Post-Construction Fatality Monitoring for Green River Wind Farm Lee and Whiteside Counties, Illinois

Final Report

May 1, 2023 – October 15, 2023

Prepared for:

Green River Wind Farm Phase 1, LLC

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WEST

EXECUTIVE SUMMARY

Green River Wind Farm Phase 1, LLC contracted Western EcoSystems Technology, Inc. to conduct post-construction monitoring (PCM) at the Green River Wind Farm (Project) in Lee and Whiteside counties, Illinois. The Project consists of 74 Siemens Gamesa G126 2.625-megawatt (MW) wind turbine generators (and associated access roads) for approximately 194 MW generation. The PCM study was designed to be consistent with the Project's final Habitat Conservation Plan (HCP) for the Indiana bat and northern long-eared bat, as well as guidance described in Tier 4 of the US Fish and Wildlife Service *Land-Based Wind Energy Guidelines*. The objectives of the PCM study were to 1) estimate an overall bat fatality estimate for the Project, 2) determine bat species impacted by Project operations, 3) report the results of Evidence of Absence analysis for Indiana bats and northern long-eared bats in 2023, 4) evaluate the assumption that summer risk to the bat species covered under the incidental take permit is limited to northern long-eared bats at the 24 turbines sited within 305 meters (m; 1,000 feet [ft]) of forest, and 5) document black-billed cuckoo and other avian mortality.

The PCM study consisted of three primary survey components: 1) standardized carcass searches of turbines, 2) searcher efficiency trials to estimate the probability a carcass was found by searchers, and 3) carcass persistence trials to estimate the average length of time a carcass remained in the search area for possible detection. Biologists and detection dog teams conducted standardized carcass searches from May 16 – October 13, providing coverage of the monitoring period described in the HCP for intensive monitoring years (May 15 – October 15). All 74 turbines were searched twice weekly using one of the following three approaches:

- 40-m (131-ft) cleared plots – plots were mowed regularly of vegetation out to 40 m from the turbine, searched with detection dog teams.
- 70-m (230-ft) hybrid plots – plots were mowed out to 40 m, and from 40–70 m vegetation (soybeans) was left uncleared, searched with detection dog teams.
- 100-m (328-ft) road and pad plots – road and pad (graveled) areas were searched out to 100 m from the turbine base, searched by human biologists.

Ninety-nine bird and 427 bat carcasses were found during 2023 monitoring, but no federally or state-listed threatened or endangered bat species were found during the study. One upland sandpiper was the only state-listed bird species documented as a fatality. The overall estimated bat fatality rate was 5.77 (90% confidence interval [CI]: 4.56–7.40) bat fatalities/megawatt (15.14 [90% CI: 11.98–19.43] bat fatalities/turbine). The most commonly found bat species were eastern red bat (167 carcasses; 39.1% of total bat carcasses) and silver-haired bat (148; 34.7%), followed by hoary bat (51; 11.9%), and big brown bat (49; 11.5%). The overall probability of detection (g) for Indiana bat and northern long-eared bat was 0.24 (95% CI: 0.22–0.26), which was higher than the value targeted in the HCP (g = 0.2). Indiana bats and northern long-eared bats were each estimated to have a mean annual take rate of 0.89 (95% CI: 0-4.46) bats per year. Adaptive management triggers will be tested after the third year of intensive monitoring following issuance of the Incidental Take Permit, depending upon on-going coordination with the USFWS.

STUDY PARTICIPANTS

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1.0 INTRODUCTION

Green River Wind Farm Phase 1, LLC (Green River), a wholly owned subsidiary of National Grid Renewables, LLC, owns the Green River Wind Farm (Project) in Lee and Whiteside counties, Illinois (Figure 1). Green River contracted Western EcoSystems Technology, Inc. (WEST) to conduct post-construction monitoring (PCM) at the Project consistent with the objectives of the Project's *Final Habitat Conservation Plan for the Indiana Bat and Northern Long-Eared Bat* (HCP; Stantec Consulting Services Inc. [Stantec] 2022), as well as guidance described in Tier 4 of the US Fish and Wildlife Service (USFWS) *Land-Based Wind Energy Guidelines* (USFWS 2012). The PCM followed the Intensive Bat Monitoring protocols described in the HCP. WEST also conducted black-billed cuckoo (*Coccyzus erythropthalmus*) fatality monitoring following measures described in the Project's *Conservation Plan* (Stantec 2021a). Current Project operations are consistent with the HCP, and the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) Incidental Take Permit (ITP), received on November 1, 2022; however, Green River has implemented new technology, in coordination with the USFWS (per Section 8.2.2.4 of the HCP), resulting in changes to the curtailment strategy described in the HCP (see Section 3).

The objectives of the study were to: 1) estimate an overall bat fatality estimate for the Project, 2) determine bat species impacted by Project operations, 3) report the results of Evidence of Absence (EoA) analysis for Indiana bats and northern long-eared bats in 2023, 4) evaluate the assumption that summer risk to the bat species covered under the ITP is limited to northern long-eared bats at the 24 turbines sited within 305 meters (m; 1,000 feet [ft]) of forest, and 5) document black-billed cuckoo and other avian mortality.

2.0 STUDY AREA

The Project is in Lee and Whiteside counties, Illinois (Figure 1), approximately 19 kilometers (12 miles) southeast of the city of Sterling, Illinois. Elevation in the Project averages approximately 210 meters (m; 689 feet [ft]) above mean sea level, and topography is relatively flat (US Geological Survey 2020). Approximately 93% of the nearly 3,456-hectare (8,540-acre) area within the Project is composed of cultivated crops (National Land Cover Database [NLCD] 2021). Corn (*Zea mays*) and soybean (*Glycine max*) are the most common crop types (US Department of Agriculture National Agricultural Statistical Service 2021). The next most common land cover is developed open space (e.g., farmsteads) that collectively compose approximately 3% of the site, followed by woody wetlands (1%; Figure 2; NLCD 2021).

3.0 PROJECT DESCRIPTION

The Project became operational in November 2019. The Project consists of 74 Siemens Gamesa G126 2.625-megawatt (MW) wind turbine generators (and associated access roads) for approximately 194 MW generation. Hub height is 83.8 m (275.0 ft), and total turbine height (blade tip height) is 147.8 m (485.0 ft). All turbines are within the migratory range of the Indiana bat and

northern-long eared bat. To minimize collision risk to bats, Green River attempted to employ a smart curtailment protocol beginning in 2022 (Stephenson and Peterson 2022) in lieu of the curtailment protocol described in the HCP.

The smart curtailment parameters were intended to achieve a reduction in bat exposure comparable to the blanket curtailment protocol described in the HCP (Stephenson and Peterson 2022). Cut-in speeds during 2023 followed those described in the smart curtailment protocol (Stephenson and Peterson 2022), but dates were adjusted slightly due to operations constraints that limited changes to curtailment parameters to certain days of the week (Table 1).

Table 1. Curtailment parameters utilized at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 17 – September 26, 2023.

Curtailment Timing	Temp (Celsius)	Turbine Location	Date*		
			May 17 – Jun 20	Jun 21 – Aug 29	Aug 30 – Sep 26
sunset to one hour before sunrise	>10	turbines <305 m from suitable habitat	feather below 5.0 m/s	feather below 5.5 m/s	feather below 5.0 m/s
		turbines >305 m from suitable habitat	feather below 4.0 m/s	feather below 4.0 m/s	feather below 4.0 m/s

* During black-billed cuckoo monitoring (May 1 – May 16) all turbines were feathered below 3.0 m/s.

Temp = temperature.

m = meter, s = second.

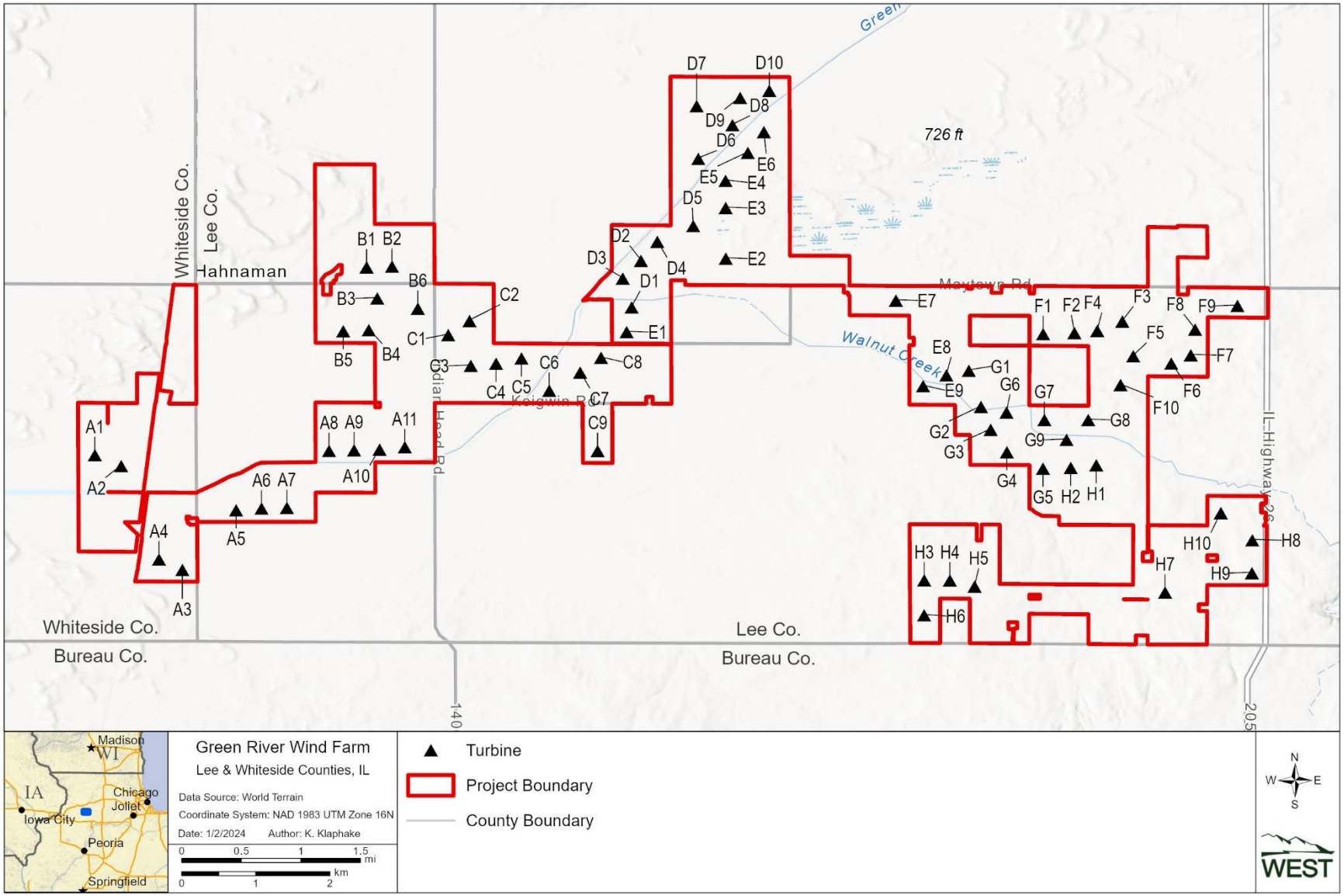

Figure 1. Location of the Green River Wind Farm, Lee and Whiteside counties, Illinois.

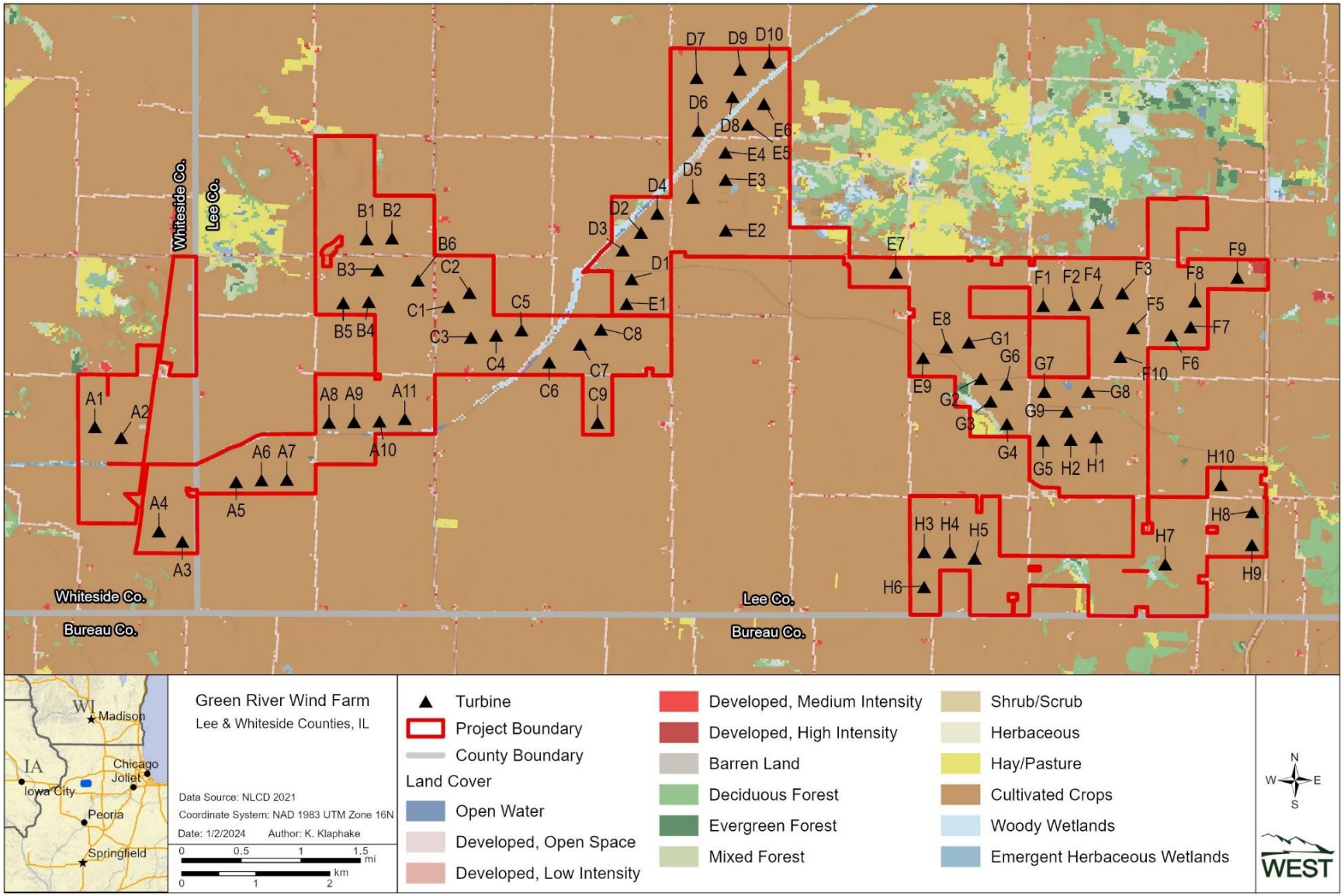

Figure 2. Land cover types in the Green River Wind Farm, Lee and Whiteside counties, Illinois.

4.0 METHODS

WEST designed the monitoring effort to target a probability of detection, or *g*, of at least 0.2 as specified in the HCP for the 74 wind turbines at the Project. A study plan was submitted to the USFWS on May 3, 2023. WEST did not receive a response in 2023 but had received approval of a very similar study plan on May 23, 2022 (Amber Schorg, USFWS, pers. comm.).

4.1 Study Design

The PCM study consisted of three primary survey components: 1) standardized carcass searches (carcass searches) of turbines, 2) searcher efficiency (SEEF) trials to estimate the probability a carcass was found by searchers, and 3) carcass persistence (CP) trials (CPT) to estimate the average length of time a carcass remained in the search area for possible detection. A search area adjustment was estimated to account for carcasses that fell outside of search areas. The methodologies of each of these components and associated analysis are described below.

4.2 Standardized Carcass Searches

4.2.1 Number of Turbines Sampled, Search Frequency, Plot Size, and Plot Selection

Biologists and detection dog teams (each team consisting of one trained detection dog and one biologist/dog handler) conducted carcass searches from May 16 – October 13, providing coverage of the monitoring period described in the HCP for intensive monitoring years (May 15 – October 15; see *Section 7.3.3.1 – Intensive Bat Monitoring* in Stantec 2022). All 74 turbines were searched twice weekly using one of the following three search area (plot) types:

- 40-m (131-ft) cleared plots – plots were mowed regularly of vegetation out to 40 m from the turbine (Figures 3 and 4).
- 70-m (230-ft) hybrid plots – plots were mowed out to 40 m, and from 40–70 m vegetation (soybeans) was left uncleared (Figures 3 and 5).
- 100-m (328-ft) road and pad plots – road and pad (graveled) areas were searched out to 100 m from the turbine base (Figures 3 and 4).

Cleared plots were composed of a single visibility class (cleared), whereas hybrid plots were composed of two visibility classes (cleared [from 0–40 m], and uncleared [from 40–70 m]). Road and pad plots were composed of a single visibility class (roads and pads). Turbines searched as road and pad plots remained the same as during 2022. Among the remaining turbines, hybrid plot turbines were randomly selected from those that had soybeans planted in the uncleared portion of the plot (40–70 m from the turbine). Turbines not searched as hybrid plots were searched as cleared plots (Table 2; Figure 7).

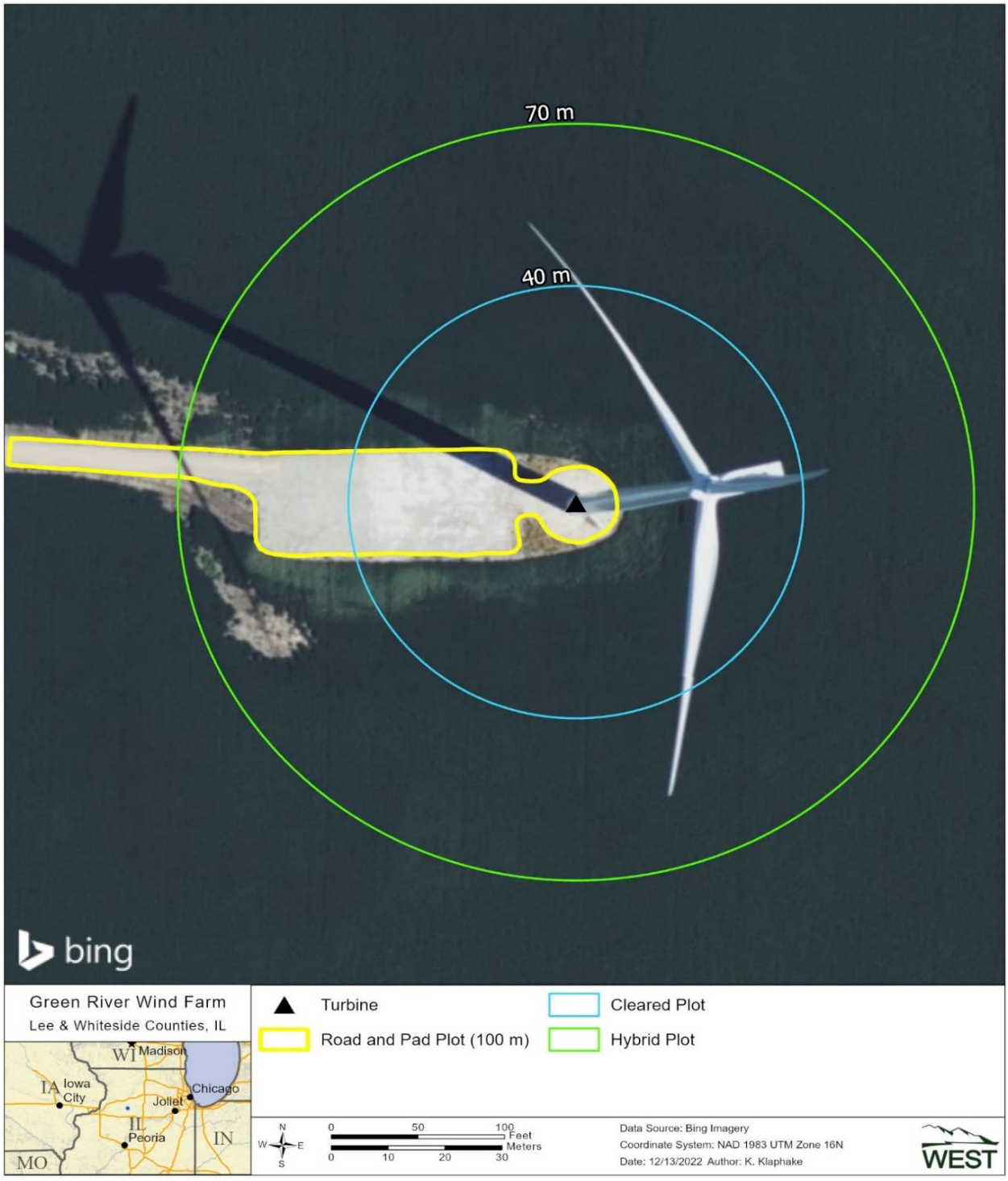

Figure 3. A schematic illustrating the three plot types.

Road and pad plot searches occurred within the turbine pads and access roads out to 100 meters (m; 328 feet [ft]). Cleared plot searches occurred within a 40-m radius of the turbine that was cleared of vegetation. Hybrid plot searches occurred within a 70-m radius of the turbine: 0-40 m from the turbine was cleared of vegetation, and 40-70 m from the turbine was uncleared vegetation (soybeans). Each turbine was assigned one plot type.

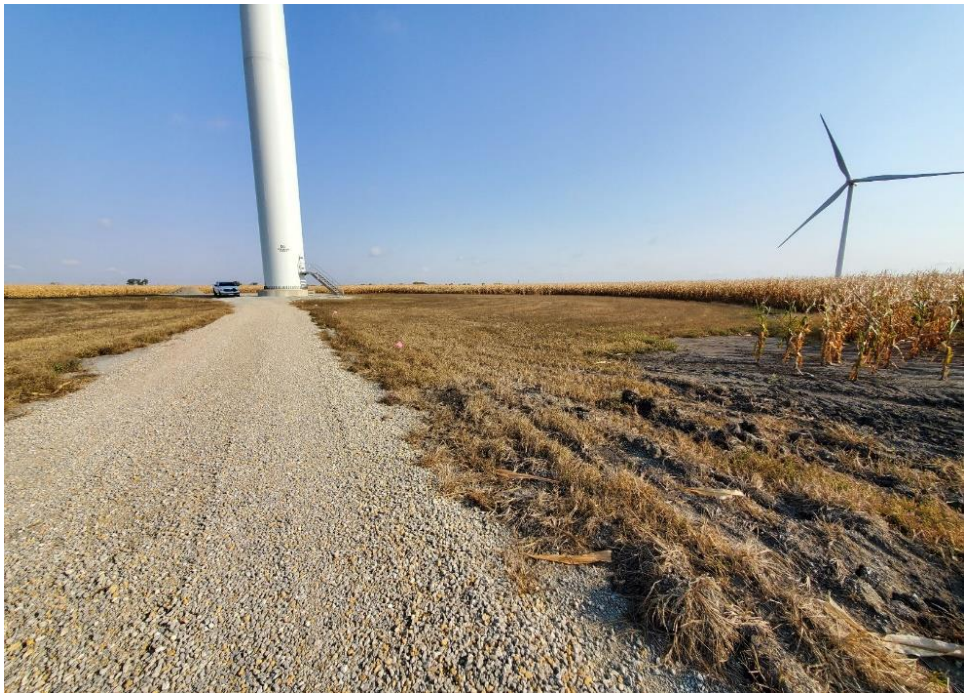

Figure 4. Example of a 40-meter cleared plot at the Green River Wind Farm, Lee and Whiteside counties, Illinois, showing the gravel road and pad associated with a turbine and the mowed area maintained at cleared plots and hybrid plots.

Figure 5. Example of a 70-meter hybrid plot at the Green River Wind Farm, Lee and Whiteside counties, Illinois. Photograph taken from within the uncleared (soybean) portion of the plot (40-70 meters from the turbine).

Table 2. Search effort by season and plot type at the Green River Wind Farm, Lee and Whiteside counties, Illinois.

Season	Searcher Type	Plot Type	Number of Turbines	Search Interval
spring (May 1 – May 15)*	humans	100-m road and pad	74	weekly
summer (May 16–July 31)	humans	100-m road and pad	48	twice weekly
	detection dog	40-m cleared	17	twice weekly
	detection dog	70-m hybrid	9	twice weekly
fall (August 1–October 15)	humans	100-m road and pad	48	twice weekly
	detection dog	40-m cleared	17	twice weekly
	detection dog	70-m hybrid	9	twice weekly

m = meter.

* Search effort related to black-billed cuckoo monitoring.

Although only 24 turbines were considered to have summer risk for northern long-eared bats, per the HCP, all turbines were searched during intensive bat monitoring to verify this assumption. Intensive bat monitoring will be conducted during the first three years of Project operation following issuance of the ITP (Stantec 2022). The HCP notes that monitoring conducted during summer (May 16 – July 31) in subsequent years (Annual Bat Monitoring; see *Section 7.3.3.2 - Annual Bat Monitoring* [Stantec 2022]) will be limited to the 24 turbines with summer risk to northern long-eared bats, as long as no Indiana bat or northern long-eared bat fatalities are found at the remaining 50 turbines during the intensive bat monitoring. In addition to the monitoring described above, all turbine roads and pads were searched out to 100 m for black-billed cuckoos during May 1 – May 15, 2023. This was requested by the Illinois Department of Natural Resources (IDNR) due to a black-billed cuckoo fatality observed at the Project in 2020 (Stantec 2021a).

4.2.2 Search Methods

WEST used two types of search methods: a biologist (human-only visual search), and a detection dog team (olfactory search). All personnel were trained to follow the Project's search protocol, including proper handling and reporting of carcasses. Carcass searches were conducted during daylight hours, beginning as early as first light.

Detection Dog Team Training and Evaluation

Detection dogs were considered candidates for carcass searches if they met basic temperament and obedience criteria and demonstrated the trainability to detect bat and/or bird carcasses. Temperament characteristics sought after were high-energy, and a high food or toy drive. Prior to conducting searches at the Project, handlers trained their detection dogs on the scent of bat carcasses following methods derived from search and rescue programs and drug detection (Kay 2012, Helfers 2017). Detection dogs were initially trained with either cotton scent swabs that had been rubbed on bat carcasses and progressing to dehydrated bats, or directly with dehydrated bat carcasses, at increasing distances over a period of three to four weeks. Prior to a field evaluation, the detection dog had to achieve a passing grade of 80% or higher in a scent recognition test. The scent recognition test consisted of 10 blind trial lineups where the dog had to indicate correctly only on dehydrated bat. After passing the scent recognition test, the detection dog and handler were evaluated in the field to measure their performance.

A detection dog coordinator conducted a 2-day field evaluation of each detection dog team. After detection dog teams achieved a SEEF of 75% or greater for dehydrated bats placed during blind evaluation trials, teams were approved to conduct carcass searches. Because the objective of the study focused on detecting bat carcasses, dogs were not explicitly trained on native bird carcasses; however, all detection dogs alerted on bird carcasses in the field. Handlers rewarded detection dogs for bird carcass finds to encourage future alerts to bird carcasses. Detection dog breeds used at the Project included two border collies and a border collie mix (Figure 6).

Cleared and Hybrid Plot Searches

Detection dog teams searched cleared plots and hybrid plots for bird and bat carcasses. The detection dog team walked transects during searches appropriate to the field conditions. Transects were perpendicular to the wind, allowing the dog to zig-zag across the transect to maximize scent detection. Wind speed, humidity, and vegetation density can affect dispersal of the target odor (i.e., bat carcasses) across the plot. To maximize detection rates during a search, transect width varied with each search, ranging from approximately 15–20 m (49–98 ft) apart. Transect lines were modified during a search only when necessary, to minimize exposure of dogs to search area hazards (e.g., excessive mud), or to compensate for scent-inhibiting search conditions (e.g., more tightly spaced transects in thicker vegetation).

Road and Pad Plot Searches

Biologists conducted searches on road and pad plots. Biologists walked transects spaced up to five m (16 ft) apart at a rate of approximately 45–60 m (148–197 ft) per minute on road and pad plots within 100 m of the turbine. Biologists scanned the area for bird and bat carcasses out to approximately 2.5 m (8.2 ft) on both sides of the transects to ensure full visual coverage of each plot.

Figure 6. Photograph of one of the detection dogs (border collie mix) following a plot search at the Green River Wind Farm, Lee and Whiteside counties, Illinois.

4.2.3 Data Collection

Data were collected on a tablet data form. After each search, biologists recorded the date, survey start and end times, biologist initials, turbine number, search type (dog-aided or road and pad), and the number of carcasses that were found. When a carcass was found during a search, the biologist placed a marker near it and continued the search. After completing the search, the biologist returned to record information for each carcass on a carcass information data sheet, including the following data:

- date and time
- species
- sex and age (when possible)
- biologist initials
- turbine number
- measured distance from turbine using a handheld rangefinder
- bearing from turbine using a handheld compass
- location of carcass (i.e., coordinates in decimal degrees)
- habitat surrounding the carcass

- condition of carcass (i.e., intact, scavenged, dismembered, feather spot [for birds only], injured)
- estimated time of death (e.g., less than one day, one to two days, etc.)

The biologist took digital photographs of each carcass, including any visible injuries, and surrounding habitat. Carcasses found outside of a scheduled search were recorded as incidental discoveries and documented following the same protocol as those found during a search. Carcasses, including incidental discoveries, found in non-search areas (e.g., outside of a plot), or those with an estimated time of death outside of the study period were included in the overall reported fatalities (Appendix A), but were excluded from analysis.

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

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

For bird carcasses, the following category was also used:

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

Bat carcasses were collected under IDNR permit numbers NH23.6431 (Brisco Schaefer), NH23.6764 (Kelly Wells), NH23.6690 (Whitley Felver), NH23.6465 (Heather Nootbaar), and NH23.6921 (Rachel Purington). Injured bats were left in place. State-listed bat species were authorized for collection under IDNR Endangered and Threatened Species Permit number 17241, and T. Travis Brown was authorized to collect federally listed bat carcasses under USFWS permit number TE234121-10. Biologists experienced in identifying bird and bat species verified all bird and bat carcass identifications. Federally permitted bat biologists (T. Travis Brown [permit number: TE234121-10], Kristina Hammond [ES03495B-3], Brenna Hyzy [ES26854C-2], Larisa Bishop-Boros [TE21829B-2], and Pallavi Sirajuddin [TE62046D]) verified the identification of all potential federally or state-listed bat carcasses. Carcasses remained in the Project freezer for potential use in bias trials during 2024.

Non-state or federally listed bird fatalities were documented, but not collected; carcasses were left in place and marked with spray paint to avoid double counting. State-listed bird fatalities were collected under the state permits described above and Migratory Bird Special Purpose Utility Permit MBPER0022957. Eagles were reported to the USFWS and collected as directed by the USFWS. Biologists placed carcasses in a sealable plastic bag labeled with a unique carcass

identification number, and stored them in a freezer on site. Biologists wore leather and nitrile gloves to handle carcasses to reduce the risk of possible transmission of rabies or other diseases. In addition to fatalities, all injured birds and bats observed during surveys were recorded and considered fatalities for analysis.

Tissue samples were collected from heavily scavenged or decomposed bat carcasses that could not be positively identified and had potential to be an Indiana bat or northern long-eared bat. Samples were submitted for DNA identification to the Dr. Jane Huffman Wildlife Genetics Institute at East Stroudsburg University.

Bat carcasses that were heavily scavenged but did not have potential to be an Indiana bat or northern long-eared bat (e.g., fur was present on the wing, or the forearms measured more than 41.0 millimeters [1.6 inches] long) were identified to the closest genus or group possible. These samples were not submitted for DNA identification.

4.3 Bias Trials

4.3.1 Searcher Efficiency Trials

The objective of the SEEF trials was to estimate the probability that a carcass was found by searchers (i.e., biologists or detection dog teams). SEEF trials were conducted in all visibility classes. Biologists conducting carcass searches did not know when SEEF trials were being conducted or the location of the trial carcasses. Trial carcasses consisted of eastern red bats (*Lasiurus borealis*), big brown bats (*Eptesicus fuscus*), hoary bats (*Lasiurus cinereus*), evening bats (*Nycticeius humeralis*), and silver-haired bats (*Lasionycteris noctivagans*) that had previously been found on site. At least 20 bat carcasses were placed per visibility class (cleared, uncleared, and road and pad) per season. Trials were distributed across multiple dates in each season to incorporate the effect of potential changes in plot conditions on SEEF over time.

Each trial carcass was discreetly marked with a black zip-tie or a piece of electrical tape around the upper forelimb for identification as a trial carcass. Trial carcasses were removed from the freezer the day before the SEEF trial to allow time for the carcasses to thaw. Trial carcasses were placed the night before or the morning of the trial. To avoid attracting scavengers, no more than three trial carcasses were placed at a single plot during an individual trial. The trial administrator dropped carcasses from waist-height or higher, and carcasses were allowed to land in a random posture. For detection dog teams, the trial administrator walked in a meandering path before placing each trial carcass to prevent dogs from associating human scent with bat carcasses. Biologists had one search to locate trial carcasses after carcass placement. Following each search, the biologist recorded the number and location of trial carcasses found. The biologist then confirmed with the trial administrator whether any missed trial carcasses were available for detection.

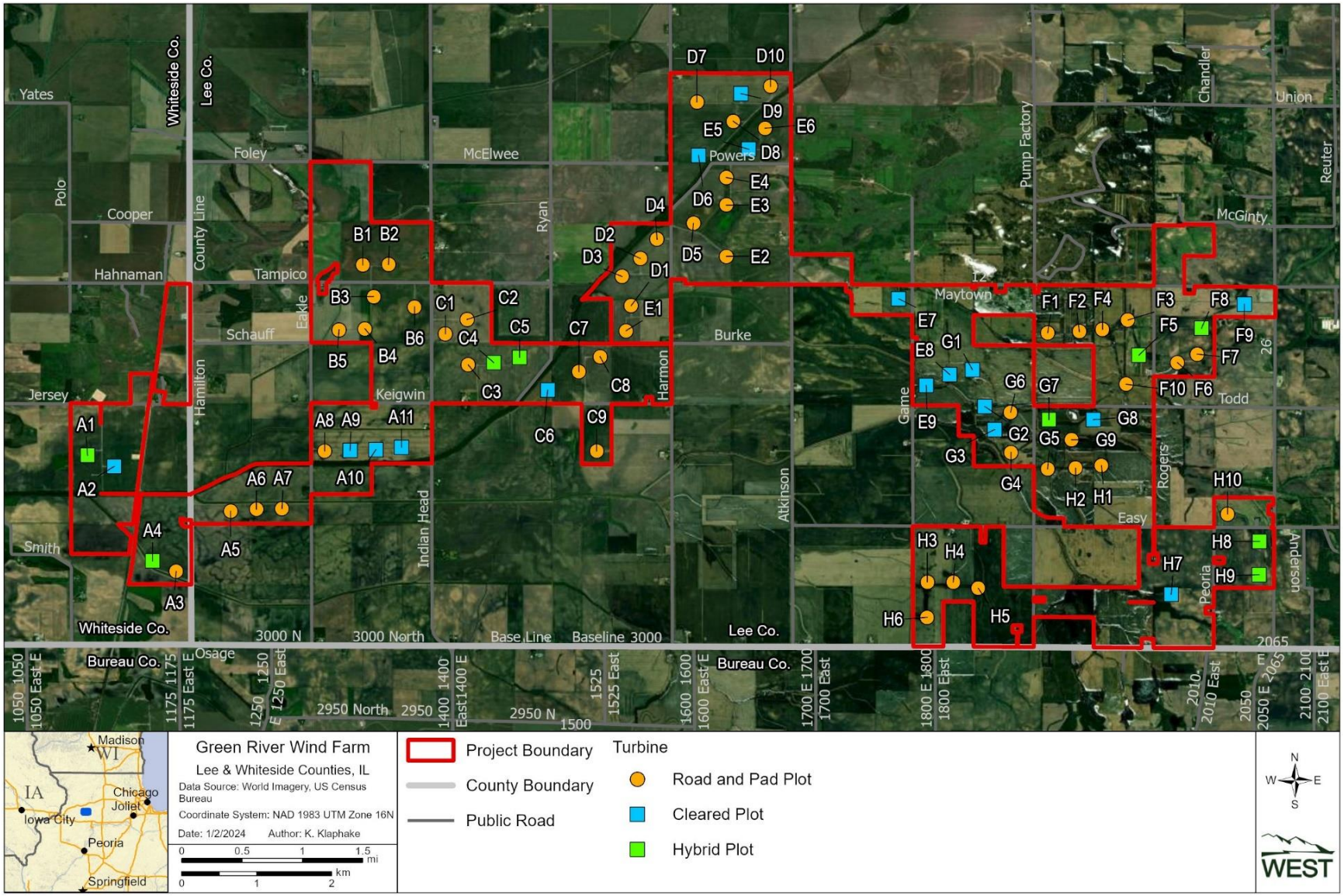

Figure 7. Turbine locations and search types at the Green River Wind Farm, Lee and Whiteside counties, Illinois (May 16 – October 15, 2023).

4.3.2 Carcass Persistence Trials

The objective of CPTs was to estimate the probability that a carcass would persist from the time it was deposited until the next scheduled search. Carcasses could be removed by scavenging or rendered undetectable by farming activities. At least 20 bat carcasses were placed per visibility class per season to incorporate the effects of varying weather and scavenger densities on CP. To avoid attracting scavengers or overseeding, no more than three trial carcasses were placed at a single plot during an individual trial.

Biologists monitored the trial carcasses over a 30-day period according to the following schedule, as closely as possible. Trial carcasses were checked daily for the first four days, then on days 7, 10, 14, and 30. Trial carcasses were monitored until they were completely removed, or the trial period ended. Detection dog teams monitored trial carcasses placed on cleared plots and hybrid plots; biologists monitored trial carcasses placed on road and pad plots.

4.4 Search Area Adjustment

Biologists recorded the boundaries of road and pad plots, cleared plots, and the cleared portions of hybrid plots, using a Trimble R1 sub-meter global positioning system unit connected via Bluetooth to a tablet. The 70-m boundaries of hybrid plots were delineated using a 70-m radius buffer around each turbine in a Geographic Information System (GIS). Unsearchable areas within plots 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 (see Section 5.3 below).

4.5 Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) measures were implemented at all stages of the study, including in the field, during data entry and analysis, and report writing. All WEST field staff were trained in proper survey techniques, and all data collected were recorded on a tablet data form. Following field surveys, biologists were responsible for inspecting data forms for completeness and accuracy. If errors or anomalies were found, follow-up measures were implemented including discussions and review of field data with biologists and/or project managers.

WEST field staff were trained on proper tablet data entry procedures. System controls were implemented to ensure correct data were entered; however, if any errors, omissions, or problems were identified in later stages of analysis, they were traced back to the raw data, where appropriate changes and measures were implemented. Data were incorporated into a Microsoft® SQL Server database and were QA/QC'd throughout the course of the study. Statisticians provided an additional level of QA/QC to ensure proper protocols were followed and data collected were congruent with the objectives of the study.

WEST's reporting and review process included project management review, technical editing and content review, senior technical review, and a final review by the project manager before delivery to the client.

4.6 Statistical Analysis

4.6.1 All Bat Fatality Rate Estimation

Carcasses included in the fatality rate estimate were found within plots and had an estimated time of death within the study period. Fatality estimates were calculated for bats by season and for the study period using GenEst (a generalized estimator of fatality; Dalthorp et al. 2018, Simonis et al. 2018). To obtain an overall estimate of fatality, each carcass included in the analysis was adjusted for SEEF, CP, a detection reduction factor (also referred to as "*k*"; see below), and a search area adjustment. Fatality estimates for the different plot types (road and pad, cleared, hybrid) were combined using a weighted average, and estimates and 90% confidence intervals were calculated using a parametric bootstrap (Dalthorp et al. 2018) for each individual category listed above, assuming more than five fatalities were detected.

4.6.2 Evidence of Absence Modeling

The EoA modeling framework (Dalthorp et al. 2017) was used to estimate take of the Indiana bat and northern long-eared bat. To estimate take, EoA used the arrival distribution of bats (described below), the number of Indiana bat or northern long-eared bats found, and the estimated overall probability of detecting a bat fatality based on data collected in the field. Data used in the EoA model included number of Indiana bat or northern long-eared bat fatalities, arrival proportions, fatality spatial data from all bats found inside search plots and with an estimated time of death within the search period, and the results of SEEF and CPT.

4.6.3 Searcher Efficiency Estimation

SEEF was estimated separately for biologists and detection dog teams to account for different modes of detection (i.e., biologists searched visually, whereas detection dogs searched using scent). EoA used raw SEEF data (i.e., number of found and available trial carcasses) to inform overall probability of detection. SEEF was modeled using logistic regression (Dalthorp et al. 2018) to determine if searcher efficiency varied by strata. Season (summer or fall) and plot visibility class (cleared or uncleared) were used as potential explanatory variables (covariates) on plots searched by detection dog teams. Season was the only covariate considered on road and pad plots because conditions remained the same on gravel throughout the year. Model selection was completed using an information theoretic approach known as AICc, or corrected Akaike Information Criterion (Burnham and Anderson 2002). The most parsimonious model (the model with the fewest variables) within two AICc units of the model with the lowest AICc value was selected as the best model. SEEF values 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 vary from zero to one. When *k* is zero, it implies that a carcass 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 (i.e., a carcass that is missed on the first search would have an equal chance of being found on a subsequent search as any other newly available carcass). A value of $k = 0.65$ was assumed to calculate bat fatality estimates using GenEst and EoA, per the HCP.

4.6.4 Carcass Persistence Rate Estimation

CPT data were used to estimate the amount of time, in days, that carcasses remained available to be located by the searcher. CP was estimated separately for plots searched by biologists (i.e., road and pad plots) versus detection dog teams (i.e., cleared plots and hybrid plots) to account for different modes of detection. The average probability that a carcass persisted through the search interval (i.e., the time between scheduled searches) was estimated using an interval-censored survival regression with four potential distributions: exponential, log-logistic, lognormal, and Weibull (Kalbfleisch and Prentice 2002, Dalthorp et al. 2018). Season (summer or fall) and visibility class (cleared or uncleared) were used as potential covariates on plots searched by detection dog teams. Season was the only covariate considered on road and pad plots. The most parsimonious model within two AICc units of the model with the lowest AICc value was selected as the best model. The parameter estimates of the selected model (α [shape] and β [scale], including the 95% confidence interval [CI] of β) were used as inputs in the EoA Single Class Module.

4.6.5 Area Adjustment

The search area adjustment accounted for carcasses that fell in unsearched areas within plots, and those that fell beyond the plot boundary. The search area adjustment 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 searched areas within the plot. Unsearched areas were due to survey obstacles such as ground cover (e.g., tall crops), terrain, or farming equipment. The search area adjustment was estimated as the product of the unsearched area around each turbine and a carcass-density distribution. The carcass-density distribution predicted the likelihood a carcass fell a given distance from the turbine base. In cases where model selection indicated differences in SEEF or CP between the visibility classes within the hybrid plots, the fraction of carcasses associated with each bias factor (SEEF or CP) could also be estimated using the area adjustment models, which was unnecessary for this study (see Section 5.0).

The carcass density distribution was modeled using site-specific fatality location data. A truncated weighted maximum likelihood (TWL) modeling approach (Khokan et al. 2013) was used to estimate the carcass-density distribution. The TWL approach weights each carcass by the inverse of its probability of detection and the proportion of area searched in each 1.0-m annulus around the turbine, out the maximum search area extent (e.g., 40 m for cleared plots). Distributions considered were normal, gamma, Gompertz, and Weibull (parameterized according to R Development Core Team [2016] and Yee [2015]). The proportion of area searched was calculated in a GIS as the amount of area searched divided by the total area searched at each 1.0-m annulus around the turbine.

4.6.6 Carcasses Excluded from Area Adjustment Calculations

Fatalities were excluded from the area adjustment calculation when the carcass was discovered outside of the spatial and temporal scope of the survey design. For example, carcasses found outside of plots were not included in the analysis because the search effort associated with those carcasses was unknown. Carcasses with an estimated time of death outside of the study period (e.g., prior to the start of surveys) were also excluded because the fatality occurred outside of the

study period. Carcasses found on a plot outside of a scheduled search (incidentally) were included in analysis if that plot was planned to be searched in the future. If an Indiana bat or northern long-eared bat fatality had been found outside of the spatial or temporal scope of the survey design, the carcass would still be excluded from the search area adjustment estimate, but it would have been included in the EoA fatality estimate following Dalthorp et al. (2020).

4.6.7 Indiana Bat and Northern Long-eared Bat Take and Detection Probability Estimates

EoA was used to estimate the mean annual take rate (λ) and the point estimate of mortality for the Indiana bat and northern long-eared bat. Estimates were calculated using the EoA method (Dalthorp et al. 2017) using the Single Class, Multiple Class, and Multiple Years modules of EoA.

When combining detection probabilities across summer and fall, weights (density-weighted proportion [DWP] in EoA) were used that accounted for assumed arrival proportions[1], curtailment operations, and the proportion of turbines that posed risk in each season (Appendix D).

The probability of detection (*g*) was estimated using the bias corrections for SEEF, CP, and area searched, as well as the assumed seasonality of risk for the Indiana bat and northern long-eared bat (computed to be 25% in summer and 75% in fall after the HCP-assumed risk proportions were adjusted for number of risk turbines in each season). The EoA Single Class Module was used to estimate the distribution of detection probability in each search stratum. This resulted in alpha (α; Ba in EoA) and beta (β; Bb in EoA) parameters that defined the beta distribution of detection probability in each search stratum.

The EoA Multiple Class Module was then used to combine detection probability distributions across strata (cleared plots and hybrid plots searched by detection dog teams and road and pad plots searched by biologists), with weights for each class defined by the sampling fraction, area searched, and seasonal arrival proportions. The results from the Multiple Class module were used within the EoA Multiple Years Module to estimate mean take rate λ and its 95% CI.

The EoA Multiple Years Module requires the input ρ, which weights the years according to the relative fatality risk within each year. The values of ρ are 1.0 for years within which operations are typical, but can be less than 1.0 if there is substantial turbine down-time reducing annual risk, or greater than 1.0 if turbines are curtailed less than usual.

5.0 RESULTS

5.1 Standardized Carcass Searches

The 74 turbines were searched once weekly during spring, and twice weekly in summer and fall, totaling 3,193 searches across the study period. The average search interval in spring was 7.57 days, and during summer and fall the average search interval was 3.58 days (Table 3).

[1] Because no Indiana or northern long-eared bat carcasses were found during the study, we assumed that summer risk occurred only at the 24 turbines within 305 m of forest at the project, and seasonal weights were adjusted to reflect the different number of risk turbines in each season.

Approximately 94% of scheduled searches were completed, with turbine maintenance and weather constraints being the primary reasons for missed searches.

Table 3. Search effort by season and plot type at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Season	Searcher Type	Plot Type	Search Interval	Number of Searches
spring (May 1–May 15)*	human	100-m road and pad	7.57	146
summer (May 16–July 31)	human	100-m road and pad	3.58	964
	detection dog	40-m cleared	3.58	359
	detection dog	70-m hybrid	3.58	191
fall (August 1–October 15)	human	100-m road and pad	3.58	980
	detection dog	40-m cleared	3.58	365
	detection dog	70-m hybrid	3.58	188
Overall				**3,193**

m = meter

* Search effort related to black-billed cuckoo monitoring. Search and fatality data from the spring were excluded from the bat fatality estimate analysis. Six bat carcasses were found during this period; these carcasses are included in Appendix A, but excluded from analysis.

5.1.1 Species Composition

No state- or federally listed species of bats were found. One upland sandpiper (*Bartramia longicauda*) fatality, state-listed as endangered in Illinois, was found during a road and pad plot search on August 2, 2023. No other state or federally listed species of birds were found. A full listing of bird (n = 99) and bat (n = 427) carcasses found is presented in Appendix A. Six bat fatalities (five silver-haired bats and one big brown bat) and one bird fatality (Nashville warbler; *Leiothlypis ruficapilla*) were found during spring black-billed cuckoo fatality monitoring (Appendix A); these carcasses were excluded from the bat fatality estimate analysis. The remainder of this report focuses on bat casualties found during summer and fall, per the HCP.

Overall, 117 bats were found in the summer and 304 bats were found in the fall (Appendix A). The most commonly found bat species were eastern red bat (167 carcasses; 39.1% of total bat carcasses) and silver-haired bat (148; 34.7%), followed by hoary bat (51; 11.9%), and big brown bat (49; 11.5%). Seven evening bats (1.6%), three unidentified *Lasiurus* bats (0.7%), one little brown bat (*Myotis lucifugus*; 0.2%), and one unidentified non-myotis bat (0.2%) were also found (Table 4; Appendix A). Over the course of the monitoring period, 22 heavily scavenged or decomposed bats were sent for genetic testing, and were identified as silver-haired, big brown, eastern red, hoary, and little brown bat. The majority of bat carcasses were recorded on the 40-m cleared plots and 70-m hybrid plots searched by detection dog teams (Table 5).

5.1.2 Carcasses Excluded from Analysis

Thirty-four of the 427 bats found were excluded from the overall fatality estimate. Carcasses excluded from analysis included 22 that were found outside of plots, and 12 that had an estimated time of death outside of the study period (Table 4).

Table 4. Number and percent (%) of bat carcasses by species included and excluded from analysis and the search area adjustment at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

	Included in Fatality Estimate		Outside Plot*		Outside Study Period*		Total	
Species	**Total**	**%**	**Total**	**%**	**Total**	**%**	**Total**	**%**
eastern red bat	163	41.5	3	13.6	1	8.3	167	39.1
silver-haired bat	129	32.8	13	59.1	6	50.0	148	34.7
hoary bat	47	12.0	2	9.1	2	16.7	51	11.9
big brown bat	43	10.9	4	18.2	2	16.7	49	11.5
evening bat	6	1.5	0	0.0	1	8.3	7	1.6
unidentified *Lasiurus* bat	3	0.8	0	0.0	0	0.0	3	0.7
little brown bat	1	0.3	0	0.0	0	0.0	1	0.2
unidentified non-myotis	1	0.3	0	0.0	0	0.0	1	0.2
Overall	**393**	**100**	**22**	**100**	**12**	**100**	**427**	**100**

Note: Totals may differ due to rounding.

* Carcasses not included in analysis. Bats listed here include those found prior to May 16 (during road and pad plot searches as part of a black-billed cuckoo monitoring effort) and those found during the study period that had an estimated time of death outside of the study period.

Table 5. Number and percent (%) of bat carcasses by species and plot type found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

	100-m Road and Pad*		40-m Cleared Plot		70-m Hybrid Plot**	
Species	**Total**	**%**	**Total**	**%**	**Total**	**%**
eastern red bat	15	33.3	91	40.8	61	38.4
silver-haired bat	19	42.2	69	30.9	60	37.7
hoary bat	3	6.7	28	12.6	20	12.6
big brown bat	7	15.6	30	13.5	12	7.5
evening bat	1	2.2	3	1.3	3	1.9
unidentified Lasiurus bat	0	0	1	0.4	2	1.3
unidentified non-myotis	0	0	0	0	1	0.6
little brown bat	0	0	1	0.4	0	0
Overall	**45**	**100**	**223**	**100**	**159**	**100**

Note: Totals may differ due to rounding.

m = meter.

* Six bats included here were found prior to May 16 during road and pad plot searches as part of a black-billed cuckoo monitoring effort. These six bats were excluded from the bat fatality estimate analysis.

** Hybrid plots were cleared of vegetation out to 40 m, and from 40-70 m vegetation (soybeans) was uncleared.

5.2 Bias Trials

5.2.1 Searcher Efficiency Trials

Overall, 156 bats were placed for SEEF trials on 22 separate dates; 130 were available to find across all plot types (Table 6). The best-fit model for SEEF on dog-aided plots was the intercept-only model, indicating that SEEF was consistent across visibility classes and seasons (Appendix B1). An intercept-only model also provided the best fit for modeling SEEF on

human-searched plots (roads and pads), indicating that SEEF was consistent across seasons (Appendix B2).

Table 6. Searcher efficiency results by season and visibility class at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Season	Visibility Class	Number Placed	Number Available	Number Found	% Found
summer	uncleared*	29	22	17	77.3
	cleared*	23	21	16	76.2
	roads and pads	28	22	18	81.8
fall	uncleared*	27	21	13	61.9
	cleared*	29	24	21	87.5
	roads and pads	20	20	18	90.0
Overall uncleared*		**56**	**43**	**30**	**69.8**
Overall cleared*		**52**	**45**	**37**	**82.2**
Overall roads and pads		**48**	**42**	**36**	**85.7**

* Dog-assisted search.

5.2.2 Carcass Persistence Trials

Overall, 140 bat carcasses were placed to estimate CP. An intercept-only model (using a lognormal distribution) provided the best fit for modeling bat CP rates on dog-aided plots, indicating that CP was consistent across visibility classes and seasons (Table 7; Appendix B3). An intercept-only model (using a log-logistic distribution) also provided the best fit for modeling bat CP rates on human-searched plots (roads and pads; Table 7; Appendix B4).

The estimated median CP time for dog-aided plots was 4.88 days (Table 7; Figure 8). The estimated median CP time for human-searched plots was 2.25 days. The average probability that a carcass persisted through a 3.5-day search interval was 0.72 (90% CI: 0.65–0.78) on dog-aided plots, and 0.60 (90% CI: 0.51–0.69) on human-searched plots (Figure 8, Appendices B5 and B6).

Table 7. Carcass persistence top models with covariates, distributions, and model parameters for the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Visibility Class	Distribution	Estimated Median Removal Times (days)	Parameter 1	Parameter 2
uncleared*	lognormal**	4.88	meanlog = 1.586	sdlog = 1.996
cleared*	lognormal**	4.88	meanlog = 1.586	sdlog = 1.996
roads and pads	loglogistic***	2.25	shape = 0.943	scale = 0.812

* Dog-assisted search.

** Parameterization follows the base R parameterization for this distribution.

***Parameterization follows the FAdist parameterization for this distribution.

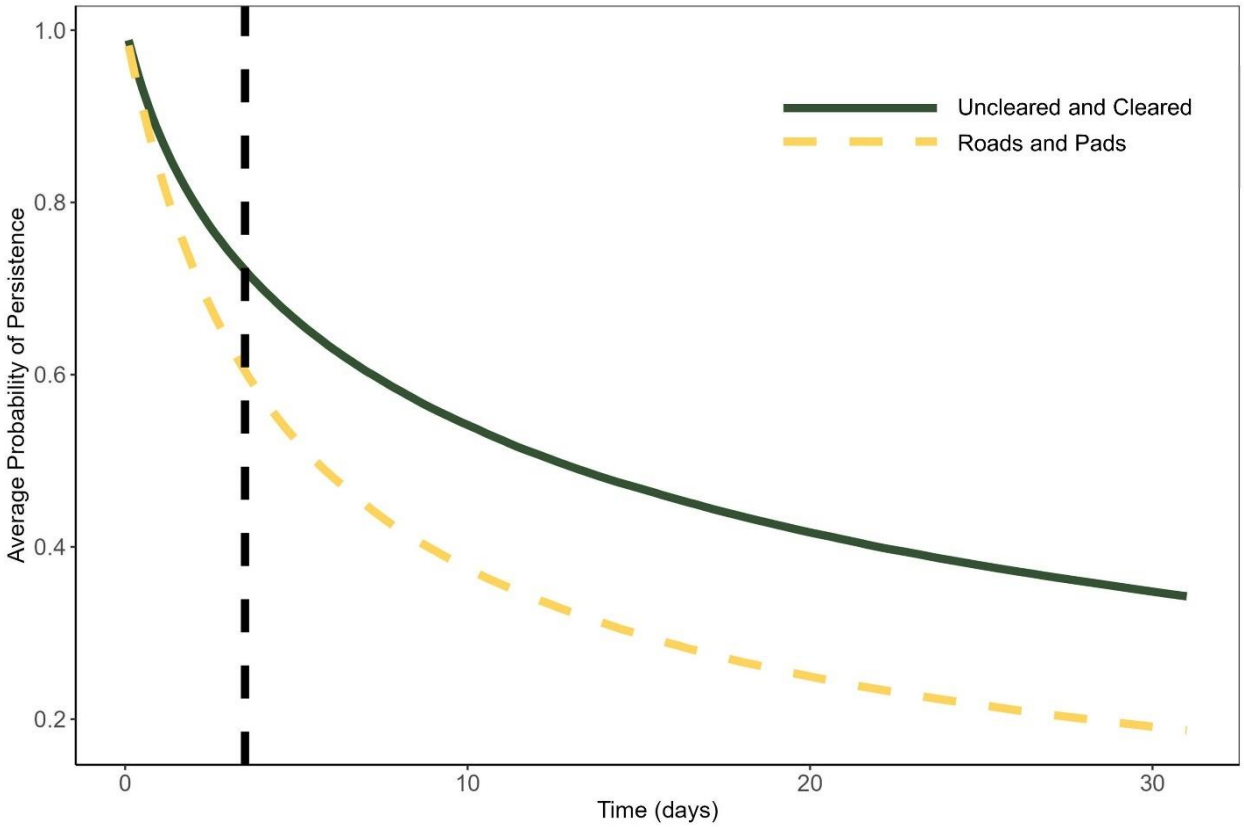

Figure 8. The average probability of carcass persistence per visibility class (roads and pads, uncleared, and cleared) over time (in days) at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023. The vertical black dashed line denotes the twice per week search interval.

5.3 Statistical Analysis

5.3.1 Area Adjustment

The normal distribution was the best fit for modeling bat carcass density distributions with respect to distance from the turbine base (Appendix C), regardless of plot type. The TWL area adjustment for bats was 0.70 at cleared plots, 0.97 at hybrid plots, and 0.17 at road and pad plots (Table 8).

Table 8. Truncated weighted maximum likelihood search area adjustment estimates for the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Plot Type	Number of Bats*	Distribution	Parameter 1	Parameter 2	Area Adjustment
40-m cleared	204	normal	28.0286	20.3122	0.70
70-m hybrid	152	normal	28.0286	20.3122	0.97
100-m roads and pads	37	normal	28.0286	20.3122	0.17

* Number of bats included in the area adjustment analysis by plot type.

(n = 393 bat carcasses).

5.3.2 Bat Fatality Rate

The overall estimated bat fatality rate was 5.77 (90% CI: 4.56–7.40) bat fatalities/MW (15.14 [90% CI: 11.98–19.43] bat fatalities/turbine; Table 9). Estimated bat fatality rates were lower for the summer (1.57 [90% CI: 1.17–2.15] bat fatalities/MW) than the fall (4.16 [90% CI: 3.27–5.43] bat fatalities/MW).

Table 9. Estimated fatality rates for combined plot types by season and overall, per megawatt (MW) and per turbine for the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

	Per MW		Per Turbine	
Season	**Estimate**	**90% CI**	**Estimate**	**90% CI**
summer	1.57	1.17–2.15	4.12	3.07–5.66
fall	4.16	3.27–5.43	10.93	8.58–14.25
Overall	**5.77**	**4.56–7.40**	**15.14**	**11.98–19.43**

CI = confidence interval.

5.3.3 Indiana Bat and Northern Long-eared Bat Take Estimates

No Indiana bat or northern long-eared bat carcasses were found during the study, including at the 24 turbines considered to pose summer risk to northern long-eared bat (i.e., within 305 m of suitable bat habitat) and at the 50 remaining turbines. The HCP defined the period of risk as including summer and fall, and detection probabilities were calculated separately for each season. The HCP noted some uncertainty regarding which turbines could pose risk to northern long-eared bats during the summer. The number of potential turbines which posed summer risk to northern long-eared bats could affect the summer probability of detection value. The EoA analysis conducted here included only the 24 turbines considered to pose summer risk during HCP development, when estimating the detection probability for summer. All turbines were included in the fall estimate.

The probability of detection of an Indiana bat or northern long-eared bat achieved for the 2023 monitoring period was 0.24 (95% CI: 0.22–0.26; Table 10). Screenshots of the graphical user interface and inputs required to run the EoA Single Class Module, Multiple Class Module, and Multiple Year Module, and stratum-specific *g* distribution values are provided in Appendix D.

The combined probability of detection of an Indiana bat or northern long-eared bat for 2022 and 2023 was 0.27 (95% CI: 0.26–0.28; Table 10). For the 2022 analysis ρ was set to 1.0 because searching during summer and fall was considered a full year of PCM for bats under the ITP operations, and there were no other operational years for comparison. The echoPITCH curtailment regime (Stephenson and Peterson 2022) was implemented for all of 2023, so 2023 was now considered a "normal" operating year. Because no curtailment occurred in the summer of 2022, ρ was set to 1.095 for 2022 to account for the increased risk in 2022 compared to 2023's operations. For 2023 ρ was set to 1.0.

Indiana bats and northern long-eared bats were each estimated to have a mean annual take rate of 0.89 (95% CI: 0-4.46) bats per year for 2022-2023 (Table 11). Based on the overall $\hat{g}$ of 0.27,

the 0.5 quantile indicated zero ($M^* = 0$) Indiana bat or northern long-eared bat fatalities occurred since 2022. The expected average annual take rate reported in the HCP is 1–2 Indiana bats per year and 3–5 northern long-eared bats per year (Stantec 2022). Adaptive management triggers will be tested after the third year of intensive monitoring following issuance of the ITP.

Table 10. Probability of detection (g), Ba, Bb, and ρ for Indiana bats or northern long-eared bats for each year of intensive monitoring to date at the Green River Wind Farm, Lee and Whiteside counties, Illinois.

Year	Ba*	Bb*	ρ**	*g*	95% CI
2022	831.73	1,975.09	1.095	0.30	0.28–0.31
2023	640.07	2,039.63	1	0.24	0.22–0.26
Cumulative	1,478.81	4,020.79	NA	0.27	0.26–0.28

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

** ρ is the weight in the weighted average that is used to combine the probability of detection distributions across years.

CI = confidence interval.

Table 11. Estimated take rates (λ) versus the expected take rates at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Species	Mean λ (95% CI)	Expected Take Rate (τ)
Indiana bat	0.89 (0–4.46)	2
northern long-eared bat	0.89 (0–4.46)	5

CI = confidence interval.

6.0 CONCLUSIONS

The PCM effort completed in 2023 was consistent with the HCP's monitoring requirements and the Project's 2023 study plan. The species composition of bat fatalities was similar to other Midwestern wind facilities (WEST 2023), and no state- or federally listed bats were observed as fatalities in 2023. One upland sandpiper was the only state-listed bird species documented as a fatality. Although the upland sandpiper is relatively uncommon in Illinois compared to its historic population (IDNR 2020), the species has been documented near the Project with some regularity (eBird 2023).

The overall bat fatality rate observed at the Project during 2023 (5.77 [90% CI: 4.56–7.40] bats/MW), is at the lower end of bat fatality rates observed at other Midwestern wind facilities that operated at manufacturer cut-in speed (WEST 2023). The overall bat fatality rate during 2023 is less than the bat fatality rate observed during PCM in 2022 at the Project (7.05 bats/MW [90% CI: 5.99–8.55]; Brown et al. 2023), and less than half of the bat fatality rate observed during PCM in 2021 at the Project (13.89 bats/MW [90% CI: 10.92–21.36]; Brown et al. 2022). During 2021, turbines were curtailed following protocols in the Project's *Draft Habitat Conservation Plan for the Indiana Bat and Northern Long-Eared Bat* (Stantec 2021b). This suggests that the smart curtailment protocol employed during 2022 and 2023 (Stephenson and Peterson 2022) may have

achieved a reduction in bat exposure greater than the blanket curtailment protocol described in the HCP.

Based on the absence of Indiana bat and northern long-eared bat fatalities found during 2022 and 2023 and the *g* of 0.24 (95% CI: 0.22–0.26), the estimated fatality rates for both Indiana bats and northern long-eared bats was 0.89 bats per year in 2022 – 2023. In addition, WEST did not find evidence (i.e., Indiana bat or northern long-eared bat fatalities) to contradict the assumption that summer risk to the bat species covered under the ITP is limited to northern long-eared bats at the 24 turbines located within 305 m of forest. Therefore, limiting annual bat monitoring to the 24 turbines located within 305 m of forest during summer (as outlined in the HCP) is consistent with the assumptions within the HCP.

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Appendix A. Carcasses Found during 2023 Post-Construction Monitoring at the Green River Wind Farm

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
Bats							
5/8/2023	silver-haired bat	24	C8	carcass search	100-m road and pad***	intact	no
5/8/2023	silver-haired bat	34	D8	carcass search	100-m road and pad***	intact	no
5/9/2023	silver-haired bat	5	A9	carcass search	100-m road and pad***	scavenged	no
5/9/2023	silver-haired bat	23	A9	carcass search	100-m road and pad***	scavenged	no
5/11/2023	silver-haired bat	36	A5	carcass search	100-m road and pad***	intact	no
5/12/2023	big brown bat	3	H7	carcass search	100-m road and pad***	intact	no
5/16/2023	hoary bat	40	F8	carcass search	70-m hybrid	intact	yes
5/17/2023	big brown bat	25	G3	carcass search	40-m cleared	dismembered	yes
5/17/2023	eastern red bat	1	G8	carcass search	40-m cleared	intact	yes
5/17/2023	evening bat	27	D9	carcass search	40-m cleared	scavenged	yes
5/17/2023	hoary bat	31	E7	carcass search	40-m cleared	scavenged	yes
5/17/2023	silver-haired bat	23	C5	carcass search	70-m hybrid	scavenged	yes
5/19/2023	eastern red bat	60	H8	carcass search	70-m hybrid	scavenged	yes
5/19/2023	hoary bat	13	A9	carcass search	40-m cleared	dismembered	yes
5/19/2023	silver-haired bat	37	A2	carcass search	40-m cleared	dismembered	yes
5/19/2023	silver-haired bat	18	H7	carcass search	40-m cleared	scavenged	yes
5/19/2023	silver-haired bat	73	H9	carcass search**	70-m hybrid	scavenged	yes
5/20/2023	silver-haired bat	51	C4	carcass search	70-m hybrid	dismembered	yes
5/20/2023	silver-haired bat	35	F5	carcass search	70-m hybrid	scavenged	yes
5/20/2023	silver-haired bat	50	G7	carcass search	70-m hybrid	scavenged	yes
5/22/2023	eastern red bat	51	H8	carcass search	70-m hybrid	intact	yes
5/22/2023	evening bat	1	E2	carcass search	100-m road and pad	scavenged	no
5/22/2023	silver-haired bat	33	A4	carcass search	70-m hybrid	scavenged	yes
5/22/2023	silver-haired bat	45	F9	carcass search**	40-m cleared	intact	yes
5/23/2023	eastern red bat	65	C5	carcass search	70-m hybrid	scavenged	yes
5/23/2023	eastern red bat	12	G3	carcass search	40-m cleared	intact	yes
5/23/2023	evening bat	21	C4	carcass search	70-m hybrid	scavenged	yes
5/23/2023	evening bat	27	G3	carcass search	40-m cleared	intact	yes
5/23/2023	hoary bat	39	C4	carcass search	70-m hybrid	scavenged	yes
5/23/2023	silver-haired bat	71	C4	carcass search**	70-m hybrid	scavenged	yes
5/25/2023	hoary bat	26	D10	carcass search	100-m road and pad	scavenged	no
5/26/2023	hoary bat	23	E7	carcass search	40-m cleared	intact	yes
5/26/2023	silver-haired bat	36	C6	carcass search	40-m cleared	intact	yes
5/28/2023	silver-haired bat	51	A9	carcass search**	40-m cleared	scavenged	yes
5/28/2023	silver-haired bat	29	A9	carcass search	40-m cleared	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
5/29/2023	silver-haired bat	43	D5	carcass search	100-m road and pad	intact	no
5/30/2023	hoary bat	37	E8	carcass search	40-m cleared	intact	yes
6/1/2023	hoary bat	14	A9	carcass search	40-m cleared	dismembered	yes
6/2/2023	evening bat	17	A4	incidental	70-m hybrid	intact	yes
6/5/2023	eastern red bat	25	A2	carcass search	40-m cleared	scavenged	yes
6/5/2023	eastern red bat	14	H9	carcass search	70-m hybrid	intact	yes
6/5/2023	silver-haired bat	23	C6	incidental	40-m cleared	intact	yes
6/6/2023	silver-haired bat	15	B6	carcass search	100-m road and pad	intact	no
6/6/2023	silver-haired bat	45	F8	incidental	70-m hybrid	scavenged	yes
6/9/2023	silver-haired bat	81	C4	carcass search**	70-m hybrid	scavenged	yes
6/12/2023	eastern red bat	46	G2	carcass search**	40-m cleared	dismembered	yes
6/12/2023	silver-haired bat	50	F9	carcass search**	40-m cleared	scavenged	yes
6/12/2023	silver-haired bat	42	H9	carcass search	70-m hybrid	intact	yes
6/12/2023	unidentified lasiurus bat	43	F8	carcass search	70-m hybrid	dismembered	yes
6/13/2023	hoary bat	60	C4	carcass search	70-m hybrid	scavenged	yes
6/13/2023	hoary bat	35	G8	carcass search	40-m cleared	intact	yes
6/13/2023	silver-haired bat	12	C4	carcass search	70-m hybrid	scavenged	yes
6/15/2023	silver-haired bat	31	G6	carcass search	100-m road and pad	intact	no
6/16/2023	silver-haired bat	23	D9	carcass search	40-m cleared	intact	yes
6/16/2023	silver-haired bat	32	E7	carcass search	40-m cleared	intact	yes
6/16/2023	silver-haired bat	8	G1	carcass search	40-m cleared	intact	yes
6/18/2023	eastern red bat	4	H9	carcass search	70-m hybrid	intact	yes
6/19/2023	silver-haired bat	43	A11	carcass search**	40-m cleared	scavenged	yes
6/19/2023	silver-haired bat	30	D9	carcass search	40-m cleared	scavenged	yes
6/21/2023	silver-haired bat	33	A4	carcass search	70-m hybrid	scavenged	yes
6/22/2023	big brown bat	19	F7	carcass search**	100-m road and pad	intact	no
6/22/2023	hoary bat	9	H10	carcass search	100-m road and pad	dismembered	no
6/23/2023	silver-haired bat	28	G7	carcass search	70-m hybrid	scavenged	yes
6/26/2023	big brown bat	12	G9	carcass search	100-m road and pad	intact	no
6/26/2023	silver-haired bat	44	A2	carcass search**	40-m cleared	scavenged	yes
6/26/2023	silver-haired bat	57	F7	carcass search	100-m road and pad	scavenged	no
6/30/2023	eastern red bat	15	A1	carcass search	70-m hybrid	scavenged	yes
6/30/2023	eastern red bat	23	E7	incidental	40-m cleared	scavenged	yes
7/1/2023	big brown bat	53	G1	carcass search**	40-m cleared	scavenged	yes
7/1/2023	eastern red bat	27	A7	carcass search	100-m road and pad	scavenged	no
7/1/2023	silver-haired bat	17	C6	carcass search	40-m cleared	dismembered	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
7/4/2023	eastern red bat	12	C5	carcass search	70-m hybrid	scavenged	yes
7/4/2023	eastern red bat	17	C6	carcass search	40-m cleared	scavenged	yes
7/6/2023	eastern red bat	55	H8	carcass search	70-m hybrid	scavenged	yes
7/7/2023	eastern red bat	36	E5	carcass search	40-m cleared	scavenged	yes
7/10/2023	hoary bat	37	A1	carcass search	70-m hybrid	intact	yes
7/13/2023	hoary bat	82	A4	carcass search**	70-m hybrid	scavenged	yes
7/17/2023	big brown bat	13	G2	carcass search	40-m cleared	scavenged	yes
7/17/2023	eastern red bat	19	A11	carcass search	40-m cleared	scavenged	yes
7/17/2023	eastern red bat	1	B2	carcass search	100-m road and pad	scavenged	no
7/17/2023	eastern red bat	16	H8	carcass search	70-m hybrid	intact	yes
7/18/2023	eastern red bat	47	C4	carcass search	70-m hybrid	scavenged	yes
7/18/2023	eastern red bat	17	E8	carcass search	40-m cleared	dismembered	yes
7/18/2023	hoary bat	35	C4	carcass search	70-m hybrid	scavenged	yes
7/18/2023	hoary bat	29	E9	carcass search	40-m cleared	dismembered	yes
7/20/2023	eastern red bat	29	A9	carcass search	40-m cleared	intact	yes
7/20/2023	hoary bat	40	A1	carcass search	70-m hybrid	intact	yes
7/20/2023	hoary bat	24	F8	carcass search	70-m hybrid	scavenged	yes
7/21/2023	big brown bat	20	E9	carcass search	40-m cleared	scavenged	yes
7/21/2023	big brown bat	18	E9	carcass search	40-m cleared	scavenged	yes
7/21/2023	eastern red bat	5	C6	carcass search	40-m cleared	intact	yes
7/21/2023	eastern red bat	15	E5	carcass search	40-m cleared	intact	yes
7/21/2023	eastern red bat	24	E7	carcass search	40-m cleared	scavenged	yes
7/21/2023	eastern red bat	28	E8	carcass search	40-m cleared	intact	yes
7/21/2023	eastern red bat	39	E9	carcass search	40-m cleared	intact	yes
7/21/2023	eastern red bat	37	G1	carcass search	40-m cleared	scavenged	yes
7/21/2023	eastern red bat	9	G1	carcass search	40-m cleared	scavenged	yes
7/21/2023	eastern red bat	22	G1	carcass search	40-m cleared	scavenged	yes
7/21/2023	hoary bat	15	E8	carcass search	40-m cleared	scavenged	yes
7/21/2023	hoary bat	23	E9	carcass search	40-m cleared	intact	yes
7/21/2023	unidentified lasiurus bat	40	G1	carcass search	40-m cleared	scavenged	yes
7/24/2023	eastern red bat	47	A4	carcass search	70-m hybrid	scavenged	yes
7/25/2023	eastern red bat	27	E8	carcass search	40-m cleared	scavenged	yes
7/25/2023	eastern red bat	27	H7	carcass search	40-m cleared	scavenged	yes
7/25/2023	hoary bat	39	C5	carcass search	70-m hybrid	scavenged	yes
7/25/2023	hoary bat	18	H7	carcass search	40-m cleared	scavenged	yes
7/26/2023	eastern red bat	62	A1	carcass search	70-m hybrid	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
7/26/2023	unidentified lasiurus bat	18	A1	carcass search	70-m hybrid	scavenged	yes
7/27/2023	eastern red bat	24	A9	carcass search	40-m cleared	scavenged	yes
7/27/2023	eastern red bat	20	F9	carcass search	40-m cleared	scavenged	yes
7/27/2023	eastern red bat	25	H9	carcass search	70-m hybrid	scavenged	yes
7/27/2023	eastern red bat	46	H9	carcass search	70-m hybrid	scavenged	yes
7/27/2023	eastern red bat	23	H9	carcass search	70-m hybrid	scavenged	yes
7/27/2023	hoary bat	24	H9	carcass search	70-m hybrid	scavenged	yes
7/29/2023	big brown bat	20	C6	carcass search	40-m cleared	scavenged	yes
7/29/2023	big brown bat	21	E9	carcass search	40-m cleared	scavenged	yes
7/29/2023	big brown bat	1	F5	carcass search	70-m hybrid	scavenged	yes
7/29/2023	big brown bat	17	G1	carcass search	40-m cleared	scavenged	yes
7/29/2023	eastern red bat	1	F5	carcass search	70-m hybrid	scavenged	yes
7/29/2023	eastern red bat	42	F5	carcass search	70-m hybrid	scavenged	yes
7/29/2023	eastern red bat	16	G1	carcass search	40-m cleared	scavenged	yes
7/29/2023	hoary bat	23	E8	carcass search	40-m cleared	scavenged	yes
7/29/2023	hoary bat	3	G1	carcass search	40-m cleared	injured	yes
8/1/2023	eastern red bat	10	A2	carcass search	40-m cleared	scavenged	yes
8/1/2023	eastern red bat	40	A4	carcass search	70-m hybrid	scavenged	yes
8/1/2023	eastern red bat	27	H7	carcass search	40-m cleared	scavenged	yes
8/1/2023	eastern red bat	14	H7	carcass search	40-m cleared	scavenged	yes
8/1/2023	eastern red bat	6	H9	carcass search	70-m hybrid	scavenged	yes
8/1/2023	hoary bat	57	A4	carcass search	70-m hybrid	scavenged	yes
8/1/2023	hoary bat	0	G1	incidental	40-m cleared	intact	no
8/1/2023	hoary bat	1	H9	carcass search	70-m hybrid	scavenged	yes
8/1/2023	unidentified non-myotis	51	H9	carcass search	70-m hybrid	scavenged	yes
8/2/2023	big brown bat	6	C4	carcass search	70-m hybrid	scavenged	yes
8/2/2023	big brown bat	9	E9	carcass search	40-m cleared	scavenged	yes
8/2/2023	big brown bat	10	E9	carcass search	40-m cleared	scavenged	yes
8/2/2023	eastern red bat	62	C4	carcass search	70-m hybrid	scavenged	yes
8/2/2023	eastern red bat	35	C4	carcass search	70-m hybrid	scavenged	yes
8/2/2023	eastern red bat	18	E7	carcass search	40-m cleared	scavenged	yes
8/4/2023	eastern red bat	23	A11	carcass search	40-m cleared	scavenged	yes
8/4/2023	eastern red bat	12	A9	carcass search	40-m cleared	scavenged	yes
8/7/2023	eastern red bat	18	F8	carcass search	70-m hybrid	intact	yes
8/7/2023	eastern red bat	5	G2	carcass search	40-m cleared	intact	yes
8/7/2023	eastern red bat	56	H8	carcass search	70-m hybrid	scavenged	yes

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Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
8/7/2023	hoary bat	7	F9	carcass search	40-m cleared	scavenged	yes
8/8/2023	eastern red bat	34	G1	carcass search	40-m cleared	scavenged	yes
8/8/2023	eastern red bat	60	G1	carcass search**	40-m cleared	scavenged	yes
8/9/2023	big brown bat	17	D6	carcass search	40-m cleared	scavenged	yes
8/9/2023	big brown bat	3	E5	carcass search	40-m cleared	scavenged	yes
8/9/2023	eastern red bat	6	D6	carcass search	40-m cleared	scavenged	yes
8/9/2023	eastern red bat	11	E7	carcass search	40-m cleared	intact	yes
8/10/2023	silver-haired bat	36	A1	carcass search	70-m hybrid	intact	yes
8/11/2023	eastern red bat	0	C2	carcass search	100-m road and pad	scavenged	no
8/11/2023	eastern red bat	2	C8	carcass search	100-m road and pad	intact	no
8/11/2023	hoary bat	65	C4	carcass search	70-m hybrid	dismembered	yes
8/11/2023	silver-haired bat	39	H9	carcass search	70-m hybrid	scavenged	yes
8/12/2023	big brown bat	22	G1	carcass search	40-m cleared	scavenged	yes
8/12/2023	eastern red bat	11	E8	carcass search	40-m cleared	scavenged	yes
8/12/2023	eastern red bat	20	E9	carcass search	40-m cleared	intact	yes
8/12/2023	eastern red bat	27	F5	carcass search	70-m hybrid	scavenged	yes
8/12/2023	eastern red bat	13	G8	carcass search	40-m cleared	scavenged	yes
8/12/2023	hoary bat	21	E9	carcass search	40-m cleared	scavenged	yes
8/15/2023	big brown bat	13	A11	carcass search	40-m cleared	scavenged	yes
8/15/2023	big brown bat	20	A2	carcass search	40-m cleared	scavenged	yes
8/15/2023	eastern red bat	10	A2	carcass search	40-m cleared	scavenged	yes
8/15/2023	eastern red bat	18	A2	carcass search	40-m cleared	scavenged	yes
8/15/2023	eastern red bat	31	A8	carcass search	100-m road and pad	scavenged	no
8/15/2023	eastern red bat	8	A9	carcass search	40-m cleared	scavenged	yes
8/15/2023	eastern red bat	10	A9	carcass search	40-m cleared	scavenged	yes
8/15/2023	eastern red bat	12	B4	carcass search	100-m road and pad	scavenged	no
8/15/2023	eastern red bat	16	B4	carcass search	100-m road and pad	scavenged	no
8/15/2023	eastern red bat	16	H7	carcass search	40-m cleared	intact	yes
8/15/2023	eastern red bat	29	H8	carcass search	70-m hybrid	scavenged	yes
8/15/2023	eastern red bat	15	H9	carcass search	70-m hybrid	scavenged	yes
8/15/2023	eastern red bat	33	H9	carcass search	70-m hybrid	scavenged	yes
8/15/2023	hoary bat	9	F8	carcass search	70-m hybrid	dismembered	yes
8/15/2023	silver-haired bat	9	B3	carcass search	100-m road and pad	scavenged	no
8/16/2023	big brown bat	20	C4	carcass search	70-m hybrid	scavenged	yes
8/16/2023	big brown bat	31	D5	carcass search	100-m road and pad	intact	no
8/16/2023	eastern red bat	13	C6	carcass search	40-m cleared	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
8/16/2023	eastern red bat	34	D9	carcass search	40-m cleared	scavenged	yes
8/16/2023	eastern red bat	26	D9	carcass search	40-m cleared	scavenged	yes
8/16/2023	eastern red bat	26	E7	carcass search	40-m cleared	scavenged	yes
8/16/2023	eastern red bat	34	G1	carcass search	40-m cleared	scavenged	yes
8/18/2023	big brown bat	49	H9	carcass search	70-m hybrid	scavenged	yes
8/18/2023	eastern red bat	23	D3	carcass search	100-m road and pad	scavenged	no
8/18/2023	eastern red bat	38	F9	carcass search	40-m cleared	intact	yes
8/18/2023	eastern red bat	12	H7	carcass search	40-m cleared	scavenged	yes
8/18/2023	eastern red bat	15	H9	carcass search	70-m hybrid	scavenged	yes
8/18/2023	eastern red bat	19	H9	carcass search	70-m hybrid	scavenged	yes
8/18/2023	eastern red bat	52	H9	carcass search	70-m hybrid	scavenged	yes
8/19/2023	big brown bat	20	E8	carcass search	40-m cleared	scavenged	yes
8/21/2023	big brown bat	12	E8	incidental	40-m cleared	intact	no
8/21/2023	eastern red bat	41	A1	carcass search	70-m hybrid	scavenged	yes
8/21/2023	eastern red bat	12	A9	carcass search	40-m cleared	scavenged	yes
8/21/2023	eastern red bat	48	F8	carcass search	70-m hybrid	scavenged	yes
8/22/2023	big brown bat	39	C5	carcass search	70-m hybrid	intact	yes
8/22/2023	big brown bat	11	D1	carcass search	100-m road and pad	intact	no
8/22/2023	big brown bat	26	E5	carcass search	40-m cleared	scavenged	yes
8/22/2023	eastern red bat	14	C4	carcass search	70-m hybrid	scavenged	yes
8/22/2023	eastern red bat	2	C6	carcass search	40-m cleared	intact	yes
8/22/2023	eastern red bat	5	C7	carcass search	100-m road and pad	intact	no
8/22/2023	eastern red bat	15	D2	carcass search	100-m road and pad	scavenged	no
8/22/2023	silver-haired bat	32	C5	carcass search	70-m hybrid	scavenged	yes
8/23/2023	eastern red bat	12	B2	incidental	100-m road and pad	intact	no
8/23/2023	eastern red bat	14	C5	incidental	70-m hybrid	scavenged	yes
8/23/2023	hoary bat	26	B2	incidental	100-m road and pad	intact	no
8/24/2023	hoary bat	33	G1	incidental	40-m cleared	intact	yes
8/25/2023	big brown bat	1	A2	carcass search	40-m cleared	scavenged	yes
8/25/2023	big brown bat	5	B4	carcass search	100-m road and pad	intact	no
8/25/2023	eastern red bat	6	B6	carcass search	100-m road and pad	intact	no
8/25/2023	eastern red bat	29	B6	carcass search	100-m road and pad	scavenged	no
8/25/2023	hoary bat	19	A2	carcass search	40-m cleared	intact	yes
8/26/2023	big brown bat	14	C4	carcass search	70-m hybrid	scavenged	yes
8/26/2023	big brown bat	14	C4	carcass search	70-m hybrid	scavenged	yes
8/26/2023	big brown bat	18	E7	carcass search	40-m cleared	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
8/26/2023	big brown bat	14	E8	carcass search	40-m cleared	scavenged	yes
8/26/2023	big brown bat	27	F8	carcass search	70-m hybrid	scavenged	yes
8/26/2023	big brown bat	8	H8	carcass search	70-m hybrid	scavenged	yes
8/26/2023	eastern red bat	22	C4	carcass search	70-m hybrid	scavenged	yes
8/26/2023	eastern red bat	33	C4	carcass search	70-m hybrid	scavenged	yes
8/26/2023	eastern red bat	12	D6	carcass search	40-m cleared	scavenged	yes
8/26/2023	eastern red bat	26	G1	carcass search	40-m cleared	scavenged	yes
8/26/2023	eastern red bat	35	H8	carcass search	70-m hybrid	scavenged	yes
8/26/2023	eastern red bat	29	H9	carcass search	70-m hybrid	scavenged	yes
8/26/2023	hoary bat	8	G1	carcass search	40-m cleared	scavenged	yes
8/26/2023	hoary bat	69	H8	carcass search	70-m hybrid	intact	yes
8/26/2023	hoary bat	9	H9	carcass search	70-m hybrid	scavenged	yes
8/26/2023	little brown bat	36	G1	carcass search	40-m cleared	scavenged	yes
8/28/2023	big brown bat	14	A9	carcass search	40-m cleared	scavenged	yes
8/28/2023	eastern red bat	21	A2	carcass search	40-m cleared	scavenged	yes
8/28/2023	eastern red bat	12	F9	carcass search	40-m cleared	scavenged	yes
8/28/2023	eastern red bat	26	F9	carcass search	40-m cleared	scavenged	yes
8/28/2023	eastern red bat	44	H9	carcass search	70-m hybrid	scavenged	yes
8/28/2023	silver-haired bat	21	A2	carcass search	40-m cleared	intact	yes
8/28/2023	silver-haired bat	21	A9	carcass search	40-m cleared	scavenged	yes
8/28/2023	silver-haired bat	38	C5	incidental	70-m hybrid	scavenged	no
8/28/2023	silver-haired bat	14	E8	incidental	40-m cleared	scavenged	yes
8/28/2023	silver-haired bat	35	F8	carcass search	70-m hybrid	intact	yes
8/29/2023	big brown bat	24	C5	carcass search	70-m hybrid	scavenged	yes
8/29/2023	big brown bat	20	F5	carcass search	70-m hybrid	scavenged	yes
8/29/2023	eastern red bat	11	C1	carcass search	100-m road and pad	intact	no
8/29/2023	eastern red bat	22	C5	carcass search	70-m hybrid	scavenged	yes
8/29/2023	eastern red bat	11	C5	carcass search	70-m hybrid	scavenged	yes
8/29/2023	eastern red bat	34	C6	carcass search	40-m cleared	scavenged	yes
8/29/2023	eastern red bat	19	E5	carcass search	40-m cleared	scavenged	yes
8/29/2023	eastern red bat	36	E8	carcass search	40-m cleared	scavenged	yes
8/29/2023	eastern red bat	31	G1	carcass search	40-m cleared	scavenged	yes
8/29/2023	hoary bat	6	C6	carcass search	40-m cleared	scavenged	yes
8/29/2023	silver-haired bat	18	D9	carcass search	40-m cleared	scavenged	yes
8/29/2023	silver-haired bat	24	D9	carcass search	40-m cleared	scavenged	yes
8/29/2023	silver-haired bat	18	G1	carcass search	40-m cleared	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
8/31/2023	big brown bat	26	H7	carcass search	40-m cleared	scavenged	yes
8/31/2023	eastern red bat	30	A2	carcass search	40-m cleared	scavenged	yes
8/31/2023	eastern red bat	36	A2	carcass search	40-m cleared	scavenged	yes
8/31/2023	eastern red bat	27	H7	carcass search	40-m cleared	scavenged	yes
8/31/2023	silver-haired bat	24	A1	carcass search	70-m hybrid	dismembered	yes
8/31/2023	silver-haired bat	2	A1	carcass search	70-m hybrid	intact	yes
8/31/2023	silver-haired bat	16	A2	carcass search	40-m cleared	scavenged	yes
8/31/2023	silver-haired bat	7	D5	carcass search	100-m road and pad	intact	no
8/31/2023	silver-haired bat	19	F3	carcass search	100-m road and pad	scavenged	no
8/31/2023	silver-haired bat	20	F8	carcass search	70-m hybrid	intact	yes
8/31/2023	silver-haired bat	14	F9	carcass search	40-m cleared	dismembered	yes
8/31/2023	silver-haired bat	29	F9	carcass search	40-m cleared	scavenged	yes
8/31/2023	silver-haired bat	10	G1	incidental	40-m cleared	scavenged	yes
8/31/2023	silver-haired bat	19	H7	carcass search	40-m cleared	scavenged	yes
8/31/2023	silver-haired bat	12	H8	carcass search	70-m hybrid	scavenged	yes
9/1/2023	eastern red bat	34	C4	carcass search	70-m hybrid	dismembered	yes
9/1/2023	eastern red bat	5	C4	carcass search	70-m hybrid	scavenged	yes
9/1/2023	eastern red bat	37	E7	carcass search	40-m cleared	scavenged	yes
9/1/2023	eastern red bat	43	E8	carcass search	40-m cleared	dismembered	yes
9/1/2023	silver-haired bat	17	E5	carcass search	40-m cleared	scavenged	yes
9/1/2023	silver-haired bat	8	E7	carcass search	40-m cleared	scavenged	yes
9/1/2023	silver-haired bat	23	F5	carcass search	70-m hybrid	scavenged	yes
9/1/2023	silver-haired bat	17	F5	carcass search	70-m hybrid	scavenged	yes
9/4/2023	eastern red bat	34	A11	carcass search	40-m cleared	scavenged	yes
9/4/2023	eastern red bat	19	A9	carcass search	40-m cleared	scavenged	yes
9/4/2023	eastern red bat	40	F8	carcass search	70-m hybrid	scavenged	yes
9/4/2023	eastern red bat	22	H7	carcass search	40-m cleared	scavenged	yes
9/4/2023	silver-haired bat	4	A2	carcass search	40-m cleared	scavenged	yes
9/4/2023	silver-haired bat	30	A2	carcass search	40-m cleared	scavenged	yes
9/4/2023	silver-haired bat	1	A4	carcass search	70-m hybrid	intact	yes
9/4/2023	silver-haired bat	25	D10	incidental	100-m road and pad	intact	no
9/4/2023	silver-haired bat	13	F8	carcass search	70-m hybrid	scavenged	yes
9/4/2023	silver-haired bat	20	F8	carcass search	70-m hybrid	scavenged	yes
9/4/2023	silver-haired bat	14	F9	carcass search	40-m cleared	dismembered	yes
9/4/2023	silver-haired bat	15	G1	incidental	40-m cleared	scavenged	no
9/4/2023	silver-haired bat	34	H9	carcass search	70-m hybrid	intact	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
9/4/2023	silver-haired bat	11	H9	carcass search	70-m hybrid	dismembered	yes
9/4/2023	silver-haired bat	25	H9	carcass search	70-m hybrid	dismembered	yes
9/5/2023	hoary bat	25	E7	carcass search	40-m cleared	scavenged	yes
9/5/2023	silver-haired bat	30	C3	carcass search	100-m road and pad	intact	no
9/5/2023	silver-haired bat	42	C4	carcass search	70-m hybrid	scavenged	yes
9/5/2023	silver-haired bat	7	C5	carcass search	70-m hybrid	scavenged	yes
9/5/2023	silver-haired bat	14	D6	carcass search	40-m cleared	scavenged	yes
9/5/2023	silver-haired bat	13	E7	carcass search	40-m cleared	scavenged	yes
9/5/2023	silver-haired bat	10	E8	carcass search	40-m cleared	scavenged	yes
9/5/2023	silver-haired bat	44	E9	carcass search	40-m cleared	scavenged	yes
9/5/2023	silver-haired bat	27	G1	carcass search	40-m cleared	scavenged	yes
9/7/2023	big brown bat	25	D3	incidental	100-m road and pad	intact	no
9/7/2023	big brown bat	27	F9	carcass search	40-m cleared	scavenged	yes
9/7/2023	eastern red bat	32	A2	carcass search	40-m cleared	scavenged	yes
9/7/2023	eastern red bat	2	A9	carcass search	40-m cleared	intact	yes
9/7/2023	eastern red bat	43	F8	carcass search	70-m hybrid	scavenged	yes
9/7/2023	eastern red bat	18	G2	carcass search	40-m cleared	scavenged	yes
9/7/2023	eastern red bat	24	H7	carcass search	40-m cleared	scavenged	yes
9/7/2023	silver-haired bat	12	A2	carcass search	40-m cleared	dismembered	yes
9/7/2023	silver-haired bat	10	A2	carcass search	40-m cleared	intact	yes
9/7/2023	silver-haired bat	119	D1	incidental	100-m road and pad	dismembered	no
9/7/2023	silver-haired bat	54	F8	carcass search	70-m hybrid	scavenged	yes
9/7/2023	silver-haired bat	17	F8	carcass search	70-m hybrid	scavenged	yes
9/7/2023	silver-haired bat	12	H7	carcass search	40-m cleared	scavenged	yes
9/7/2023	silver-haired bat	41	H8	carcass search	70-m hybrid	scavenged	yes
9/8/2023	big brown bat	3	D6	carcass search	40-m cleared	scavenged	yes
9/8/2023	big brown bat	44	E8	carcass search**	40-m cleared	scavenged	yes
9/8/2023	big brown bat	49	E9	carcass search**	40-m cleared	scavenged	yes
9/8/2023	eastern red bat	17	C4	carcass search	70-m hybrid	intact	yes
9/8/2023	eastern red bat	13	C5	carcass search	70-m hybrid	scavenged	yes
9/8/2023	eastern red bat	22	E9	carcass search	40-m cleared	intact	yes
9/8/2023	eastern red bat	23	E9	carcass search	40-m cleared	scavenged	yes
9/8/2023	eastern red bat	4	E9	carcass search	40-m cleared	scavenged	yes
9/8/2023	eastern red bat	5	F6	carcass search	100-m road and pad	intact	no
9/8/2023	eastern red bat	24	G7	carcass search	70-m hybrid	scavenged	yes
9/8/2023	hoary bat	37	G3	carcass search	40-m cleared	intact	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
9/8/2023	silver-haired bat	15	C5	carcass search	70-m hybrid	scavenged	yes
9/8/2023	silver-haired bat	24	D9	carcass search	40-m cleared	scavenged	yes
9/8/2023	silver-haired bat	32	E7	carcass search	40-m cleared	intact	yes
9/11/2023	eastern red bat	53	A1	carcass search	70-m hybrid	scavenged	yes
9/11/2023	silver-haired bat	52	H8	carcass search	70-m hybrid	scavenged	yes
9/12/2023	big brown bat	29	G1	carcass search	40-m cleared	scavenged	yes
9/12/2023	eastern red bat	49	C4	carcass search	70-m hybrid	scavenged	yes
9/12/2023	eastern red bat	20	C6	carcass search	40-m cleared	scavenged	yes
9/12/2023	silver-haired bat	31	C6	carcass search	40-m cleared	scavenged	yes
9/12/2023	silver-haired bat	38	C6	carcass search	40-m cleared	scavenged	yes
9/12/2023	silver-haired bat	4	D4	incidental	100-m road and pad	intact	no
9/14/2023	eastern red bat	68	F8	carcass search	70-m hybrid	scavenged	yes
9/14/2023	silver-haired bat	16	A1	carcass search	70-m hybrid	scavenged	yes
9/14/2023	silver-haired bat	2	F8	carcass search	70-m hybrid	scavenged	yes
9/14/2023	silver-haired bat	38	F8	carcass search	70-m hybrid	scavenged	yes
9/14/2023	silver-haired bat	59	H9	carcass search	70-m hybrid	scavenged	yes
9/15/2023	silver-haired bat	9	C4	carcass search	70-m hybrid	scavenged	yes
9/15/2023	silver-haired bat	21	E7	carcass search	40-m cleared	scavenged	yes
9/15/2023	silver-haired bat	2	E7	carcass search	40-m cleared	intact	yes
9/15/2023	silver-haired bat	41	E9	carcass search**	40-m cleared	scavenged	yes
9/15/2023	silver-haired bat	1	E9	carcass search	40-m cleared	intact	yes
9/15/2023	silver-haired bat	40	G1	carcass search	40-m cleared	scavenged	yes
9/18/2023	big brown bat	34	A4	carcass search	70-m hybrid	scavenged	yes
9/18/2023	hoary bat	14	A4	carcass search	70-m hybrid	scavenged	yes
9/18/2023	silver-haired bat	49	H9	carcass search	70-m hybrid	scavenged	yes
9/19/2023	eastern red bat	49	C4	carcass search	70-m hybrid	scavenged	yes
9/19/2023	eastern red bat	2	G1	carcass search	40-m cleared	intact	yes
9/19/2023	silver-haired bat	19	D9	carcass search	40-m cleared	scavenged	yes
9/19/2023	silver-haired bat	28	E5	carcass search	40-m cleared	scavenged	yes
9/19/2023	silver-haired bat	12	E9	carcass search	40-m cleared	scavenged	yes
9/21/2023	eastern red bat	12	A4	carcass search	70-m hybrid	intact	yes
9/22/2023	big brown bat	12	D9	carcass search	40-m cleared	intact	yes
9/22/2023	hoary bat	5	G1	carcass search	40-m cleared	scavenged	yes
9/25/2023	eastern red bat	26	A9	carcass search	40-m cleared	scavenged	yes
9/25/2023	eastern red bat	31	E7	carcass search	40-m cleared	scavenged	yes
9/25/2023	eastern red bat	30	E7	carcass search	40-m cleared	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
9/25/2023	eastern red bat	41	E7	carcass search	40-m cleared	scavenged	yes
9/25/2023	eastern red bat	26	H7	carcass search	40-m cleared	scavenged	yes
9/25/2023	eastern red bat	30	H8	carcass search	70-m hybrid	intact	yes
9/25/2023	hoary bat	32	A9	carcass search	40-m cleared	scavenged	yes
9/25/2023	hoary bat	25	A9	carcass search	40-m cleared	scavenged	yes
9/25/2023	silver-haired bat	73	A1	carcass search**	70-m hybrid	scavenged	yes
9/25/2023	silver-haired bat	13	A11	carcass search	40-m cleared	scavenged	yes
9/25/2023	silver-haired bat	11	H7	carcass search	40-m cleared	intact	yes
9/26/2023	hoary bat	43	C4	carcass search	70-m hybrid	scavenged	yes
9/26/2023	silver-haired bat	31	D6	carcass search	40-m cleared	scavenged	yes
9/27/2023	hoary bat	35	E8	carcass search	40-m cleared	dismembered	yes
9/27/2023	silver-haired bat	27	G1	carcass search	40-m cleared	scavenged	yes
9/27/2023	silver-haired bat	26	G3	carcass search	40-m cleared	scavenged	yes
9/28/2023	eastern red bat	14	A2	carcass search	40-m cleared	scavenged	yes
9/28/2023	eastern red bat	15	A2	carcass search	40-m cleared	intact	yes
9/28/2023	eastern red bat	29	F8	carcass search	70-m hybrid	scavenged	yes
9/28/2023	eastern red bat	20	H8	carcass search	70-m hybrid	scavenged	yes
9/28/2023	hoary bat	50	A4	carcass search	70-m hybrid	scavenged	yes
9/28/2023	silver-haired bat	47	A1	carcass search	70-m hybrid	scavenged	yes
9/28/2023	silver-haired bat	14	H8	carcass search	70-m hybrid	scavenged	yes
9/28/2023	silver-haired bat	62	H9	carcass search	70-m hybrid	scavenged	yes
9/29/2023	eastern red bat	30	E5	carcass search	40-m cleared	intact	yes
9/29/2023	eastern red bat	39	E7	carcass search	40-m cleared	intact	yes
9/29/2023	hoary bat	30	D6	carcass search	40-m cleared	scavenged	yes
9/29/2023	hoary bat	32	E8	carcass search	40-m cleared	scavenged	yes
9/29/2023	hoary bat	52	F5	carcass search	70-m hybrid	scavenged	yes
9/29/2023	silver-haired bat	16	E8	carcass search	40-m cleared	intact	yes
9/29/2023	silver-haired bat	13	G3	carcass search	40-m cleared	scavenged	yes
10/2/2023	eastern red bat	4	A1	carcass search	70-m hybrid	scavenged	yes
10/2/2023	eastern red bat	27	F8	carcass search	70-m hybrid	scavenged	yes
10/2/2023	silver-haired bat	22	F8	carcass search	70-m hybrid	intact	yes
10/3/2023	eastern red bat	15	C4	carcass search	70-m hybrid	intact	yes
10/3/2023	hoary bat	47	E7	carcass search**	40-m cleared	scavenged	yes
10/3/2023	silver-haired bat	39	C5	carcass search	70-m hybrid	scavenged	yes
10/5/2023	silver-haired bat	23	A2	carcass search	40-m cleared	intact	yes
10/5/2023	silver-haired bat	20	A4	carcass search	70-m hybrid	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
10/5/2023	silver-haired bat	31	A4	carcass search	70-m hybrid	dismembered	yes
10/5/2023	silver-haired bat	21	D10	carcass search	100-m road and pad	intact	no
10/5/2023	silver-haired bat	30	D7	carcass search	100-m road and pad	injured	no
10/5/2023	silver-haired bat	26	F8	carcass search	70-m hybrid	scavenged	yes
10/5/2023	silver-haired bat	52	F8	carcass search	70-m hybrid	scavenged	yes
10/5/2023	silver-haired bat	19	H1	carcass search	100-m road and pad	intact	no
10/5/2023	silver-haired bat	32	H8	carcass search	70-m hybrid	intact	yes
10/6/2023	eastern red bat	34	C4	carcass search	70-m hybrid	scavenged	yes
10/6/2023	eastern red bat	24	E9	carcass search	40-m cleared	intact	yes
10/6/2023	eastern red bat	23	G3	carcass search	40-m cleared	dismembered	yes
10/6/2023	evening bat	23	D6	carcass search	40-m cleared	intact	yes
10/6/2023	silver-haired bat	11	E7	carcass search	40-m cleared	intact	yes
10/9/2023	silver-haired bat	25	A1	carcass search	70-m hybrid	scavenged	yes
10/9/2023	silver-haired bat	18	A9	carcass search	40-m cleared	scavenged	yes
10/9/2023	silver-haired bat	34	G2	carcass search	40-m cleared	scavenged	yes
10/9/2023	silver-haired bat	35	H8	carcass search	70-m hybrid	dismembered	yes
10/9/2023	silver-haired bat	37	H8	carcass search	70-m hybrid	scavenged	yes
10/10/2023	eastern red bat	24	A4	carcass search	70-m hybrid	intact	yes
10/10/2023	eastern red bat	42	D9	carcass search**	40-m cleared	scavenged	yes
10/10/2023	eastern red bat	32	E5	carcass search	40-m cleared	scavenged	yes
10/10/2023	evening bat	32	C4	carcass search	70-m hybrid	scavenged	yes
10/10/2023	silver-haired bat	41	D9	carcass search**	40-m cleared	intact	yes
10/10/2023	silver-haired bat	37	E8	carcass search	40-m cleared	intact	yes
10/10/2023	silver-haired bat	20	E9	carcass search	40-m cleared	intact	yes
10/12/2023	big brown bat	1	G2	carcass search	40-m cleared	scavenged	yes
10/12/2023	eastern red bat	18	F9	carcass search	40-m cleared	intact	yes
10/12/2023	silver-haired bat	10	F8	carcass search	70-m hybrid	scavenged	yes
10/12/2023	silver-haired bat	43	H8	carcass search	70-m hybrid	scavenged	yes
10/12/2023	silver-haired bat	56	H9	carcass search	70-m hybrid	scavenged	yes
10/13/2023	silver-haired bat	43	C6	carcass search**	40-m cleared	scavenged	yes
10/13/2023	silver-haired bat	34	E7	carcass search	40-m cleared	scavenged	yes
10/13/2023	silver-haired bat	32	G1	carcass search	40-m cleared	scavenged	yes
Birds							
5/11/2023	Nashville warbler	1	F6	carcass search	100-m road and pad	intact	no
5/16/2023	common yellowthroat	16	F8	carcass search	70-m hybrid	dismembered	yes
5/16/2023	gray catbird	42	A4	carcass search	70-m hybrid	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
5/16/2023	magnolia warbler	51	A11	carcass search**	40-m cleared	scavenged	yes
5/16/2023	red-winged blackbird	6	H7	carcass search	40-m cleared	intact	yes
5/17/2023	mallard	3	E3	carcass search	100-m road and pad	dismembered	no
5/17/2023	red-winged blackbird	10	G1	carcass search	40-m cleared	feather spot	yes
5/17/2023	unidentified passerine	12	D6	carcass search	40-m cleared	scavenged	yes
5/19/2023	gray catbird	70	A2	carcass search**	40-m cleared	intact	yes
5/20/2023	American redstart	39	E5	carcass search	40-m cleared	intact	yes
5/20/2023	blue jay	29	F5	carcass search	70-m hybrid	scavenged	yes
5/23/2023	downy woodpecker	27	E9	carcass search	40-m cleared	feather spot	yes
5/23/2023	red-winged blackbird	27	C4	carcass search	70-m hybrid	feather spot	yes
5/25/2023	cliff swallow	77	H9	carcass search**	70-m hybrid	scavenged	yes
5/25/2023	unidentified oriole	22	A4	carcass search	70-m hybrid	feather spot	yes
5/26/2023	unidentified passerine	39	G1	carcass search	40-m cleared	scavenged	yes
5/28/2023	mallard	64	A1	carcass search	70-m hybrid	feather spot	yes
6/5/2023	indigo bunting	7	F3	carcass search	100-m road and pad	scavenged	no
6/6/2023	unidentified sparrow	27	C4	carcass search	70-m hybrid	scavenged	yes
6/8/2023	brown-headed cowbird	20	H7	carcass search	40-m cleared	intact	yes
6/9/2023	Savannah sparrow	29	E7	carcass search	40-m cleared	intact	yes
6/9/2023	unidentified small bird	22	G3	carcass search	40-m cleared	scavenged	yes
6/13/2023	unidentified passerine	15	G7	carcass search	70-m hybrid	feather spot	yes
6/15/2023	horned lark	58	H8	carcass search	70-m hybrid	scavenged	yes
6/15/2023	red-winged blackbird	31	H8	carcass search	70-m hybrid	intact	yes
6/18/2023	red-winged blackbird	50	H9	carcass search	70-m hybrid	intact	yes
6/19/2023	cedar waxwing	24	E9	carcass search	40-m cleared	feather spot	yes
6/19/2023	mourning dove	44	E9	carcass search**	40-m cleared	intact	yes
6/20/2023	unidentified blackbird	32	E7	carcass search	40-m cleared	scavenged	yes
6/22/2023	unidentified blackbird	46	H7	carcass search**	40-m cleared	scavenged	yes
6/22/2023	unidentified small bird	37	H8	carcass search	70-m hybrid	scavenged	yes
6/26/2023	killdeer	17	A1	carcass search	70-m hybrid	scavenged	yes
6/30/2023	Baltimore oriole	26	F8	carcass search	70-m hybrid	scavenged	yes
6/30/2023	unidentified small bird	65	F5	incidental	70-m hybrid	scavenged	yes
7/1/2023	unidentified small bird	37	F5	carcass search	70-m hybrid	scavenged	yes
7/3/2023	cliff swallow	32	A9	carcass search	40-m cleared	scavenged	yes
7/4/2023	killdeer	17	C5	carcass search	70-m hybrid	scavenged	yes
7/6/2023	chimney swift	38	G2	carcass search	40-m cleared	scavenged	yes
7/7/2023	cliff swallow	13	E7	carcass search	40-m cleared	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
7/7/2023	turkey vulture	29	D6	carcass search	40-m cleared	intact	yes
7/11/2023	cliff swallow	34	C5	carcass search	70-m hybrid	scavenged	yes
7/13/2023	American robin	33	A11	carcass search	40-m cleared	dismembered	yes
7/13/2023	cliff swallow	12	H9	carcass search	70-m hybrid	scavenged	yes
7/14/2023	unidentified passerine	33	C6	carcass search	40-m cleared	feather spot	yes
7/18/2023	cedar waxwing	33	E5	carcass search	40-m cleared	scavenged	yes
7/18/2023	cedar waxwing	18	E7	carcass search	40-m cleared	scavenged	yes
7/20/2023	unidentified swallow	6	H7	carcass search	40-m cleared	scavenged	yes
7/21/2023	cedar waxwing	24	E5	carcass search	40-m cleared	feather spot	yes
7/21/2023	unidentified passerine	14	C4	carcass search	70-m hybrid	scavenged	yes
7/27/2023	downy woodpecker	27	H1	carcass search	100-m road and pad	scavenged	no
8/1/2023	American goldfinch	28	H10	carcass search	100-m road and pad	scavenged	no
8/1/2023	cliff swallow	14	F9	carcass search	40-m cleared	intact	yes
8/2/2023	upland sandpiper	11	A8	carcass search	100-m road and pad	scavenged	no
8/7/2023	dickcissel	20	G2	carcass search	40-m cleared	scavenged	yes
8/7/2023	horned lark	8	F8	carcass search	70-m hybrid	scavenged	yes
8/8/2023	barn swallow	20	G3	carcass search	40-m cleared	intact	yes
8/10/2023	unidentified blackbird	34	H2	carcass search	100-m road and pad	feather spot	no
8/15/2023	unidentified woodpecker	28	H1	carcass search	100-m road and pad	scavenged	no
8/16/2023	barn swallow	19	E9	carcass search	40-m cleared	scavenged	yes
8/16/2023	cedar waxwing	11	C5	carcass search	70-m hybrid	scavenged	yes
8/16/2023	cedar waxwing	30	E5	carcass search	40-m cleared	scavenged	yes
8/16/2023	green heron	3	C6	carcass search	40-m cleared	scavenged	yes
8/19/2023	blue-gray gnatcatcher	20	G1	carcass search	40-m cleared	scavenged	yes
8/19/2023	horned lark	34	C5	carcass search	70-m hybrid	scavenged	yes
8/19/2023	unidentified swallow	30	E7	carcass search	40-m cleared	scavenged	yes
8/21/2023	Baltimore oriole	40	E2	carcass search	100-m road and pad	dismembered	no
8/21/2023	unidentified passerine	10	F8	carcass search	70-m hybrid	feather spot	yes
8/26/2023	American redstart	42	G3	carcass search**	40-m cleared	scavenged	yes
8/26/2023	grasshopper sparrow	40	D9	carcass search	40-m cleared	dismembered	yes
8/26/2023	red-headed woodpecker	26	E5	carcass search	40-m cleared	feather spot	yes
8/26/2023	unidentified small bird	27	G3	carcass search	40-m cleared	scavenged	yes
8/28/2023	Tennessee warbler	28	E6	carcass search	100-m road and pad	scavenged	no
8/28/2023	unidentified passerine	36	H9	carcass search	70-m hybrid	dismembered	yes
8/29/2023	Tennessee warbler	37	E5	carcass search	40-m cleared	scavenged	yes
8/31/2023	Tennessee warbler	55	H9	carcass search	70-m hybrid	scavenged	yes

Appendix A. Complete listing of carcasses found at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Found Date*	Species	Distance from Turbine (m)	Turbine	Search Type	Plot Type	Physical Condition	Dog-Aided Search
9/4/2023	American goldfinch	19	H8	carcass search	70-m hybrid	scavenged	yes
9/4/2023	rock pigeon	19	H7	carcass search	40-m cleared	intact	yes
9/5/2023	Blackburnian warbler	13	G1	carcass search	40-m cleared	scavenged	yes
9/5/2023	Eurasian tree sparrow	23	F5	carcass search	70-m hybrid	scavenged	yes
9/5/2023	chimney swift	50	C6	carcass search**	40-m cleared	scavenged	yes
9/5/2023	least flycatcher	20	D6	carcass search	40-m cleared	dismembered	yes
9/7/2023	Nashville warbler	44	F8	carcass search	70-m hybrid	scavenged	yes
9/7/2023	unidentified warbler	13	H8	carcass search	70-m hybrid	scavenged	yes
9/11/2023	rock pigeon	27	F9	carcass search	40-m cleared	dismembered	yes
9/12/2023	belted kingfisher	22	C6	carcass search	40-m cleared	scavenged	yes
9/12/2023	wild turkey	18	G3	carcass search	40-m cleared	feather spot	yes
9/15/2023	Tennessee warbler	4	G7	carcass search	70-m hybrid	scavenged	yes
9/18/2023	killdeer	55	A1	carcass search	70-m hybrid	scavenged	yes
9/19/2023	red-eyed vireo	15	F9	carcass search	40-m cleared	scavenged	yes
9/25/2023	brown creeper	54	F6	carcass search	100-m road and pad	intact	no
9/27/2023	bobolink	37	G7	carcass search	70-m hybrid	scavenged	yes
9/27/2023	unidentified warbler	16	G8	carcass search	40-m cleared	dismembered	yes
9/28/2023	killdeer	31	A11	carcass search	40-m cleared	dismembered	yes
9/29/2023	unidentified passerine	11	C4	carcass search	70-m hybrid	scavenged	yes
10/3/2023	American robin	17	C6	carcass search	40-m cleared	scavenged	yes
10/3/2023	bobolink	10	G3	carcass search	40-m cleared	scavenged	yes
10/9/2023	killdeer	32	A11	carcass search	40-m cleared	scavenged	yes
10/9/2023	unidentified small bird	53	A1	carcass search	70-m hybrid	scavenged	yes
10/12/2023	unidentified passerine	23	A4	carcass search	70-m hybrid	scavenged	yes

* Spring = May 1 – May 15; Summer = May 16 – July 31; Fall = August 1 – October 15.

** Carcass was found outside the plot.

*** Found during a black-billed cuckoo monitoring effort when all turbines were searched as road and pad plots. These carcasses were excluded from the bat fatality estimate analysis.

m = meter.

Appendix A2. Summary of bat fatalities recorded by season and plot type at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 1 – October 15, 2023.

Season	Plot Type*	Number of Searched Turbines	Total Number of Bats Recorded**
spring (May 1–May 15)***	100-m road and pad	74	6
summer (May 16–July 31)	100-m road and pad	48	11
	40-m cleared	17	61
	70-m hybrid	9	45
fall (August 1–October 15)	100-m road and pad	48	28
	40-m cleared	17	162
	70-m hybrid	9	114
Overall			**427**

* 100-meter (m) road and pad plots were searched by humans, and 40-m cleared plots and 70-m hybrid plots were searched by detection-dog teams.

** Four hundred twenty-seven bats in total were found. Thirty-four bats were excluded from analysis.

*** Search effort related to black-billed cuckoo monitoring. Search and fatality data from the spring were excluded from the bat fatality estimate analysis. Six bat carcasses were found during this period; these carcasses are included in Appendix A, but excluded from analysis.

Appendix B. Searcher Efficiency and Carcass Persistence Model Fitting Results, and Bat Fatality Rates and Adjustment Factors

Appendix B1. Searcher efficiency models for bats within dog-aided search plots at the Green River Wind Farm, Lee and Whiteside counties, Illinois from May 16 – October 15, 2023 (n = 88 bat carcasses).

Covariates*	AICc	Delta AICc
No Covariates	98.76	0**
Visibility Class	98.96	0.20
Season	101.00	2.08
Season + Visibility Class	101.07	2.31
Season * Visibility Class	101.11	2.35

* Visibility class includes uncleared and cleared.

** Selected model.

k fixed at 0.65.

AICc = corrected Akaike Information Criterion.

Delta AICc is the change from the minimum AICc.

Appendix B2. Searcher efficiency models for bats within human-searched plots (roads and pads) from the Green River Wind Farm, Lee and Whiteside counties, Illinois from May 16 – October 15, 2023 (n = 42 bat carcasses).

Covariates	AICc	Delta AICc
No Covariates	36.55	0*
Season	38.17	1.62

* Selected model.

k fixed at 0.65

AICc = corrected Akaike Information Criterion.

Delta AICc is the change from the minimum AICc.

Appendix B3. Number of carcass persistence trial carcasses placed by season and plot type at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Season	Visibility Class	Number of Carcasses Placed
summer	roads and pads	26
	cleared*	27
	uncleared*	27
fall	roads and pads	20
	cleared*	20
	uncleared*	20
Overall roads and pads		**46**
Overall cleared*		**47**
Overall uncleared*		**47**
Overall		**140**

* Dog-assisted search.

Appendix B4. Carcass persistence models with covariates and distributions for bats within dog-aided search plots at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023 (n = 94).

Location Covariates*	Scale Covariates*	Distribution	AICc	Delta AICc
No Covariates	No Covariates	lognormal	385.48	0*
No Covariates	No Covariates	loglogistic	385.66	0.18
Season	No Covariates	lognormal	385.86	0.38
Season	No Covariates	loglogistic	386.23	0.75
No Covariates	Visibility Class	lognormal	386.80	1.32
No Covariates	Season	lognormal	386.87	1.39
No Covariates	Visibility Class	loglogistic	386.97	1.49
No Covariates	Season	loglogistic	387.01	1.53
Season	Season	lognormal	387.18	1.70
Season	Visibility Class	lognormal	387.34	1.86
Visibility Class	No Covariates	lognormal	387.36	1.88
Season	Season	loglogistic	387.55	2.07
Visibility Class	No Covariates	loglogistic	387.66	2.18
Season	Visibility Class	loglogistic	387.69	2.21
Season + Visibility Class	No Covariates	lognormal	387.78	2.30
Season + Visibility Class	No Covariates	loglogistic	388.30	2.82
No Covariates	Season + Visibility Class	lognormal	388.40	2.92
No Covariates	Season + Visibility Class	loglogistic	388.52	3.04
Visibility Class	Season	lognormal	388.75	3.27
Visibility Class	Visibility Class	lognormal	388.77	3.29
Season	Season + Visibility Class	lognormal	388.86	3.38
Visibility Class	Season	loglogistic	389.03	3.55
Visibility Class	Visibility Class	loglogistic	389.05	3.57
Season + Visibility Class	Season	lognormal	389.10	3.62
Season	Season + Visibility Class	loglogistic	389.20	3.72
No Covariates	No Covariates	Weibull	389.27	3.79
Season + Visibility Class	Visibility Class	lognormal	389.35	3.87
Season + Visibility Class	Season	loglogistic	389.64	4.16
Season + Visibility Class	Visibility Class	loglogistic	389.84	4.36
Season * Visibility Class	No Covariates	lognormal	390.00	4.52
No Covariates	Season * Visibility Class	lognormal	390.08	4.60
No Covariates	Season * Visibility Class	loglogistic	390.21	4.73
Visibility Class	Season + Visibility Class	lognormal	390.37	4.89
No Covariates	Season	Weibull	390.47	4.99
Season	No Covariates	Weibull	390.48	5.00
Season * Visibility Class	No Covariates	loglogistic	390.50	5.02
Season	Season * Visibility Class	lognormal	390.50	5.02
Visibility Class	No Covariates	Weibull	390.60	5.12
Visibility Class	Season + Visibility Class	loglogistic	390.61	5.13
No Covariates	Visibility Class	Weibull	390.70	5.22
Season + Visibility Class	Season + Visibility Class	lognormal	390.87	5.39
Season	Season * Visibility Class	loglogistic	390.93	5.45
Season + Visibility Class	Season + Visibility Class	loglogistic	391.37	5.89
Season * Visibility Class	Season	lognormal	391.38	5.90
Season	Season	Weibull	391.51	6.03
Season * Visibility Class	Visibility Class	lognormal	391.58	6.10
Season + Visibility Class	No Covariates	Weibull	391.85	6.37
Season	Visibility Class	Weibull	391.90	6.42
Visibility Class	Season	Weibull	391.90	6.42
Season * Visibility Class	Season	loglogistic	391.91	6.43
Visibility Class	Season * Visibility Class	lognormal	391.94	6.46

Appendix B4. Carcass persistence models with covariates and distributions for bats within dog-aided search plots at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023 (n = 94).

Location Covariates*	Scale Covariates*	Distribution	AICc	Delta AICc
Season * Visibility Class	Visibility Class	loglogistic	392.05	6.57
No Covariates	Season + Visibility Class	Weibull	392.09	6.61
Visibility Class	Visibility Class	Weibull	392.22	6.74
Visibility Class	Season * Visibility Class	loglogistic	392.25	6.77
Season + Visibility Class	Season * Visibility Class	lognormal	392.65	7.17
Season + Visibility Class	Season	Weibull	392.99	7.51
Season	Season + Visibility Class	Weibull	393.13	7.65
Season + Visibility Class	Season * Visibility Class	loglogistic	393.18	7.70
Season * Visibility Class	Season + Visibility Class	lognormal	393.18	7.70
Season + Visibility Class	Visibility Class	Weibull	393.48	8.00
Season * Visibility Class	Season + Visibility Class	loglogistic	393.66	8.18
Visibility Class	Season + Visibility Class	Weibull	393.69	8.21
No Covariates	Season * Visibility Class	Weibull	393.96	8.48
Season * Visibility Class	No Covariates	Weibull	394.05	8.57
Season + Visibility Class	Season + Visibility Class	Weibull	394.78	9.30
Season	Season * Visibility Class	Weibull	394.90	9.42
Season * Visibility Class	Season * Visibility Class	lognormal	395.00	9.52
Season * Visibility Class	Season	Weibull	395.22	9.74
Visibility Class	Season * Visibility Class	Weibull	395.41	9.93
Season * Visibility Class	Season * Visibility Class	loglogistic	395.52	10.04
Season * Visibility Class	Visibility Class	Weibull	395.75	10.27
Season + Visibility Class	Season * Visibility Class	Weibull	396.68	11.20
Season * Visibility Class	Season + Visibility Class	Weibull	397.09	11.61
Season * Visibility Class	Season * Visibility Class	Weibull	399.06	13.58
No Covariates	-	exponential	424.11	38.63
Visibility Class	-	exponential	424.43	38.95
Season	-	exponential	425.20	39.72
Season + Visibility Class	-	exponential	425.51	40.03
Season * Visibility Class	-	exponential	427.60	42.12

* Visibility class includes uncleared and cleared.

** Selected model.

AICc = corrected Akaike Information Criterion.

Delta AICc is the change from the minimum AICc.

Appendix B5. Carcass persistence models with covariates and distributions for bats within human searched plots (roads and pads) at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023 (n = 46).

Location Covariates	Scale Covariates	Distribution	AICc	Delta AICc
No Covariates	No Covariates	loglogistic	183.51	0*
No Covariates	Season	loglogistic	184.03	0.52
Season	No Covariates	loglogistic	184.93	1.42
No Covariates	No Covariates	lognormal	185.00	1.49
No Covariates	Season	lognormal	185.47	1.96
Season	Season	loglogistic	185.48	1.97
Season	No Covariates	lognormal	186.55	3.04
Season	Season	lognormal	186.80	3.29
No Covariates	No Covariates	Weibull	192.06	8.55
No Covariates	Season	Weibull	192.56	9.05
Season	No Covariates	Weibull	194.28	10.77
Season	Season	Weibull	194.59	11.08
No Covariates	-	exponential	211.57	28.06
Season	-	exponential	213.75	30.24

* Selected model

AICc = corrected Akaike Information Criterion.

Delta AICc is the change from the minimum AICc.

Appendix B6. Estimated fatality rates and adjustment factors with 90% confidence intervals (CI) by plot type for searches conducted during summer at the Green River Wind Farm, Lee and Whiteside counties, Illinois from May 16 – July 31, 2023.

	40-m cleared plot 17 turbines searched		70-m hybrid plot 9 turbines searched		100-m road and pad plot 48 turbines searched	
	Estimate	90% CI	Estimate	90% CI	Estimate	90% CI
Search Area Adjustment						
Bat	0.70	0.58 - 0.84	0.97	0.93 - 1.00	0.17	0.13 - 0.21
Searcher Efficiency						
Bat	0.76	0.68 - 0.83	0.76	0.68 - 0.83	0.86	0.74 - 0.93
Average Probability of a Carcass Persisting Through the Search Interval*						
Bat	0.72	0.65 - 0.78	0.72	0.65 - 0.78	0.60	0.51 - 0.69
Probability of Available and Detected						
Bat	0.61	0.54 - 0.68	0.61	0.54 - 0.68	0.52	0.43 - 0.61
Estimated Fatality Rates (Fatalities/Turbine/Season)						
Bat	7.01	5.29 - 9.26	7.71	6.19 - 9.33	2.42	1.19 - 4.26
Estimated Fatality Rates (Fatalities/megawatt/Season)						
Bat	2.67	2.02 - 3.53	2.94	2.36 - 3.55	0.92	0.45 - 1.62

m = meter.

* The search interval was twice per week.

Appendix B7. Estimated fatality rates and adjustment factors with 90% confidence intervals (CI) by plot type for searches conducted during fall at the Green River Wind Farm, Lee and Whiteside counties, Illinois from August 1 – October 15, 2023.

	40-m cleared plot 17 turbines searched		70-m hybrid plot 9 turbines searched		100-m road and pad plot 48 turbines searched	
	Estimate	**90% CI**	**Estimate**	**90% CI**	**Estimate**	**90% CI**
Search Area Adjustment						
Bat	0.70	0.58 - 0.84	0.97	0.93 - 1.00	0.17	0.13 - 0.21
Searcher Efficiency						
Bat	0.76	0.68 - 0.83	0.76	0.68 - 0.83	0.86	0.74 - 0.93
Average Probability of a Carcass Persisting Through the Search Interval*						
Bat	0.72	0.65 - 0.78	0.72	0.65 - 0.78	0.60	0.51 - 0.69
Probability of Available and Detected						
Bat	0.61	0.54 - 0.68	0.61	0.54 - 0.68	0.52	0.43 - 0.61
Estimated Fatality Rates (Fatalities/Turbine/Season)						
Bat	19.42	15.48 - 24.83	20.04	17.15 - 23.64	6.18	3.89 - 9.50
Estimated Fatality Rates (Fatalities/megawatt/Season)						
Bat	7.40	5.90 - 9.46	7.63	6.53 - 9.01	2.36	1.48 - 3.62

m = meter.

* The search interval was twice per week.

Appendix C. Search Area Adjustment Models for Bats from the Green River Wind Farm

Appendix C. Search area adjustment models for bats at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Distribution	AICc	Delta AICc
normal	10,275.55	0*
Gompertz	10,276.18	0.64
Weibull	10,301.96	26.41
gamma	10,370.79	95.25

* Selected model.

AICc = corrected Akaike Information Criterion.

Delta AICc is the change from the minimum AICc.

Appendix D. Screenshots of the Graphical User Interface and Inputs for the Single Class, Multiple Class, and Multiple Year Modules in Evidence of Absence

Appendix D1. Inputs needed to run Evidence of Absence: Single Class Module for all plot types at the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

						Searcher Efficiency*		Carcass Persistence		
Season	Plot Type	Search Interval (I)	# of Searches**	Spatial Coverage (a)	Temporal Coverage	Carcasses Available	Carcasses Found	Shape (α)	Scale (β)	Distribution
summer	40-m cleared	3.5	22	0.70	1	88	67	3.98	1.59	lognormal
summer	70-m hybrid	3.5	22	0.97	1	88	67	3.98	1.59	lognormal
summer	100-m roads and pads	3.5	21	0.17	1	42	36	1.06	2.25	log-logistic
fall	40-m cleared	3.5	22	0.70	1	88	67	3.98	1.59	lognormal
fall	70-m hybrid	3.5	22	0.97	1	88	67	3.98	1.59	lognormal
fall	100-m roads and pads	3.5	21	0.17	1	42	36	1.06	2.25	log-logistic

* *k* was assumed to equal 0.65 for all strata, per the Habitat Conservation Plan.

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

m = meter.

Appendix D2. Inputs needed to run Evidence of Absence: Multiple Class Module Within Season for the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Season	Plot Type	Within-Season Sampling Fraction (DWP)*	Ba**	Bb**
summer	40-m cleared	0.42	135.19	174.65
summer	70-m hybrid	0.04	94.80	61.91
summer	100-m roads and pads	0.54	85.58	850.33
fall	40-m cleared	0.23	135.19	174.65
fall	70-m hybrid	0.12	94.80	61.91
fall	100-m roads and pads	0.65	85.58	850.33

* The weight (density-weighted proportion [DWP]) is the arrival proportion multiplied by the operations factor, then rescaled to sum to one across seasons. Operations in summer represent the reduced number of turbines with summer risk.

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

m = meter; DWP = density-weighted proportion.

Appendix D3. Inputs needed to run Evidence of Absence: Multiple Class Module Seasons for the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2023.

Season	Arrival Proportion	Operations	Weight (DWP)*	Ba**	Bb**
summer	0.50	0.32	0.25	294.47	853.38
fall	0.50	1	0.75	410.45	1,350.21

* The weight (density-weighted proportion [DWP]) is the arrival proportion multiplied by the operations factor, then rescaled to sum to one across seasons. Operations in summer represent the reduced number of turbines with summer risk.

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

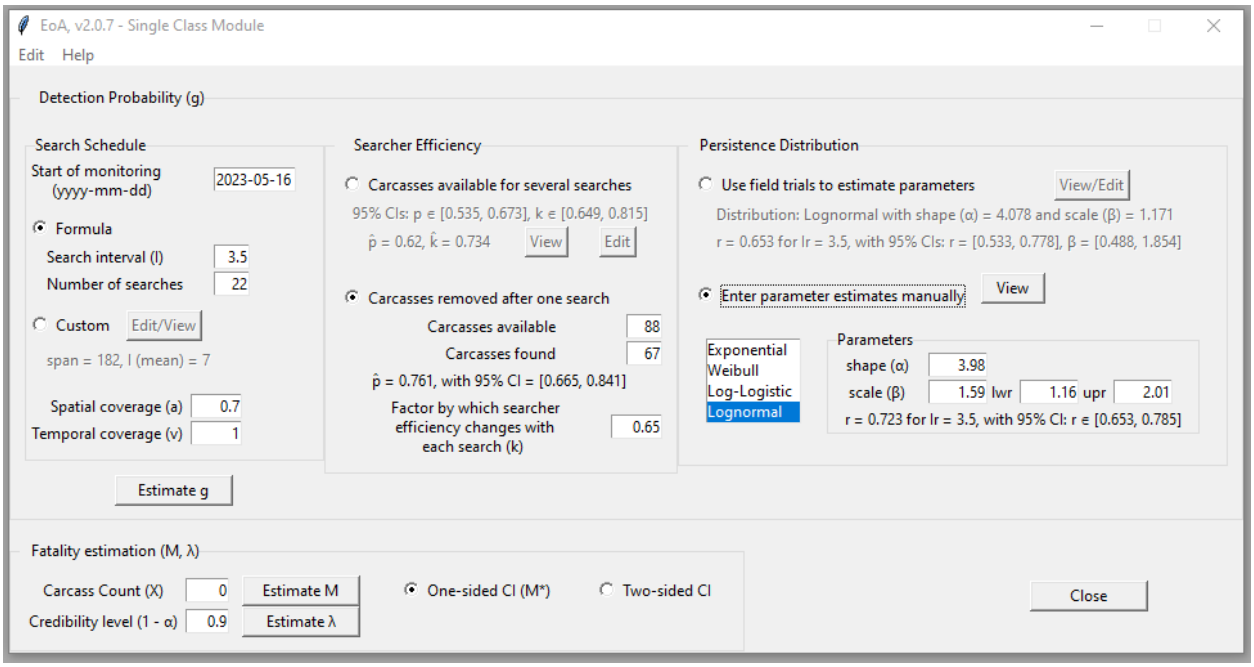
m = meter.

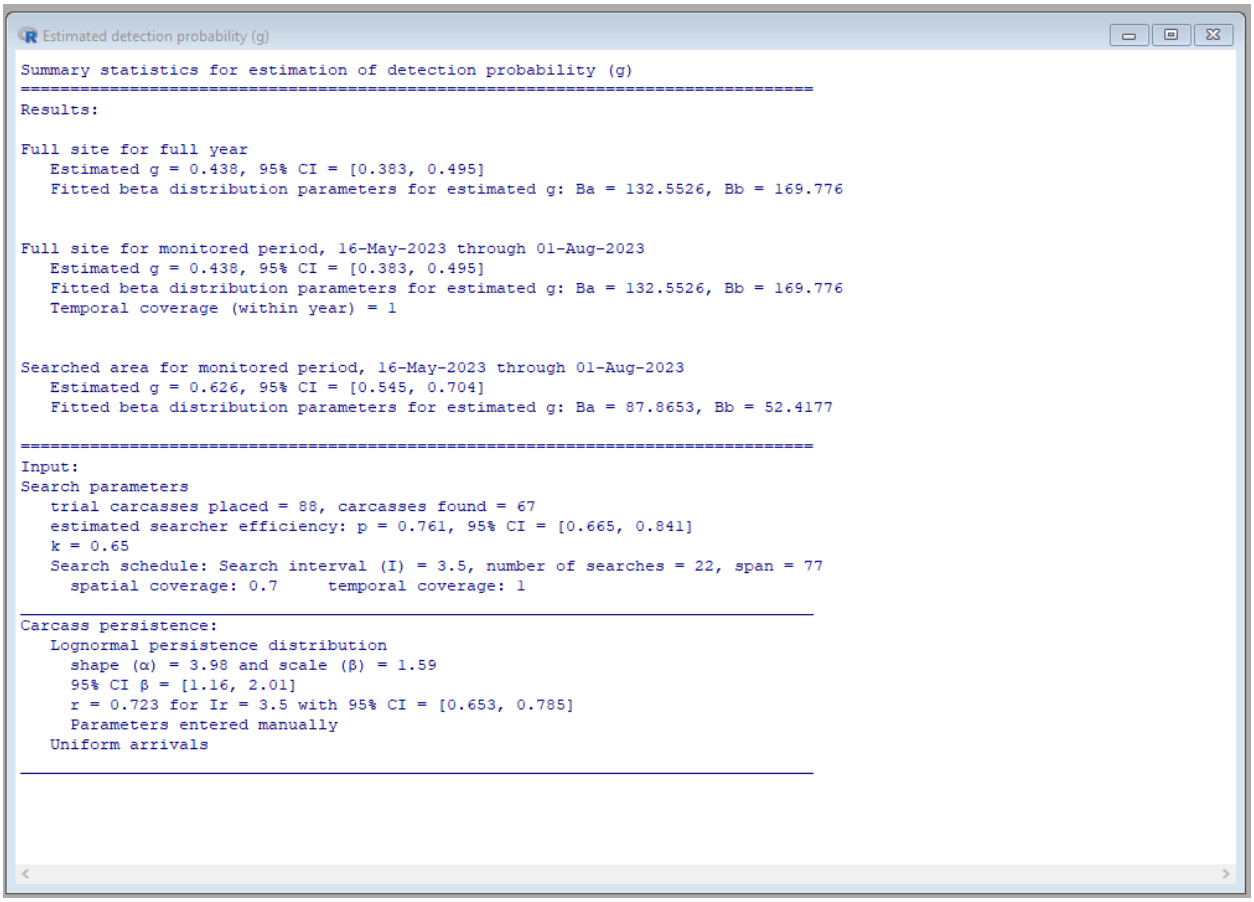
Appendix D4. Inputs needed to run Evidence of Absence: Multiple Years Module for the Green River Wind Farm, Lee and Whiteside counties, Illinois, from May 16 – October 15, 2022.

Year	Ba*	Bb*	rho
2022	831.73	1,975.09	1.095
2023	640.07	2,039.63	1
Cumulative	1,478.81	4,020.79	NA

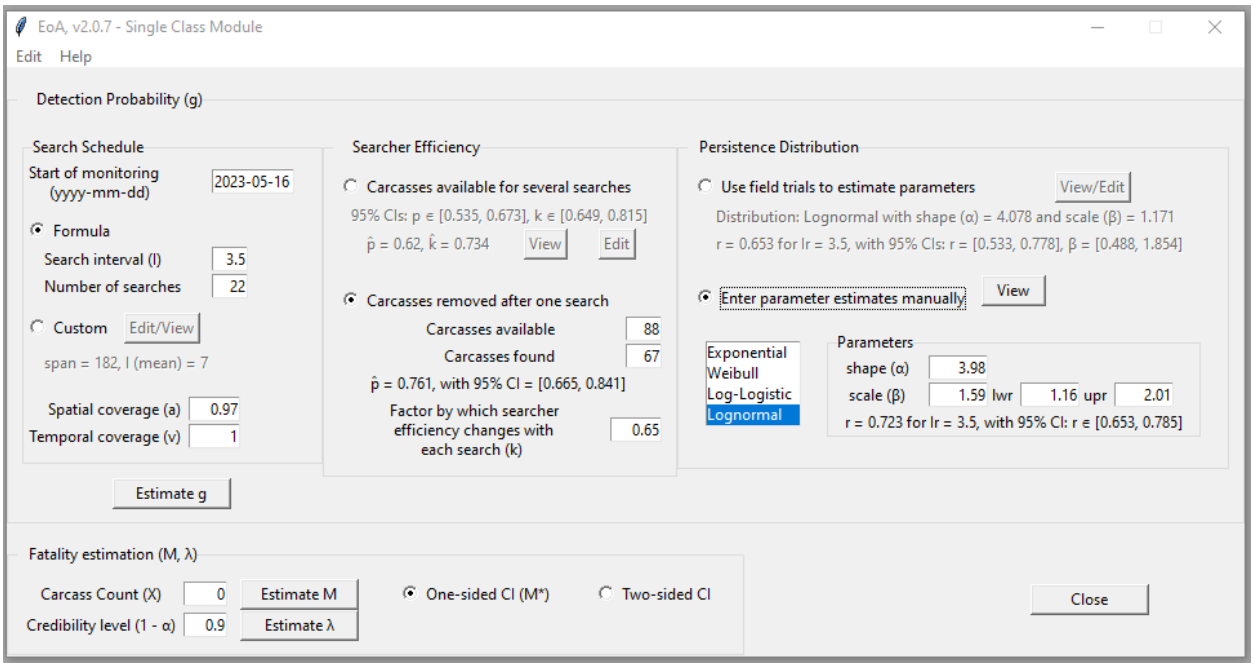
* Ba and Bb are the parameters for the beta distribution used to characterize the probability of detection.

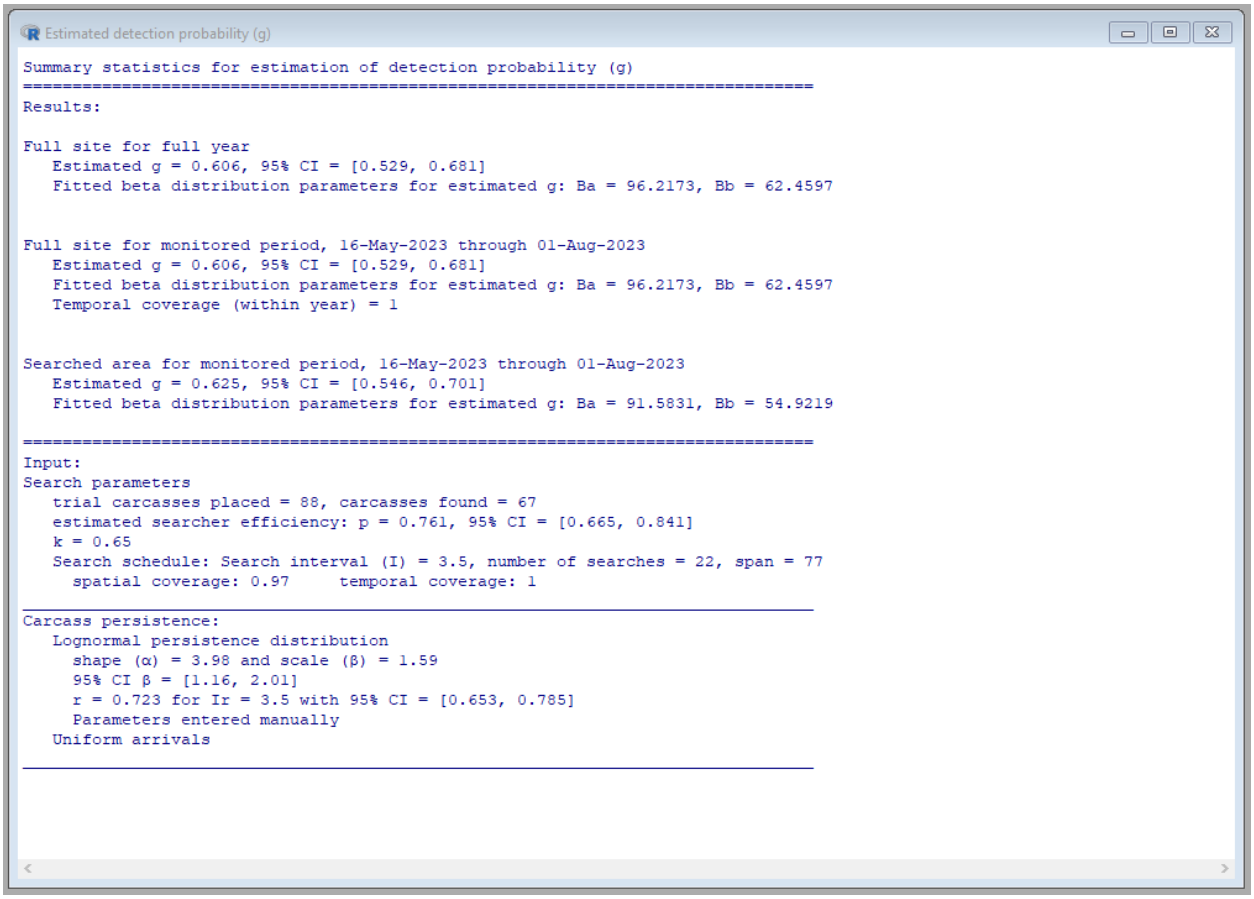
rho = weight for combining years.



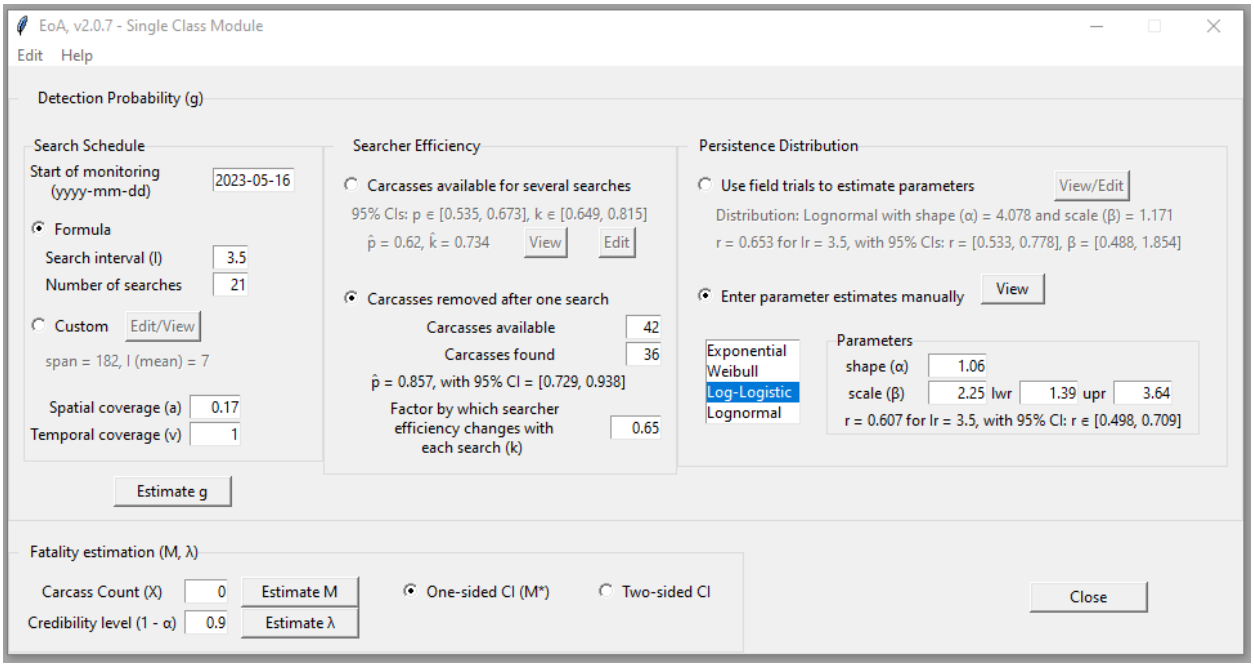


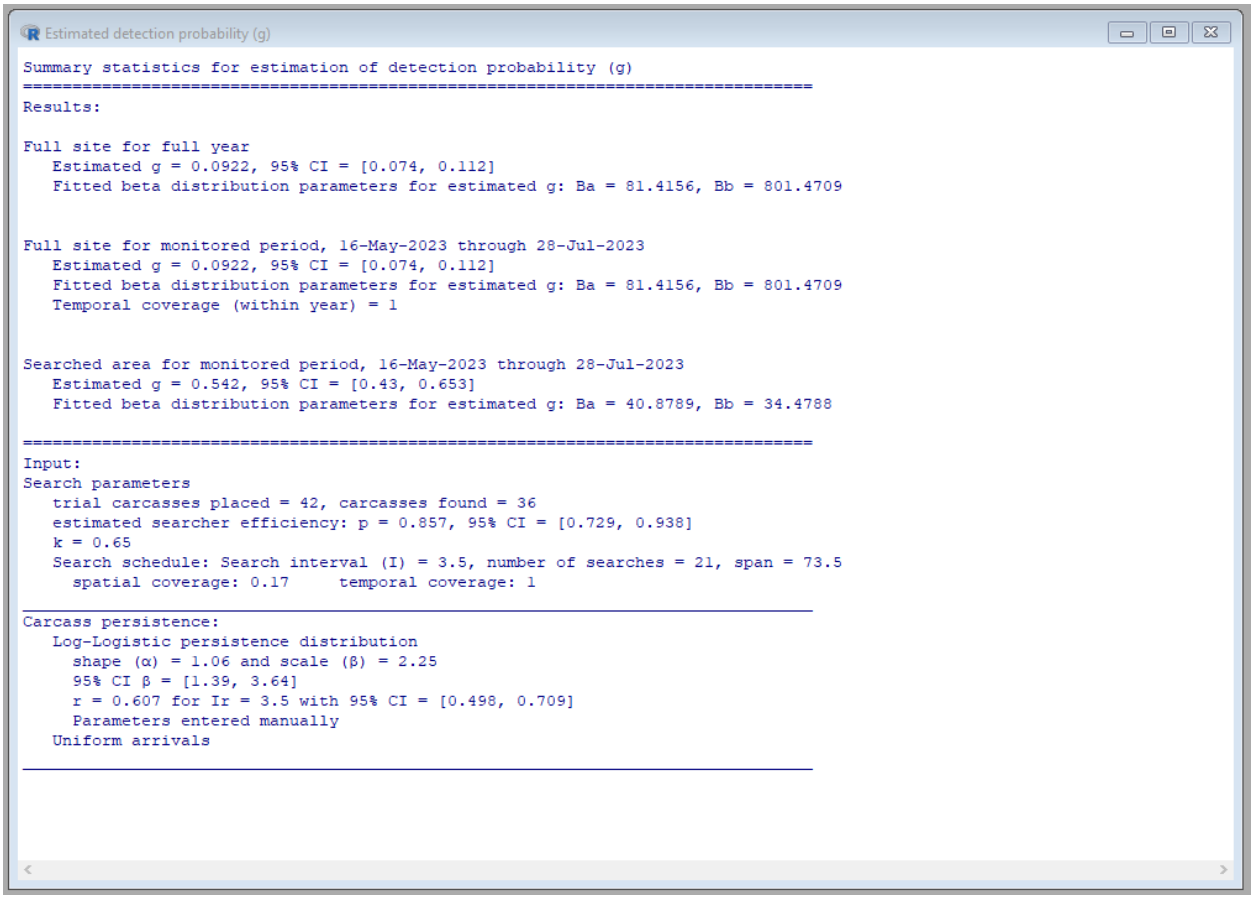
Appendix D5. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for summer 2023, 40-meter cleared plot searches at 10 turbines, searched at a 3.5-day interval.



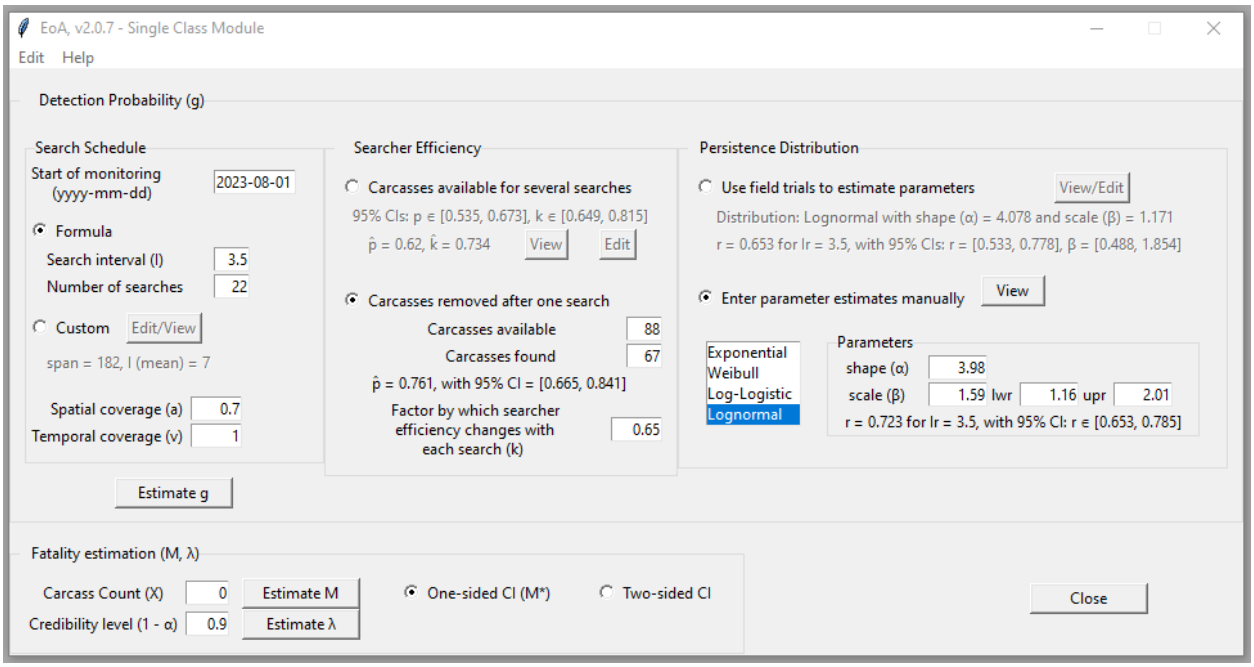


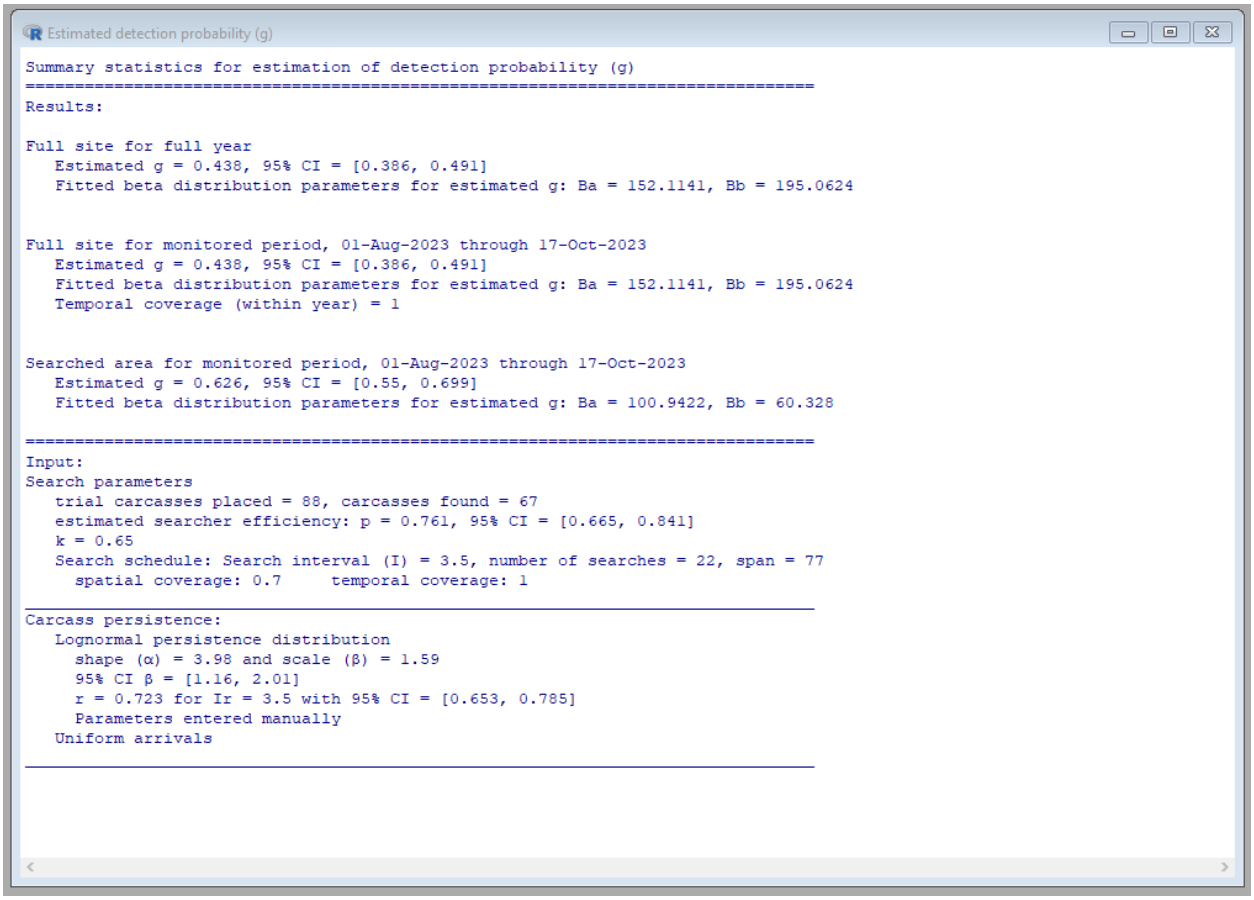
Appendix D6. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for summer 2023, 70-meter hybrid plot searches at 1 turbine, searched at a 3.5-day interval.



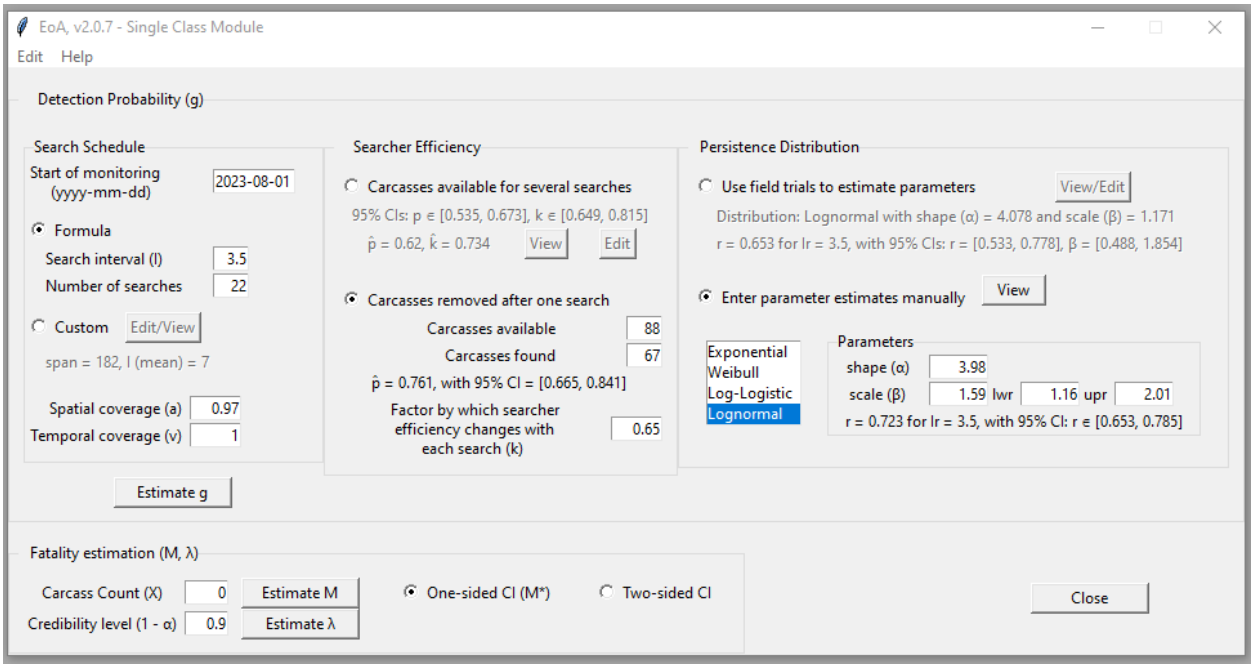


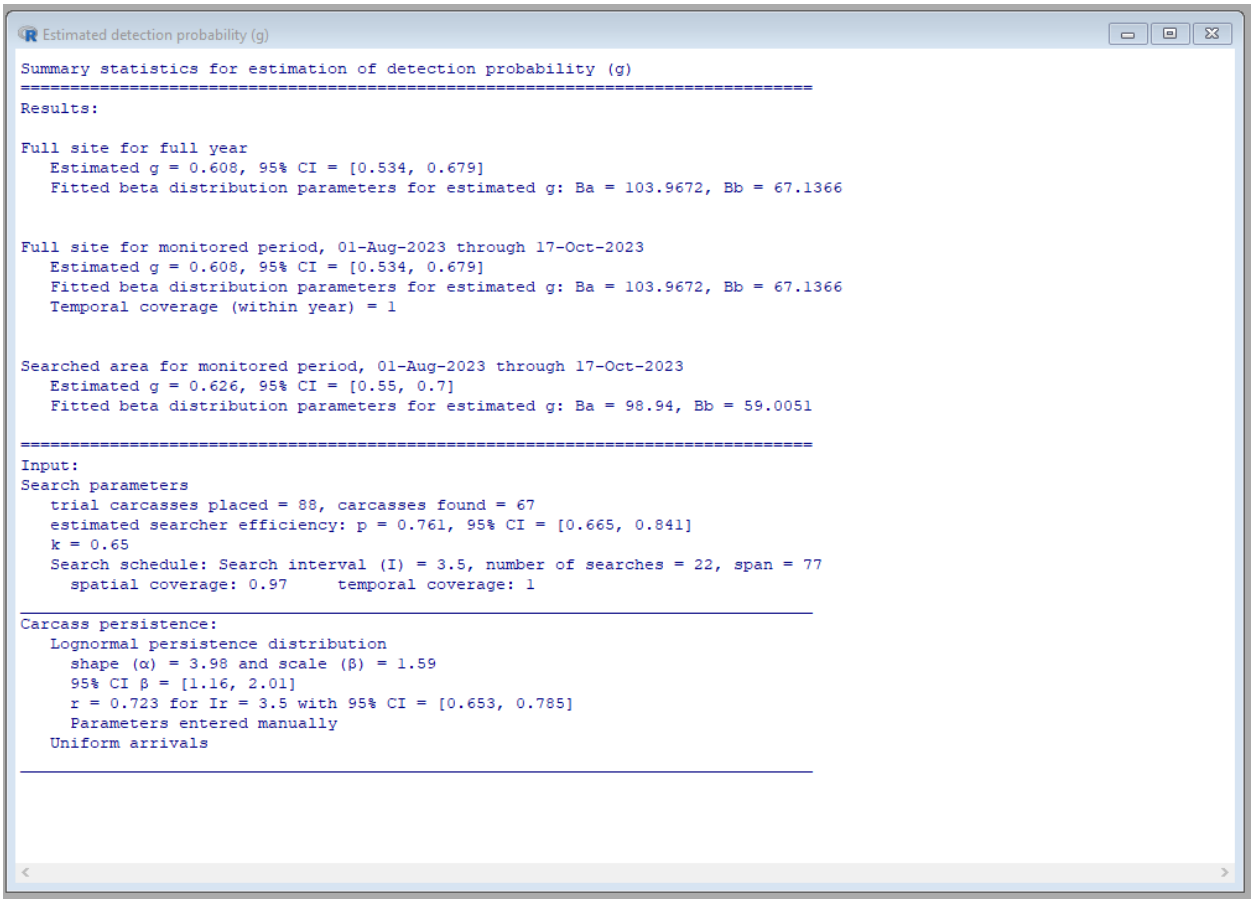
Appendix D7. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for summer 2023, 100-meter road and pad plot searches at 13 turbines, searched at a 3.5-day interval.



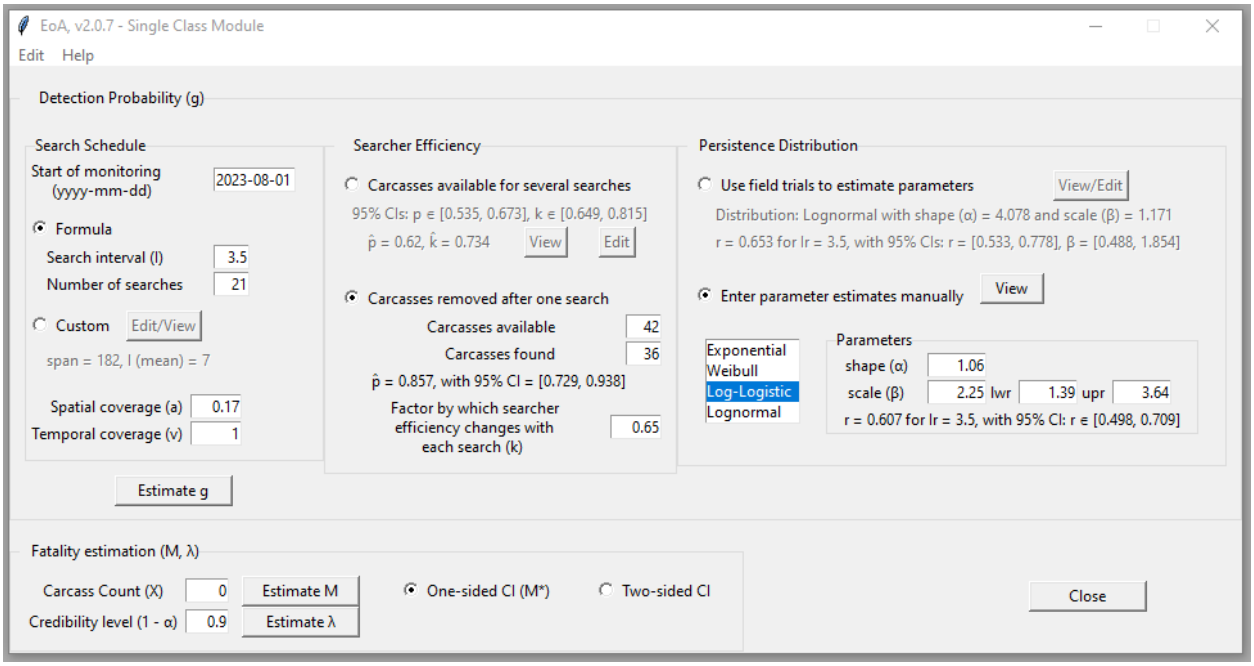


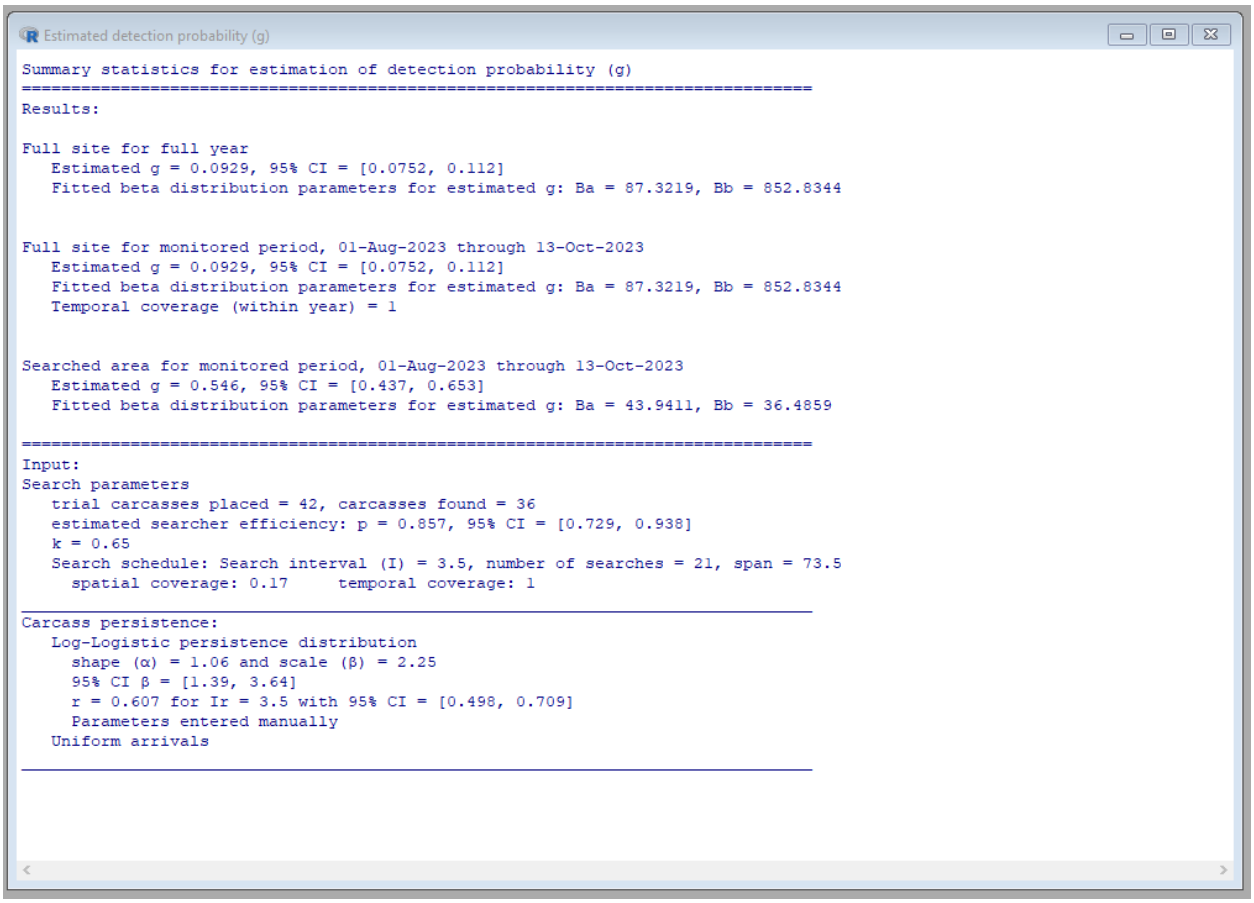
Appendix D8. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for fall 2023, 40-meter cleared plot searches at 17 turbines, searched at a 3.5-day interval.



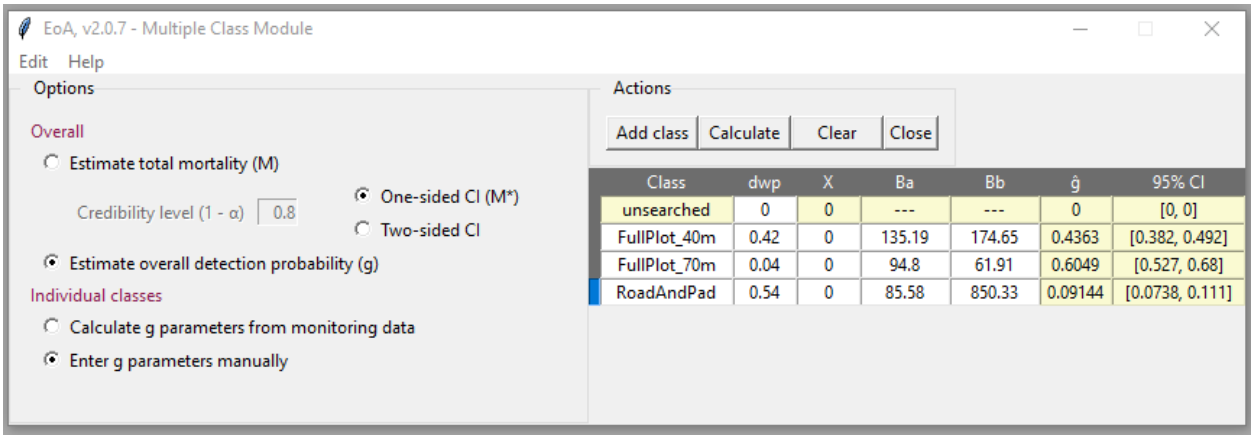


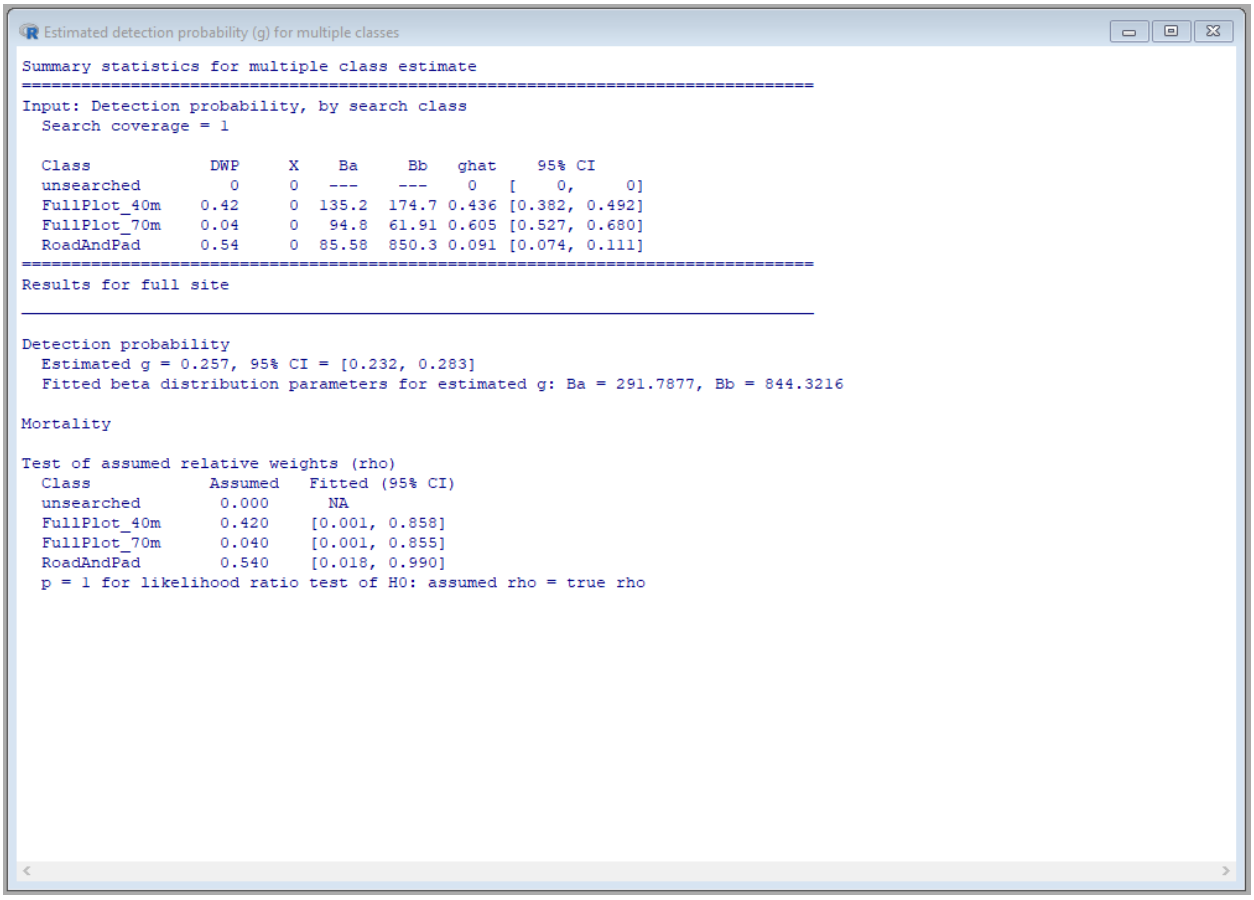
Appendix D9. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for fall 2023, 70-meter hybrid plot searches at 9 turbines, searched at a 3.5-day interval.



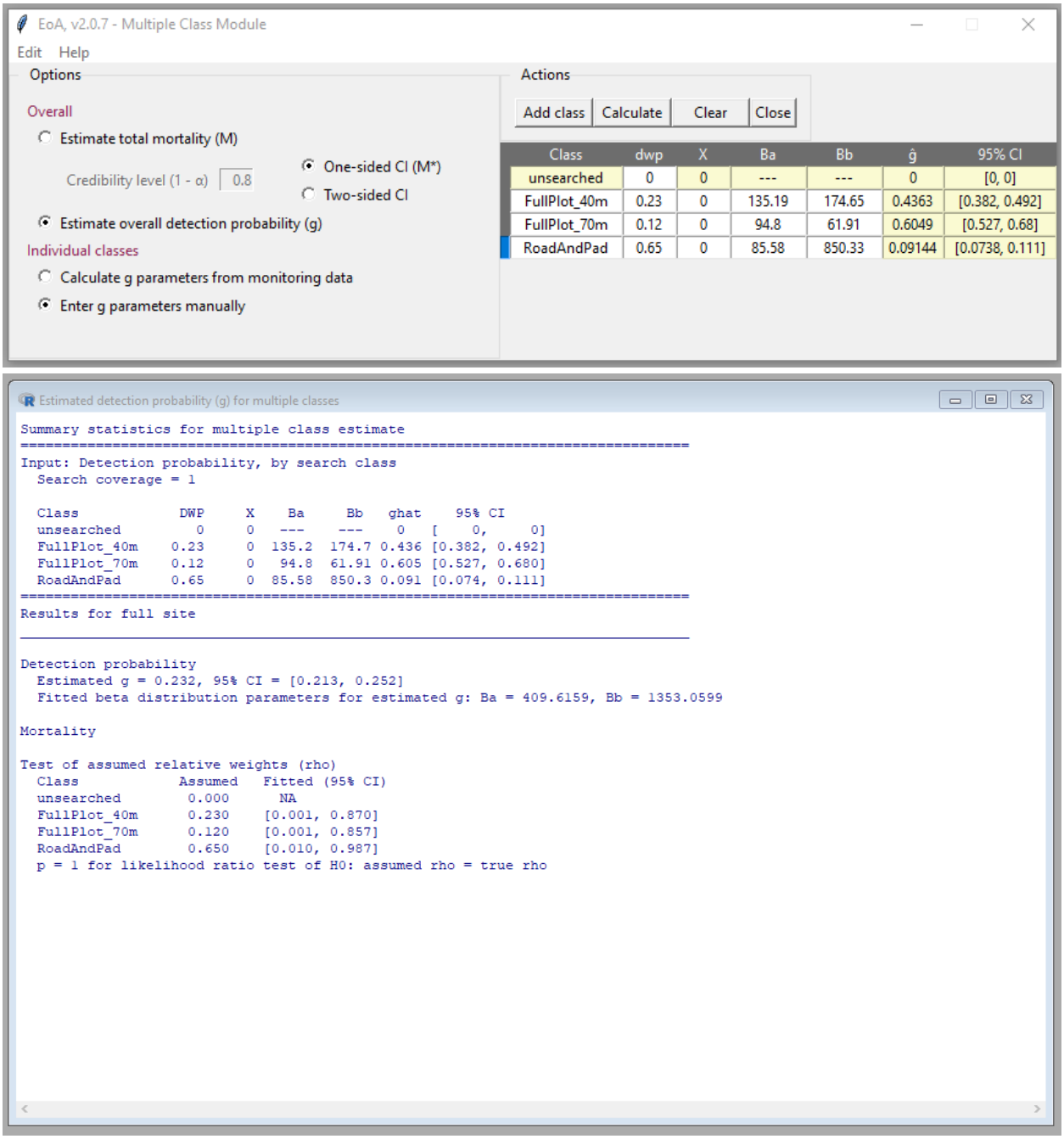


Appendix D10. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Single Class Module inputs for fall 2023, 100-meter road and pad plot searches at 48 turbines, searched at a 3.5-day interval.

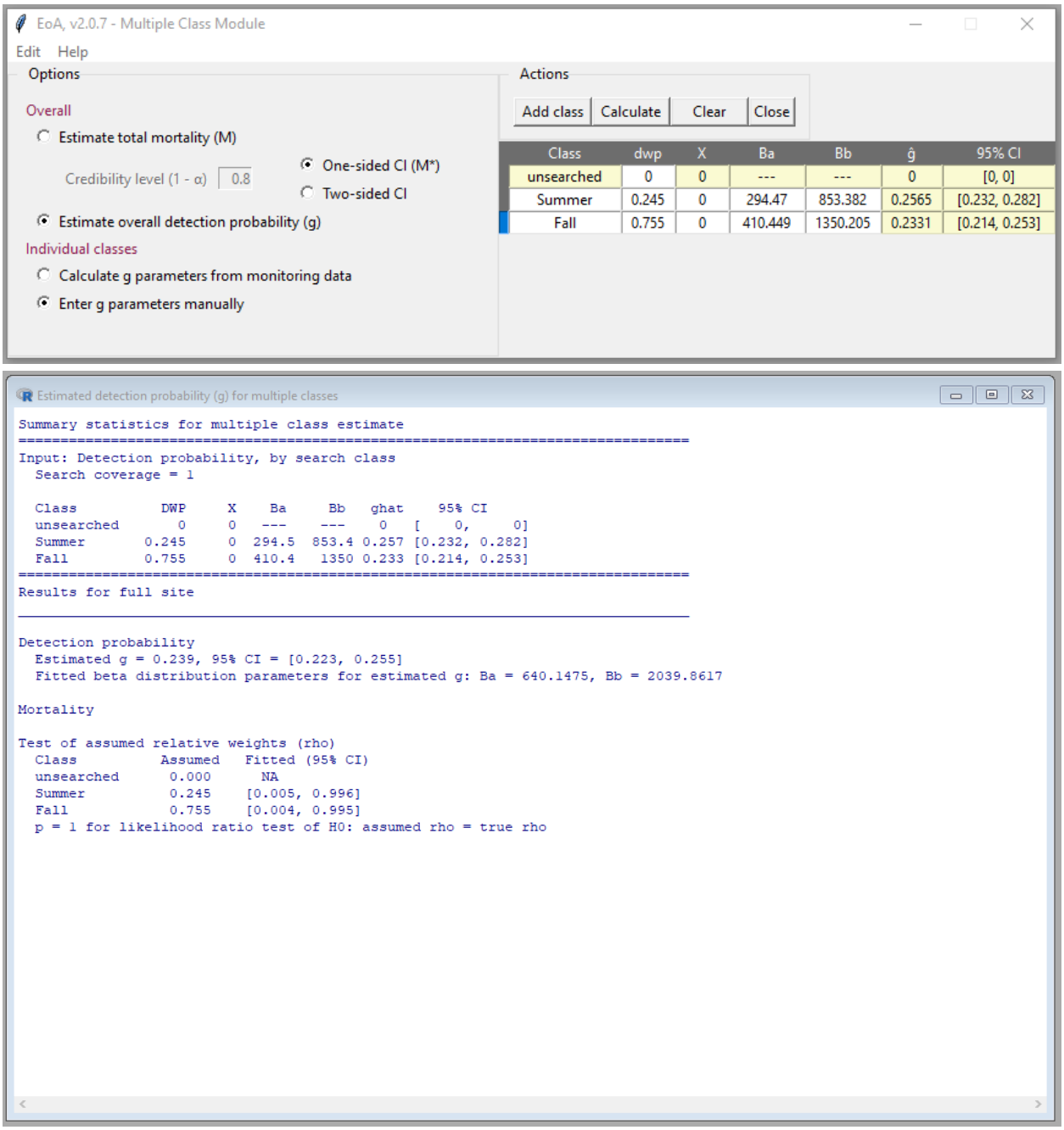




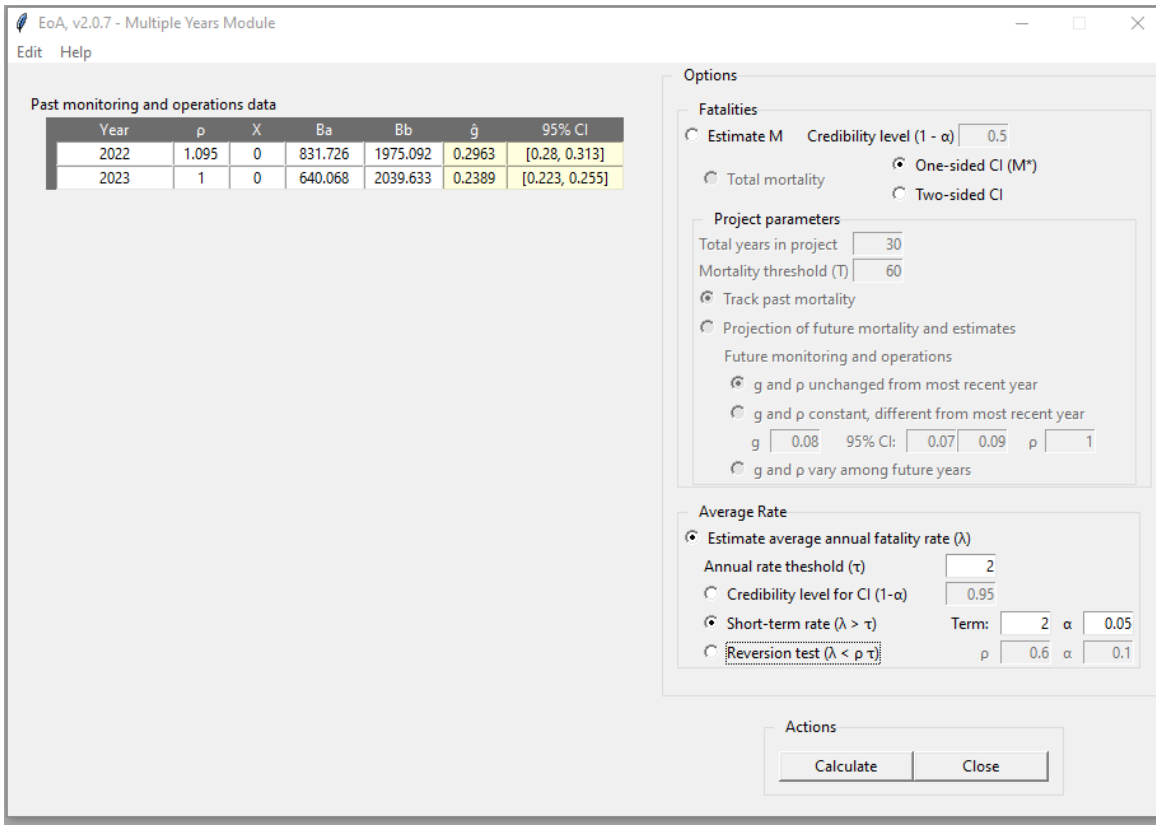
Appendix D11. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for combining all summer plot types during 2023 (n= 24), searched at a 3.5-day interval.

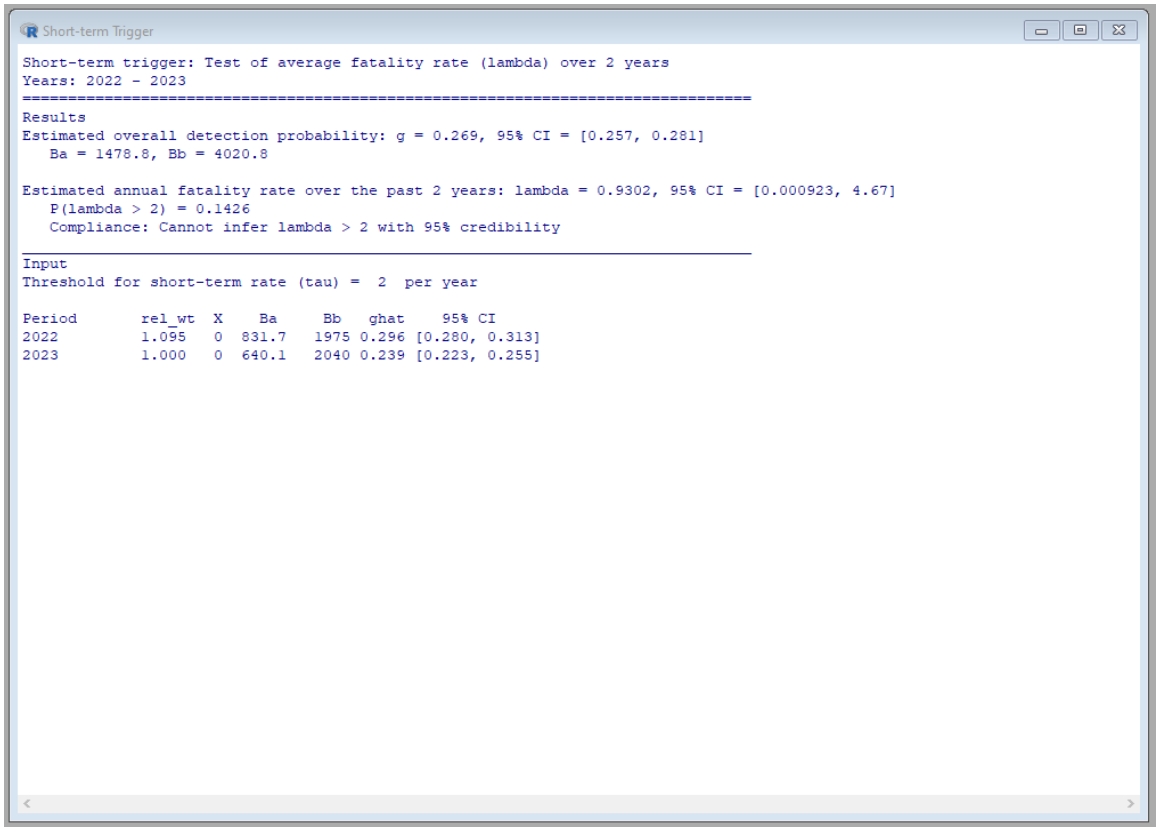


Appendix D12. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for combining all fall plot types during 2023 (n= 74), searched at a 3.5-day interval.

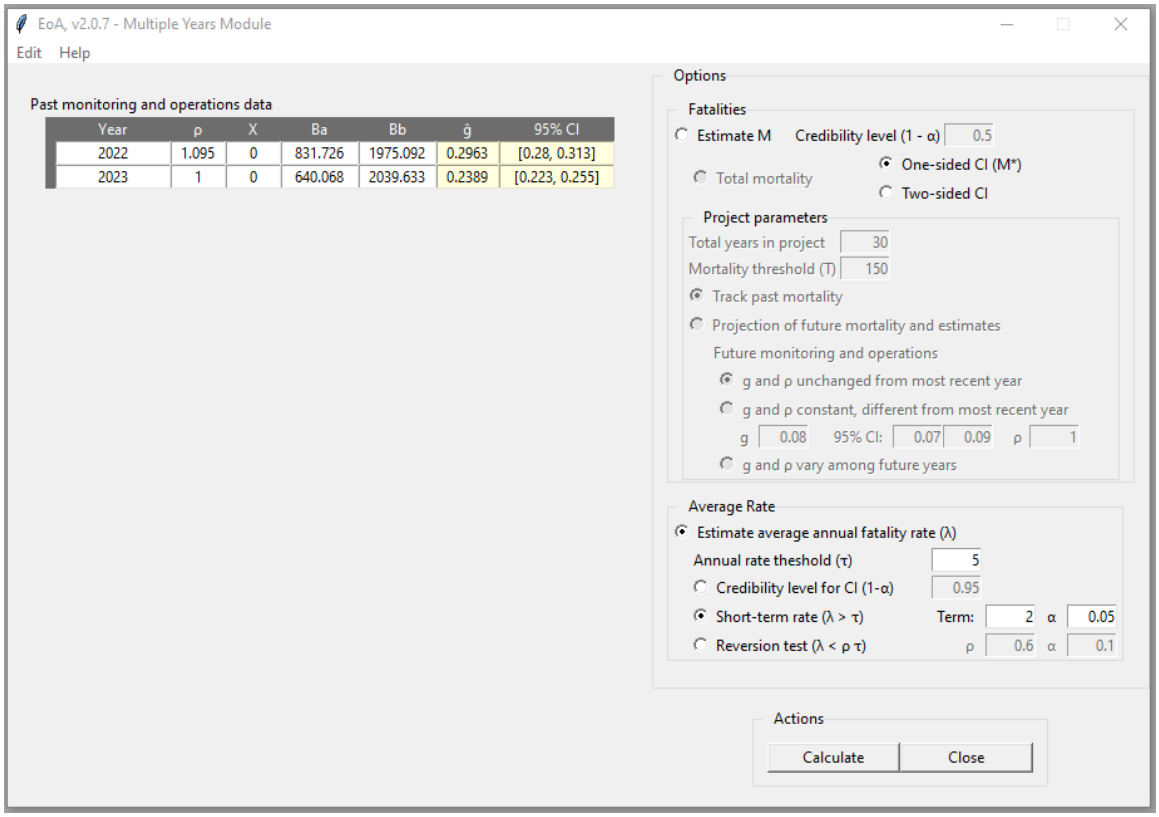


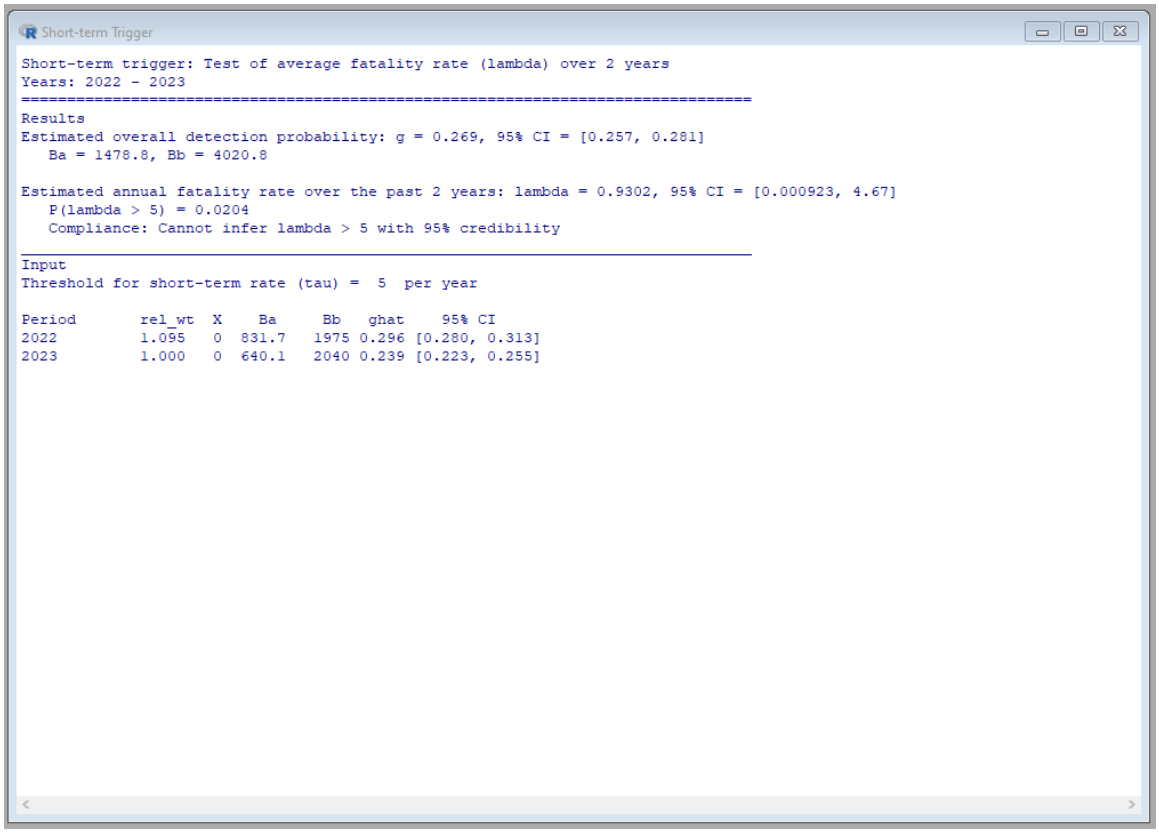
Appendix D13. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Class Module inputs for combining summer and fall plot types during 2023, searched at a 3.5-day interval.





Appendix D14. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Years Module inputs for combining 2022 and 2023 for Indiana bat.





Appendix D15. Screenshot of Evidence of Absence (v2.0.7) graphical user interface, Multiple Years Module inputs for combining 2022 and 2023 for northern long-eared bat.