59	0.1239 --

¹ Parameterization follows the base R parameterization for this distribution.

² The exponential distribution only uses one parameter.

Appendix B5. Carcass persistence models with covariates and distributions for 100-meter roads and pads at the Indiana Crossroads Wind Energy Project, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season	No Covariates	loglogistic	122.8	0
Season	-	exponential	123.06	0.26
Season	No Covariates	lognormal	123.38	0.58
No covariates	No covariates	lognormal	123.44	0.64
No covariates	No covariates	loglogistic	123.50	0.70
Season	Season	loglogistic	124.51	1.71
No covariates	-	exponential	124.56	1.76*
No covariates	Season	lognormal	124.86	2.06
Season	Season	lognormal	124.93	2.13
No covariates	Season	loglogistic	124.96	2.16
Season	No Covariates	Weibull	125.08	2.28
No covariates	No covariates	Weibull	125.86	3.06
Season	Season	Weibull	127.64	4.84
No covariates	Season	Weibull	128.16	5.36

* Selected model.

AICc is corrected Akaike Information Criterion; Delta AICc is the difference between the AICc of a given model and the lowest AICc value.

Appendix B6. Number and percent (%) of bat carcasses found at the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Species	Included in Fatality Estimate		Outside Search Area*		Outside Study Period*		Total	
	Total	%	Total	%	Total	%	Total	%
eastern red bat	330	54.2	4	66.7	28	62.2	362	54.8
silver-haired bat	144	23.7	2	33.3	0	0	146	22.1
big brown bat	74	12.2	0	0	8	17.8	82	12.4
hoary bat	51	8.4	0	0	9	20.0	60	9.1
evening bat	4	0.7	0	0	0	0	4	0.6
Seminole bat	2	0.3	0	0	0	0	2	0.3
unidentified <i>Lasiurus</i> bat	2	0.3	0	0	0	0	2	0.3
big brown bat or silver-haired bat	1	0.7	0	0	0	0	1	0.2
eastern red bat or Seminole bat	1	0.7	0	0	0	0	1	0.2
Total	609	100	6	100	45	100	660	100

Appendix B7. Search area adjustment models for bats from the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Distribution	AICc	Delta AICc
Weibull	23,863.69	0*
normal	23,908.89	45.21
gamma	23,916.98	53.30
Gompertz	24,105.35	241.66

* Selected model.

AICc is corrected Akaike Information Criterion; Delta AICc is the difference between the AICc of a given model and the lowest AICc value.

Appendix B8. Truncated weighted maximum likelihood search area adjustment estimates for the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Plot Type	Area Correction
70-meter plots	0.86
100-meter road and pad	0.21

The carcass density followed a truncated gamma distribution with the following parameters: 1.7988 (Parameter 1) and 0.0319 (Parameter 2) and a left-truncation bound at zero meters.

The number of bat carcasses informing this model is 609.

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

Appendix C1. Inputs needed to run Evidence of Absence (EoA): Single Class Module for the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Season	Plot Type	Search		Spatial Coverage (a)	Searcher Efficiency		Carcass Persistence ¹			
		Interval (l)	Number of Searches ²		Carcasses Available	Carcasses Found	Shape (α)	Scale (β)	Scale Lower Limit (β)	Scale Upper Limit (β)
Spring	100-meter road and pad	7	7	0.21	43	41	N/A	8.07	8.07	12.16
Fall	100-meter road and pad	7	11	0.21	43	41	N/A	8.07	8.07	12.16
Fall	70-meter plots	3.5	22	0.86	41	32	N/A	26.02	14.78	45.83

¹ An exponential distribution was used for the road and pad, cleared, and uncleared plot carcass persistence distributions.

² Includes one additional search beyond what was conducted in the field to account for the EoA graphical user interface assumption that a clearing search is included in the number of searches.

³ Temporal coverage (v) was set to 1, as arrival proportions are accounted for in the Multiple Class Module

N/A = not applicable

Appendix C2. Inputs needed to run Evidence of Absence: Multiple Class Module for the combination of plot types probabilities within a season at the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Season	Plot Type	Arrival Proportion	Ba	Bb	Within-Season Weights (ρ)*
spring	100-meter road and pad	0.11	119.66	770.43	1.00
fall	70-meter plots	0.89	119.15	43.32	0.26
fall	100-meter road and pad	0.11	119.85	770.86	0.72

Ba and Bb are the parameters for the beta distribution used to characterize the probability of detection.

Appendix C3. Inputs needed to run Evidence of Absence: Multiple Class Module for the combination of seasonal detection probabilities at the Indiana Crossroads Wind Farm, White County, Indiana, April 1 – May 15 and August 1 – October 15, 2023.

Season	Plot Type	Ba	Bb	Temporal Coverage (v)	Turbine Operation	Weights (ρ)
spring	100-m road and pad	119.657	770.434	0.11	1.0	0.11
fall	100-m road and pad and 70-m plots	393.523	943.06	0.89	1.0	0.89

Ba and Bb are the parameters for the beta distribution used to characterize the probability of detection.

m = meter

Appendix C4. Inputs needed to run Evidence of Absence: Multiple Years Module for the Indiana Crossroads Wind Farm, White County, Indiana, from 2022 and 2023.

Year	g	95% Confidence Interval	Ba	Bb	Weights (ρ)
2022	0.201	0.170–0.234	122.085	485.401	0.838
2023	0.277	0.255–0.299	444.494	1161.188	1.000

Ba and Bb are the parameters for the beta distribution used to characterize the probability of detection.

Detection Probability (g)

<p>Search Schedule</p> <p>Start of monitoring (yyyy-mm-dd) <input type="text" value="2023-04-01"/></p> <p><input checked="" type="radio"/> Formula</p> <p>Search interval (I) <input type="text" value="7"/></p> <p>Number of searches <input type="text" value="7"/></p> <p><input type="radio"/> Custom <input type="button" value="Edit/View"/></p> <p>span = 182, I (mean) = 7</p> <p>Spatial coverage (a) <input type="text" value="0.21"/></p> <p>Temporal coverage (v) <input type="text" value="1"/></p> <p><input type="button" value="Estimate g"/></p>	<p>Searcher Efficiency</p> <p><input type="radio"/> Carcasses available for several searches</p> <p>95% CIs: p ∈ [0.532, 0.677], k ∈ [0.648, 0.815]</p> <p>$\hat{p} = 0.62, \hat{k} = 0.735$ <input type="button" value="View"/> <input type="button" value="Edit"/></p> <p><input checked="" type="radio"/> Carcasses removed after one search</p> <p>Carcasses available <input type="text" value="43"/></p> <p>Carcasses found <input type="text" value="41"/></p> <p>$\hat{p} = 0.953$, with 95% CI = [0.859, 0.99]</p> <p>Factor by which searcher efficiency changes with each search (k) <input type="text" value="0.674"/></p>	<p>Persistence Distribution</p> <p><input type="radio"/> Use field trials to estimate parameters <input type="button" value="View/Edit"/></p> <p>Distribution: Lognormal with shape (α) = 4.078 and scale (β) = 1.171</p> <p>r = 0.531 for Ir = 7, with 95% CIs: r = [0.411, 0.677], β = [0.488, 1.854]</p> <p><input checked="" type="radio"/> Enter parameter estimates manually <input type="button" value="View"/></p> <p>Parameters</p> <p>Exponential <input checked="" type="radio"/></p> <p>Weibull <input type="radio"/></p> <p>Log-Logistic <input type="radio"/></p> <p>Lognormal <input type="radio"/></p> <p>shape (α) <input type="text" value="0.124"/></p> <p>scale (β) <input type="text" value="8.07"/> lwr <input type="text" value="5.36"/> upr <input type="text" value="12.16"/></p> <p>r = 0.669 for Ir = 7, with 95% CI: r ∈ [0.558, 0.76]</p>
--	---	---

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 = 0.134, 95% CI = [0.113, 0.156]

Fitted beta distribution parameters for estimated g: Ba = 127.4778, Bb = 822.9442

Full site for monitored period, 01-Apr-2023 through 20-May-2023

Estimated g = 0.134, 95% CI = [0.113, 0.156]

Fitted beta distribution parameters for estimated g: Ba = 127.4778, Bb = 822.9442

Temporal coverage (within year) = 1

Searched area for monitored period, 01-Apr-2023 through 20-May-2023

Estimated g = 0.639, 95% CI = [0.535, 0.736]

Fitted beta distribution parameters for estimated g: Ba = 54.7072, Bb = 30.9535

=====

Input:

Search parameters

trial carcasses placed = 43, carcasses found = 41

estimated searcher efficiency: p = 0.953, 95% CI = [0.859, 0.99]

k = 0.674

Search schedule: Search interval (I) = 7, number of searches = 7, span = 49

spatial coverage: 0.21 temporal coverage: 1

Carcass persistence:

Exponential persistence distribution

scale (β) = 8.07

95% CI β = [5.36, 12.16] and r = 0.669 for Ir = 7 with 95% CI = [0.558, 0.76]

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 2023, 100-meter road and pad searches at 72 turbines, 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% CIs: p ∈ [0.532, 0.677], k ∈ [0.648, 0.815]

$\hat{p} = 0.62, \hat{k} = 0.735$

Carcasses removed after one search

Carcasses available

Carcasses found

$\hat{p} = 0.953$, with 95% CI = [0.859, 0.99]

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 Ir = 7, with 95% CIs: r = [0.411, 0.677], β = [0.488, 1.854]

Enter parameter estimates manually

Parameters

shape (α)

scale (β) lwr upr

r = 0.669 for Ir = 7, with 95% CI: r ∈ [0.558, 0.76]

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 = 0.134, 95% CI = [0.113, 0.158]

Fitted beta distribution parameters for estimated g: Ba = 118.9471, Bb = 766.4311

Full site for monitored period, 01-Aug-2023 through 17-Oct-2023

Estimated g = 0.134, 95% CI = [0.113, 0.158]

Fitted beta distribution parameters for estimated g: Ba = 118.9471, Bb = 766.4311

Temporal coverage (within year) = 1

Searched area for monitored period, 01-Aug-2023 through 17-Oct-2023

Estimated g = 0.64, 95% CI = [0.531, 0.742]

Fitted beta distribution parameters for estimated g: Ba = 50.0378, Bb = 28.1796

Input:

Search parameters

trial carcasses placed = 43, carcasses found = 41

estimated searcher efficiency: p = 0.953, 95% CI = [0.859, 0.99]

k = 0.674

Search schedule: Search interval (I) = 7, number of searches = 11, span = 77

spatial coverage: 0.21 temporal coverage: 1

Carcass persistence:

Exponential persistence distribution

scale (β) = 8.07

95% CI β = [5.36, 12.16] and r = 0.669 for Ir = 7 with 95% CI = [0.558, 0.76]

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 2023, 100-meter road and pad searches at 53 turbines 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 [Edit/View](#)

span = 182, I (mean) = 7

Spatial coverage (a)

Temporal coverage (v)

[Estimate g](#)

Searcher Efficiency

Carcasses available for several searches

95% CIs: p ∈ [0.532, 0.677], k ∈ [0.648, 0.815]

$\hat{p} = 0.62, \hat{k} = 0.735$ [View](#) [Edit](#)

Carcasses removed after one search

Carcasses available

Carcasses found

$\hat{p} = 0.78$, with 95% CI = [0.638, 0.885]

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

Persistence Distribution

Use field trials to estimate parameters [View/Edit](#)

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

r = 0.653 for I = 3.5, with 95% CIs: r = [0.535, 0.778], β = [0.488, 1.854]

Enter parameter estimates manually [View](#)

Parameters

Exponential

shape (α)

Weibull

scale (β) lwr upr

Log-Logistic

Lognormal

r = 0.936 for I = 3.5, with 95% CI: r ∈ [0.89, 0.963]

Fatality estimation (M, λ)

Carcass Count (X) [Estimate M](#)

Credibility level (1 - α) [Estimate \$\lambda\$](#)

One-sided CI (M*) Two-sided CI

[Close](#)

```

Estimated detection probability (g)
Summary statistics for estimation of detection probability (g)
=====
Results:
Full site for full year
  Estimated g = 0.733, 95% CI = [0.662, 0.798]
  Fitted beta distribution parameters for estimated g: Ba = 118.6771, Bb = 43.2586

Full site for monitored period, 01-Aug-2023 through 17-Oct-2023
  Estimated g = 0.733, 95% CI = [0.662, 0.798]
  Fitted beta distribution parameters for estimated g: Ba = 118.6771, Bb = 43.2586
  Temporal coverage (within year) = 1

Searched area for monitored period, 01-Aug-2023 through 17-Oct-2023
  Estimated g = 0.852, 95% CI = [0.765, 0.922]
  Fitted beta distribution parameters for estimated g: Ba = 64.7302, Bb = 11.2277

=====
Input:
Search parameters
  trial carcasses placed = 41, carcasses found = 32
  estimated searcher efficiency: p = 0.78, 95% CI = [0.638, 0.885]
  k = 0.674
  Search schedule: Search interval (I) = 3.5, number of searches = 22, span = 77
  spatial coverage: 0.86    temporal coverage: 1

Carcass persistence:
  Exponential persistence distribution
  scale ( $\beta$ ) = 26.02
  95% CI  $\beta$  = [14.78, 45.83] and r = 0.936 for I = 3.5 with 95% CI = [0.89, 0.963]
  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 2023, 70-meter plot searches at 19 turbines 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]
Fall_fp	0.27	0	119.15	43.32	0.7334	[0.663, 0.798]
Fall_rp	0.73	0	119.85	770.86	0.1346	[0.113, 0.158]

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]
Fall_fp	0.27	0	119.2	43.32	0.733	[0.663, 0.798]
Fall_rp	0.73	0	119.8	770.9	0.135	[0.113, 0.158]

Results for full site

Detection probability

Estimated g = 0.296, 95% CI = [0.272, 0.321]

Fitted beta distribution parameters for estimated g: Ba = 393.5879, Bb = 935.0487

Mortality

Test of assumed relative weights (rho)

Class	Assumed	Fitted (95% CI)
unsearched	0.000	NA
Fall_fp	0.270	[0.001, 0.969]
Fall_rp	0.730	[0.030, 0.999]

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

Appendix C8. Screen shot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for fall plot types 2023, (n= 72), searched at a 7-day interval for 100-meter roads and pads, and a 3.5-day interval for 70-m plots.

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	119.66	770.43	0.1344	[0.113, 0.158]
Fall	0.89	0	393.523	943.06	NA	NA

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	119.7	770.4	0.134	[0.113, 0.158]
Fall	0.89	0	393.5	943.1	0.294	[0.270, 0.319]

Results for full site

Detection probability
Estimated g = 0.277, 95% CI = [0.255, 0.299]
Fitted beta distribution parameters for estimated g: Ba = 444.4946, Bb = 1161.1882

Mortality

Test of assumed relative weights (rho)

Class	Assumed	Fitted (95% CI)
unsearched	0.000	NA
Spring	0.110	[0.011, 0.997]
Fall	0.890	[0.003, 0.989]

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 seasonal detection probabilities 2023, (n = 72 plots in spring, 72 in fall), searched at a 7-day interval in the spring, a 7-day interval in the fall for 100-meter roads and pads, and a 3.5-day interval in the fall for 70-meter plots.

EoA, v2.0.7 - Multiple Years Module

Edit Help

Past monitoring and operations data

Year	ρ	X	Ba	Bb	\hat{g}	95% CI
2022	0.838	0	122.085	485.401	0.201	[0.17, 0.234]
2023	1	0	444.494	1161.188	0.2768	[0.255, 0.299]

Options

Fatalities

Estimate M Credibility level (1 - α)

Total mortality One-sided CI (M*)
 Two-sided CI

Project parameters

Total years in project
Mortality threshold (T)

Track past mortality

Projection of future mortality and estimates

Future monitoring and operations

g and ρ unchanged from most recent year

g and ρ constant, different from most recent year
 g 95% CI: ρ

g and ρ vary among future years

Average Rate

Estimate average annual fatality rate (λ)

Annual rate threshold (τ)

Credibility level for CI (1- α)

Short-term rate ($\lambda > \tau$) Term: α

Reversion test ($\lambda < \rho \tau$) ρ α

Actions

Short-term Trigger

Short-term trigger: Test of average fatality rate (λ) over 2 years
Years: 2022 - 2023

=====

Results

Estimated overall detection probability: $g = 0.242$, 95% CI = [0.224, 0.261]
Ba = 484.44, Bb = 1515.4

Estimated annual fatality rate over the past 2 years: $\lambda = 1.034$, 95% CI = [0.00102, 5.2]
P($\lambda > 2$) = 0.1643
Compliance: Cannot infer $\lambda > 2$ with 95% credibility

Input

Threshold for short-term rate (τ) = 2 per year

Period	rel_wt	X	Ba	Bb	ghat	95% CI
2022	0.838	0	122.1	485.4	0.201	[0.170, 0.234]
2023	1.000	0	444.5	1161	0.277	[0.255, 0.299]

Appendix C10. Screen shot of Evidence of Absence (v2.0.7; EOA) graphical user interface (GUI), Multiple Years Module inputs for estimation of annual fatality rate (λ) for 2023.

Note: Although the weight (ρ) column of the Multiple Years Module sums to 1.838, the EoA GUI produces a “year-adjusted λ ” by calculating the average λ over the number of input rows (years) in the multi-year module of the GUI. Because the ρ values associated with each year in the GUI are scaled so that a “ ρ ” of 1.0 is equivalent to a typical operations year for the Project (but some turbines were not operating during parts of 2022), we would like to calculate the “ ρ -adjusted λ ,” but the GUI does not accommodate that calculation. Therefore, the “ ρ -adjusted λ ,” 1.13, is equivalent to the “year-adjusted λ ” (1.034, as seen in the output above) divided by the sum of ρ (1.838) multiplied by the number of years (two).