Post-construction Monitoring Study

Sugar Creek Wind Project

Logan County, Illinois

Final Report

April 1 – October 15, 2023

Prepared for:

Sugar Creek Wind One LLC

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INTRODUCTION AND BACKGROUND

The Sugar Creek Wind Project (Project), located in Logan County, Illinois (Figure 1), is owned by Sugar Creek Wind One LLC (Sugar Creek), a subsidiary of Algonquin Power Company, and is operated by Liberty Power. Sugar Creek obtained a US Fish and Wildlife Service (USFWS) Incidental Take Permit (ITP; ESPER0047644) for the federally listed as endangered Indiana bat (*Myotis sodalis*) and northern long-eared bat (*M. septentrionalis*; hereafter, Covered Species) dated July 15, 2022. Sugar Creek also obtained Incidental Take Authorization (ITA) from the Illinois Department of Natural Resources (IDNR) for the Covered Species on December 22, 2022. Both the USFWS ITP and IDNR ITA require the Project to minimize impacts to the Covered Species and conduct post-construction monitoring (PCM).

Western EcoSystems Technology, Inc. (WEST) completed a third year of post-construction monitoring (PCM) at the Project in 2023 in accordance with the Project's Habitat Conservation Plan (HCP; version dated April 29, 2022; Liberty Power 2022) and Bird and Bat Conservation Strategy (version dated September 30, 2017; Sugar Creek 2017). The 2023 PCM was the second year of the Intensive Monitoring Phase under the Project's ITP. The objectives of this study were to estimate take of the Covered Species and estimate the overall bat fatality rate as specified in the HCP and BBCS. This report presents the results of the 2023 year of monitoring conducted at the Project from April 1 – October 15, 2023.

PROJECT LOCATION

The Project is located approximately 13 kilometers (eight miles) west of the city of Lincoln, Illinois (Figure 1). Topography is categorized by gentle, rolling hills largely composed of cultivated croplands and developed areas (Liberty Power 2021). Land cover in the Project is dominated by agriculture (i.e., row crop and pasture) with small creeks and drainages interspersed throughout. Small areas of hay/pasture, woody wetlands, deciduous forest, and open water are also present within the Project (National Land Cover Database 2021; Figure 2).

The Project is a 202-megawatt (MW) wind energy facility that became operational in 2020 and consists of 57 wind turbines: 17 Vestas V110s 2.0-MW turbines that have a 95-meter (m; 312-foot [ft]) hub height and 54-m (177-ft) blade length, and 40 Vestas V150s 4.2-MW turbines that have a 110-m (361-ft) hub height and 75-m (246-ft) blade length. All turbines were within the migratory range of the Covered Species, therefore, to minimize the impacts, all turbines were feathered below wind speeds of 5.0 m/second (m/s; 16.4 ft/s) from sunset to sunrise when temperatures were above 10 degrees Celsius (°C; 50° Fahrenheit [F]) during the fall migration period (August 1 – October 15; Table 1). Additionally, all turbines were feathered below the manufacturers cut-in speed of 3.0 m/s (9.8 ft/s) from sunset to sunrise when temperatures were above 4°C (40 F) during the summer maternity season and spring migration period, and winter (March 15 – July 31 and October 16 – March 14, respectively; Table 1).

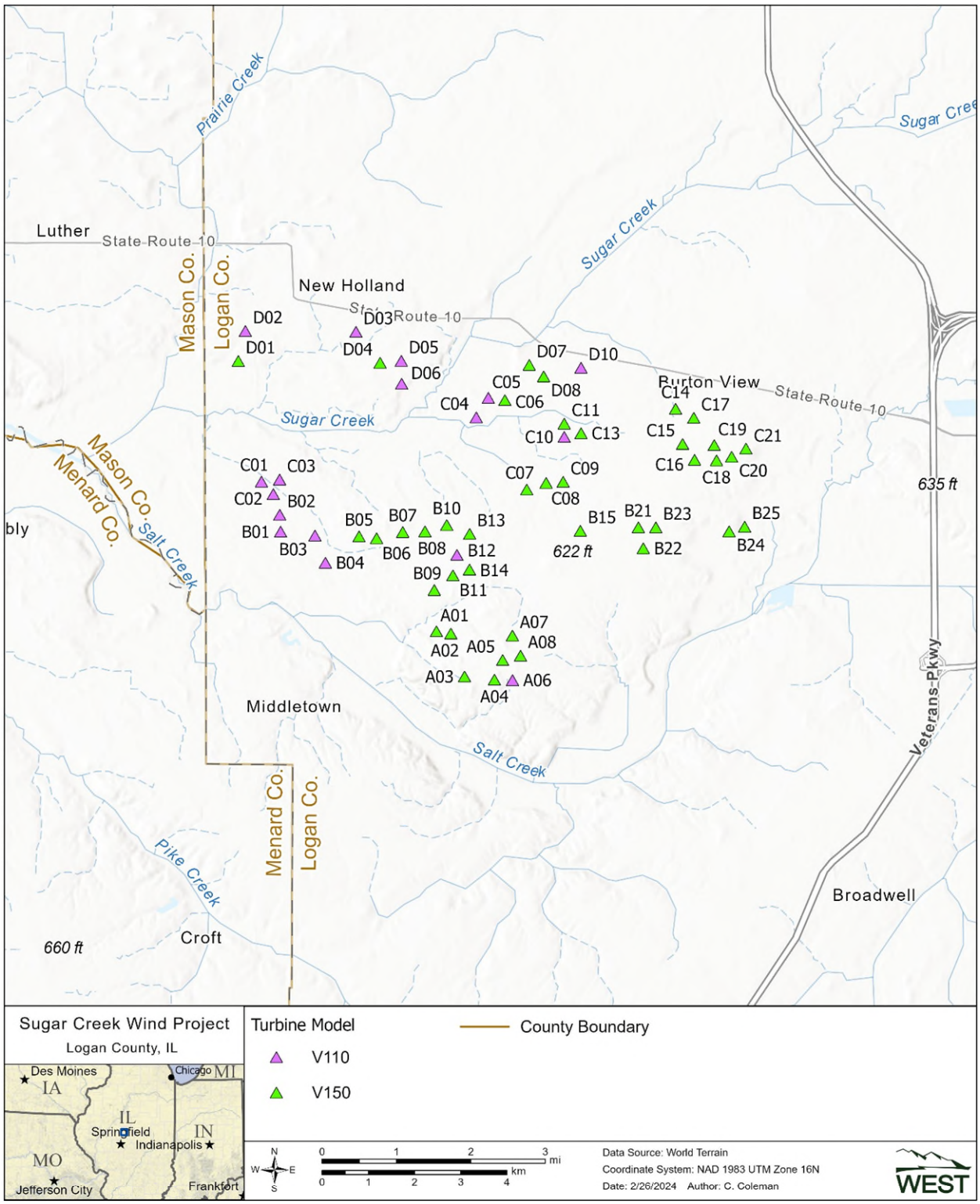

Figure 1. Location of turbines at the Sugar Creek Wind Project, Logan County, Illinois.

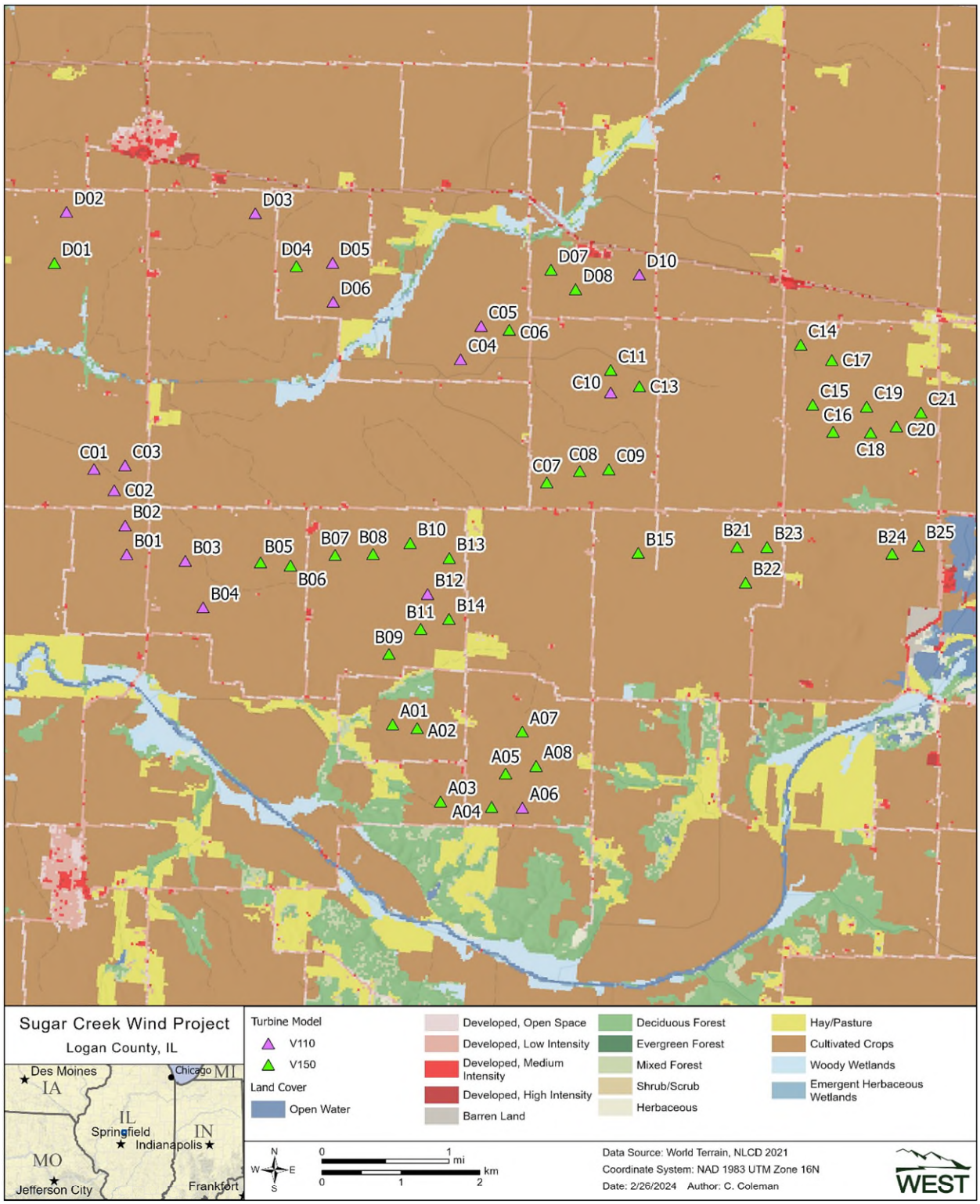

Figure 2. Land cover at the Sugar Creek Wind Project, Logan County, Illinois.

Table 1. Seasonal curtailment[1] regime at the Sugar Creek Wind Project, Logan County, Illinois.

Temperature	Spring and Summer: March 15 – July 31	Fall: August 1 – October 15	Winter: October 16 – March 14
Less than 4°C (40°F)	Uncurtailed	Uncurtailed	Uncurtailed
4–10°C (40–50°F)[2]	3.0 m/s	3.0 m/s	3.0 m/s
Greater than 10°C (50°F)	3.0 m/s	5.0 m/s	3.0 m/s

1. The manufacturer's cut-in wind speed is 3.0 meters per second (m/s; 9.8 feet [ft]/s) across the Project turbines.

2. Turbines will be feathered below cut-in when temperatures are above the threshold. Feathering means that turbine blades will be pitched into the wind such that they spin at less than one rotation per minute.

°C = degrees Celsius; °F = degrees Fahrenheit.

METHODS

WEST followed PCM methods outlined in the Project's HCP for the Intensive Monitoring Phase, which targeted a probability of detection (*g*) above 0.20 for the Covered Species to meet the monitoring commitments.

Standardized Carcass Searches

Number of Turbines Sampled, Search Frequency, and Plot Size

Technicians conducted standardized carcass searches at all 57 turbines from April 1 – October 15, 2023. Search effort varied by season (Table 2), consistent with the Project's HCP. Searches were conducted within three types of search areas: gravel turbine access roads and pads, gravel turbine access roads and pads with a 5-m (16-ft) cleared buffer, or full plots (Table 2, Figure 3). The gravel portions of road and pad areas were searched out to 100 m (328 ft) from the turbine base at all 57 turbines weekly during the spring and summer (April 1 – July 31, 2023), and five days per week at 42 turbines during fall (August 1 – October 15, 2023). During fall, vegetation within a 5-m buffer around each road and pad, and at all full plots was mowed and maintained by Project staff to increase the search area and enhance detectability of carcasses. Full plot searches were conducted at 15 turbines within cleared areas centered on the turbines and searched five days per week from August 1 – October 15, 2023, which exceeded the level of effort in the HCP. The full plots were larger than specified in the HCP to reflect the different turbine sizes: 60-m (197-ft) radius circles at nine V110s 2.0 MW turbines and 70-m (230-ft) radius circles at six V150s 4.2 MW turbines.

Table 2. Assignment of transect searches by season and search interval at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Season	# Full Plot Turbines	# Road and Pad Turbines	Search Interval
Spring (April 1 – May 31)	0	57	Once per week
Summer (June 1 – July 31)	0	57	Once per week
Fall (August 1 – October 15)	15[1]	42[2]	Five days per week

1. Nine turbines each had a 60-meter (m; 197-foot [ft]) radius and the remaining six each had a 70-m (230-ft) radius.

2. Fall road and pad search areas included a 5-m (16-ft) cleared buffer around each road and pad

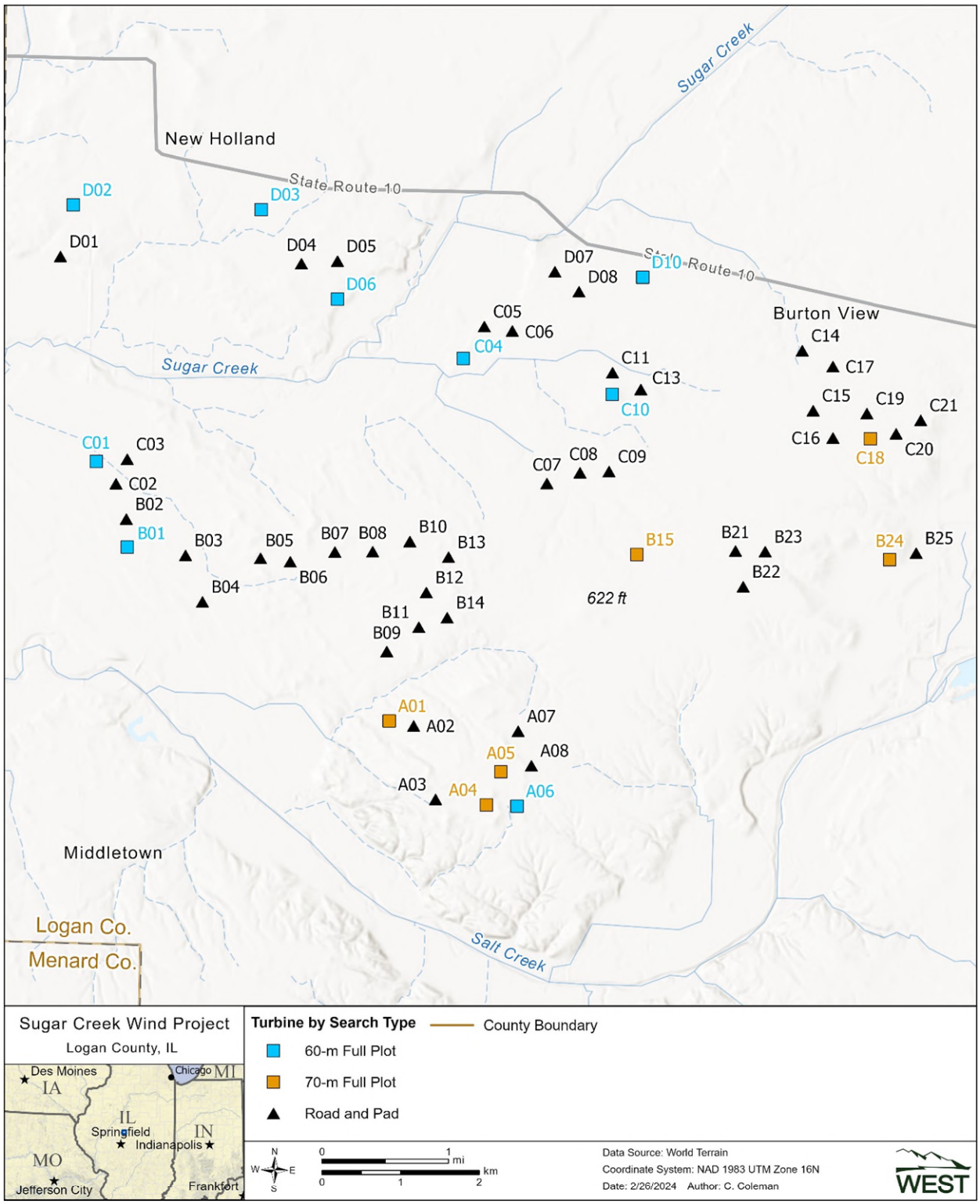

Figure 3. Location of turbines by search type at the Sugar Creek Wind Project, Logan County, Illinois.

Search Methods

Technicians trained in proper search techniques conducted carcass searches and looked for carcasses while walking at a pace of approximately 45.0–60.0 m (148.0–197.0 ft) per minute (min) within search areas. At road and pad turbines, the technician walked the access road starting at 100 m from the turbine and walked towards the turbine, around the turbine along the gravel pad, and back towards their vehicle, searching out 2.5 m (8.2 ft) on each side until the entire road and pad was searched. During fall, technicians also walked transects spaced 2.5-m apart in the 5.0-m buffers of road and pad plots. For full plots, technicians walked transects spaced at approximately 5.0 m intervals while scanning the ground for carcasses within 2.5 m of each transect. The technician commenced searching at one side of the full plot and systematically searched the entire plot in a north/south or east/west direction.

Data Collection

Technicians recorded the date, search start and end times, technician name, turbine number, type of search, and if any carcasses were found during each scheduled search. Although the Covered Species are the focal species of the study, all bird and bat carcasses were recorded and collected. When a carcass was found, technicians placed a flag near it and continued the search. After searching the entire road and pad or full plot, the technician returned to each carcass and recorded the date and time found, technician name, species, sex, and age of the carcass (when possible), turbine number, distance and azimuth from turbine, location of carcass using geographic coordinate system (latitude and longitude), habitat surrounding carcass, estimated time since death (i.e., zero to one day, two to three days, four to seven days, eight to 14 days, 15–30 days, or more than 30 days), and condition of carcass (e.g., intact, scavenged, dismembered).

Carcasses found in non-search areas (i.e., outside of a plot boundary), or outside of the scheduled search time, were coded as incidental discoveries and were documented following the same protocol for those found during standard searches.

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

- Intact—a carcass that was entirely in one piece, not badly decomposed, and showed no sign of being fed upon by a predator or scavenger
- Scavenged—a carcass that showed signs of being fed upon by a predator or scavenger but was otherwise complete; or a portion(s) of a carcass in one location (e.g., wings, skeletal remains, part of a carcass), or a carcass that has been heavily infested by insects
- Dismembered—all portions of a single carcass found in multiple pieces that are distributed more than 1.0 m (3.3 ft) apart from one another, due to scavenging or other reasons
- Injured—a bat or bird found alive but impaired in some way

For bird carcasses, the following category was also used if needed:

- Feather spot—10 or more feathers (excluding down), or two or more primary feathers at one location indicating predation or scavenging of a bird carcass

Technicians took digital photographs of each carcass, including any visible injuries, and surrounding habitat. Bat carcasses were collected under the Project's USFWS ITP ESPER0047644, WEST's Federal Native Endangered and Threatened Species Recovery Permit TE234121-10, WEST's State Endangered and Threatened Species Scientific Permit 1531, and individual salvage permits: NH23.6975, NH23.7011, NH23.7012, NH23.7010, NH23.6976, NH23.6877, NH23.6978, and NH23.6819. Bird carcasses were collected under the Project's Federal Migratory Bird Special Purpose – Utility Permit (MBPER1772639). Technicians placed all 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 carcasses to eliminate possible transmission of rabies or other diseases. Live, injured bats and birds were recorded and considered fatalities for analysis purposes when observed in search areas and were handled in accordance with permit conditions (left in place).

Carcass Identification and Agency Notification

A federally permitted bat biologist (Meredith Hoggatt ESPER0039249; Pallavi Sirajuddin TE62046D-0) identified all bat carcasses via photos and/or in hand at the end of the surveys. Biologists experienced in identifying Midwestern bird species and their feathers verified all bird carcass identifications. The USFWS and the IDNR were notified within 24 hours of positive identification of any state- or federally listed species.

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 and submitted to the East Stroudsburg University Wildlife Genetics Institute for identification via deoxyribonucleic acid (DNA) analysis.

Bias Trials

Searcher Efficiency Trials

The objective of searcher efficiency (SEEF) trials was to collect data to estimate the probability a technician detected bat carcasses. No bird carcasses were placed for searcher efficiency trials. This effort accounted for any biases associated with changes in conditions such as search plot type, vegetation, topography, and weather (e.g., rain and/or cloud cover, muddy plots), and technician variability that may affect SEEF.

SEEF trials commenced with the start of carcass searches and were conducted in the same areas where searches took place throughout the study period. SEEF trials were stratified by search area (road and pad and full plot) and season. A bias trial administrator (administrator) placed SEEF trial carcasses (SEEF carcasses) in search areas to keep technicians unaware of when and where the SEEF carcasses were placed. Non-*Myotis* bats found on site were used as SEEF

carcasses. A random number generator was used to produce the location (distances and bearing) for the SEEF carcasses within plot boundaries.

The administrator placed 94 bat carcasses in random locations. Prior to placement, each SEEF carcass was marked discreetly with electrical tape around one leg so it could be identified as a SEEF carcass. The administrator dropped SEEF carcasses from waist height or higher and allowed them to land in a random posture. To avoid attracting scavengers, no more than two SEEF carcasses were placed at a single turbine at the same time. Technicians conducting carcass searches recorded the location of any SEEF carcasses found. Immediately following the trial, the bias trial administrator determined the number of SEEF carcasses that were available for detection during the trial.

Carcass Persistence Trials

The objective of carcass persistence trials (CPT) was to collect data to estimate the average probability a bat carcass remained available to be found during the search interval. The data collected were used to adjust for the potential bias of carcasses removed during carcass searches. CPT were conducted throughout the survey period to incorporate the effects of varying weather, climatic conditions, and scavenger densities. Possible means of carcass removal included predators, scavengers, insects, or agricultural practices, such as being plowed into a field. Estimates of bat carcass persistence were used to adjust the total number of bat carcasses found as compared to those removed from the search area. A random number generator was used to produce the distances and bearing for the trial carcasses within plot boundaries.

The administrator placed 71 bat carcasses for CPT. The same bat species used for SEEF trials also were used for CPT. Carcasses were marked discreetly with electrical tape around a leg for recognition by technicians and other personnel, and then dropped from waist height or higher and allowed to land in a random posture within the search area.

CPT carcasses were monitored over a 30-day period according to the following schedule: every day for the first seven days, then on days 10, 14, 21, and 30. The condition of carcasses was recorded each time the CPT carcasses were checked. The schedule varied slightly depending on weather, turbine maintenance, and coordination with other survey work. Following the 30-day period, any remaining evidence of carcasses was removed.

Search Area Mapping

Technicians recorded the boundaries of the spring and summer 100-m roads and pads, the fall 100-m roads and pad with the 5-m buffer, and fall full plot boundaries using a Trimble submeter Global Positioning Satellite unit. Unsearchable areas within plot boundaries were also mapped. The plot boundaries were used to verify if carcasses were found inside the search areas, and to inform the distribution of carcasses around turbines to estimate the number of carcasses that fell inside or outside of search areas.

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 surveys, technicians were responsible for inspecting data forms for completeness, accuracy, and legibility. Potentially erroneous data were identified using a series of database queries. Irregular codes or data suspected as questionable were discussed with the technician and/or Project Manager. Errors, omissions, or problems identified in later stages of analysis were traced back to the raw data forms, and appropriate changes and measures were implemented. A Microsoft® SQL database was developed to store, organize, and retrieve survey data. All data forms and electronic data files were retained for reference.

Statistical Analysis

The Evidence of Absence (EoA; Dalthorp et al. 2017) modeling framework was used to estimate the probability of detecting Covered Species. Additionally, per the Project's HCP, the all-bat fatality estimate was calculated using GenEst (a generalized estimator of fatality; Dalthorp et al. 2018, Simonis et al. 2018).

Searcher Efficiency Estimation

EoA uses raw SEEF data (e.g., number of found and available trial carcasses) to inform overall probability of detection. However, to determine if SEEF data should be pooled, or separated by strata such as season and/or plot type, we modeled searcher efficiency using logistic regression. Model selection was completed using an information theoretic approach known as AICc, or corrected Akaike Information Criterion (Burnham and Anderson 2002). The best model was selected as the most parsimonious model within two AICc units of the model with the lowest AICc value. SEEF data were input into the EoA software according to the model selection results.

The change in SEEF 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 SEEF remained constant no matter how many times a carcass was missed. An assumed value of $k = 0.65$ was used to calculate bat fatality estimates using EoA, per the HCP.

Carcass Persistence Estimation

Data collected during CPT's were used to estimate the probability carcasses remained available to be located by the searcher, given the search interval (i.e., the time between scheduled searches). The average probability a carcass persisted was estimated using an interval-censored survival regression with four potential distributions: exponential, log-logistic, lognormal, and Weibull distributions (Kalbfleisch and Prentice 2002, Dalthorp et al. 2018). Covariates (explanatory variables of interest) were fit to each of the parameters of the distributions and the covariates considered were season and plot type. The best 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 (α [shape] and β [scale], including the 95% confidence interval of β) were used as inputs in the EoA Single Class module.

Search Area Adjustment Estimate

The search area adjustment accounted for unsearched areas beneath turbines and was calculated as a probability that ranged from zero to one. For example, an area adjustment of 0.75 meant that an estimated 75% of carcasses fell within the search area. Unsearched areas were due to survey obstacles such as ground cover (e.g., tall crops) or terrain, or areas where carcasses fell outside the search area (e.g., a carcass landed 70 m away from the turbine on a plot searched out to 60 m from the turbine base). The area adjustment was estimated as the product of the unsearched 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-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 carcass locations. The TWL approach uses weights based on probability of detection and the proportion of area searched in each 1-m annulus around the turbine. Due to the variation in turbine sizes (hub heights range from 95–110 m [312–361 ft] and blade lengths range from 54–75 m [177–246 ft] in diameter) carcass-density distribution models were fit for each turbine size separately and compared to additional models fit with data pooled across all turbine sizes. The pooled turbine size model was chosen, thus the only difference in area correction estimates across turbines is due to the proportions of area searched. Distributions considered were normal, gamma, Gompertz, and Weibull (parameterized according to R Development Core Team [2016] and Yee [2010]). Fitted models were checked for validity and excluded from consideration if the estimated variance was negative or infinite, if the statistical fitting algorithm returned indicated an error, or if the fitted distribution indicated less than 5% of carcasses within the maximum search radius (after Dalthorp and Huso 2023). The best model was selected using AICc after excluding invalid models.

Carcasses Excluded from Area Correction Calculations

Carcasses were excluded from the analysis when the carcass was discovered outside of the spatial and temporal scope of the survey design. For example, carcasses found outside a designated plot were not included in the analysis because the TWL fitting procedure accounts for unsearched areas. Carcasses found prior to the start of surveys (e.g., a carcass found on a plot in the spring that was estimated to have died prior to April 1) were also excluded because the carcass occurred outside of the study period. Note that carcasses found on a plot incidentally (e.g., found by maintenance personnel) were included in the analysis if that plot had a scheduled search in the future, but within the same season. If a carcass of a Covered Species was found outside of the spatial or temporal scope of the survey design, it would be excluded from the search area adjustment but would be included in the EoA fatality estimate following Dalthorp et al. (2020).

Overall Fatality Rate Estimation

Carcasses included in the all-bat fatality rate estimation were found within the search areas (plots) and had an estimated time of death within the study period. Fatality estimates were calculated for bats, by season and for the entire study period, using GenEst (Dalthorp et al. 2018, Simonis et al. 2018). To obtain an overall fatality estimate, each carcass included in the analysis was adjusted for SEEF, carcass persistence, *k*, and a search area adjustment. Estimates and 90% CI were calculated using a parametric bootstrap (Dalthorp et al. 2018). The relative number of

turbines sampled within each plot type was used to weight each plot type estimate within each season, resulting in an overall estimate by season. The overall estimates for each season were then summed to generate an overall estimate for the entire study period.

Covered Species Take and Evidence of Absence Detection Probabilities

EoA was used to estimate the median cumulative take to-date (M^*) and mean annual take rate (λ) for the Covered Species. Estimates were calculated using the EoA method (Dalthorp et al. 2017), using the Single Class, Multiple Class, and Multiple Years modules of EoA.

The overall *g* was estimated using the EoA Software (Dalthorp et al. 2017). The EoA method utilizes data from PCM to estimate site-wide *g*. Estimating an annual *g* is a 3-step process: first, the single stratum module is used to estimate *g* within each search stratum (e.g., search area type within season), second, search strata are combined within each season to estimate detection probability for each season, and, third, seasonal detection probabilities are combined to estimate an annual detection probability.

Single-stratum detection probability estimates were computed using the EoA Single Class module with inputs that described the estimated carcass removal rate, estimated SEEF rates, and temporal search effort. Data were not available to estimate the detection probability reduction factor (*k*), so an assumed value of 0.65 was used as stated in the Project HCP. Adjustments for the number of turbines searched were not included in the single-stratum detection probability estimates. Rather, unsearched turbines were given their own strata with near-zero detection probabilities[1] where relevant (D. Dalthorp, US Geological Survey, pers. comm., 2017), resulting in a searched area adjustment to the seasonal detection probabilities. For the purposes of this analysis, it is assumed that all turbines were operational for the entire study period.

Stratum-specific detection probabilities were combined into seasonal detection probabilities using the EoA multiple class module where the weights for each stratum (density-weighted proportion in the EoA software) were the fraction of Project turbines within the stratum.

Seasonal detection probabilities were combined into a whole-site, whole-year detection probability using the EoA multiple class module where the weights for each stratum were then assumed seasonality of risk for Covered Species which, has previously been estimated as 11% in spring and 89% in fall (USFWS 2016).

Assessment of Adaptive Management Triggers

As specified in the Project's HCP, evaluation of EoA and the annual PCM to determine the need for adaptive management will take place after Year 3 of post-ITP issuance operations. As the 2023 PCM was the second year of monitoring under the Project's ITP, adaptive management triggers were not evaluated.

[1] EoA cannot analyze zero-valued detection probabilities. An arbitrarily low detection probability (10^{-5}) was used instead by specifying a beta (0.01, 1,000) distribution for the detection probability.

RESULTS

Standardized Carcass Searches

There were 3,726 searches completed across all seasons (spring = 452; summer = 440; fall = 2,834). Two hundred sixty-eight searches (full plot = 104; road and pad = 59; road and pad with buffer = 105; 7.2%) were missed due to turbine and access road maintenance, vegetation height, or unsafe weather conditions.

Overall Carcasses Found

Four hundred seventy bat carcasses were found during carcass searches (Table 3; Appendix A). Twenty-six bat carcasses were found outside the search areas, outside the study period (died prior to the study period), or found during plot setup, prior to the study starting; therefore, these carcasses were not included in analysis. Seventy-eight bird carcasses were found during searches (Appendix A); however, no birds were included in the analysis (Table 3).

Table 3. Number and percent (%) of carcasses by species included and excluded from analysis at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

	Included in Fatality Estimate		Outside Search Area*		Outside Study Period*		Other*		Total	
Species	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**
Bat										
eastern red bat	285	60.6	4	57.1	1	50.0	10	58.8	300	60.5
silver-haired bat	75	16.0	2	28.6	0	0	4	23.5	81	16.3
hoary bat	58	12.3	1	14.3	1	50.0	2	11.8	62	12.5
evening bat	25	5.3	0	0	0	0	0	0	25	5.0
big brown bat	21	4.5	0	0	0	0	0	0	21	4.2
unidentified *Lasiurus* bat	4	0.9	0	0	0	0	1	5.9	5	1.0
eastern red bat or Seminole bat	1	0.2	0	0	0	0	0	0	1	0.2
Indiana bat	1	0.2	0	0	0	0	0	0	1	0.2
Overall Bats	**470**	**100**	**7**	**100**	**2**	**100**	**17**	**100**	**496**	**100**
Bird										
common yellowthroat	0	0	0	0	0	0	7	8.9	7	8.9
horned lark	0	0	0	0	0	0	6	7.6	6	7.6
unidentified small bird	0	0	0	0	0	0	5	6.3	5	6.3
chimney swift	0	0	0	0	0	0	5	6.3	5	6.3
killdeer	0	0	0	0	0	0	4	5.1	4	5.1
rock pigeon	0	0	0	0	0	0	4	5.1	4	5.1
blackburnian warbler	0	0	0	0	0	0	3	3.8	3	3.8
ruby-crowned kinglet	0	0	0	0	0	0	3	3.8	3	3.8
red-eyed vireo	0	0	0	0	0	0	3	3.8	3	3.8
Tennessee warbler	0	0	0	0	0	0	3	3.8	3	3.8
great horned owl	0	0	0	0	0	0	2	2.5	2	2.5
house sparrow	0	0	0	0	0	0	2	2.5	2	2.5
magnolia warbler	0	0	0	0	0	0	2	2.5	2	2.5
mourning dove	0	0	0	0	0	0	2	2.5	2	2.5
unidentified passerine	0	0	0	0	0	0	2	2.5	2	2.5
unidentified warbler	0	0	0	0	0	0	2	2.5	2	2.5
white-crowned sparrow	0	0	0	0	0	0	2	2.5	2	2.5

Table 3. Number and percent (%) of carcasses by species included and excluded from analysis at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

	Included in Fatality Estimate		Outside Search Area*		Outside Study Period*		Other*		Total	
Species	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**
yellow-throated vireo	0	0	0	0	0	0	2	2.5	2	2.5
blue-gray gnatcatcher	0	0	0	0	0	0	1	1.3	1	1.3
brown-headed cowbird	0	0	0	0	0	0	1	1.3	1	1.3
brown creeper	0	0	0	0	0	0	1	1.3	1	1.3
cliff swallow	0	0	0	0	0	0	1	1.3	1	1.3
Cooper's hawk	0	0	0	0	0	0	1	1.3	1	1.3
downy woodpecker	0	0	0	0	0	0	1	1.3	1	1.3
European starling	0	0	0	0	0	0	1	1.3	1	1.3
golden-crowned kinglet	0	0	0	0	0	0	1	1.3	1	1.3
indigo bunting	0	0	0	0	0	0	1	1.3	1	1.3
ovenbird	0	0	0	0	0	0	1	1.3	1	1.3
swamp sparrow	0	0	0	0	0	0	1	1.3	1	1.3
turkey vulture	0	0	0	0	0	0	1	1.3	1	1.3
unidentified vireo	0	0	0	0	0	0	1	1.3	1	1.3
Virginia rail	0	0	0	0	0	0	1	1.3	1	1.3
white-breasted nuthatch	0	0	0	0	0	0	1	1.3	1	1.3
yellow-breasted chat	0	0	0	0	0	0	1	1.3	1	1.3
yellow warbler	0	0	0	0	0	0	1	1.3	1	1.3
Overall Birds	**0**	**0**	**0**	**0**	**0**	**0**	**78**	**100**	**78**	**100**

[1.] Carcasses not included in analysis.

Sums may not equal total values shown due to rounding.

Species Composition

One Covered Species, a federally listed as endangered Indiana bat, was found on August 22, 2023 (Table 3). The carcass was found approximately six m (20 ft; 40.13832, -89.54623) from Turbine B08. No other federally or state-listed species were found.

Eastern red bat (*Lasiurus borealis*; 300 carcasses; 60.5%) was the most commonly found bat species during surveys and incidentally, followed by silver-haired bat (*Lasionycteris noctivagans*; 81; 16.3%), hoary bat (*Lasiurus cinereus*; 62; 12.5%), evening bat (*Nycticeius humeralis*; 25; 5.0%), big brown bat (*Eptesicus fuscus*; 21; 4.2%), and unidentified *Lasiurus* bat (five; 1.0%). One eastern red or Seminole bat (0.2%) and one Indiana bat (0.2%) were also found during surveys (Table 3; Appendix A).

Bias Trials

Searcher Efficiency Trials

Ninety-four bats were placed for SEEF trials on 11 separate dates and 85 were available for searchers to find (Table 4). The best-fit model indicated that SEEF varied by search area type (Table 5). Overall, the observed SEEF ratios were 86.0% on road and pads and 46.4% on full plots (Table 4).

Table 4. Searcher efficiency results for road and pad search areas at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023, as a function of season and plot search type.

Search Area Type	Season	# Placed	# Available	# Found	% Found
Road and pad	Spring	19	17	17	100
	Summer	16	16	14	87.5
	Fall	26	24	18	75.0
	Overall	**61**	**57**	**49**	**86.0**
Full plot	Fall	33	28	13	46.4
	Overall	**33**	**28**	**13**	**46.4**

Table 5. Searcher efficiency models for bats from the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 85).

Covariates	*k* Value	AICc	Delta AICc
Plot Search Type	k fixed at 0.65	89.06	0*
Season	k fixed at 0.65	89.52	0.46
No Covariates	k fixed at 0.65	101.30	12.24

* Selected model.

k = detection reduction factor; AICc = corrected Akaike Information Criterion; Delta AICc = change in AICc.

Carcass Persistence Trials

Seventy-one carcasses were placed for CPT in search areas throughout the duration of the study (Appendix B). The best-fit model for carcass persistence rates had a loglogistic distribution and indicated that carcass persistence varied by plot search type (Table 6; Appendix B). Due to rounding, the median carcass persistence time for all plot search types was 3.17 days (Table 6).

The average probability a carcass persisted through the weekly search interval on roads and pads was 0.53 (90% CI: 0.45–0.61) in the spring and 0.52 (90% CI: 0.44–0.59) in the summer. The average probability a carcass persisted through the five times per week search interval in the fall was 0.88 (90% CI: 0.82–0.93) on road and pads and 0.73 (90% CI: 0.66–0.81) on full plots (Figure 4).

Table 6. Carcass persistence top models with covariates, distributions, and model parameters for the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Search Area Type	Distribution	Predicted Median Removal Time (days)	Parameter 1	Parameter 2
Road and pad	loglogistic*	3.17	shape = 1.578	scale = 1.154
Full plot	loglogistic*	3.17	shape = 0.722	scale = 1.154

* Parameterization follows the FAdist parameterization for this distribution.

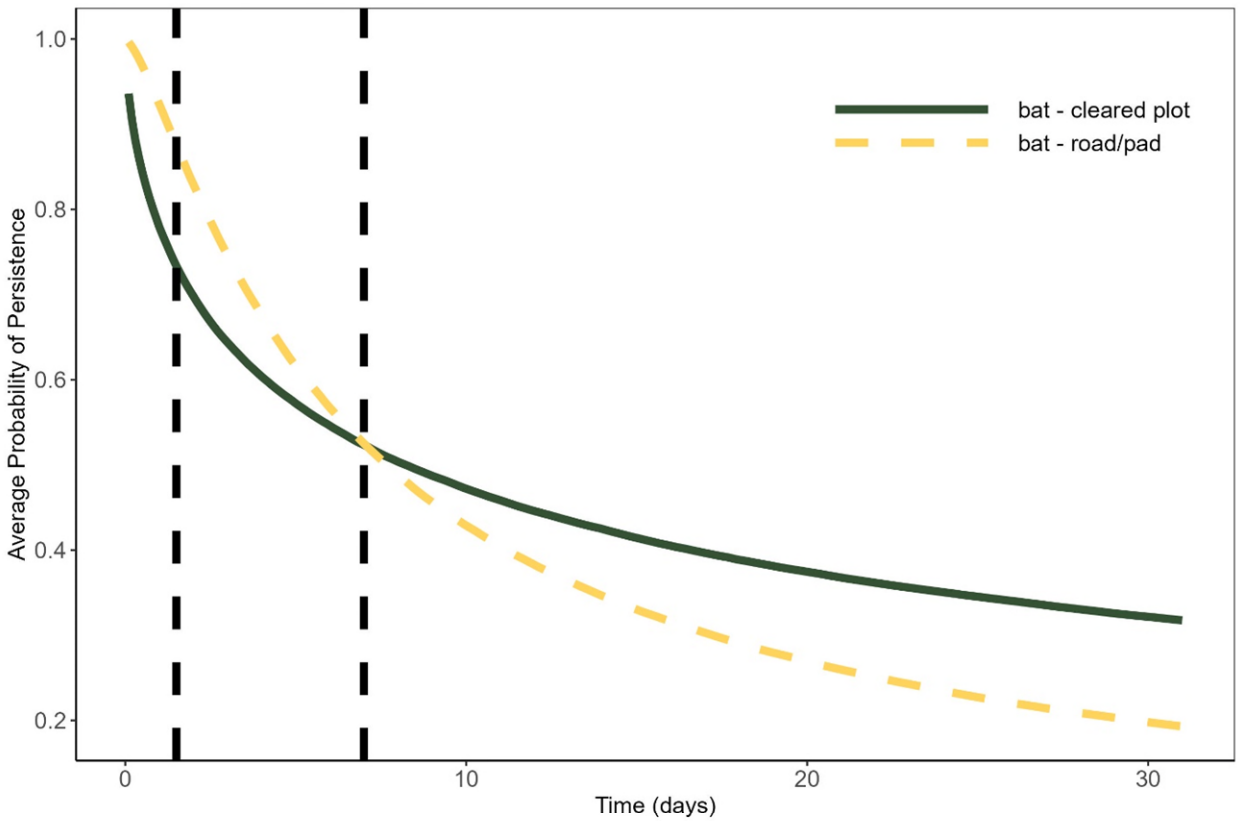

Figure 4. The average probability of carcass persistence on road and pads and full plots over time (in days) at 2.0-megawatt (MW) and 4.2-MW turbines at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Note: The vertical dashed lines indicate the five times per week and weekly search intervals for the full plot and road and pad search areas.

Search Area Adjustment

The best model selected by AICc for carcass-density distribution of bats from the pooled turbine size data was a Gompertz model (Appendix C). The TWL area adjustment for bats at road and pad plots was 0.13 in spring and summer, and 0.21 at road and pad plots with 5-m buffer in fall. The TWL area adjustment at 60-m full plots was 0.75 and 0.84 at 70-m full plots (Table 7; Appendix C).

Table 7. Truncated weighted maximum likelihood search area adjustment estimates for the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023, for bats (n = 470).

Search Area Size (m)	Season	Area Adjustment	Search Area Type	Distribution	Parameter 1	Parameter 2
100	spring	0.13	100-m road and pad	Gompertz	0.0396	0.0054
	summer	0.13	100-m road and pad	Gompertz	0.0396	0.0054
	fall	0.21	100-m road and pad with 5-m buffer	Gompertz	0.0396	0.0054
60	fall	0.75	60-m full plot	Gompertz	0.0396	0.0054
70	fall	0.84	70-m full plot	Gompertz	0.0396	0.0054

Overall Fatality Estimates

The overall bat fatality estimate was 13.95 bats per MW (90% CI: 11.29–17.83; Table 8a). Bat fatality estimates were highest during the fall, followed by summer, and spring (Table 8b). Inputs used to calculate fatality estimates are presented in Appendix D.

Table 8a. Overall fatality rates per megawatt (MW) and per turbine for overall search area studies conducted at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Search Area	Per MW Estimates		Per Turbine Estimates	
Type	Estimate	90% CI	Estimate	90% CI
Road and pad	14.35	11.45–18.71	52.16	41.72–67.30
Full plot	8.37	6.74–11.39	25.29	20.65–34.26
Overall	**13.95**	**11.29–17.83**	**49.17**	**39.91–62.80**

CI = confidence interval.

Table 8b. Estimated fatality rates, with 90% confidence intervals (CI) at overall search areas for studies conducted at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Search Area	Spring 57 Turbines Searched		Summer 57 Turbines Searched		Fall 57 Turbines Searched	
Type	Estimate	90% CI	Estimate	90% CI	Estimate	90% CI
Estimated Fatality Rates (Fatalities/Turbine/Season)						
Road and pad	4.12	2.33–6.94	10.86	7.26–16.06	37.08	30.08–46.70
Full plot	n/a*	n/a*	n/a*	n/a*	25.29	20.65–34.26
Overall	**4.12**	**2.33–6.94**	**10.86**	**7.26–16.06**	**34.02**	**28.32–42.22**
Estimated Fatality Rates (Fatalities/Megawatt/Season)						
Road and pad	1.14	0.64–1.99	3.10	2.04–4.79	10.07	8.20–12.72
Full plot	n/a*	n/a*	n/a*	n/a*	8.37	6.74–11.39
Overall	**1.14**	**0.64–1.99**	**3.10**	**2.04–4.79**	**9.64**	**8.06–12.06**

* Not applicable; full plot searches were not conducted in the spring and summer.

Covered Species Take Estimates and Probability of Detection (g)

One Indiana bat carcass was found during the 2023 study. To date, two Indiana bats and zero northern long-eared bats have been found during PCM at the Project. The overall g achieved for the 2023 study period was 0.216 (95% CI: 0.201–0.231; Table 9). 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 E. Appendix F includes representative screenshots of the inputs for the Single Class and Multiple Class Modules.[2]

[2] There may be very minor differences between screenshots (Appendix E) and the results in the main text because EoA is a stochastic estimator, leading to slightly different estimates each time the modules are run.

Table 9. Probability of detection (g), Ba, and Bb, at the Sugar Creek Wind Project, Logan County, Illinois.

Year	Ba[1]	Bb[1]	*g*[1]	90% CI
2021	11,354.711	80,708.378	0.123	0.122–0.125
2022	49.125	424.596	0.104	0.082–0.128
2023	426.664	1,552.003	0.216	0.201–0.231
2021–2023	490.353	2,769.178	0.150	0.140–0.161
2022–2023	304.545	1,602.841	0.160	0.146–0.174

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

CI = confidence interval of *g*.

Mean annual take rates based on the combined 2021[3]–2023 monitoring years were estimated to be 6.21 (90% CI: 1.42–13.78) Indiana bats per year and 1.24 (90% CI: 0–4.78) northern long-eared bats per year. Cumulative take under the ITP to date (2022 and 2023 monitoring years), *M*,* at α = 0.5 (50th credible bound), is estimated to be seven Indiana bats and one northern long-eared bat.

Adaptive Management Triggers

As the 2023 PCM was the second year of monitoring under the Project's ITP, adaptive management triggers were not evaluated, per the HCP.

CONCLUSION

During the 2023 monitoring period, Intensive Monitoring was conducted in accordance with the HCP, and one covered species carcass was found. As per the HCP, adaptive management triggers will be evaluated after Year 3 (2024) of monitoring under the permit term.

Per the Project's HCP, PCM will continue at the Project in 2024 under the Annual Monitoring Phase. Annual Monitoring includes weekly searches at the gravel roads and pads of all 57 turbines from August 1 – October 15, 2024.

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[3] The 2021 PCM analysis was updated with turbine operational data, which resulted in an overall g of 0.123.

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Appendix A. Carcasses Found during the 2023 Post-construction Monitoring Surveys at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023

Appendix A1. Species found during carcasses searches and incidentally at Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Species	Scientific Name
Bat	
big brown bat	*Eptesicus fuscus*
eastern red bat	*Lasiurus borealis*
eastern red bat or Seminole bat	–
evening bat	*Nycticeius humeralis*
hoary bat	*Lasiurus cinereus*
Indiana bat	*Myotis sodalis*
silver-haired bat	*Lasionycteris noctivagans*
unidentified *Lasiurus* bat	–
Bird	
Blackburnian warbler	*Setophaga fusca*
blue-gray gnatcatcher	*Polioptila caerulea*
brown-headed cowbird	*Molothrus ater*
brown creeper	*Certhia americana*
chimney swift	*Chaetura pelagica*
cliff swallow	*Petrochelidon pyrrhonota*
common yellowthroat	*Geothlypis trichas*
Cooper's hawk	*Accipiter cooperii*
downy woodpecker	*Dryobates pubescens*
European starling	*Sturnus vulgaris*
golden-crowned kinglet	*Regulus satrapa*
great horned owl	*Bubo virginianus*
horned lark	*Eremophila alpestris*
house sparrow	*Passer domesticus*
indigo bunting	*Passerina cyanea*
killdeer	*Charadrius vociferus*
magnolia warbler	*Setophaga magnolia*
mourning dove	*Zenaida macroura*
ovenbird	*Seiurus aurocapilla*
red-eyed vireo	*Vireo olivaceus*
rock pigeon	*Columba livia*
ruby-crowned kinglet	*Corthylio calendula*
swamp sparrow	*Melospiza georgiana*
Tennessee warbler	*Leiothlypis peregrina*
turkey vulture	*Cathartes aura*
Virginia rail	*Rallus limicola*
white-breasted nuthatch	*Sitta carolinensis*
white-crowned sparrow	*Zonotrichia leucophrys*
yellow-breasted chat	*Icteria virens*
yellow-throated vireo	*Vireo flavifrons*
yellow warbler	*Setophaga petechia*

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
04/04/2023	eastern red bat	17	B05	carcass search	100-m road and pad	intact
04/06/2023	hoary bat	14	D01	carcass search	100-m road and pad	intact
04/10/2023	eastern red bat	21	A02	carcass search	100-m road and pad	intact
04/12/2023	eastern red bat	13	B24	carcass search	100-m road and pad	injured
04/13/2023	eastern red bat	40	B05	incidental*	n/a	intact
04/13/2023	silver-haired bat	20	B05	incidental*	n/a	intact
04/24/2023	silver-haired bat	45	B13	carcass search**	100-m road and pad	injured
05/08/2023	eastern red bat	10	A05	carcass search	100-m road and pad	scavenged
05/08/2023	silver-haired bat	15	A08	carcass search	100-m road and pad	injured
05/09/2023	eastern red bat	44	C09	carcass search	100-m road and pad	intact
05/10/2023	big brown bat	61	D07	carcass search	100-m road and pad	scavenged
05/11/2023	eastern red bat	12	B09	incidental*	n/a	dismembered
05/15/2023	silver-haired bat	31	A05	carcass search	100-m road and pad	scavenged
05/16/2023	silver-haired bat	13	D02	carcass search	100-m road and pad	dismembered
05/17/2023	eastern red bat	3	C16	carcass search	100-m road and pad	scavenged
05/22/2023	eastern red bat	5	B14	carcass search	100-m road and pad	scavenged
05/22/2023	evening bat	18	B12	carcass search	100-m road and pad	scavenged
05/23/2023	silver-haired bat	21	D01	carcass search	100-m road and pad	scavenged
05/24/2023	eastern red bat	5	C19	carcass search	100-m road and pad	scavenged
05/24/2023	evening bat	20	C14	carcass search	100-m road and pad	scavenged
05/24/2023	evening bat	0	C17	carcass search	100-m road and pad	scavenged
06/05/2023	eastern red bat	9	B07	carcass search	100-m road and pad	scavenged
06/05/2023	silver-haired bat	5	A03	carcass search	100-m road and pad	scavenged
06/06/2023	evening bat	24	B04	carcass search	100-m road and pad	scavenged
06/07/2023	eastern red bat	6	C16	carcass search	100-m road and pad	dismembered
06/07/2023	silver-haired bat	27	B23	carcass search	100-m road and pad	intact
06/12/2023	silver-haired bat	74	A07	carcass search	100-m road and pad	dismembered
06/19/2023	eastern red bat	57	B05	carcass search	100-m road and pad	scavenged
06/27/2023	eastern red bat	9	D08	carcass search	100-m road and pad	scavenged
06/30/2023	eastern red bat	17	C01	carcass search	100-m road and pad	scavenged
07/03/2023	eastern red bat	28	A02	carcass search	100-m road and pad	scavenged
07/03/2023	eastern red bat	70	A07	carcass search	100-m road and pad	scavenged
07/03/2023	eastern red bat	8	B06	carcass search	100-m road and pad	scavenged
07/05/2023	eastern red bat	12	C15	carcass search	100-m road and pad	scavenged
07/10/2023	eastern red bat	18	A04	carcass search	100-m road and pad	intact
07/11/2023	eastern red bat	80	B23	carcass search	100-m road and pad	dismembered

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
07/19/2023	eastern red bat	35	A07	carcass search	100-m road and pad	intact
07/19/2023	eastern red bat	51	B11	carcass search**	100-m road and pad	scavenged
07/19/2023	eastern red bat	9	D01	carcass search	100-m road and pad	scavenged
07/19/2023	eastern red bat	10	D02	carcass search	100-m road and pad	scavenged
07/19/2023	eastern red bat	23	D04	carcass search	100-m road and pad	intact
07/19/2023	evening bat	15	A04	carcass search	100-m road and pad	intact
07/20/2023	eastern red bat	39	B02	carcass search	100-m road and pad	intact
07/20/2023	eastern red bat	25	C14	carcass search	100-m road and pad	scavenged
07/20/2023	eastern red bat	16	C14	carcass search	100-m road and pad	scavenged
07/20/2023	eastern red bat	20	C18	carcass search	100-m road and pad	intact
07/20/2023	hoary bat	50	B23	carcass search	100-m road and pad	dismembered
07/20/2023	hoary bat	31	C20	carcass search	100-m road and pad	scavenged
07/20/2023	unidentified *Lasiurus* bat	18	C17	carcass search	100-m road and pad	dismembered
07/25/2023	hoary bat	15	B06	carcass search	100-m road and pad	intact
07/27/2023	eastern red bat	27	B07	carcass search	100-m road and pad	scavenged
07/27/2023	eastern red bat	20	C17	carcass search	100-m road and pad	dismembered
07/27/2023	eastern red bat	34	C18	carcass search	100-m road and pad	scavenged
07/27/2023	eastern red bat	10	C19	carcass search	100-m road and pad	intact
07/27/2023	evening bat	21	D01	carcass search	100-m road and pad	scavenged
07/27/2023	hoary bat	27	C10	carcass search	100-m road and pad	scavenged
07/27/2023	hoary bat	1	C19	carcass search	100-m road and pad	scavenged
07/27/2023	hoary bat	22	C19	carcass search	100-m road and pad	scavenged
07/31/2023	eastern red bat	10	C11	carcass search	n/a	scavenged
07/31/2023	eastern red bat	15	C13	carcass search	n/a	scavenged
07/31/2023	eastern red bat	32	C16	incidental*	n/a	intact
07/31/2023	eastern red bat	12	C16	incidental*	n/a	intact
07/31/2023	eastern red bat	10	C17	incidental*	n/a	intact
07/31/2023	eastern red bat	20	C20	incidental*	n/a	scavenged
07/31/2023	eastern red bat	13	C21	incidental	n/a	scavenged
07/31/2023	hoary bat	49	D10	incidental*	n/a	intact
08/01/2023	eastern red bat	26	B04	carcass search	100-m road and pad	intact
08/01/2023	eastern red bat	16	B07	carcass search	100-m road and pad	scavenged
08/01/2023	eastern red bat	19	B14	carcass search	100-m road and pad	dismembered
08/01/2023	eastern red bat	48	C03	carcass search	100-m road and pad	scavenged
08/01/2023	eastern red bat	7	C03	carcass search	100-m road and pad	scavenged
08/01/2023	eastern red bat	8	C21	carcass search	100-m road and pad	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/01/2023	eastern red bat	30	D10	carcass search	60-m full plot	intact
08/01/2023	evening bat	16	B07	carcass search	100-m road and pad	scavenged
08/01/2023	evening bat	49	D06	carcass search	60-m full plot	scavenged
08/01/2023	hoary bat	36	A01	carcass search	70-m full plot	scavenged
08/02/2023	big brown bat	27	A06	carcass search	60-m full plot	dismembered
08/02/2023	eastern red bat	11	A01	carcass search	70-m full plot	scavenged
08/02/2023	eastern red bat	31	A04	carcass search	70-m full plot	scavenged
08/02/2023	eastern red bat	49	A04	carcass search	70-m full plot	scavenged
08/02/2023	eastern red bat	16	A05	carcass search	70-m full plot	dismembered
08/02/2023	eastern red bat	4	A05	carcass search	70-m full plot	scavenged
08/02/2023	eastern red bat	6	A07	carcass search	100-m road and pad	scavenged
08/02/2023	eastern red bat	60	B15	carcass search	70-m full plot	scavenged
08/02/2023	eastern red bat	66	B15	carcass search	70-m full plot	scavenged
08/02/2023	eastern red bat	26	B22	carcass search	100-m road and pad	dismembered
08/02/2023	eastern red bat	65	C02	carcass search	100-m road and pad	intact
08/02/2023	eastern red bat	46	C06	carcass search	100-m road and pad	intact
08/02/2023	eastern red bat	72	C17	carcass search	100-m road and pad	scavenged
08/02/2023	eastern red bat	40	D04	carcass search	100-m road and pad	intact
08/02/2023	eastern red bat	31	D08	carcass search	100-m road and pad	scavenged
08/02/2023	evening bat	5	B21	carcass search	100-m road and pad	dismembered
08/02/2023	hoary bat	45	A01	carcass search	70-m full plot	intact
08/02/2023	hoary bat	45	A04	carcass search	70-m full plot	scavenged
08/02/2023	hoary bat	43	B07	carcass search	100-m road and pad	intact
08/02/2023	hoary bat	36	C06	carcass search	100-m road and pad	intact
08/02/2023	hoary bat	37	C10	carcass search	60-m full plot	scavenged
08/03/2023	eastern red bat	22	A07	carcass search	100-m road and pad	intact
08/03/2023	eastern red bat	66	A08	carcass search	100-m road and pad	scavenged
08/03/2023	eastern red bat	25	B15	carcass search	70-m full plot	intact
08/03/2023	hoary bat	43	A01	carcass search	70-m full plot	intact
08/04/2023	eastern red bat	5	A07	carcass search	100-m road and pad	intact
08/04/2023	eastern red bat	19	B10	carcass search	100-m road and pad	intact
08/04/2023	eastern red bat	23	C14	carcass search	100-m road and pad	intact
08/04/2023	eastern red bat	33	C17	carcass search	100-m road and pad	intact
08/04/2023	eastern red bat	56	D02	carcass search	60-m full plot	intact
08/04/2023	eastern red bat	30	D06	carcass search	60-m full plot	intact
08/04/2023	eastern red bat	44	D10	carcass search	60-m full plot	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/04/2023	evening bat	9	C21	carcass search	100-m road and pad	intact
08/04/2023	hoary bat	56	D10	carcass search	60-m full plot	scavenged
08/07/2023	eastern red bat	23	A01	carcass search	70-m full plot	scavenged
08/07/2023	eastern red bat	29	A02	carcass search	100-m road and pad	scavenged
08/07/2023	eastern red bat	66	A04	carcass search	70-m full plot	intact
08/07/2023	eastern red bat	27	C04	carcass search	60-m full plot	intact
08/07/2023	eastern red bat	11	C06	carcass search	100-m road and pad	intact
08/07/2023	eastern red bat	29	C11	carcass search	100-m road and pad	intact
08/07/2023	eastern red bat	31	C18	carcass search	70-m full plot	scavenged
08/07/2023	eastern red bat	35	C18	carcass search	70-m full plot	scavenged
08/07/2023	eastern red bat	26	C19	carcass search	100-m road and pad	scavenged
08/08/2023	eastern red bat	36	B15	carcass search	70-m full plot	scavenged
08/08/2023	eastern red bat	31	B15	carcass search	70-m full plot	dismembered
08/08/2023	eastern red bat	62	C10	carcass search	60-m full plot	intact
08/09/2023	eastern red bat	17	A04	carcass search	70-m full plot	intact
08/10/2023	big brown bat	31	B01	carcass search	60-m full plot	scavenged
08/10/2023	eastern red bat	14	B15	carcass search	70-m full plot	scavenged
08/10/2023	eastern red bat	17	B15	carcass search	70-m full plot	intact
08/10/2023	eastern red bat	16	B23	carcass search	100-m road and pad	intact
08/11/2023	big brown bat	30	A01	carcass search	70-m full plot	scavenged
08/11/2023	big brown bat	12	D08	carcass search	100-m road and pad	scavenged
08/11/2023	evening bat	29	A01	carcass search	70-m full plot	scavenged
08/11/2023	hoary bat	37	A01	carcass search	70-m full plot	scavenged
08/11/2023	hoary bat	65	A04	carcass search	70-m full plot	scavenged
08/12/2023	eastern red bat	3	C01	carcass search	60-m full plot	scavenged
08/12/2023	eastern red bat	55	C01	carcass search	60-m full plot	scavenged
08/12/2023	eastern red bat	59	C02	carcass search	100-m road and pad	intact
08/14/2023	big brown bat	35	A02	carcass search	100-m road and pad	scavenged
08/14/2023	big brown bat	22	A04	carcass search	70-m full plot	intact
08/14/2023	eastern red bat	84	A02	carcass search	100-m road and pad	scavenged
08/14/2023	eastern red bat	6	A03	carcass search	100-m road and pad	scavenged
08/14/2023	eastern red bat	36	B06	carcass search	100-m road and pad	intact
08/14/2023	eastern red bat	60	B08	carcass search	100-m road and pad	intact
08/14/2023	eastern red bat	9	B11	carcass search	100-m road and pad	scavenged
08/14/2023	eastern red bat	17	C01	carcass search	60-m full plot	scavenged
08/14/2023	eastern red bat	5	C03	carcass search	100-m road and pad	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/14/2023	eastern red bat	38	C13	carcass search	100-m road and pad	intact
08/14/2023	eastern red bat	59	C21	carcass search	100-m road and pad	scavenged
08/14/2023	eastern red bat	23	D07	carcass search	100-m road and pad	intact
08/14/2023	evening bat	33	C01	carcass search	60-m full plot	scavenged
08/14/2023	evening bat	8	C16	carcass search	100-m road and pad	scavenged
08/14/2023	evening bat	29	D07	carcass search	100-m road and pad	scavenged
08/14/2023	hoary bat	42	A02	carcass search	100-m road and pad	intact
08/14/2023	hoary bat	0	B03	carcass search	100-m road and pad	scavenged
08/14/2023	hoary bat	29	C03	carcass search	100-m road and pad	scavenged
08/14/2023	hoary bat	16	C14	carcass search	100-m road and pad	scavenged
08/15/2023	big brown bat	5	C11	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	63	A02	carcass search**	100-m road and pad	intact
08/15/2023	eastern red bat	24	A02	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	40	B08	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	6	B14	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	56	C06	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	8	C06	carcass search	100-m road and pad	scavenged
08/15/2023	eastern red bat	26	C09	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	23	C19	carcass search	100-m road and pad	intact
08/15/2023	eastern red bat	18	D02	carcass search	60-m full plot	scavenged
08/15/2023	evening bat	30	C21	carcass search	100-m road and pad	intact
08/16/2023	big brown bat	29	A08	carcass search	100-m road and pad	intact
08/16/2023	eastern red bat	5	A02	carcass search	100-m road and pad	scavenged
08/16/2023	eastern red bat	5	D05	carcass search	100-m road and pad	intact
08/17/2023	eastern red bat	36	B01	carcass search	60-m full plot	scavenged
08/17/2023	eastern red bat	28	D02	carcass search	60-m full plot	scavenged
08/18/2023	eastern red bat	6	A08	carcass search	100-m road and pad	intact
08/18/2023	eastern red bat	59	C20	carcass search	100-m road and pad	intact
08/18/2023	eastern red bat	12	D10	carcass search	60-m full plot	scavenged
08/21/2023	big brown bat	14	B24	carcass search	70-m full plot	scavenged
08/21/2023	big brown bat	24	D04	carcass search	100-m road and pad	dismembered
08/21/2023	eastern red bat	32	A01	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	4	A01	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	36	A02	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	21	A04	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	21	A07	carcass search	100-m road and pad	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/21/2023	eastern red bat	7	A07	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	22	B06	carcass search	100-m road and pad	scavenged
08/21/2023	eastern red bat	44	B06	carcass search	100-m road and pad	scavenged
08/21/2023	eastern red bat	54	B15	carcass search	70-m full plot	intact
08/21/2023	eastern red bat	37	B15	carcass search	70-m full plot	intact
08/21/2023	eastern red bat	53	B23	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	40	B24	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	39	B24	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	6	B24	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	63	B24	carcass search	70-m full plot	scavenged
08/21/2023	eastern red bat	32	C05	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	20	C11	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	71	C13	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	63	C13	carcass search	100-m road and pad	intact
08/21/2023	eastern red bat	14	D02	carcass search	60-m full plot	scavenged
08/21/2023	eastern red bat	63	D10	carcass search	60-m full plot	intact
08/21/2023	evening bat	28	B11	carcass search	100-m road and pad	intact
08/21/2023	hoary bat	32	B02	carcass search	100-m road and pad	intact
08/21/2023	hoary bat	40	B24	carcass search	70-m full plot	scavenged
08/21/2023	hoary bat	9	C13	carcass search	100-m road and pad	intact
08/21/2023	hoary bat	31	C18	carcass search	70-m full plot	intact
08/21/2023	hoary bat	26	C20	carcass search	100-m road and pad	intact
08/22/2023	Indiana bat	6	B08	carcass search	100-m road and pad	intact
08/22/2023	big brown bat	34	B14	carcass search	100-m road and pad	intact
08/22/2023	big brown bat	5	C14	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	9	A07	incidental	100-m road and pad	intact
08/22/2023	eastern red bat	6	A07	incidental	100-m road and pad	intact
08/22/2023	eastern red bat	11	B05	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	66	B08	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	14	B15	carcass search	70-m full plot	scavenged
08/22/2023	eastern red bat	27	B24	carcass search	70-m full plot	scavenged
08/22/2023	eastern red bat	21	B24	carcass search	70-m full plot	scavenged
08/22/2023	eastern red bat	8	B25	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	44	C01	carcass search	60-m full plot	intact
08/22/2023	eastern red bat	36	C07	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	58	C09	carcass search	100-m road and pad	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/22/2023	eastern red bat	5	C11	carcass search	100-m road and pad	scavenged
08/22/2023	eastern red bat	41	C14	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	44	C18	carcass search	70-m full plot	intact
08/22/2023	eastern red bat	8	C19	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	30	C19	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	50	C20	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	15	C21	carcass search	100-m road and pad	intact
08/22/2023	eastern red bat	28	D06	carcass search	60-m full plot	scavenged
08/22/2023	hoary bat	23	B25	carcass search	100-m road and pad	intact
08/22/2023	hoary bat	29	C14	carcass search	100-m road and pad	scavenged
08/22/2023	hoary bat	11	D08	carcass search	100-m road and pad	scavenged
08/23/2023	big brown bat	0	D01	carcass search	100-m road and pad	intact
08/23/2023	eastern red bat	40	A01	carcass search	70-m full plot	intact
08/23/2023	eastern red bat	31	A05	carcass search	70-m full plot	intact
08/23/2023	eastern red bat	25	B24	carcass search	70-m full plot	scavenged
08/23/2023	eastern red bat	15	C05	carcass search	100-m road and pad	scavenged
08/23/2023	eastern red bat	15	D01	carcass search	100-m road and pad	intact
08/23/2023	eastern red bat	46	D10	carcass search	60-m full plot	scavenged
08/23/2023	hoary bat	41	C04	carcass search	60-m full plot	scavenged
08/24/2023	big brown bat	14	B07	carcass search	100-m road and pad	dismembered
08/24/2023	eastern red bat	17	B02	carcass search	100-m road and pad	intact
08/24/2023	eastern red bat	47	B04	carcass search	100-m road and pad	scavenged
08/24/2023	eastern red bat	28	B21	carcass search	100-m road and pad	intact
08/24/2023	eastern red bat	34	B22	carcass search	100-m road and pad	intact
08/24/2023	eastern red bat	62	B24	carcass search	70-m full plot	intact
08/24/2023	eastern red bat	42	B24	carcass search	70-m full plot	intact
08/24/2023	eastern red bat	30	C18	carcass search	70-m full plot	scavenged
08/24/2023	eastern red bat	12	C18	carcass search	70-m full plot	intact
08/24/2023	eastern red bat	23	C18	carcass search	70-m full plot	dismembered
08/24/2023	eastern red bat	12	C19	carcass search	100-m road and pad	intact
08/25/2023	eastern red bat	45	A01	carcass search	70-m full plot	scavenged
08/25/2023	eastern red bat	4	A01	carcass search	70-m full plot	scavenged
08/25/2023	eastern red bat	40	A01	carcass search	70-m full plot	scavenged
08/25/2023	eastern red bat	79	B06	carcass search	100-m road and pad	scavenged
08/25/2023	eastern red bat	11	B14	carcass search	100-m road and pad	intact
08/25/2023	eastern red bat	13	C15	carcass search	100-m road and pad	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/25/2023	eastern red bat	9	C21	carcass search	100-m road and pad	intact
08/25/2023	eastern red bat	38	D01	carcass search	100-m road and pad	intact
08/25/2023	hoary bat	18	A01	carcass search	70-m full plot	intact
08/25/2023	hoary bat	22	A01	carcass search	70-m full plot	scavenged
08/25/2023	hoary bat	20	A03	carcass search	100-m road and pad	dismembered
08/25/2023	unidentified *Lasiurus* bat	15	A03	carcass search	100-m road and pad	dismembered
08/26/2023	big brown bat	6	B15	carcass search	70-m full plot	intact
08/26/2023	big brown bat	5	B25	carcass search	100-m road and pad	scavenged
08/26/2023	eastern red bat	39	A02	carcass search	100-m road and pad	scavenged
08/26/2023	eastern red bat	9	A07	carcass search	100-m road and pad	intact
08/26/2023	eastern red bat	10	B15	carcass search	70-m full plot	intact
08/26/2023	hoary bat	63	B15	carcass search	70-m full plot	intact
08/26/2023	hoary bat	34	B15	carcass search	70-m full plot	intact
08/28/2023	eastern red bat	63	A05	carcass search	70-m full plot	scavenged
08/28/2023	eastern red bat	45	B07	carcass search	100-m road and pad	scavenged
08/28/2023	eastern red bat	23	C01	carcass search	60-m full plot	scavenged
08/28/2023	eastern red bat	50	C03	carcass search	100-m road and pad	scavenged
08/28/2023	eastern red bat	14	C04	carcass search	60-m full plot	scavenged
08/28/2023	eastern red bat	8	C04	carcass search	60-m full plot	scavenged
08/28/2023	eastern red bat	161	C06	incidental**	n/a	scavenged
08/28/2023	eastern red bat	51	C06	carcass search	100-m road and pad	scavenged
08/28/2023	eastern red bat	3	C14	carcass search	100-m road and pad	intact
08/28/2023	eastern red bat	45	C15	carcass search	100-m road and pad	intact
08/28/2023	eastern red bat	32	C18	carcass search	70-m full plot	scavenged
08/28/2023	eastern red bat	6	C21	carcass search	100-m road and pad	scavenged
08/28/2023	eastern red bat	14	D04	carcass search	100-m road and pad	intact
08/28/2023	eastern red bat	40	D05	carcass search	100-m road and pad	intact
08/28/2023	evening bat	12	B08	carcass search	100-m road and pad	scavenged
08/28/2023	hoary bat	22	A06	carcass search	60-m full plot	dismembered
08/28/2023	hoary bat	14	C06	carcass search	100-m road and pad	intact
08/28/2023	hoary bat	5	C08	carcass search	100-m road and pad	intact
08/28/2023	hoary bat	21	C09	carcass search	100-m road and pad	intact
08/28/2023	silver-haired bat	13	A02	carcass search	100-m road and pad	intact
08/28/2023	silver-haired bat	12	A07	carcass search	100-m road and pad	scavenged
08/28/2023	silver-haired bat	47	B24	carcass search	70-m full plot	intact
08/28/2023	silver-haired bat	37	B24	carcass search	70-m full plot	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
08/28/2023	silver-haired bat	16	C08	carcass search	100-m road and pad	scavenged
08/28/2023	silver-haired bat	35	C08	carcass search	100-m road and pad	intact
08/28/2023	silver-haired bat	6	C15	carcass search	100-m road and pad	intact
08/28/2023	silver-haired bat	84	C20	carcass search	100-m road and pad	scavenged
08/28/2023	silver-haired bat	33	C20	carcass search	100-m road and pad	intact
08/29/2023	eastern red bat	22	D03	carcass search	60-m full plot	scavenged
08/29/2023	eastern red bat	9	D07	carcass search	100-m road and pad	scavenged
08/29/2023	hoary bat	41	C18	carcass search	70-m full plot	scavenged
08/29/2023	hoary bat	11	D07	carcass search	100-m road and pad	scavenged
08/29/2023	silver-haired bat	7	B08	carcass search	100-m road and pad	intact
08/29/2023	silver-haired bat	24	D07	carcass search	100-m road and pad	scavenged
08/29/2023	unidentified *Lasiurus* bat	20	C13	carcass search	100-m road and pad	dismembered
08/30/2023	eastern red bat	8	A01	carcass search	70-m full plot	scavenged
08/30/2023	hoary bat	41	C10	carcass search	60-m full plot	scavenged
08/30/2023	silver-haired bat	23	A02	carcass search	100-m road and pad	scavenged
08/30/2023	silver-haired bat	15	B05	carcass search	100-m road and pad	scavenged
08/30/2023	silver-haired bat	25	D04	carcass search	100-m road and pad	intact
08/31/2023	big brown bat	75	B08	carcass search	100-m road and pad	intact
08/31/2023	silver-haired bat	16	B05	carcass search	100-m road and pad	intact
08/31/2023	silver-haired bat	65	B15	carcass search	70-m full plot	scavenged
08/31/2023	silver-haired bat	16	B24	carcass search	70-m full plot	intact
08/31/2023	silver-haired bat	25	C07	carcass search	100-m road and pad	intact
09/01/2023	eastern red bat	29	A04	carcass search	70-m full plot	intact
09/01/2023	eastern red bat	8	A08	carcass search	100-m road and pad	intact
09/01/2023	eastern red bat	30	B03	carcass search	100-m road and pad	intact
09/01/2023	eastern red bat	45	B07	carcass search	100-m road and pad	injured
09/01/2023	eastern red bat	26	B15	carcass search	70-m full plot	dismembered
09/01/2023	eastern red bat	52	C10	carcass search	60-m full plot	intact
09/01/2023	eastern red bat	25	C16	carcass search	100-m road and pad	intact
09/01/2023	hoary bat	32	B08	carcass search	100-m road and pad	intact
09/01/2023	silver-haired bat	29	A02	carcass search	100-m road and pad	intact
09/01/2023	silver-haired bat	27	C09	carcass search	100-m road and pad	intact
09/01/2023	silver-haired bat	16	C11	carcass search	100-m road and pad	intact
09/02/2023	eastern red bat	50	C01	carcass search	60-m full plot	scavenged
09/02/2023	eastern red bat	1	C08	carcass search	100-m road and pad	intact
09/04/2023	big brown bat	28	B24	carcass search	70-m full plot	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
09/04/2023	eastern red bat	2	A03	carcass search	100-m road and pad	intact
09/04/2023	eastern red bat	30	B06	carcass search	100-m road and pad	intact
09/04/2023	eastern red bat	45	B07	carcass search	100-m road and pad	scavenged
09/04/2023	eastern red bat	41	B23	carcass search	100-m road and pad	intact
09/04/2023	eastern red bat	40	B23	carcass search	100-m road and pad	scavenged
09/04/2023	eastern red bat	30	B24	carcass search	70-m full plot	intact
09/04/2023	eastern red bat	10	C08	carcass search	100-m road and pad	scavenged
09/04/2023	eastern red bat	40	C18	carcass search	70-m full plot	scavenged
09/04/2023	eastern red bat	34	D01	carcass search	100-m road and pad	scavenged
09/04/2023	evening bat	16	B24	carcass search	70-m full plot	scavenged
09/04/2023	hoary bat	47	A01	carcass search	70-m full plot	intact
09/04/2023	hoary bat	17	D01	carcass search	100-m road and pad	scavenged
09/04/2023	silver-haired bat	29	B08	carcass search	100-m road and pad	intact
09/04/2023	silver-haired bat	29	B24	carcass search	70-m full plot	scavenged
09/04/2023	silver-haired bat	20	C02	carcass search	100-m road and pad	scavenged
09/04/2023	silver-haired bat	26	C16	carcass search	100-m road and pad	scavenged
09/04/2023	silver-haired bat	52	C17	carcass search	100-m road and pad	scavenged
09/04/2023	silver-haired bat	25	C19	carcass search	100-m road and pad	scavenged
09/04/2023	silver-haired bat	48	C20	carcass search	100-m road and pad	scavenged
09/05/2023	eastern red bat	1	A07	carcass search	100-m road and pad	scavenged
09/05/2023	hoary bat	9	C07	carcass search	100-m road and pad	intact
09/05/2023	silver-haired bat	14	C08	carcass search	100-m road and pad	intact
09/05/2023	silver-haired bat	29	D08	carcass search	100-m road and pad	dismembered
09/06/2023	eastern red bat	17	A01	carcass search	70-m full plot	scavenged
09/06/2023	eastern red bat	53	A01	carcass search	70-m full plot	scavenged
09/06/2023	eastern red bat	46	B01	carcass search	60-m full plot	scavenged
09/06/2023	eastern red bat	52	B06	carcass search	100-m road and pad	scavenged
09/06/2023	eastern red bat	1	C15	carcass search	100-m road and pad	scavenged
09/06/2023	eastern red bat	88	C16	carcass search	100-m road and pad	scavenged
09/06/2023	evening bat	18	A02	carcass search	100-m road and pad	intact
09/06/2023	evening bat	5	B06	carcass search	100-m road and pad	intact
09/06/2023	hoary bat	12	C11	carcass search	100-m road and pad	intact
09/06/2023	silver-haired bat	12	B10	carcass search	100-m road and pad	scavenged
09/06/2023	silver-haired bat	22	C17	carcass search	100-m road and pad	scavenged
09/07/2023	eastern red bat	32	A04	carcass search	70-m full plot	intact
09/07/2023	eastern red bat	18	A07	carcass search	100-m road and pad	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
09/07/2023	eastern red bat	75	B03	carcass search	100-m road and pad	scavenged
09/07/2023	eastern red bat	36	B05	carcass search	100-m road and pad	scavenged
09/07/2023	eastern red bat	70	B06	carcass search	100-m road and pad	scavenged
09/07/2023	eastern red bat	5	B08	carcass search	100-m road and pad	intact
09/07/2023	eastern red bat	14	C06	carcass search	100-m road and pad	scavenged
09/07/2023	evening bat	33	C05	carcass search	100-m road and pad	intact
09/07/2023	hoary bat	69	C10	carcass search	60-m full plot	intact
09/08/2023	eastern red bat	9	B07	carcass search	100-m road and pad	scavenged
09/08/2023	eastern red bat	83	D05	carcass search	100-m road and pad	scavenged
09/08/2023	evening bat	30	B23	carcass search	100-m road and pad	intact
09/08/2023	hoary bat	45	A07	carcass search	100-m road and pad	intact
09/08/2023	hoary bat	16	C06	carcass search	100-m road and pad	intact
09/08/2023	hoary bat	58	C15	carcass search	100-m road and pad	intact
09/08/2023	hoary bat	38	D08	carcass search	100-m road and pad	scavenged
09/08/2023	silver-haired bat	58	D10	carcass search	60-m full plot	scavenged
09/08/2023	unidentified *Lasiurus* bat	38	C18	carcass search	70-m full plot	dismembered
09/09/2023	eastern red bat	47	B01	carcass search	60-m full plot	scavenged
09/09/2023	silver-haired bat	12	B05	carcass search	100-m road and pad	intact
09/11/2023	big brown bat	2	C20	carcass search	100-m road and pad	intact
09/11/2023	eastern red bat	2	A04	carcass search	70-m full plot	intact
09/11/2023	eastern red bat	6	B07	carcass search	100-m road and pad	scavenged
09/11/2023	eastern red bat	57	C05	carcass search	100-m road and pad	scavenged
09/11/2023	eastern red bat	51	C10	carcass search	60-m full plot	scavenged
09/11/2023	eastern red bat	22	D04	carcass search	100-m road and pad	intact
09/11/2023	hoary bat	6	C13	carcass search	100-m road and pad	intact
09/11/2023	hoary bat	33	D02	carcass search	60-m full plot	scavenged
09/11/2023	silver-haired bat	35	B06	carcass search	100-m road and pad	intact
09/11/2023	silver-haired bat	15	B10	carcass search	100-m road and pad	intact
09/11/2023	silver-haired bat	25	B11	carcass search	100-m road and pad	scavenged
09/11/2023	silver-haired bat	21	C08	carcass search	100-m road and pad	intact
09/11/2023	silver-haired bat	1	C13	carcass search	100-m road and pad	intact
09/11/2023	silver-haired bat	2	D04	carcass search	100-m road and pad	scavenged
09/11/2023	silver-haired bat	20	D07	carcass search	100-m road and pad	intact
09/11/2023	silver-haired bat	7	D10	carcass search	60-m full plot	scavenged
09/12/2023	eastern red bat	31	B12	carcass search	100-m road and pad	intact
09/12/2023	silver-haired bat	31	A02	carcass search	100-m road and pad	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
09/12/2023	silver-haired bat	34	B22	carcass search	100-m road and pad	scavenged
09/12/2023	silver-haired bat	34	C21	carcass search	100-m road and pad	intact
09/13/2023	eastern red bat	31	D02	carcass search	60-m full plot	intact
09/13/2023	evening bat	23	A05	carcass search	70-m full plot	intact
09/13/2023	silver-haired bat	11	A07	carcass search	100-m road and pad	intact
09/13/2023	silver-haired bat	21	B15	carcass search	70-m full plot	scavenged
09/13/2023	silver-haired bat	61	C19	carcass search	100-m road and pad	intact
09/14/2023	eastern red bat	28	C16	carcass search	100-m road and pad	intact
09/14/2023	eastern red bat	12	D10	carcass search	60-m full plot	intact
09/14/2023	silver-haired bat	20	A01	carcass search	70-m full plot	scavenged
09/14/2023	silver-haired bat	35	D02	carcass search	60-m full plot	scavenged
09/15/2023	eastern red bat	35	B25	carcass search	100-m road and pad	intact
09/15/2023	silver-haired bat	63	A04	carcass search	70-m full plot	scavenged
09/15/2023	silver-haired bat	19	C10	carcass search	60-m full plot	intact
09/18/2023	eastern red bat	10	B03	carcass search	100-m road and pad	intact
09/18/2023	hoary bat	13	B24	carcass search	70-m full plot	scavenged
09/18/2023	silver-haired bat	21	C19	carcass search	100-m road and pad	intact
09/19/2023	eastern red bat	63	B06	carcass search	100-m road and pad	scavenged
09/19/2023	eastern red bat	38	B07	carcass search	100-m road and pad	scavenged
09/19/2023	eastern red bat	17	B15	carcass search	70-m full plot	scavenged
09/19/2023	eastern red bat	32	B15	carcass search	70-m full plot	scavenged
09/19/2023	eastern red bat	8	C21	carcass search	100-m road and pad	intact
09/19/2023	hoary bat	44	B10	incidental**	100-m road and pad	scavenged
09/19/2023	silver-haired bat	5	B24	carcass search	70-m full plot	intact
09/19/2023	silver-haired bat	4	C07	carcass search	100-m road and pad	scavenged
09/20/2023	eastern red bat	31	A04	carcass search	70-m full plot	intact
09/20/2023	eastern red bat	17	B15	carcass search	70-m full plot	intact
09/20/2023	eastern red bat	37	B23	carcass search	100-m road and pad	scavenged
09/20/2023	hoary bat	72	D05	carcass search	100-m road and pad	scavenged
09/20/2023	silver-haired bat	35	A01	carcass search	70-m full plot	scavenged
09/21/2023	eastern red bat	15	B11	carcass search	100-m road and pad	scavenged
09/22/2023	silver-haired bat	33	C06	carcass search	100-m road and pad	intact
09/25/2023	eastern red bat	23	A02	carcass search	100-m road and pad	intact
09/25/2023	eastern red bat	35	B24	carcass search	70-m full plot	scavenged
09/25/2023	eastern red bat	11	C06	carcass search	100-m road and pad	scavenged
09/25/2023	eastern red bat	10	C14	carcass search	100-m road and pad	dismembered

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
09/25/2023	eastern red bat	19	C14	carcass search	100-m road and pad	scavenged
09/25/2023	eastern red bat	75	D01	carcass search	100-m road and pad	scavenged
09/25/2023	eastern red bat	20	D08	carcass search	100-m road and pad	scavenged
09/26/2023	eastern red bat	53	A04	carcass search	70-m full plot	scavenged
09/26/2023	eastern red bat	22	B14	carcass search	100-m road and pad	scavenged
09/26/2023	eastern red bat	35	B23	incidental	n/a	intact
09/26/2023	eastern red bat	41	B24	carcass search	70-m full plot	scavenged
09/26/2023	eastern red bat	3	B25	carcass search	100-m road and pad	scavenged
09/26/2023	eastern red bat	11	C20	carcass search	100-m road and pad	intact
09/26/2023	eastern red bat	9	D07	carcass search	100-m road and pad	intact
09/26/2023	silver-haired bat	11	C19	incidental	n/a	intact
09/27/2023	eastern red bat	55	B06	carcass search	100-m road and pad	intact
09/27/2023	hoary bat	11	B03	carcass search	100-m road and pad	intact
09/27/2023	silver-haired bat	19	B15	incidental	n/a	scavenged
09/28/2023	eastern red bat	58	C10	carcass search	60-m full plot	intact
09/28/2023	silver-haired bat	16	A02	incidental**	100-m road and pad	intact
09/28/2023	silver-haired bat	4	B06	incidental	n/a	scavenged
09/29/2023	eastern red bat	33	A06	carcass search	60-m full plot	scavenged
09/29/2023	eastern red bat	56	C20	carcass search	100-m road and pad	intact
09/29/2023	eastern red bat	38	D08	carcass search	100-m road and pad	scavenged
09/29/2023	silver-haired bat	7	A05	carcass search	70-m full plot	intact
10/02/2023	eastern red bat	27	A01	carcass search	70-m full plot	scavenged
10/02/2023	eastern red bat	12	B13	carcass search	100-m road and pad	intact
10/02/2023	eastern red bat	47	B24	carcass search	70-m full plot	intact
10/02/2023	eastern red bat	40	C17	carcass search	100-m road and pad	scavenged
10/03/2023	eastern red bat	39	B15	carcass search	70-m full plot	scavenged
10/03/2023	eastern red bat	14	C02	carcass search	100-m road and pad	scavenged
10/03/2023	eastern red bat	26	C16	carcass search	100-m road and pad	intact
10/04/2023	eastern red bat	17	A01	carcass search	70-m full plot	scavenged
10/04/2023	eastern red bat	9	C18	carcass search	70-m full plot	scavenged
10/04/2023	eastern red bat or Seminole bat	33	A02	carcass search	100-m road and pad	dismembered
10/04/2023	hoary bat	14	A02	carcass search	100-m road and pad	intact
10/04/2023	silver-haired bat	33	B15	carcass search	70-m full plot	scavenged
10/06/2023	big brown bat	76	C05	carcass search	100-m road and pad	dismembered
10/06/2023	eastern red bat	27	A06	carcass search	60-m full plot	scavenged
10/06/2023	eastern red bat	29	B02	carcass search	100-m road and pad	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
10/06/2023	eastern red bat	21	B23	carcass search	100-m road and pad	intact
10/06/2023	eastern red bat	32	B24	carcass search	70-m full plot	scavenged
10/06/2023	eastern red bat	62	B24	carcass search	70-m full plot	intact
10/06/2023	eastern red bat	55	C04	carcass search	60-m full plot	intact
10/06/2023	eastern red bat	58	C08	carcass search	100-m road and pad	intact
10/06/2023	eastern red bat	52	C20	carcass search	100-m road and pad	intact
10/06/2023	evening bat	9	B06	carcass search	100-m road and pad	intact
10/07/2023	eastern red bat	40	A04	carcass search	70-m full plot	intact
10/07/2023	evening bat	20	A01	carcass search	70-m full plot	scavenged
10/09/2023	eastern red bat	18	C14	carcass search	100-m road and pad	intact
10/09/2023	eastern red bat	31	C19	carcass search	100-m road and pad	scavenged
10/09/2023	silver-haired bat	27	B07	carcass search	100-m road and pad	intact
10/09/2023	silver-haired bat	10	C14	carcass search	100-m road and pad	intact
10/09/2023	silver-haired bat	66	C20	carcass search	100-m road and pad	intact
10/09/2023	silver-haired bat	72	D05	carcass search	100-m road and pad	scavenged
10/09/2023	silver-haired bat	33	D07	carcass search	100-m road and pad	intact
10/10/2023	silver-haired bat	0	B10	carcass search	100-m road and pad	injured
10/10/2023	silver-haired bat	46	B11	carcass search	100-m road and pad	intact
10/10/2023	silver-haired bat	36	B15	carcass search	70-m full plot	scavenged
10/11/2023	silver-haired bat	48	C06	carcass search	100-m road and pad	intact
10/12/2023	eastern red bat	9	A08	carcass search	100-m road and pad	intact
10/12/2023	eastern red bat	50	B09	carcass search**	100-m road and pad	intact
10/12/2023	eastern red bat	27	C01	carcass search	60-m full plot	injured
10/13/2023	eastern red bat	36	B01	carcass search	60-m full plot	intact
10/13/2023	eastern red bat	23	D10	carcass search	60-m full plot	scavenged
10/13/2023	hoary bat	14	C15	carcass search	100-m road and pad	intact
10/13/2023	hoary bat	26	D04	carcass search	100-m road and pad	intact
10/17/2023	unidentified *Lasiurus bat*	1	C02	incidental*	n/a	scavenged
04/06/2023	swamp sparrow	97	D01	carcass search	100-m road and pad	intact
04/11/2023	mourning dove	0	C21	carcass search	100-m road and pad	intact
04/12/2023	golden-crowned kinglet	46	C02	carcass search	100-m road and pad	intact
04/19/2023	house sparrow	11	B23	carcass search	100-m road and pad	injured
04/25/2023	ruby-crowned kinglet	21	D04	carcass search	100-m road and pad	scavenged
05/01/2023	horned lark	19	B05	carcass search	100-m road and pad	injured
05/10/2023	white-crowned sparrow	61	C16	carcass search	100-m road and pad	scavenged
05/11/2023	white-crowned sparrow	107	B07	incidental**	100-m road and pad	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
05/15/2023	Virginia rail	70	A02	carcass search**	100-m road and pad	intact
05/15/2023	great horned owl	0	Substation	incidental**	n/a	injured
05/17/2023	common yellowthroat	19	C18	carcass search	100-m road and pad	scavenged
06/07/2023	house sparrow	15	B23	carcass search	100-m road and pad	intact
06/14/2023	European starling	41	B22	carcass search	100-m road and pad	intact
06/26/2023	killdeer	49	B06	carcass search	100-m road and pad	dismembered
07/05/2023	cliff swallow	17	C17	carcass search	100-m road and pad	intact
07/06/2023	great horned owl	1	D08	carcass search	100-m road and pad	scavenged
07/10/2023	white-breasted nuthatch	43	B10	carcass search**	100-m road and pad	dismembered
07/27/2023	unidentified passerine	5	B22	carcass search	100-m road and pad	dismembered
07/31/2023	yellow warbler	9	D08	carcass search	n/a	scavenged
08/02/2023	killdeer	52	D10	carcass search	60-m full plot	feather spot
08/07/2023	mourning dove	5	D03	carcass search	60-m full plot	intact
08/08/2023	yellow-breasted chat	42	C13	carcass search	100-m road and pad	scavenged
08/15/2023	unidentified passerine	24	C10	carcass search	60-m full plot	scavenged
08/16/2023	Blackburnian warbler	22	B21	carcass search	100-m road and pad	intact
08/18/2023	yellow-throated vireo	41	D06	carcass search	60-m full plot	intact
08/21/2023	horned lark	25	B24	carcass search	70-m full plot	scavenged
08/23/2023	blue-gray gnatcatcher	34	A04	carcass search	70-m full plot	intact
08/28/2023	Blackburnian warbler	43	A01	carcass search	70-m full plot	intact
08/28/2023	horned lark	28	B24	carcass search	70-m full plot	intact
08/28/2023	horned lark	17	B24	carcass search	70-m full plot	feather spot
08/28/2023	killdeer	37	A05	carcass search	70-m full plot	feather spot
08/28/2023	magnolia warbler	43	B08	carcass search	100-m road and pad	intact
08/28/2023	red-eyed vireo	89	C03	carcass search	100-m road and pad	dismembered
08/29/2023	Tennessee warbler	15	D07	carcass search	100-m road and pad	scavenged
08/30/2023	Cooper's hawk	1	C07	carcass search	100-m road and pad	intact
08/30/2023	Tennessee warbler	28	C13	carcass search	100-m road and pad	scavenged
08/30/2023	chimney swift	43	B03	carcass search	100-m road and pad	intact
08/30/2023	downy woodpecker	54	C19	carcass search	100-m road and pad	intact
08/30/2023	rock pigeon	22	B14	carcass search	100-m road and pad	feather spot
09/01/2023	common yellowthroat	80	C15	carcass search	100-m road and pad	scavenged
09/01/2023	unidentified small bird	29	A06	carcass search	60-m full plot	dismembered
09/04/2023	common yellowthroat	79	D01	carcass search	100-m road and pad	scavenged
09/05/2023	turkey vulture	31	B10	carcass search**	100-m road and pad	intact

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
09/06/2023	common yellowthroat	51	C20	carcass search	100-m road and pad	scavenged
09/06/2023	horned lark	24	B23	carcass search	100-m road and pad	intact
09/07/2023	unidentified small bird	91	B03	carcass search	100-m road and pad	feather spot
09/07/2023	yellow-throated vireo	70	B06	carcass search	100-m road and pad	intact
09/08/2023	Blackburnian warbler	64	C18	carcass search	70-m full plot	scavenged
09/08/2023	unidentified small bird	56	B24	carcass search	70-m full plot	feather spot
09/11/2023	Tennessee warbler	22	C20	carcass search	100-m road and pad	intact
09/12/2023	common yellowthroat	56	A05	carcass search	70-m full plot	scavenged
09/12/2023	common yellowthroat	5	D07	carcass search	100-m road and pad	scavenged
09/12/2023	ovenbird	42	B07	carcass search	100-m road and pad	intact
09/13/2023	unidentified warbler	34	A02	carcass search	100-m road and pad	scavenged
09/15/2023	horned lark	15	B22	carcass search	100-m road and pad	feather spot
09/19/2023	common yellowthroat	43	C06	carcass search	100-m road and pad	intact
09/19/2023	magnolia warbler	8	B06	carcass search	100-m road and pad	scavenged
09/21/2023	chimney swift	40	B24	carcass search	70-m full plot	feather spot
09/21/2023	unidentified small bird	17	B24	carcass search	70-m full plot	dismembered
09/25/2023	brown-headed cowbird	38	C16	carcass search	100-m road and pad	intact
09/26/2023	unidentified small bird	49	B21	carcass search	100-m road and pad	feather spot
09/27/2023	unidentified warbler	14	A02	carcass search	100-m road and pad	scavenged
09/28/2023	red-eyed vireo	33	A02	carcass search	100-m road and pad	intact
09/29/2023	chimney swift	44	C06	carcass search	100-m road and pad	dismembered
09/29/2023	killdeer	1	D07	carcass search	100-m road and pad	intact
10/03/2023	indigo bunting	6	B13	carcass search	100-m road and pad	intact
10/04/2023	chimney swift	45	A01	carcass search	70-m full plot	intact
10/04/2023	chimney swift	95	B06	carcass search	100-m road and pad	scavenged
10/04/2023	red-eyed vireo	8	C16	carcass search	100-m road and pad	scavenged
10/05/2023	rock pigeon	19	B25	carcass search	100-m road and pad	dismembered
10/10/2023	brown creeper	63	B15	carcass search	70-m full plot	scavenged
10/10/2023	rock pigeon	61	B06	carcass search	100-m road and pad	scavenged
10/10/2023	rock pigeon	48	B06	carcass search	100-m road and pad	feather spot
10/10/2023	ruby-crowned kinglet	42	B07	carcass search	100-m road and pad	scavenged
10/11/2023	unidentified vireo	74	C03	carcass search	100-m road and pad	scavenged

Appendix A2. Complete listing of carcasses found at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Found Date	Species	Distance from Turbine (m)	Turbine	Search Type	Search Area Type[1]	Physical Condition
10/13/2023	ruby-crowned kinglet	66	C16	carcass search	100-m road and pad	intact

[1] Fall road and pad search areas included a 5-m (16-ft) cleared buffer around each road and pad.

* Carcass found during scanning searches that were completed per the Project's Eagle Conservation Plan (Stantec Consulting Services, Inc. 2020).

** Carcass was found outside the search area.

m = meter(s); n/a = not applicable.

Appendix B. Carcass Persistence Trial Information and Model Tables for the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023

Appendix B1. All carcasses placed for carcass persistence trials by date, season, species, and turbine at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Date Placed	Season	Species	Turbine	Before Removal*	After Removal**
4/3/2023	Spring	silver-haired bat	C10	5/3/2023	5/3/2023
4/3/2023	Spring	silver-haired bat	D02	4/4/2023	4/5/2023
4/3/2023	Spring	eastern red bat	B03	5/3/2023	5/3/2023
4/3/2023	Spring	eastern red bat	B11	4/6/2023	4/7/2023
4/3/2023	Spring	eastern red bat	B06	4/8/2023	4/9/2023
4/3/2023	Spring	hoary bat	A07	4/17/2023	4/24/2023
4/3/2023	Spring	eastern red bat	B01	4/4/2023	4/4/2023
4/3/2023	Spring	eastern red bat	A06	4/4/2023	4/5/2023
4/3/2023	Spring	eastern red bat	A01	5/3/2023	5/3/2023
4/3/2023	Spring	silver-haired bat	B24	4/4/2023	4/4/2023
4/3/2023	Spring	hoary bat	C07	4/9/2023	4/10/2023
4/3/2023	Spring	eastern red bat	B05	4/6/2023	4/7/2023
4/3/2023	Spring	eastern red bat	A03	4/5/2023	4/6/2023
4/3/2023	Spring	eastern red bat	B10	4/4/2023	4/5/2023
4/3/2023	Spring	eastern red bat	A05	4/6/2023	4/7/2023
4/25/2023	Spring	hoary bat	C03	5/9/2023	5/16/2023
4/25/2023	Spring	eastern red bat	D01	4/27/2023	4/28/2023
4/25/2023	Spring	hoary bat	C07	4/28/2023	4/29/2023
4/25/2023	Spring	silver-haired bat	C04	5/5/2023	5/9/2023
6/12/2023	Summer	eastern red bat	B04	6/14/2023	6/15/2023
6/12/2023	Summer	silver-haired bat	B05	6/13/2023	6/15/2023
6/12/2023	Summer	eastern red bat	A04	6/16/2023	6/18/2023
6/12/2023	Summer	eastern red bat	B10	6/14/2023	6/15/2023
6/12/2023	Summer	hoary bat	A06	6/13/2023	6/13/2023
6/12/2023	Summer	silver-haired bat	B11	6/13/2023	6/14/2023
6/12/2023	Summer	silver-haired bat	A07	6/18/2023	6/18/2023
6/12/2023	Summer	eastern red bat	B13	6/17/2023	6/18/2023
6/26/2023	Summer	eastern red bat	B14	6/26/2023	6/30/2023
6/26/2023	Summer	eastern red bat	B09	6/27/2023	6/27/2023
6/26/2023	Summer	eastern red bat	B10	7/1/2023	7/2/2023
6/26/2023	Summer	eastern red bat	A05	6/27/2023	6/27/2023
6/26/2023	Summer	eastern red bat	A01	7/1/2023	7/3/2023
6/26/2023	Summer	eastern red bat	A06	7/26/2023	7/26/2023
6/26/2023	Summer	silver-haired bat	B06	7/6/2023	7/9/2023
6/26/2023	Summer	silver-haired bat	A07	6/27/2023	6/27/2023
8/7/2023	Fall	eastern red bat	C01	9/6/2023	9/6/2023
8/7/2023	Fall	silver-haired bat	B01	8/8/2023	8/9/2023
8/7/2023	Fall	eastern red bat	D06	8/7/2023	8/7/2023
8/7/2023	Fall	eastern red bat	C10	8/7/2023	8/8/2023
8/7/2023	Fall	eastern red bat	B15	8/21/2023	8/28/2023
8/7/2023	Fall	silver-haired bat	B01	8/7/2023	8/7/2023
8/8/2023	Fall	eastern red bat	C16	8/8/2023	8/9/2023
8/8/2023	Fall	hoary bat	C14	8/11/2023	8/12/2023
8/8/2023	Fall	hoary bat	D01	8/10/2023	8/11/2023
8/8/2023	Fall	eastern red bat	B04	8/10/2023	8/11/2023
8/8/2023	Fall	eastern red bat	D07	8/9/2023	8/10/2023
8/8/2023	Fall	eastern red bat	C05	8/9/2023	8/10/2023
8/28/2023	Fall	hoary bat	D04	8/30/2023	8/31/2023
8/28/2023	Fall	eastern red bat	A01	9/3/2023	9/6/2023
8/28/2023	Fall	silver-haired bat	D03	8/29/2023	8/30/2023
8/28/2023	Fall	eastern red bat	C11	8/28/2023	8/29/2023

Appendix B1. All carcasses placed for carcass persistence trials by date, season, species, and turbine at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Date Placed	Season	Species	Turbine	Before Removal*	After Removal**
8/28/2023	Fall	eastern red bat	C11	8/28/2023	8/28/2023
8/28/2023	Fall	eastern red bat	D05	9/3/2023	9/6/2023
8/28/2023	Fall	big brown bat	B09	8/28/2023	8/29/2023
8/28/2023	Fall	big brown bat	B09	9/2/2023	9/3/2023
8/28/2023	Fall	eastern red bat	A01	9/27/2023	9/27/2023
8/28/2023	Fall	silver-haired bat	C04	9/6/2023	9/11/2023
8/28/2023	Fall	eastern red bat	C04	9/6/2023	9/11/2023
8/28/2023	Fall	eastern red bat	D03	9/18/2023	9/27/2023
9/12/2023	Fall	eastern red bat	A06	9/12/2023	9/12/2023
9/12/2023	Fall	hoary bat	C11	9/14/2023	9/15/2023
9/12/2023	Fall	eastern red bat	D02	9/12/2023	9/12/2023
9/12/2023	Fall	eastern red bat	C18	9/12/2023	9/12/2023
9/12/2023	Fall	hoary bat	D04	9/17/2023	9/18/2023
9/12/2023	Fall	eastern red bat	C18	9/15/2023	9/16/2023
9/12/2023	Fall	hoary bat	C03	9/17/2023	9/18/2023
9/12/2023	Fall	eastern red bat	A07	9/15/2023	9/16/2023
9/12/2023	Fall	eastern red bat	A06	9/12/2023	9/12/2023
9/12/2023	Fall	eastern red bat	D02	9/15/2023	9/16/2023
9/12/2023	Fall	hoary bat	C13	9/13/2023	9/14/2023
9/12/2023	Fall	eastern red bat	A07	9/16/2023	9/17/2023

* Last date checked before removal.

** Date checked after removal.

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
No Covariates	Plot Search Type	loglogistic	336.49	0*
Plot Search Type	Plot Search Type	loglogistic	338.36	1.87
No Covariates	Season + Plot Search Type	loglogistic	338.41	1.92
No Covariates	Plot Type Season	loglogistic	338.41	1.92
No Covariates	Plot Search Type	lognormal	338.72	2.23
Season + Plot Search Type	Plot Search Type	loglogistic	340.17	3.68
Season	Season + Plot Search Type	Weibull	340.23	3.74
No Covariates	Season + Plot Search Type	lognormal	340.25	3.76
No Covariates	Plot Type Season	lognormal	340.25	3.76
Plot Search Type	Plot Search Type	lognormal	340.38	3.89
Season	Season + Plot Search Type	loglogistic	340.45	3.96
Plot Search Type	Season + Plot Search Type	loglogistic	340.52	4.03
Season + Plot Search Type	Plot Search Type	lognormal	340.70	4.21
Season	Season + Plot Search Type	lognormal	340.89	4.40
No Covariates	Season + Plot Search Type	Weibull	341.37	4.88
No Covariates	Plot Type Season	Weibull	341.37	4.88
Season + Plot Search Type	Season + Plot Search Type	Weibull	342.17	5.68
Plot Type Season	Season + Plot Search Type	Weibull	342.17	5.68
Season + Plot Search Type	Plot Type Season	Weibull	342.17	5.68
Plot Type Season	Plot Type Season	Weibull	342.17	5.68
Plot Search Type	Season + Plot Search Type	lognormal	342.31	5.82
No Covariates	Plot Search Type + Plot Type Season	lognormal	342.63	6.14
Season	Plot Search Type + Plot Type Season	Weibull	342.78	6.29
Season + Plot Search Type	Plot Search Type	Weibull	342.78	6.29
No Covariates	No Covariates	loglogistic	342.87	6.38
Season + Plot Search Type	Season + Plot Search Type	loglogistic	342.94	6.45
Plot Type Season	Season + Plot Search Type	loglogistic	342.94	6.45
Season + Plot Search Type	Plot Type Season	loglogistic	342.94	6.45
Plot Type Season	Plot Type Season	loglogistic	342.94	6.45
Season	Plot Search Type + Plot Type Season	loglogistic	343.00	6.51
Plot Search Type + Plot Type Season	Plot Search Type	lognormal	343.17	6.68
Season + Plot Search Type	Season + Plot Search Type	lognormal	343.38	6.89
Plot Type Season	Season + Plot Search Type	lognormal	343.38	6.89
Season + Plot Search Type	Plot Type Season	lognormal	343.38	6.89
Plot Type Season	Plot Type Season	lognormal	343.38	6.89

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season	Plot Search Type + Plot Type Season	lognormal	343.43	6.94
Plot Search Type	Season + Plot Search Type	Weibull	343.56	7.07
No Covariates	Plot Search Type + Plot Type Season	Weibull	343.76	7.27
No Covariates	Plot Search Type	Weibull	344.31	7.82
Season	No Covariates	loglogistic	344.70	8.21
Plot Search Type	No Covariates	loglogistic	344.78	8.29
Plot Type Season	Plot Search Type + Plot Type Season	Weibull	344.79	8.30
Plot Search Type + Plot Type Season	Plot Type Season	Weibull	344.79	8.30
No Covariates	No Covariates	lognormal	344.79	8.30
Plot Search Type + Plot Type Season	Plot Search Type	Weibull	345.25	8.76
Season + Plot Search Type	Plot Search Type + Plot Type Season	loglogistic	345.56	9.07
Plot Type Season	Plot Search Type + Plot Type Season	loglogistic	345.56	9.07
Season + Plot Type Season	Plot Search Type	lognormal	345.71	9.22
Season	No Covariates	lognormal	345.77	9.28
Season + Plot Search Type	Plot Search Type + Plot Type Season	lognormal	346.01	9.52
Plot Type Season	Plot Search Type + Plot Type Season	lognormal	346.01	9.52
Plot Search Type + Plot Type Season	Plot Type Season	lognormal	346.01	9.52
Plot Search Type	Plot Search Type + Plot Type Season	Weibull	346.02	9.53
No Covariates	Season	loglogistic	346.55	10.06
Plot Search Type	No Covariates	lognormal	346.55	10.06
Plot Search Type	Plot Search Type	Weibull	346.56	10.07
Season + Plot Search Type	No Covariates	loglogistic	347.01	10.52
Plot Type Season	No Covariates	loglogistic	347.01	10.52
No Covariates	No Covariates	Weibull	347.30	10.81
Season + Plot Search Type	No Covariates	Weibull	347.46	10.97
Plot Type Season	No Covariates	Weibull	347.46	10.97
Season + Plot Search Type	Season + Plot Search Type + Season:Plot Search Type	Weibull	347.51	11.02
Season + Plot Type Season	Plot Type Season	Weibull	347.51	11.02
Season + Plot Type Season	Plot Search Type	Weibull	347.79	11.30
Season + Plot Search Type	No Covariates	lognormal	348.04	11.55
Plot Type Season	No Covariates	lognormal	348.04	11.55
Season + Plot Search Type + Plot Type Season	Plot Search Type	lognormal	348.34	11.85
No Covariates	Season	lognormal	348.34	11.85
Season	Season	loglogistic	348.61	12.12

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season	No Covariates	Weibull	348.72	12.23
Plot Type Season	Season + Plot Type Season	lognormal	348.73	12.24
Season + Plot Type Season	Plot Type Season	lognormal	348.73	12.24
No Covariates	Season + Plot Search Type + Plot Type Season	Weibull	348.77	12.28
Plot Search Type	No Covariates	Weibull	349.07	12.58
Season	Season	lognormal	349.50	13.01
Plot Search Type + Plot Type Season	No Covariates	Weibull	349.85	13.36
Season + Plot Search Type + Plot Type Season	Plot Type Season	Weibull	350.32	13.83
Season + Plot Search Type + Plot Type Season	Plot Search Type	Weibull	350.42	13.93
Plot Search Type + Plot Type Season	No Covariates	lognormal	350.43	13.94
Season + Plot Search Type	Season	loglogistic	351.07	14.58
No Covariates	Season	Weibull	351.28	14.79
Season + Plot Search Type + Plot Type Season	Plot Type Season	lognormal	351.54	15.05
Season + Plot Search Type	Season	lognormal	351.94	15.45
Season + Plot Search Type	Season	Weibull	352.27	15.78
Season + Plot Type Season	No Covariates	Weibull	352.31	15.82
Season + Plot Type Season	No Covariates	lognormal	352.90	16.41
Season	Season	Weibull	353.03	16.54
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	Plot Search Type	lognormal	353.87	17.38
Plot Search Type + Plot Type Season	Season	lognormal	354.48	17.99
Plot Search Type + Plot Type Season	Season	Weibull	354.82	18.33
Season + Plot Search Type + Plot Type Season	No Covariates	Weibull	354.86	18.37
Season + Plot Search Type	–	exponential	354.98	18.49
Plot Type Season	–	exponential	354.98	18.49
Season + Plot Search Type + Plot Type Season	No Covariates	lognormal	355.44	18.95
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	Plot Search Type	Weibull	355.94	19.45
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	Plot Type Season	Weibull	356.23	19.74
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	Plot Search Type	lognormal	356.77	20.28
Season + Plot Type Season	Season	lognormal	357.11	20.62
Plot Search Type + Plot Type Season	–	exponential	357.30	20.81

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season + Plot Type Season	Season	Weibull	357.44	20.95
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	Plot Type Season	lognormal	357.45	20.96
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	Plot Search Type	Weibull	358.85	22.36
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	Plot Type Season	Weibull	359.34	22.85
Season + Plot Type Season	–	exponential	359.69	23.20
Season + Plot Search Type + Plot Type Season	Season	lognormal	359.83	23.34
Season + Plot Search Type + Plot Type Season	Season	Weibull	360.16	23.67
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	No Covariates	Weibull	360.20	23.71
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	Plot Type Season	lognormal	360.56	24.07
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	No Covariates	lognormal	360.79	24.30
Season	–	exponential	361.96	25.47
Season + Plot Search Type + Plot Type Season	–	exponential	362.15	25.66
No Covariates	–	exponential	362.60	26.11
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	Plot Search Type	lognormal	362.89	26.40
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	No Covariates	Weibull	363.01	26.52
Plot Search Type	–	exponential	363.23	26.74
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	No Covariates	lognormal	363.59	27.10
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	Plot Search Type	Weibull	364.97	28.48
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	Season	lognormal	365.54	29.05
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	Season	Weibull	365.87	29.38
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	Plot Type Season	Weibull	365.92	29.43
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	Plot Search Type	lognormal	366.12	29.63

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	Plot Type Season	lognormal	367.14	30.65
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type	–	exponential	367.32	30.83
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	Plot Search Type	Weibull	368.20	31.71
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	Season	lognormal	368.55	32.06
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	Season	Weibull	368.88	32.39
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	No Covariates	Weibull	368.92	32.43
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	Plot Type Season	Weibull	369.39	32.90
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	No Covariates	lognormal	369.50	33.01
Season + Plot Search Type + Plot Type Season + Plot Search Type:Plot Type Season	–	exponential	370.04	33.55
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	Plot Type Season	lognormal	370.61	34.12
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	No Covariates	Weibull	372.03	35.54
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	No Covariates	lognormal	372.62	36.13
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	Plot Search Type	lognormal	372.94	36.45
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	Season	lognormal	374.89	38.40
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	Plot Search Type	Weibull	375.02	38.53
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	Season	Weibull	375.22	38.73
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Plot Search Type:Plot Type Season	–	exponential	375.75	39.26
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Search Type	lognormal	376.55	40.06

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	Plot Type Season	Weibull	376.75	40.26
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	Plot Type Season	lognormal	377.96	41.47
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	Season	lognormal	378.23	41.74
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	Season	Weibull	378.57	42.08
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	No Covariates	Weibull	378.61	42.12
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Search Type	Weibull	378.62	42.13
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season	–	exponential	378.76	42.27
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	No Covariates	lognormal	379.19	42.70
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Type Season	Weibull	380.64	44.15
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Type Season	lognormal	381.86	45.37
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	No Covariates	Weibull	382.08	45.59
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	No Covariates	lognormal	382.67	46.18
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Search Type	lognormal	384.19	47.70
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	–	exponential	385.10	48.61
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	Season	lognormal	385.31	48.82
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season	Season	Weibull	385.65	49.16
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Search Type	Weibull	386.27	49.78

Appendix B2. Carcass persistence models with covariates and distributions for bats at the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023 (n = 71).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	–	exponential	388.45	51.96
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Type Season	Weibull	388.93	52.44
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	Season	lognormal	389.06	52.57
Season + Plot Search Type + Plot Type Season + Season:Plot Type Season + Plot Search Type:Plot Type Season	Season	Weibull	389.40	52.91
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	No Covariates	Weibull	389.44	52.95
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	No Covariates	lognormal	390.02	53.53
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	Plot Type Season	lognormal	390.15	53.66
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	–	exponential	395.53	59.04
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	Season	lognormal	397.02	60.53
Season + Plot Search Type + Plot Type Season + Season:Plot Search Type + Season:Plot Type Season + Plot Search Type:Plot Type Season	Season	Weibull	397.35	60.86

* Selected model.

AICc = corrected Akaike Information Criterion; Delta AICc = change in AICc.

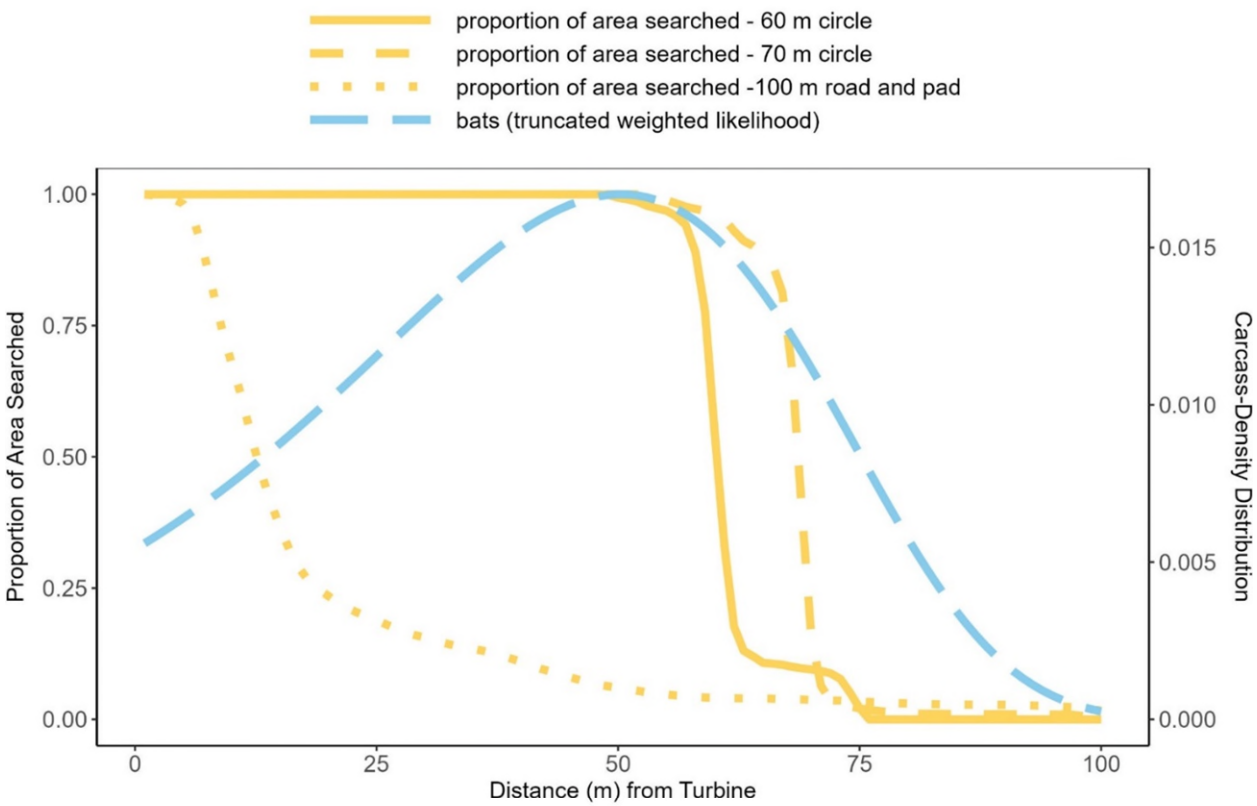
Appendix C. Truncated Weighted Likelihood Area Adjustment Estimate Model Fitting Results for the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Appendix C1. Search area adjustment models for bats from the Sugar Creek Wind Energy Project, Logan County, Illinois, from April 1 – October 15, 2023.

Distribution	AICc	Delta AICc
Gompertz	26,881.84	0*
normal	26,984.11	102.27
Weibull	27,028.36	146.52
gamma	27,131.86	250.02

* Selected model.

AICc = corrected Akaike Information Criterion; Delta AICc = change in AICc.



Appendix C3. Estimated carcass-density distribution for 4.2 megawatt blade length turbines, and proportion of area searched by distance from turbine at Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023. *Fall road and pad search areas included a 5-m (16-ft) cleared buffer around each road and pad.

Appendix D. Bat Fatality Rates and Adjustment Factors Table for the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

Appendix D1. Estimated fatality rates and adjustment factors, with 90% confidence intervals (CI) at 60-meter full plot search areas for studies conducted at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

	Fall 9 turbines searched	
	Estimate	**90% CI**
Search Area Adjustment		
	0.75	0.68–0.81
Searcher Efficiency		
	0.46	0.32–0.62
Average Probability of a Carcass Persisting Through the Search Interval*		
	0.73	0.66–0.81
Probability of Available and Detected		
	0.46	0.35–0.56
Estimated Fatality Rates (Fatalities/Turbine/Season)		
	14.92	11.30–21.06
Estimated Fatality Rates (Fatalities/Megawatt/Season)		
	7.46	5.65–10.53

* The search interval was five times per week.

Appendix D2. Estimated fatality rates and adjustment factors, with 90% confidence intervals (CI) at 70-meter full plot search areas for studies conducted at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

	Fall 6 turbines searched	
	Estimate	**90% CI**
Search Area Adjustment		
	0.84	0.79–0.89
Searcher Efficiency		
	0.46	0.32–0.62
Average Probability of a Carcass Persisting Through the Search Interval*		
	0.73	0.66–0.81
Probability of Available and Detected		
	0.46	0.35–0.56
Estimated Fatality Rates (Fatalities/Turbine/Season)		
	40.75	32.84–56.02
Estimated Fatality Rates (Fatalities/Megawatt/Season)		
	9.70	7.82–13.34

* The search interval was five times per week.

Appendix D3. Estimated fatality rates and adjustment factors, with 90% confidence intervals (CI) at road and pad search areas for studies conducted at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023.

	Spring 57 Turbines Searched		Summer 55 Turbines Searched		Fall 57 Turbines Searched	
	Estimate	**90% CI**	**Estimate**	**90% CI**	**Estimate**	**90% CI**
Search Area Adjustment						
	0.13	0.11–0.16	0.13	0.11–0.16	0.21	0.18–0.25
Searcher Efficiency						
	0.86	0.77–0.92	0.86	0.77–0.92	0.86	0.77–0.92
Average Probability of a Carcass Persisting Through the Search Interval*						
	0.53	0.45–0.61	0.52	0.44–0.59	0.88	0.82–0.93
Probability of Available and Detected						
	0.46	0.38–0.54	0.46	0.38–0.54	0.76	0.68–0.83
Estimated Fatality Rates (Fatalities/Turbine/Season)						
	4.12	2.33–6.94	10.86	7.26–16.06	37.08	30.08–46.70
Estimated Fatality Rates (Fatalities/Megawatt/Season)						
	1.14	0.64–1.99	3.10	2.04–4.79	10.07	8.20–12.72

* The search interval was weekly in spring and summer and five times per week in fall.

Appendix E. Inputs Required to Run the Evidence of Absence Single Class Module and Stratum-Specific *g* Distribution Values at the Sugar Creek Wind Project, Logan County, Illinois, from April 1 – October 15, 2023

Appendix E. Single Class Module Inputs for stratum *g* estimation.

Season	Search Area Type	Turbine MW	# of Turbines Searched	Total # of Turbines	Arrival Proportion	Sampling Fraction	Plot Shape	Plot Size (m)	Start Date	End Date	Search Interval
spring	road and pad	2.0	17	57	0.11	0.30	circle	100	3-Apr	25-May	7.0
		4.2	40	57	0.11	0.70	circle	100	3-Apr	25-May	7.0
fall	full plot	2.0	9	57	0.89	0.16	circle	60	2-Aug	21-Oct	1.5
		4.2	6	57	0.89	0.11	circle	70	2-Aug	21-Oct	1.5
	road and pad	2.0	8	57	0.89	0.14	circle	100	2-Aug	21-Oct	1.5
		4.2	34	57	0.89	0.60	circle	100	2-Aug	21-Oct	1.5

MW = megawatt; m = meters.

Appendix E. (*continued*) Single Class Module Inputs for stratum *g* estimation.

Season	Search Area Type	SEEF	# of SEEF-C Found	# of SEEF-C Placed	*k*	# of Searches	CPT Shape Parameter	CPT Scale Parameter	CPT Scale Parameter–Lower	CPT Scale Parameter–Upper
spring	road and pad	0.86	49	57	0.65	9	1.39	3.17	2.29	4.39
		0.86	49	57	0.65	9	1.39	3.17	2.29	4.39
fall	full plot	0.46	13	28	0.65	48	0.63	3.17	2.29	4.39
		0.46	13	28	0.65	45	0.63	3.17	2.29	4.39
	road and pad	0.86	49	57	0.65	53	1.39	3.17	2.29	4.39
		0.86	49	57	0.65	51	1.39	3.17	2.29	4.39

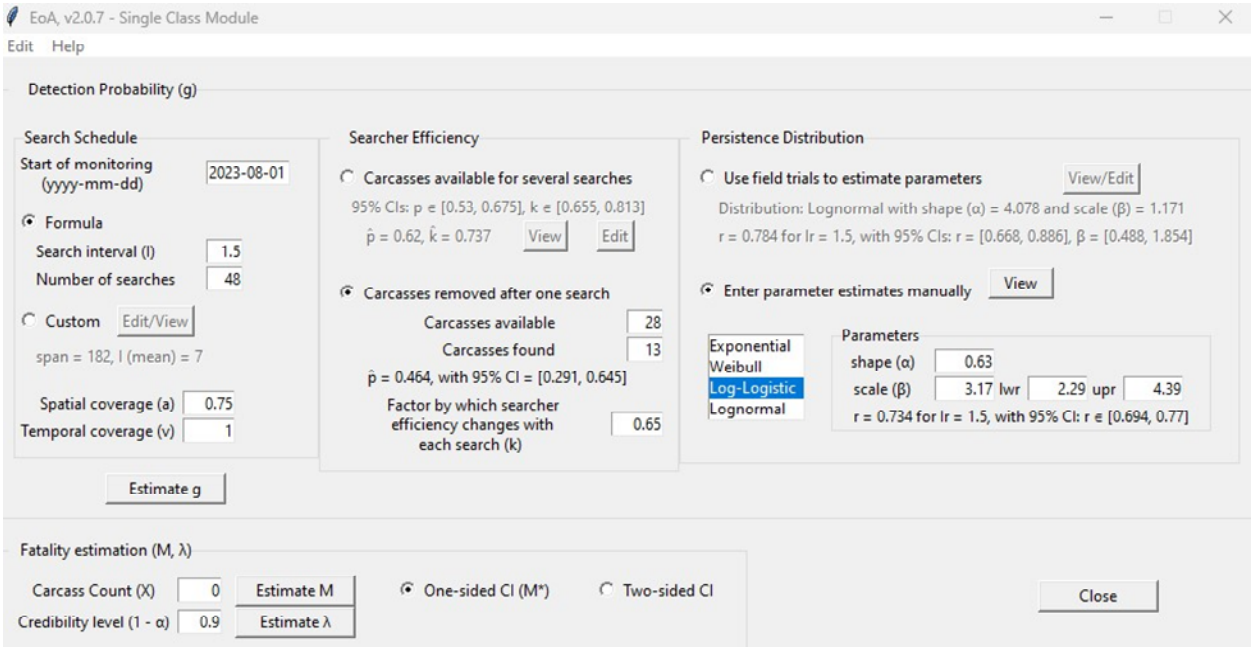
SEEF = searcher efficiency; SEEF-C = searcher efficiency carcasses; *k* = detection reduction factor; CPT = carcass persistence trials.

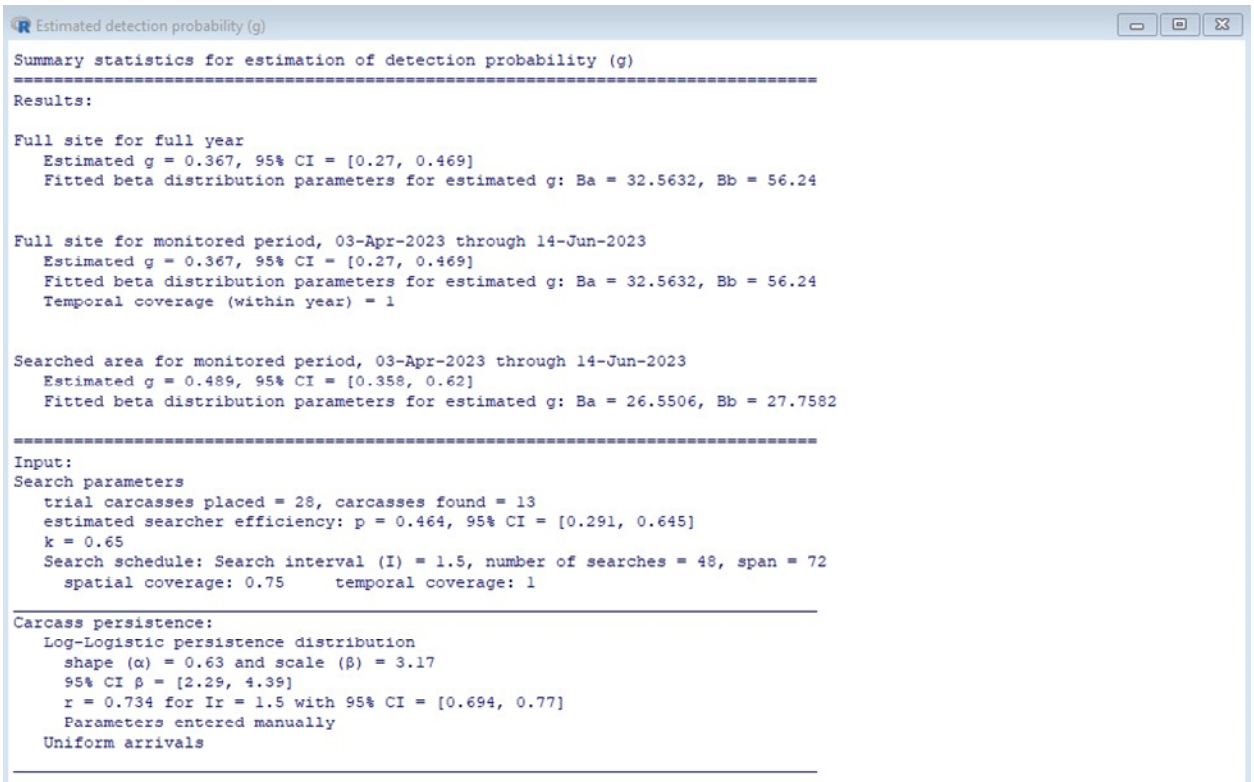
Appendix E. (*continued*) Single Class Module Inputs for stratum *g* estimation.

Season	Search Area Type	CPT Distribution	CPT Scale Parameter Confidence Level	Area Correction	*g* - Beta Distribution, Alpha Parameter	*g* - Beta Distribution, Beta Parameter	g	*g* - lower	*g* - upper
spring	road and pad	loglogistic	0.95	0.13	472.16	7,586.43	0.06	0.05	0.06
		loglogistic	0.95	0.13	472.16	7,586.43	0.06	0.05	0.06
fall	full plot	loglogistic	0.95	0.75	35.44	56.52	0.39	0.30	0.47
		loglogistic	0.95	0.84	32.66	42.39	0.44	0.34	0.53
	road and pad	loglogistic	0.95	0.21	1,113.55	5,277.15	0.17	0.17	0.18
		loglogistic	0.95	0.21	1,111.74	5,269.13	0.17	0.17	0.18

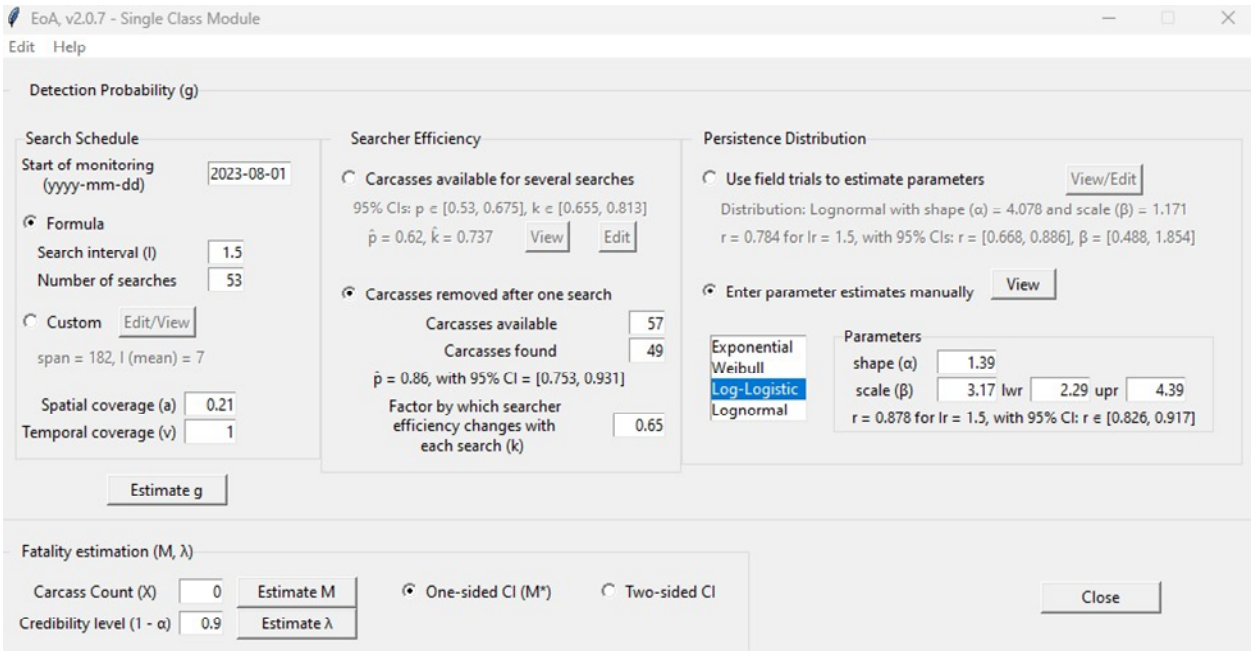
CPT = carcass persistence trials; *g* = detection probability.

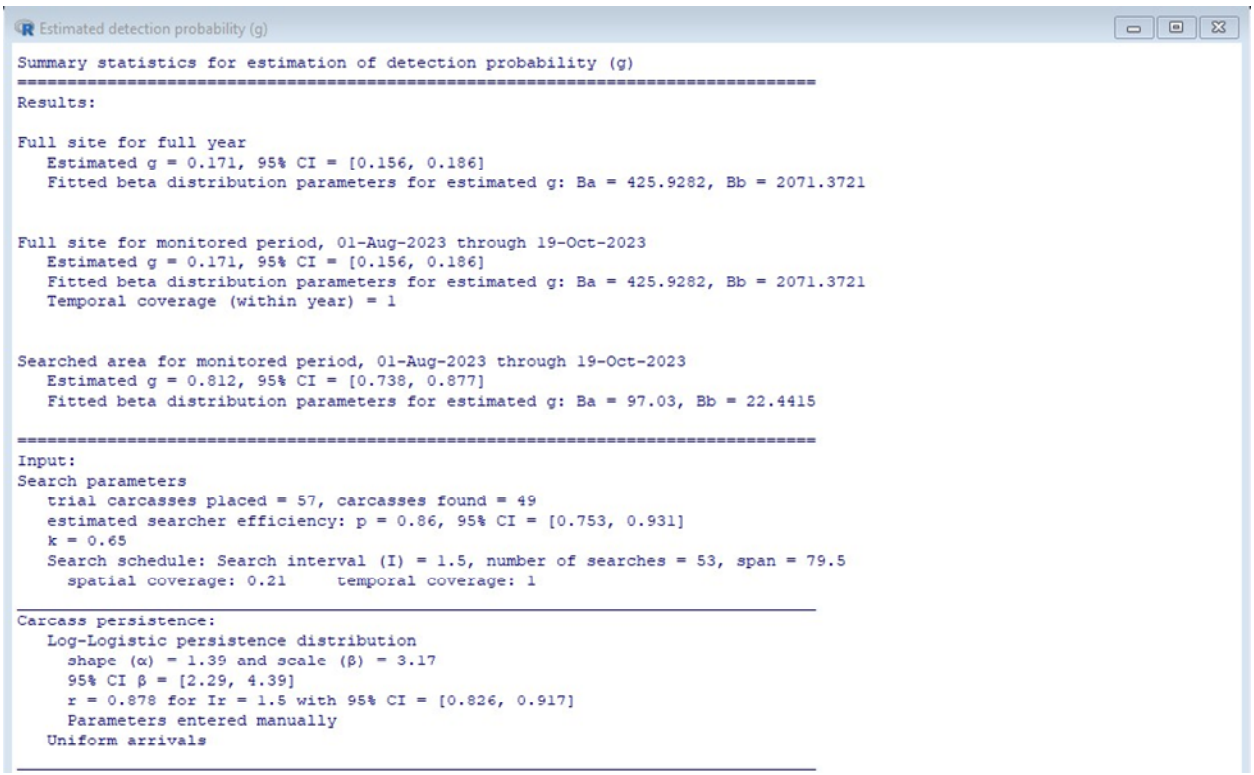
Appendix F. Screenshots of Inputs for Single Class and Multiple Class Modules in Evidence of Absence.





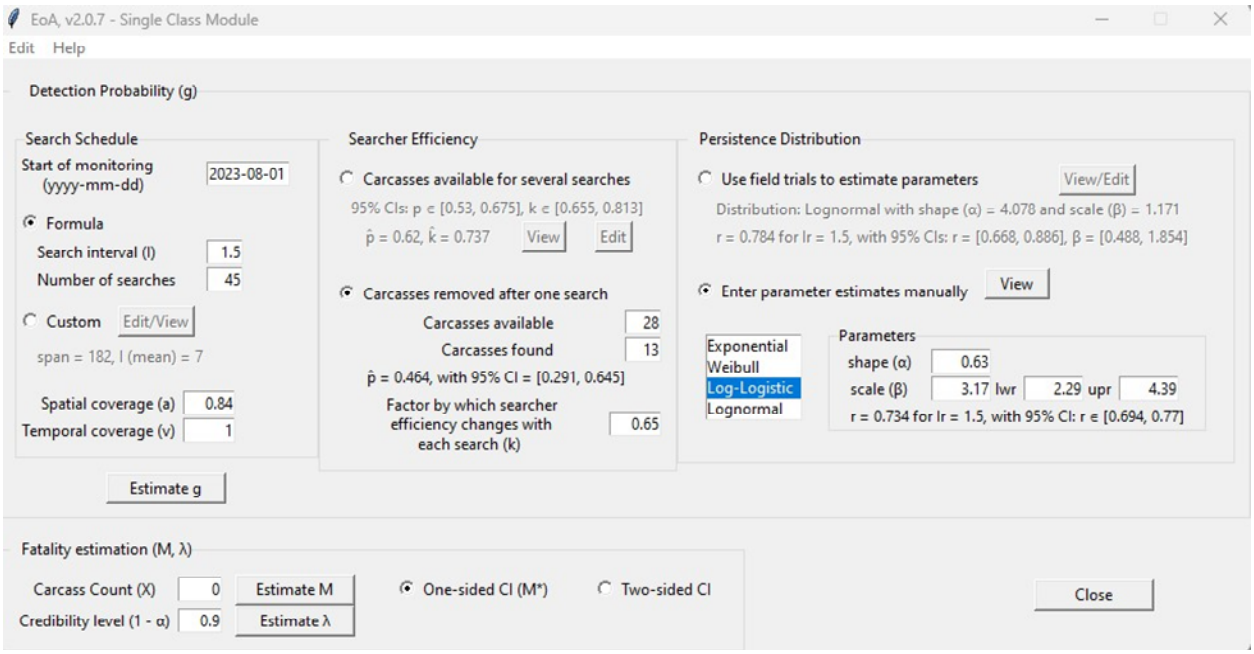
Appendix F1. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Indiana and northern-long eared bats. Sampling fraction and temporal coverage are accounted for in the Multiple Class Module weights. Detection probability estimates can be found in the *Covered Species Take Estimates and Probability of Detection (g)* section under *Results*.

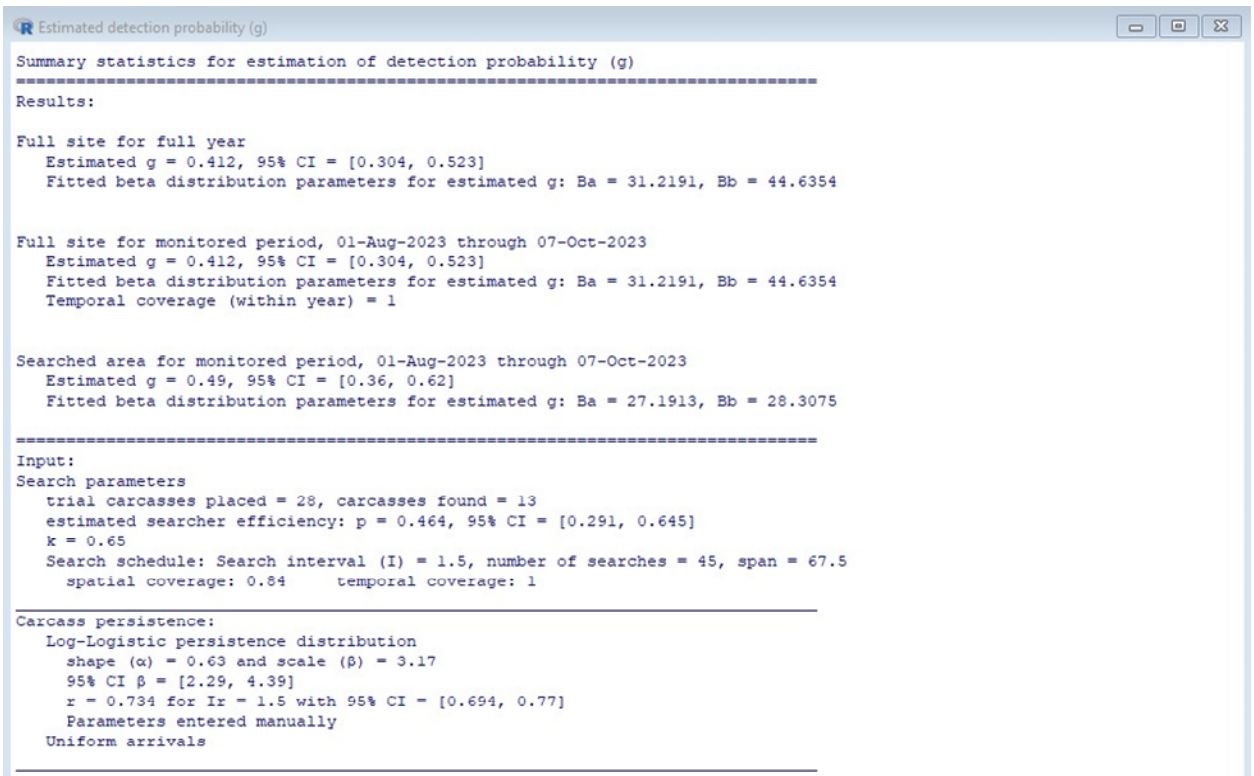




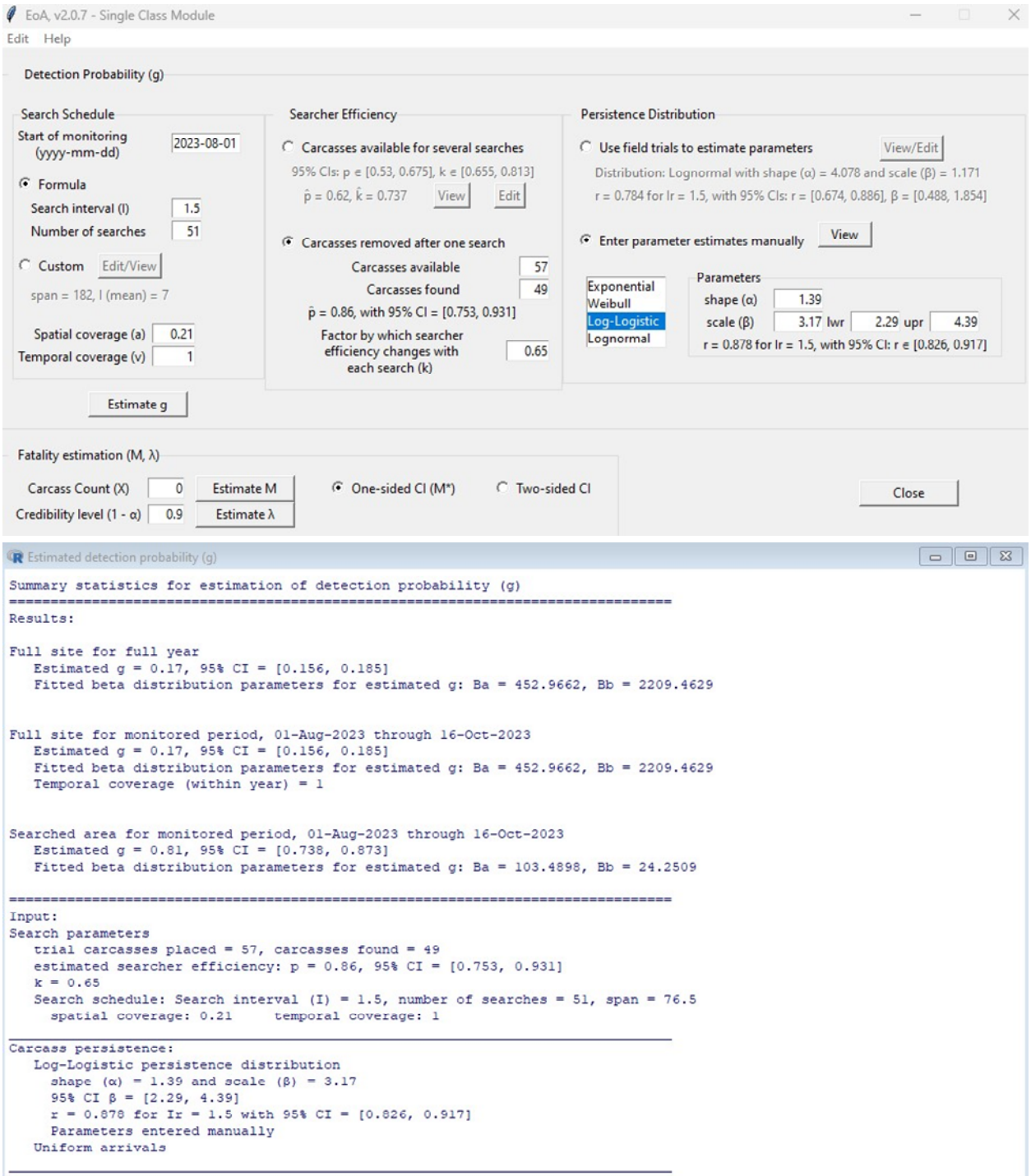
```
Estimated detection probability (g)

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

Full site for full year
   Estimated g = 0.171, 95% CI = [0.156, 0.186]
   Fitted beta distribution parameters for estimated g: Ba = 425.9282, Bb = 2071.3721


Full site for monitored period, 01-Aug-2023 through 19-Oct-2023
   Estimated g = 0.171, 95% CI = [0.156, 0.186]
   Fitted beta distribution parameters for estimated g: Ba = 425.9282, Bb = 2071.3721
   Temporal coverage (within year) = 1


Searched area for monitored period, 01-Aug-2023 through 19-Oct-2023
   Estimated g = 0.812, 95% CI = [0.738, 0.877]
   Fitted beta distribution parameters for estimated g: Ba = 97.03, Bb = 22.4415

================================================================================
Input:
Search parameters
   trial carcasses placed = 57, carcasses found = 49
   estimated searcher efficiency: p = 0.86, 95% CI = [0.753, 0.931]
   k = 0.65
   Search schedule: Search interval (I) = 1.5, number of searches = 53, span = 79.5
     spatial coverage: 0.21     temporal coverage: 1
--------------------------------------------------------------------------------
Carcass persistence:
   Log-Logistic persistence distribution
     shape (α) = 1.39 and scale (β) = 3.17
     95% CI β = [2.29, 4.39]
     r = 0.878 for Ir = 1.5 with 95% CI = [0.826, 0.917]
     Parameters entered manually
   Uniform arrivals
--------------------------------------------------------------------------------
```

Appendix F2. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Indiana and northern-long eared bats. Sampling fraction and temporal coverage are accounted for in the Multiple Class Module weights. Detection probability estimates can be found in the *Covered Species Take Estimates and Probability of Detection (g)* section under *Results*.

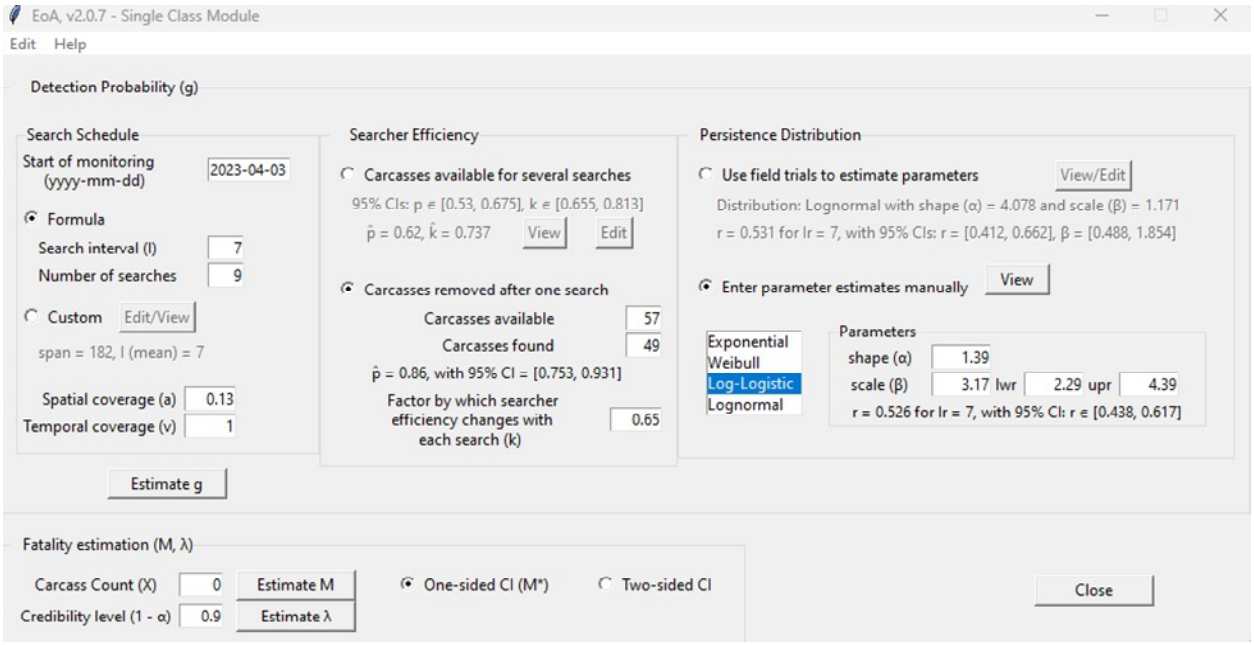


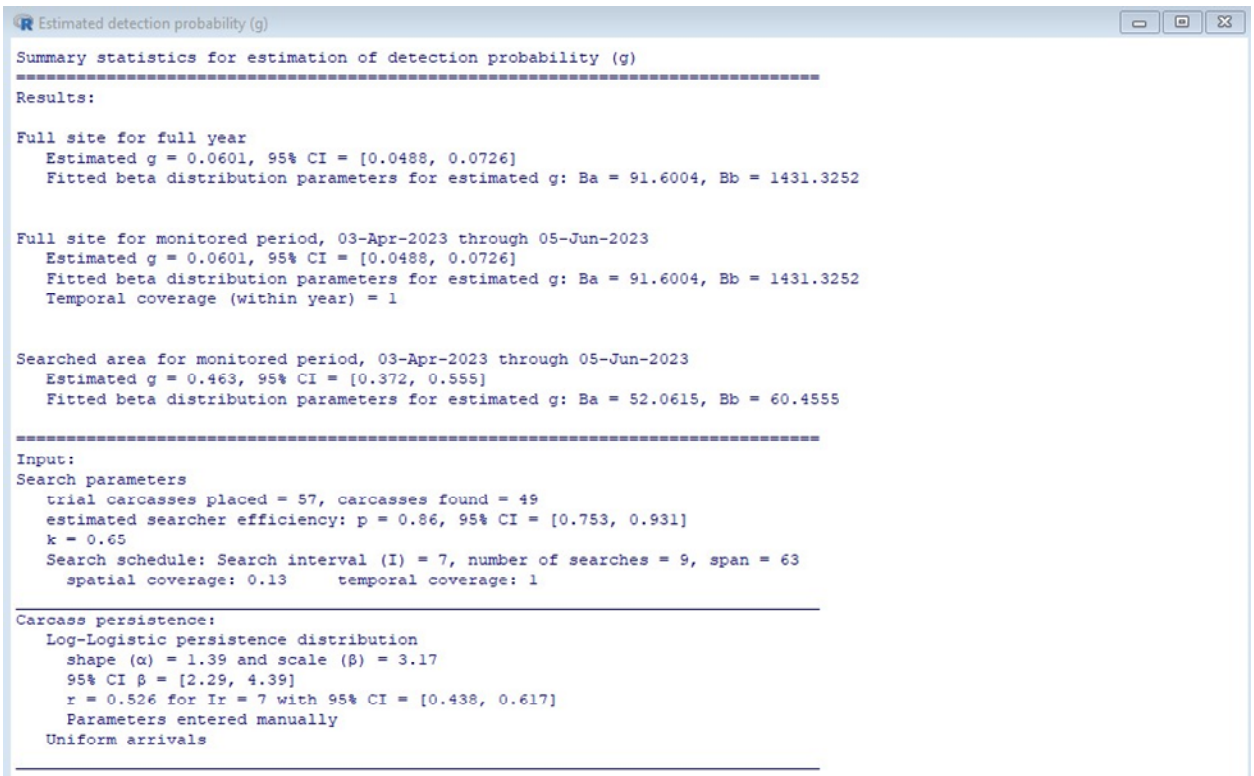


Appendix F3. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Indiana and northern-long eared bats. Sampling fraction and temporal coverage are accounted for in the Multiple Class Module weights. Detection probability estimates can be found in the *Covered Species Take Estimates and Probability of Detection (g)*section under *Results*.

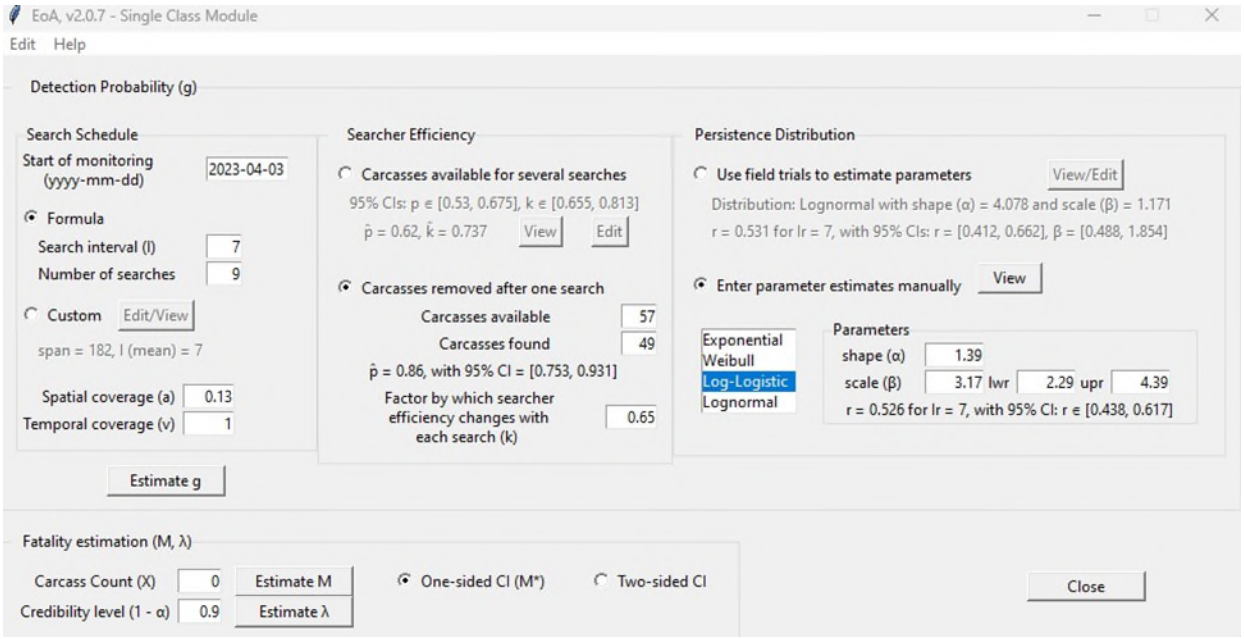


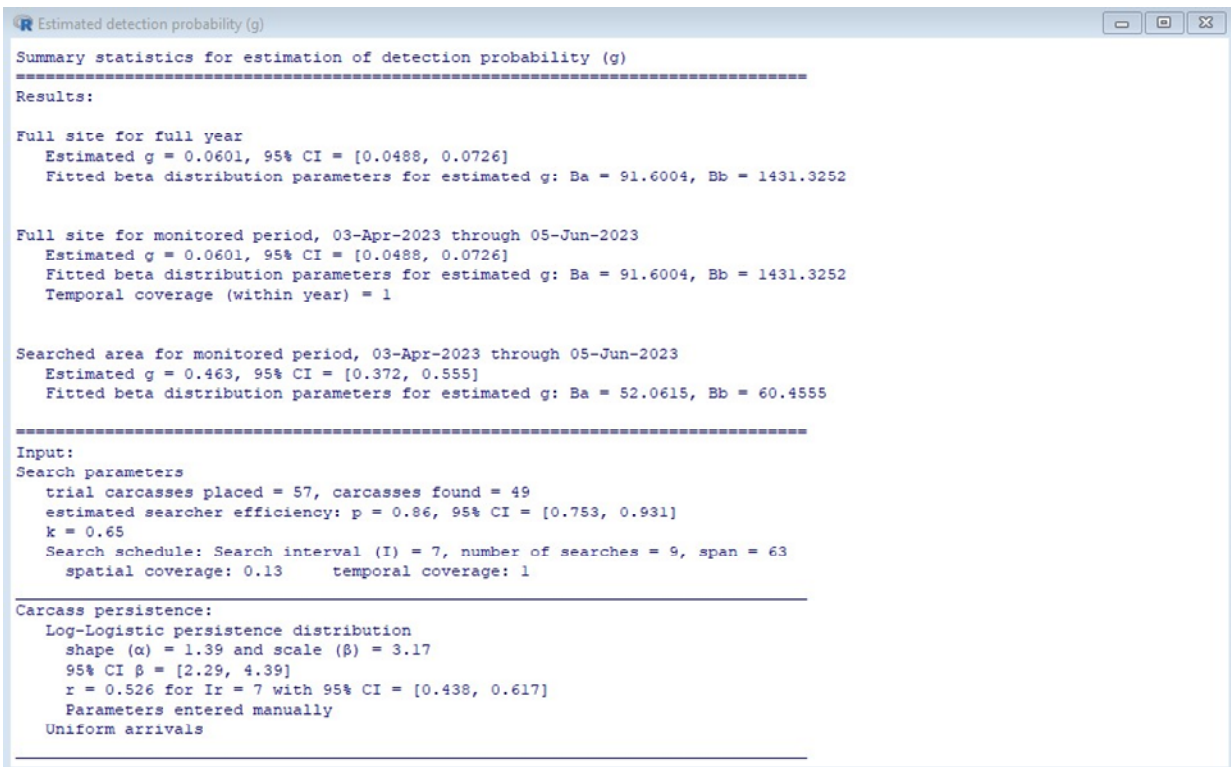
Appendix F4. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Indiana and northern-long eared bats. Sampling fraction and temporal coverage are accounted for in the Multiple Class Module weights. Detection probability estimates can be found in the *Covered Species Take Estimates and Probability of Detection (g)* section under *Results*.



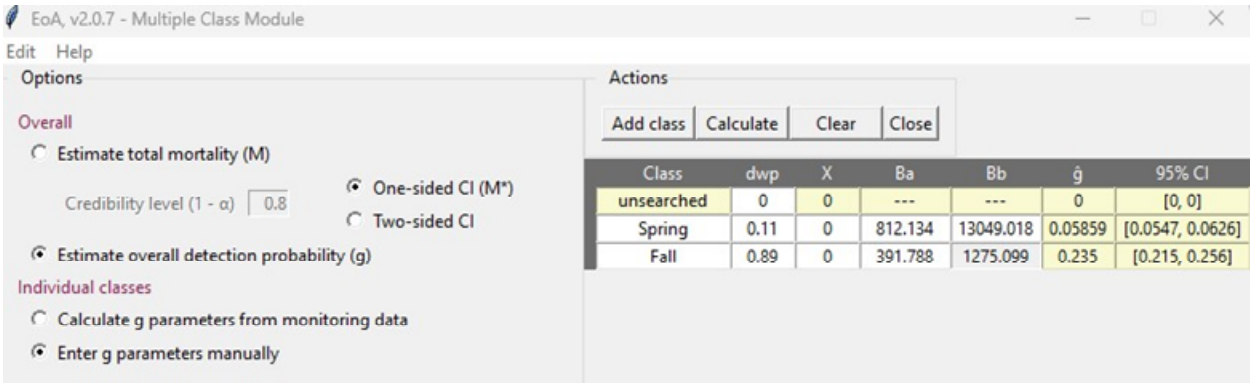


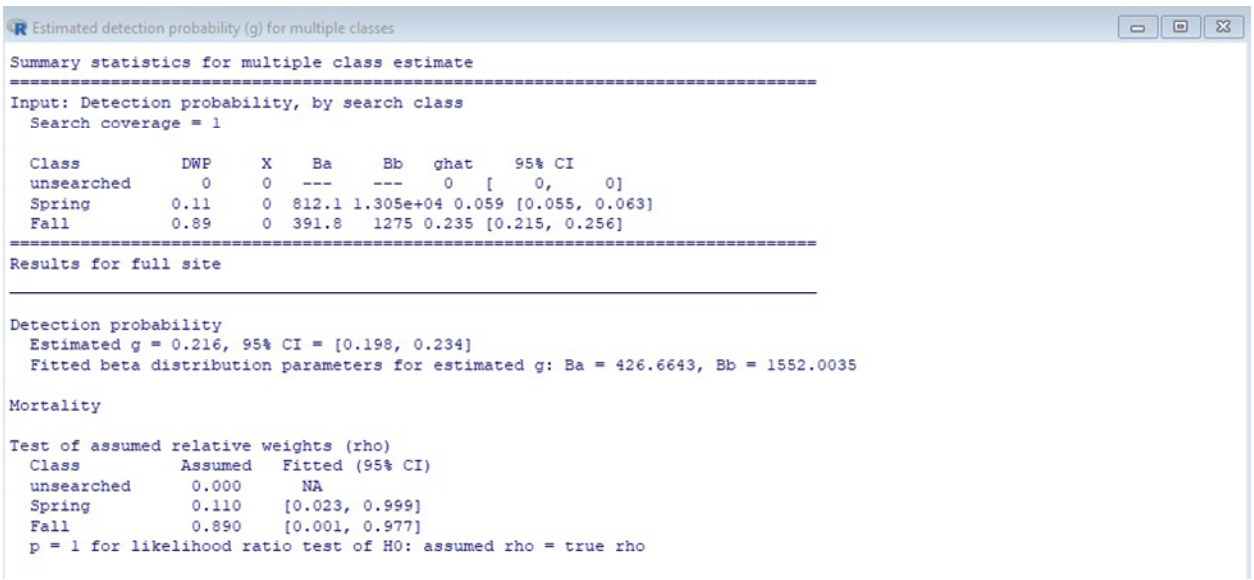
Appendix F5. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Indiana and northern-long eared bats. Sampling fraction and temporal coverage are accounted for in the Multiple Class Module weights. Detection probability estimates can be found in the *Covered Species Take Estimates and Probability of Detection (g)* section under *Results*.



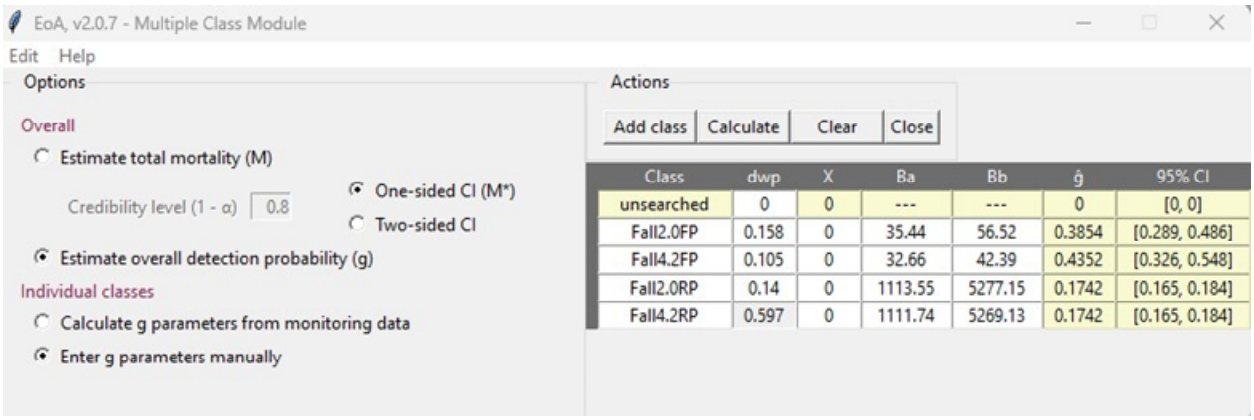


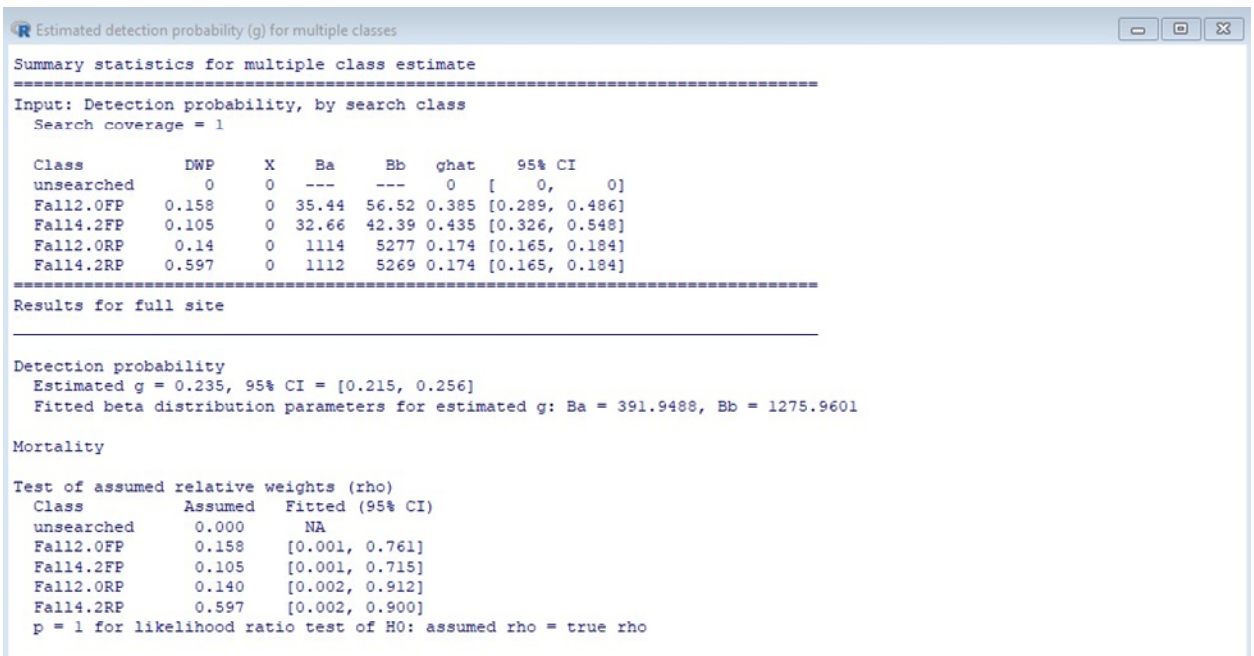
Appendix F6. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for Indiana and northern-long eared bats. Sampling fraction and temporal coverage are accounted for in the Multiple Class Module weights. Detection probability estimates can be found in the *Covered Species Take Estimates and Probability of Detection (g)* section under *Results*.



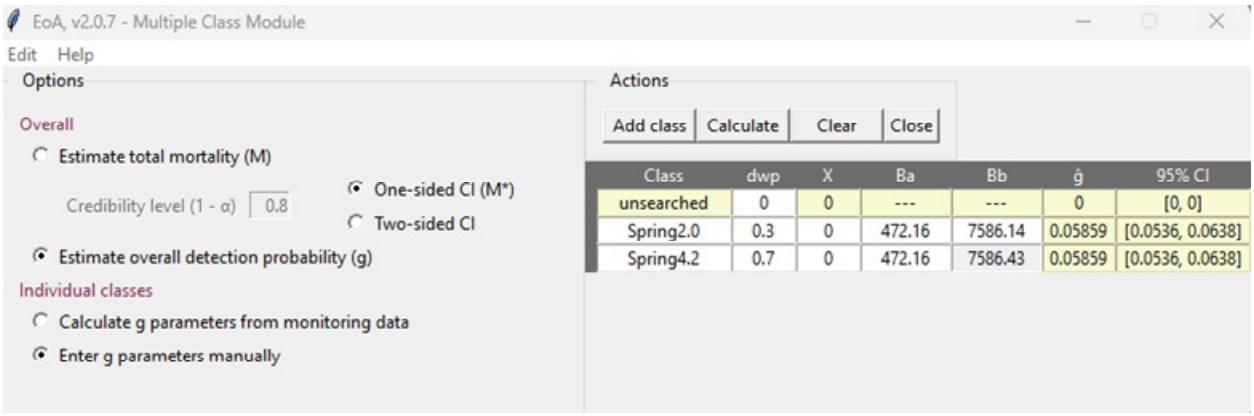


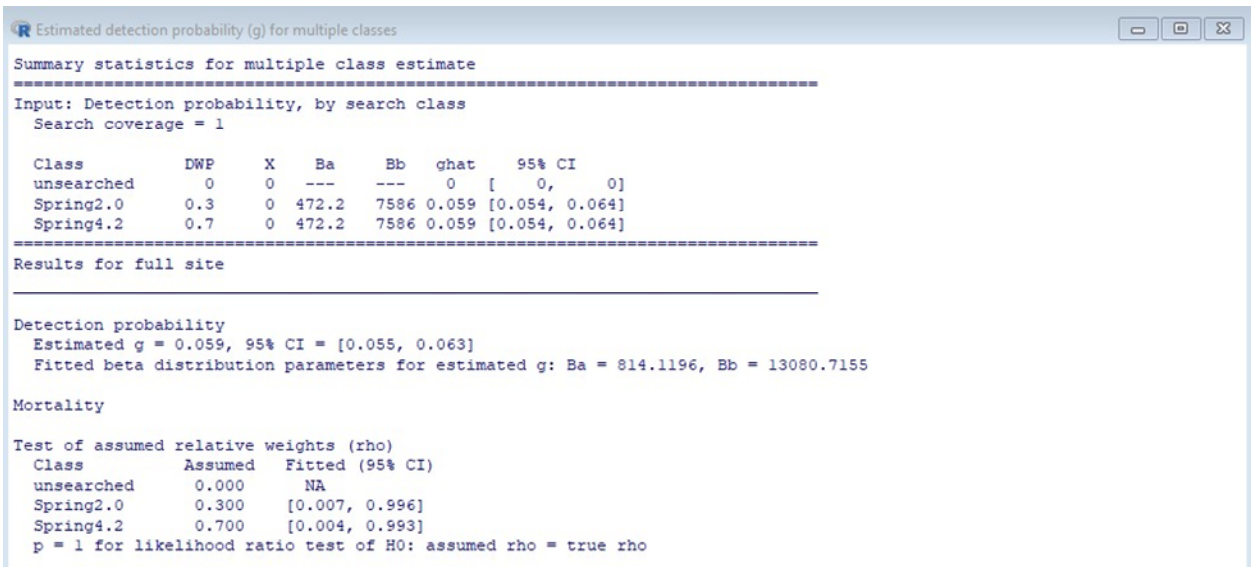
Appendix F7. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for Indiana and northern long-eared bats. Weights (DWP) were calculated as the sampling fraction within season and temporal coverage (arrival proportion) across seasons. Detection probabilities estimates can be located in the *Covered Species Take Estimates and Probability of Detection (g)*section, under *Results*. Mortality estimates were calculated using the Multiple Years Module.



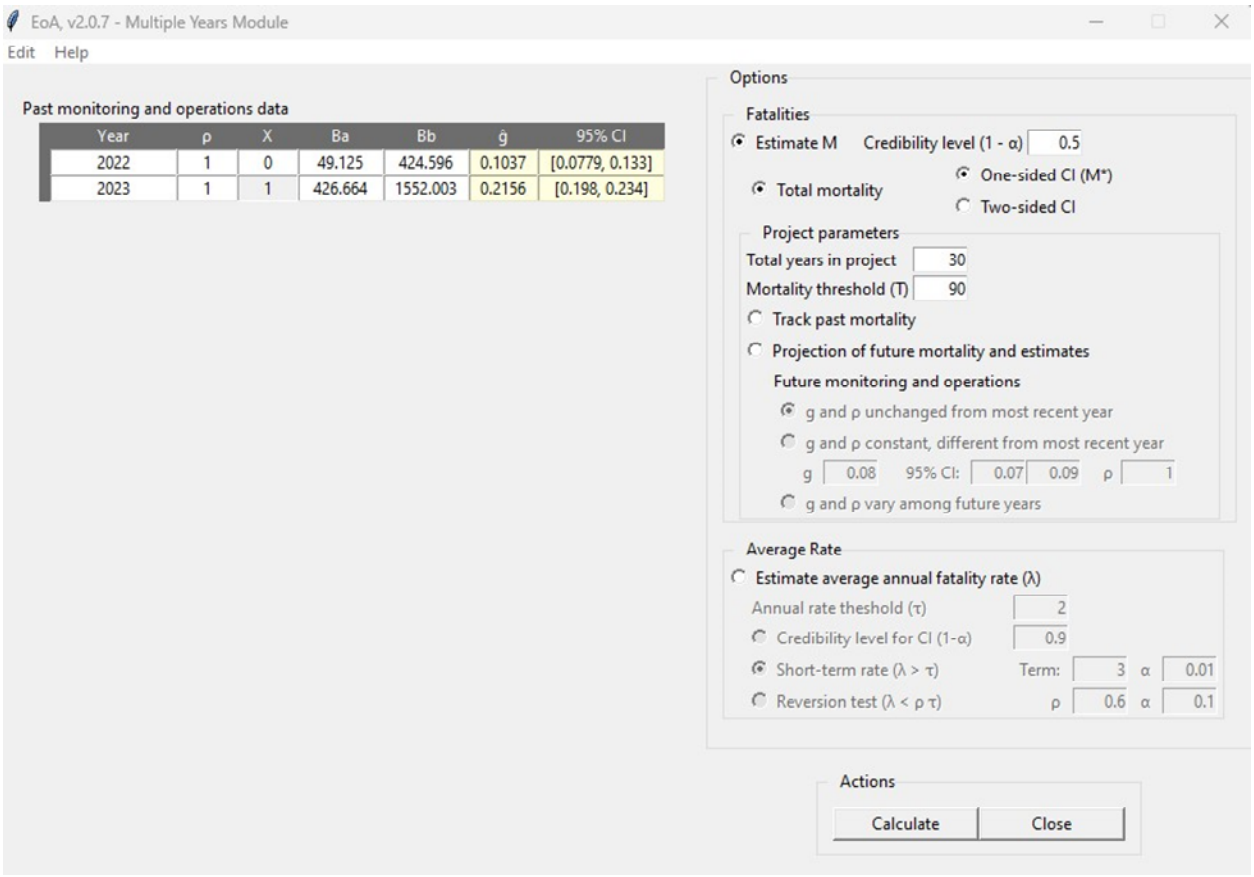


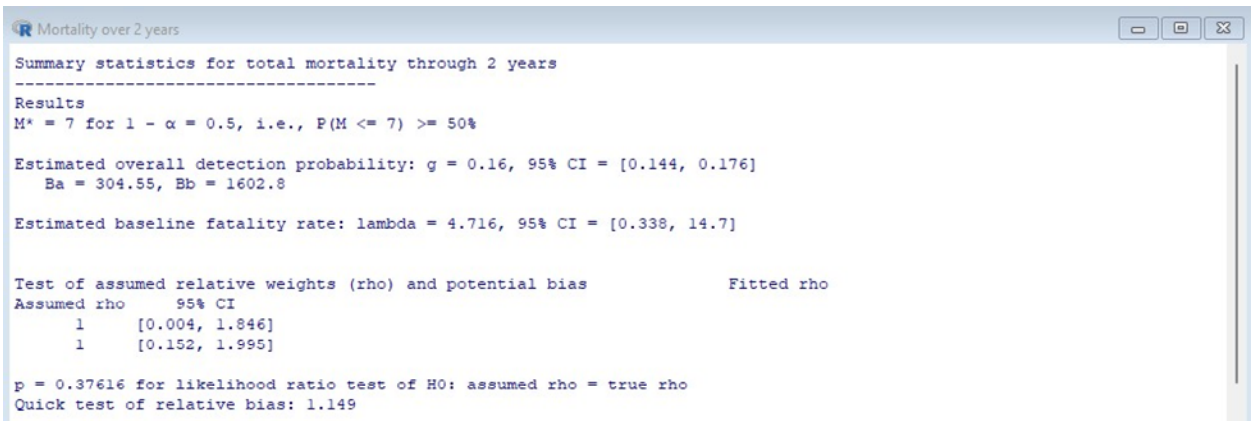
Appendix F8. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for Indiana and northern long-eared bats. Weights (DWP) were calculated as the sampling fraction within season and temporal coverage (arrival proportion) across seasons. Detection probabilities estimates can be located in the *Covered Species Take Estimates and Probability of Detection (g)*section, under *Results*. Mortality estimates were calculated using the Multiple Years Module.



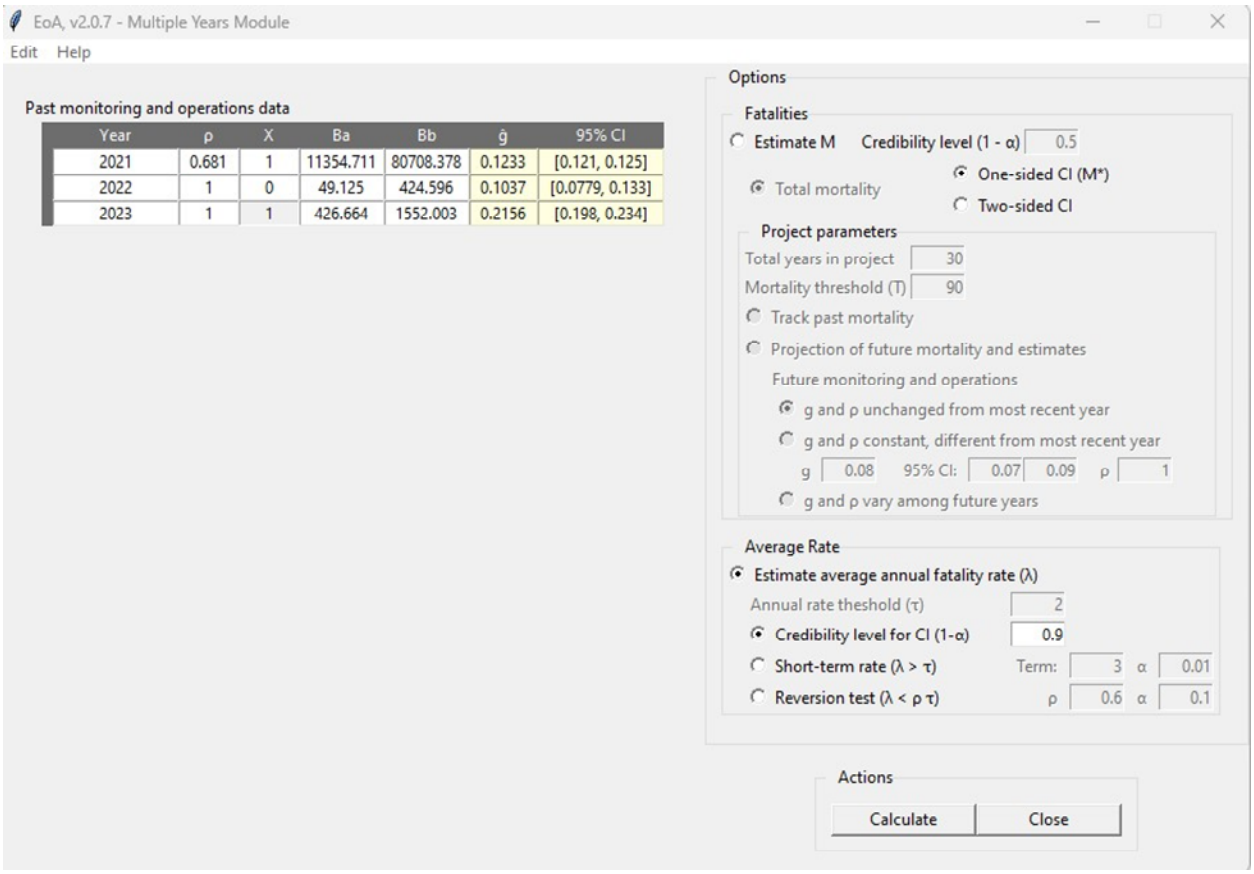


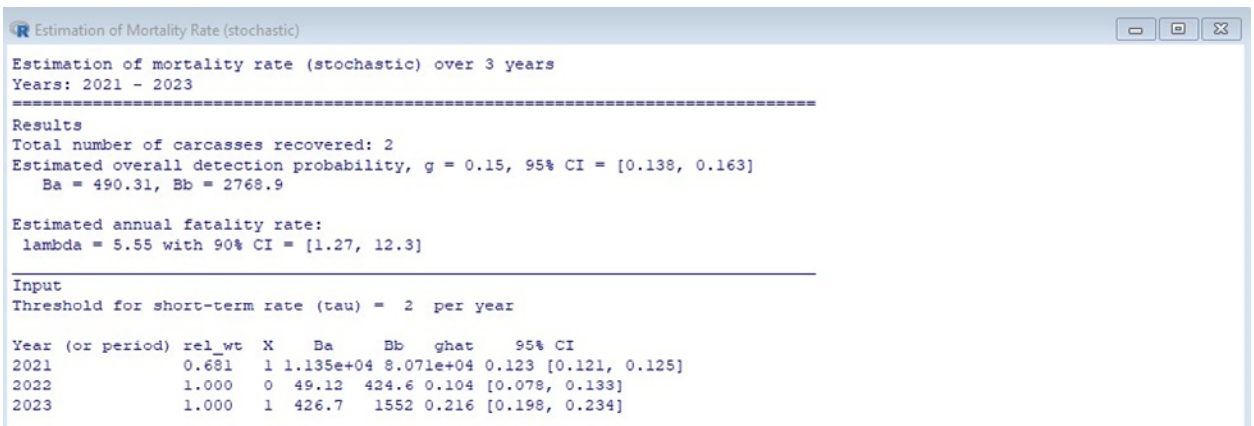
Appendix F9. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for Indiana and northern long-eared bats. Weights (DWP) were calculated as the sampling fraction within season and temporal coverage (arrival proportion) across seasons. Detection probabilities estimates can be located in the *Covered Species Take Estimates and Probability of Detection (g)*section, under *Results*. Mortality estimates were calculated using the Multiple Years Module.





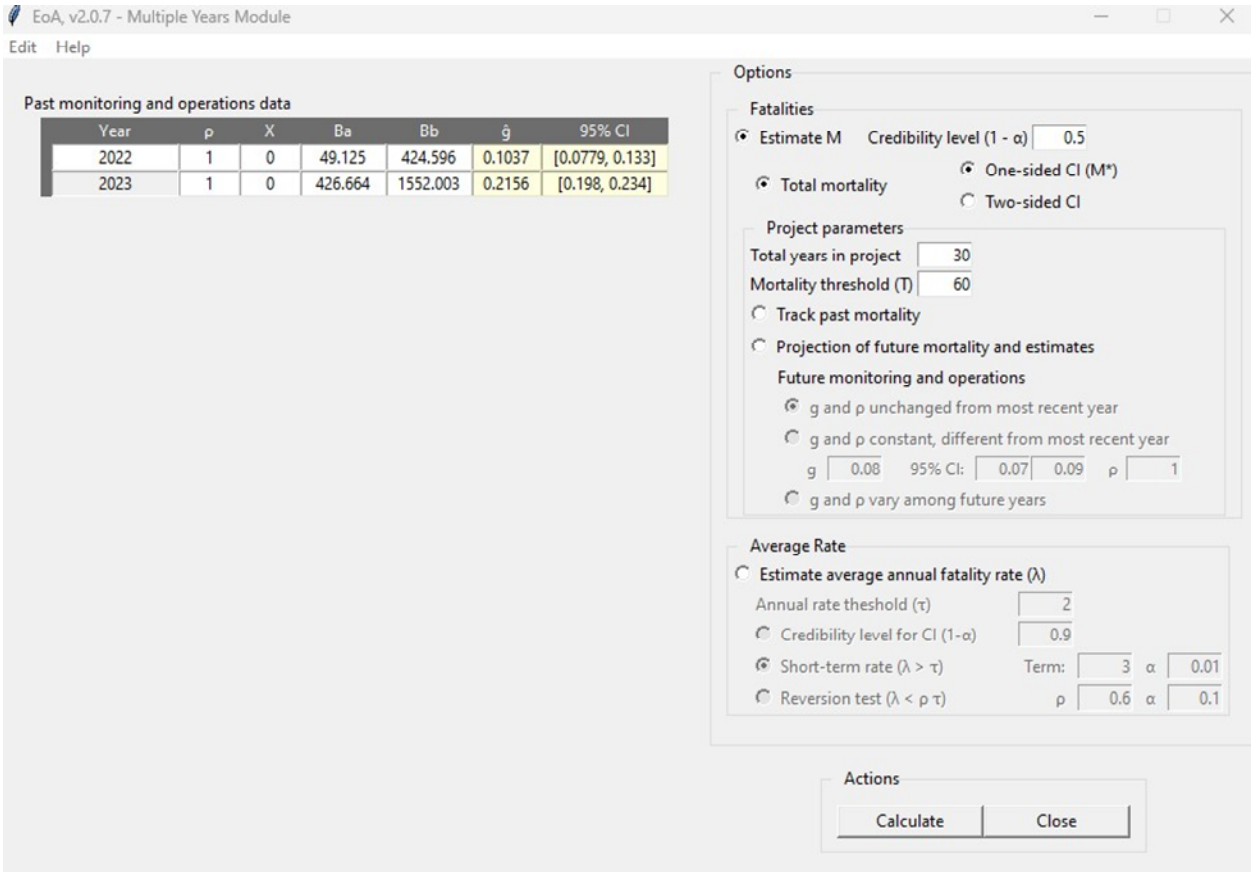
Appendix F10. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Multiple Years Module inputs for Indiana bats. Years 2022 and 2023 were used for the M* estimates, and years 2021–2023 were used for the lambda estimates. Weights (ρ) were calculated to combine Beta distribution parameters across years, with a ρ of 1 representing a normal risk year.

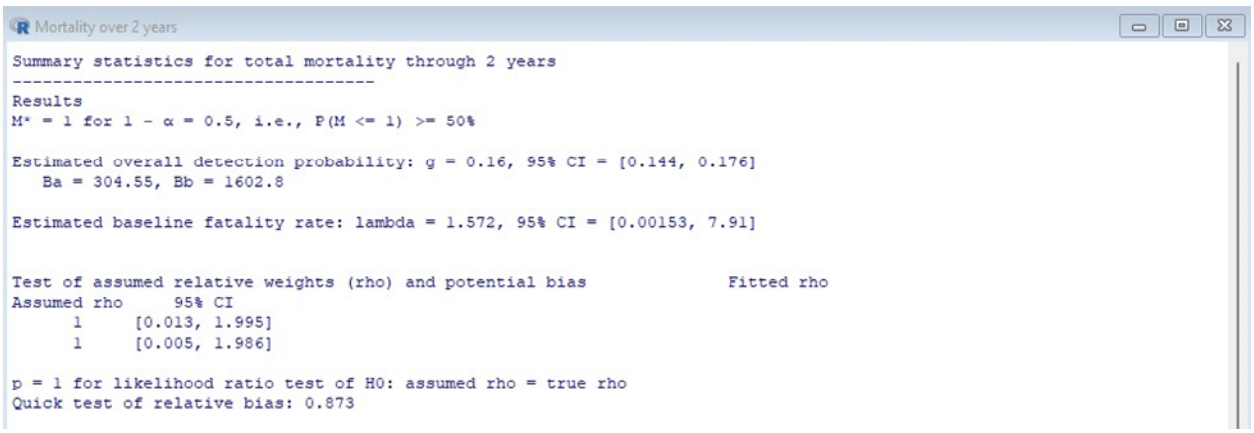




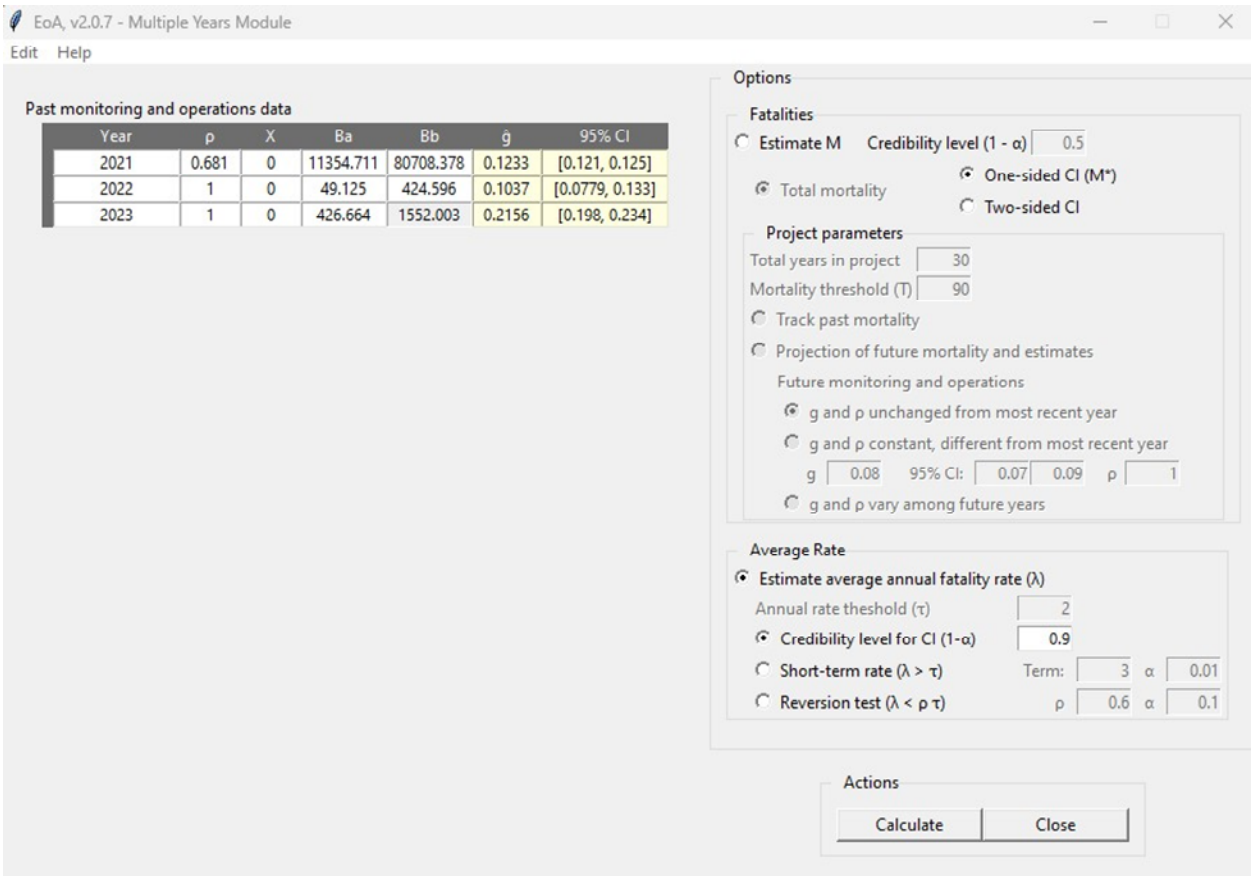
Appendix F11. Screenshots of Evidence of Absence (v2.0.7) graphical user interface (GUI), Multiple Years Module inputs for Indiana bats. Years 2022 and 2023 were used for the M* estimates, and years 2021–2023 were used for the lambda estimates. Weights (ρ) were calculated to combine Beta distribution parameters across years, with a ρ of 1 representing a normal risk year.

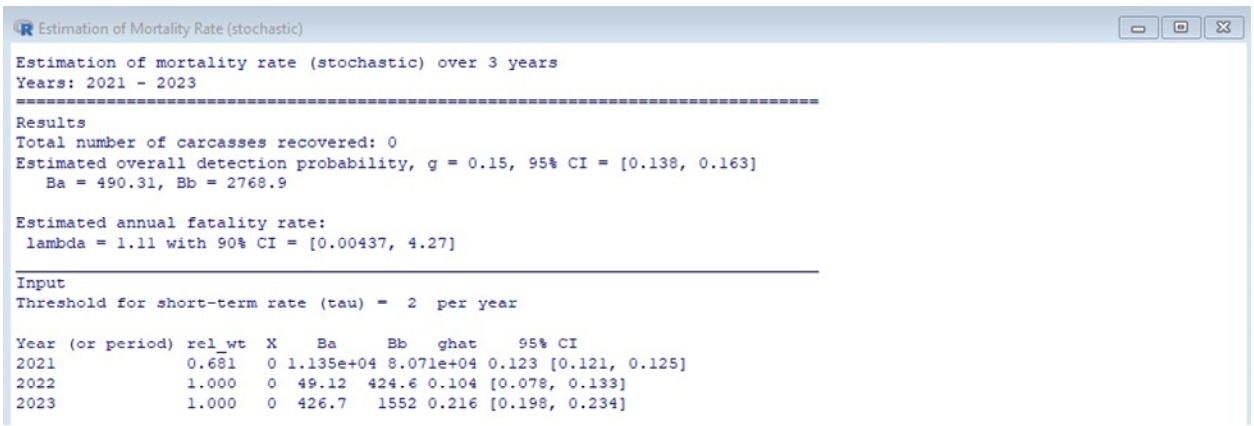
Note: although the weight (ρ) column of the Multiple Years Module sums to 2.68, the EoA GUI produces a "year-adjusted λ" by calculating the average λ over the number of input rows (years) in the multi-year module of the GUI. Because the ρ values associated with each year in the GUI are scaled so that a "ρ" of 1.0 is equivalent to a typical operations year for the wind farm, we would like to calculate the "ρ-adjusted λ" but the GUI does not accommodate that calculation. Therefore, the "ρ-adjusted λ," 6.21, is equivalent to the "year-adjusted λ" (5.55, as seen in the output above) divided by the sum of ρ (2.68) multiplied by the number of years (3).





Appendix F12. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Multiple Years Module inputs for northern-long eared bats. Years 2022 and 2023 were used for the M* estimates, and years 2021–2023 were used for the lambda estimates. Weights (ρ) were calculated to combine Beta distribution parameters across years, with a ρ of 1 representing a normal risk year.





Appendix F13. Screenshots of Evidence of Absence (v2.0.7) graphical user interface, Multiple Years Module inputs for northern-long eared bats. Years 2022 and 2023 were used for the M* estimates, and years 2021–2023 were used for the lambda estimates. Weights (ρ) were calculated to combine Beta distribution parameters across years, with a ρ of 1 representing a normal risk year.

Note: although the weight (ρ) column of the Multiple Years Module sums to 2.68, 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 wind farm, we would like to calculate the "ρ-adjusted λ" but the GUI does not accommodate that calculation. Therefore, the "ρ-adjusted λ," 1.24, is equivalent to the "year-adjusted λ" (1.11, as seen in the output above) divided by the sum of ρ (2.68) multiplied by the number of years (3).