10(a)(1)(A) Permit

ESPER0011726 Annual Report 2025

Kings Point Wind Project and North Fork Ridge Wind Project
Barton, Dade, Jasper and Lawrence Counties, Missouri

January 31, 2026

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Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
ΔAIC	difference between statistical models evaluated using AIC
80-m cleared plot	mowed 80-m radius plot around a turbine
ai	fraction of ground searched within each distance band
AIC	Akaike information criterion
control	3.0 m/s cut-in speed
CP	carcass persistence
d/b/a	doing business as
DWP	density-weighted proportion
EofA	Evidence of absence
GenEst	Generalized Estimator
g-value	detection probability
I	search interval
k	searcher efficiency decay
Kings Point	Kings Point Wind Project
Liberty	The Empire District Electric Company d/b/a Liberty
m	meters
m/s	meters per second
MW	megawatt
North Fork Ridge	North Fork Ridge Wind Project
Permit	10(a)(1)(A) Permit # ESPER0011726
rpm	revolutions per minute
SE	searcher efficiency
road and pad	graveled areas of turbine pads and access roads out to 100 m
TAL	Technical Assistance Letter
TCBA 10	tricolored bat 10.0 m/s cut-in curtailment strategy
USFWS	U. S. Fish and Wildlife Service
v	temporal coverage
WEST	Western EcoSystems Technology, Inc.
WTGs	wind turbine generators
Xi	number of carcasses found within each distance band

1 Introduction

1.1 Project Description and History

The Empire District Electric Company d/b/a Liberty (Liberty) developed and is currently operating two wind power facilities in southwest Missouri. Kings Point Wind Project (Kings Point) is located in Barton, Dade, Jasper and Lawrence counties, Missouri and North Fork Ridge Wind Project (North Fork Ridge) is located in Barton County, Missouri. These two wind projects are collectively referred to as "the Projects" throughout this report. The Projects each consist of 69 Vestas wind turbine generators (WTGs; 12 Vestas V-110 2.0-megawatt [MW], 57 Vestas V-120 2.2-MW) with an approximate capacity of 149.4 MW for each Project. Total, the Projects include 138 WTGs. A map showing the location of the WTGs for the Projects is provided in Figure A-1 of Appendix A.

Due to the potential risk of take of the federally endangered gray bat (*Myotis grisescens*) during operations, Liberty applied for a Native Endangered Species Recovery Permit under Section 10(a)(1)(A) of the Endangered Species Act (Permit) to evaluate the effectiveness of smart curtailment on reducing gray bat fatalities. The application included a study plan outlining a 4-year research study that was developed through coordination with the U.S. Fish and Wildlife Service (USFWS) Columbia, Missouri Ecological Services Field Office and the Missouri Department of Conservation (Stantec 2021).

The study plan included both post-construction fatality monitoring for bats and acoustic monitoring for bat activity. The Permit (ESPER0011726) was issued on August 6, 2021, and the first full year of the study under the Permit began in March 2022. The study has continued each year since then, with Phase I occurring in 2022 – 2023, and Phase II occurring in 2024 – 2025. This report summarizes the fourth full year of operations and post-construction fatality monitoring completed at the Projects in 2025 and is intended to satisfy Condition L (Annual Reporting) of the Permit.

Revisions to the study plan were made in 2025 to include implementation of the curtailment strategy described in the draft Habitat Conservation Plan (HCP) in development for the Projects. This strategy, known as EP1, was designed to reduce acoustic exposure of Covered Species below predetermined thresholds outlined in the HCP. Criteria of the EP1 strategy were selected based on the temporal distribution of bat activity documented in 2022 – 2024 and are outlined below in Section 1.1.5. At each site, the EP1 curtailment strategy was implemented at a subset of 34 treatment turbines, with the remaining 35 turbines serving as an operational control in which turbine blades were fully feathered at wind speeds below the manufacturer's cut-in speed of 3.0 m/s. The revised study plan was submitted to USFWS for approval April 8, 2024 (Stantec 2024b) and the revised Permit (ESPER0011726:V1) was issued April 12, 2024.

1.1.1 Monitoring Periods (2021 – 2025)

1.1.1.1 Spring and Summer 2021 – Technical Assistance Letters

Operations and monitoring during the spring and summer of 2021 were in accordance with the Technical Assistance Letters (TALs) for the Projects. Conditions of the TALs required feathering of all turbine blades below 8.0 m/s when ambient temperature was above 50 degrees Fahrenheit during the gray bat active season (March 1 through November 15) from 30 minutes prior to sunset through 30 minutes after sunrise. Bat fatality monitoring began March 3, 2021 for North Fork Ridge and April 8, 2021 for Kings Point. Bat fatality monitoring included search efforts expected to achieve a detection probability (g-value or "g") of 0.2 based on Evidence of Absence (EofA; Dalthorp et al. 2017). Fatality monitoring included twice weekly searches at all WTGs on graveled roads and pads out to 100 meters (m) from the turbine base and 60-m radius cleared plots around 48 WTGs. Searcher efficiency (SE) and carcass persistence (CP) trials were completed in accordance with the TALs.

1.1.1.2 Fall 2021 – 10(a)(1)(A) Permit

After receiving the Permit, fatality monitoring and operational curtailment were adjusted, and acoustic monitoring was added at the Projects to begin collecting data to address the research objectives outlined in the study plan (Stantec 2021) for the Permit. Fatality monitoring efforts included an expansion of 8 of the search plots from 60-m radius cleared plots to 100-m radius cleared plots on August 23, 2021. On September 7, 2021 (Kings Point) and August 30, 2021 (North Fork Ridge) the Projects began operating half of their turbines at 3.0 m/s (control) and half at 5.0 m/s (treatment) cut-in speeds (i.e., turbines are "feathered" below this wind speed to minimize blade movement, based on the wind speed measured at each turbine's nacelle) from 30 minutes before sunset to 30 minutes after sunrise each night. Acoustic bat monitors were installed on 30 WTGs in August 2021. Details of the monitoring effort and survey results for the monitoring from 2021 are available in the 2021 annual report (Stantec 2022).

1.1.2 Spring, Summer, Fall 2022 – 10(a)(1)(A); Phase 1, Year 1

Bat fatality monitoring and acoustic bat activity monitoring was completed at the Projects from April 1 – October 31, 2022. Turbine control and treatment operations were the same as they were during the fall 2021 monitoring period, but the bat fatality monitoring effort was increased for 2022 to include searches 3 times per week for all turbines and the addition of 8, 60-m radius cleared plots. The 2022 monitoring period represents the first full year of the study under the Permit and is defined as Phase 1, Year 1 in the Study Plan (Stantec 2021). Results from the 2022 monitoring are available in Stantec (2023).

1.1.3 Spring, Summer, Fall 2023 – 10(a)(1)(A); Phase 1, Year 2

Bat fatality monitoring and acoustic bat activity monitoring was completed at the Projects from April 1 to October 31 during the spring (April – May), summer (June – August), and fall (September – October) of 2023. Turbine control and treatment operations were the same as they were during the 2022 monitoring period, but the 2023 bat fatality monitoring effort was increased to include searches 3 times per week for all turbines and an increase in plot size from 60-m radius cleared plots to 80-m radius cleared plots. The 2023 monitoring period represents the second full year of the study under the Permit and is defined as Phase 1, Year 2 in the Study Plan (Stantec 2021). Results from the 2023 monitoring are available in Stantec (2024a).

1.1.4 Spring, Summer, Fall 2024 – 10(a)(1)(A); Phase 2, Year 1

Bat fatality monitoring and acoustic bat activity monitoring was completed at the Projects from April 1 to October 31 during the spring (April – May), summer (June – August), and fall (September – October) of 2024. In 2024, turbines at each site were assigned to either a control treatment (feathering below 3.0 m/s) or a curtailment treatment. Kings Point had 35 control turbines and 34 treatment turbines, and North Fork Ridge had 34 control turbines and 34 treatment turbines (one turbine at North Fork Ridge was offline in 2024). As stated in Section 1.1, the curtailment treatment group's curtailment strategy that was proposed for 2024 (Stantec 2024a) was modified, per request of the USFWS, to focus on minimizing exposure during the high-risk period for tricolored bats (*Perimyotis subflavus*) and proposed a 10.0 m/s cut-in speed from July 18 – September 7 at North Fork Ridge and from July 25 – September 7 at Kings Point. The 10.0 m/s strategies were reviewed within the EchoPITCH framework and were estimated to achieve a >60% reduction for gray bats and tricolored bats for each project, compared to simulated uncurtailed operation. There were modifications to the curtailment treatment group's curtailment strategy that happened within the high-risk season and included reduction of the cut-in speeds at both projects from 10.0 m/s to 6.5-7.5 m/s. Those reductions were made in coordination with the USFWS and approved through written correspondence between Liberty and the USFWS. The curtailment that ultimately happened at the treatment turbines in 2024 is outlined below and referenced as "Implemented 2024":

North Fork Ridge:

- April 1 – October 31: 3.0 m/s cut-in speed from 30 minutes before sunset – 30 minutes after sunrise (feathering baseline)
- July 18 – August 9: 10.0 m/s cut-in speed from 30 minutes after sunset – 30 minutes before sunrise at temperatures above 10° C
- August 10 – August 20: 7.5 m/s cut-in from 30 minutes after sunset – 30 minutes before sunrise at temperatures above 10° C
- August 21 – September 7: 6.5 m/s cut-in from 30 minutes after sunset – 30 minutes before sunrise at temperatures above 10° C

Kings Point:

- April 1 – October 31: 3.0 m/s cut-in speed from 30 minutes before sunset – 30 minutes after sunrise (feathering baseline)
- July 25 – August 9: 10.0 m/s cut-in speed from 30 minutes after sunset – 30 minutes before sunrise at temperatures above 10° C

- August 10 – September 7: 7.5 m/s cut-in from 30 minutes after sunset – 30 minutes before sunrise at temperatures above 10° C

1.1.5 Spring, Summer, Fall 2025 – 10(a)(1)(A); Phase 2, Year 2

Bat fatality monitoring and acoustic bat activity monitoring was completed at the Projects throughout the spring (April – May), summer (June – August), and fall (September – October) of 2025. In 2025, turbines at each site were assigned to either a control treatment (feathering below 3.0 m/s) or a curtailment treatment. Each Project had 35 control turbines and 34 treatment turbines. The curtailment strategy, referred to as EP1, was implemented at both Projects and included the following criteria:

- April 1 – October 31: 3.0 m/s cut-in speed from 30 minutes before sunset – 30 minutes after sunrise (feathering baseline)
- July 18 – 31: 9.0 m/s cut-in speed from sunset – 90 minutes before sunrise at temperatures above 10° C; additionally, baseline feathering below 3.0 from 30 minutes before sunset – 30 minutes after sunrise
- August 1 – 31: 10.5 m/s cut-in speed from sunset – 90 minutes before sunrise at temperatures above 10° C; additionally, baseline feathering below 3.0 from 30 minutes before sunset – 30 minutes after sunrise
- September 1 – 14: 9.0 m/s cut-in speed from sunset – 90 minutes before sunrise at temperatures above 10° C; additionally, baseline feathering below 3.0 from 30 minutes before sunset – 30 minutes after sunrise

1.2 Purpose and Objectives of the Study

The goal of this study is to evaluate and understand gray bat fatality rates at the Projects and to develop and test an optimal curtailment strategy for reducing impacts to the species. This will aid in the recovery of the gray bat by providing a basis of understanding for gray bat and wind turbine interactions. While the study was initially designed to focus on gray bat recovery, the study objectives are also applicable to the tricolored bat , which was proposed to be listed as endangered by the USFWS in 2022. A final rule listing the species has not yet been issued; however, where possible, results specific to tricolored bats are included in this report. The study was extended to cover the 2025 monitoring period and combines acoustic bat monitoring on WTG nacelles, fatality monitoring beneath WTGs, and operational curtailment treatments applied to WTGs to achieve 4 study objectives:

- Objective 1: Quantify turbine-related fatality rates for gray bats and tricolored bats
- Objective 2: Quantify relationship between exposed gray bat and tricolored bat activity and fatality
- Objective 3: Quantify effectiveness curtailment strategies for reducing gray bat and tricolored bat fatality

- Objective 4: Demonstrate use of nacelle-based acoustic and weather data to optimize turbine operational curtailment and evaluate its effectiveness at reducing gray bat and tricolored bat fatality

2 Methods

Survey methods for carcass searches, SE trials, CP trials, and acoustic monitoring followed those specified in the Permit conditions, as outlined in the revised study plan (Stantec 2024b), and through consultation with the USFWS. Notable revisions to methods from the initial study plan include increased search efforts characterized by larger radius search plots, more cleared search plots, and the addition of Western EcoSystems Technology, Inc. (WEST) as a collaborator bringing detection dog search teams to enhance the detection probability (g-value) and study design and statistical support. The methods and results presented here are comprehensive for the Stantec and WEST 2025 surveys, and additional information about search methods, SE and CP trials for dog teams are available in WEST (2026a, 2026b). Post-construction monitoring included the following components:

- Standardized carcass searches to systematically search plots at all WTGs for bat fatalities attributable to the WTGs;
- SE trials to estimate the percentage of bat carcasses that were found by the searcher(s);
- CP trials to estimate the persistence time of carcasses on-site before scavengers removed them; and
- Acoustic monitoring to assess total bat activity, gray bat activity and tricolored bat activity at nacelle height on WTGs within the rotor-sweep.

2.1 Field Methods

2.1.1 Standardized Carcass Searches

Standardized carcass searches were completed at all Projects' WTGs between April 1 and October 31, 2025. Standardized carcass searches consisted of surveying search plots at each turbine on either (1) the graveled areas of turbine pads and access roads out to 100 m (road and pad searches) or (2) within an 80-m radius of turbines (80-m cleared plot) during spring, summer, and fall. WEST detection dog teams searched 23 80-m cleared plots at North Fork Ridge and 24 80-m cleared plots at Kings Point each Project from June 1, 2025, through October 31, 2025. Figures A-2 and A-3 (see Appendix A) show the search plot types by turbine location for Kings Point and North Fork Ridge, respectively. The distribution of the search plots was as follows:

- Kings Point – 45 WTGs with road and pad searches, 24 WTGs with 80-m cleared plot searches; and

- North Fork Ridge – 45 WTGs with road and pad searches, 23 WTGs with 80-m cleared plot searches[1].

The 80-m cleared plots were mowed periodically with the goal of maintaining vegetation below 5 inches for plots searched by human searchers and below 10 inches for plots searched by detection dog teams during the survey period.

Standardized carcass searches were conducted by qualified searchers trained in fatality search methods, including proper handling and reporting of carcasses. Searchers were familiar with and able to accurately identify bat species likely to be found at the Projects. Preliminary bat species identifications were made in the field. When carcass condition allowed, sex, age and reproductive status of the carcass were recorded. When possible, forearm length was recorded to facilitate species identification. In addition to the carcass, photographs and data collected for each carcass were used to verify the species identification. Photos of bat carcasses unable to be identified to the species level in the field were sent to a Stantec/WEST permitted bat biologist for positive visual identification, and carcasses were kept on-site. Bats that could not be positively identified and had potential to be a gray bat or tricolored bat were submitted to a USFWS-approved laboratory (the Dr. Jane Huffman Wildlife Genetics Institute at East Stroudsburg University) for identification and sex determination using molecular and genetic testing.

During searches, human searchers targeted a walking rate of approximately 45 to 60 m per minute while searching 3 m on either side of the road and pads. Search methods for the detection dog search teams are described in WEST (2026a, 2026b). For each carcass found, the following data were recorded digitally within Survey123 (esri, Redlands, CA):

- Date and time
- Initial species identification (this information was updated as needed based on photos, dentition, or expert opinion)
- Sex, age, and reproductive condition (when applicable; sex was updated based on genetic testing when applicable)
- Global positioning system location
- Distance and bearing to turbine
- Condition and Disposition (condition being a result of collision, disposition being a result of persistence on the ground. Conditions included complete, dismembered, injured, alive – uninjured while dispositions included states of decomposition or scavenging).
- Any notes on presumed cause of death

[1] One of the 69 North Fork Ridge turbines was non-operational for the entire 2024 period and was therefore excluded from searches

A digital photograph of bat carcasses next to a ruler for scale was taken before the carcasses were handled and removed. Bat carcasses were labeled, bagged, and stored in onsite freezers at the Projects' Operations and Maintenance Buildings. Bat carcasses were collected and retained under the Permit and Missouri Department of Conservation Wildlife Collector's Permit #s: (Stantec: 68084 ,68085, 68086, 68088; WEST: 68210, 68209, 68217, 68219, 68132, 68126, and 68131).

Bat carcasses found in non-search areas were coded as incidental finds and documented in a similar fashion to those found in standardized surveys when possible. These included carcasses found during non-search times or outside the monitoring plot. Incidental bat carcasses were collected and stored in the freezer with the carcasses found during standardized surveys. As per industry standard, incidental finds were not included in the fatality estimates.

2.1.2 Searcher Efficiency Trials

SE trials were used to estimate the probability of bat carcass detection by the searchers. Trials were spread out across Projects, seasons, searchers, and search plot types. The searchers did not know when trials were being conducted, at which turbines trial carcasses were placed, or the location or number of trial carcasses placed in any given search plot during monitoring periods (i.e., blind trials). Bat carcasses collected during 2023, 2024, and 2025 surveys were used for the trials.

All SE trial carcasses for human searchers were randomly placed by a field lead within the search plots. Trial carcasses were placed in the morning prior to the planned carcass searches for that day and checked after the planned carcass search to verify they were still available to be found. Trial carcasses removed prior to the scheduled search were not included in analyses. The number of trial carcasses found by the searcher in each plot was recorded and compared to the total number placed in the plots prior to the SE trial. Methods for the SE trials for the detection dog teams are presented in WEST (2026a, 2026b).

2.1.3 Carcass Persistence Trials

CP trials were conducted to estimate the average length of time carcasses remained in the search plots before being removed by scavengers or other means (e.g., mowed over, tilled under). CP trials were randomly placed within the search plots and were conducted separately for the detection dog search teams and for the human search teams. Trials took place in all three seasons and across plot types to determine if CP varied by season or plot type, and trials were conducted separately for each Project. During the CP trials, carcasses were checked every day for the first week, and then regularly checked until missing, the season ended, or the carcass was no longer detectable (i.e., approximately days 1, 2, 3, 4, 5, 6, 7, 10, 14, 21, 28, and weekly thereafter).

The condition of each carcass was recorded during each CP trial check. The conditions recorded were defined as follows:

- Intact – complete carcass with no body parts missing
- Scavenged – carcass with some evidence or signs of scavenging

- Fur spot – no carcass, but fur spot remaining
- Missing – no carcass or fur remaining

Carcasses indicated as intact, scavenged, or fur spot were considered still present and detectable for analysis while missing carcasses represented removals or absences.

2.1.4 Acoustic Monitoring

Wildlife Acoustics (Model SM4BAT FS) acoustic bat detectors with SMM-U1 microphones were mounted on 30 WTG nacelles (height of 120 m; 15 per Project) for the 2025 season between February and November. As in 2023 and 2024, detectors were connected to 120-v AC power inside the nacelle, equipped with 2 high-capacity SD cards, and programmed to record from 45 minutes before sunset to 45 minutes after sunrise on a nightly basis. The detector microphones were mounted to anemometer masts outside the nacelle, oriented horizontally and pointed downwind from the turbine rotor. Detectors were programmed to use default audio triggering settings, recording all echolocation pulses within range of the detector (approximately 30 m) throughout the monitoring season. Detector locations are shown in Appendix A, Figures A-4 and A-5. Turbines equipped with acoustic detectors were assigned to both operational treatments (n = 7–8 turbines per treatment).

2.2 Data Analysis – GenEst

The Generalized Estimator (GenEst; Dalthorp et al. 2018) was used for calculating bias correction factors (SE, and CP) and fatality estimates. GenEst generates all estimates through iterative modeling (i.e., “bootstrapping”) and each iteration can yield slightly different results; thus, subsets of GenEst estimates are not additive and should be interpreted individually (e.g., fatality by season may not add up to total fatality).

2.2.1 Searcher Efficiency

SE represents the average probability that a carcass was detected by the searcher. Simply, this rate is calculated using the data collected during SE trials (Section 2.1.2) by dividing the number of trial carcasses the observer found by the total number which remained available during the trial (i.e., non-scavenged). For this analysis, the SE rate was modeled in GenEst using the data collected as part of the SE trials (Section 2.1.2). Analysis included an evaluation of whether SE differed by season (spring, summer, fall), or plot type (roads and pads, 80-m cleared human plots, 80-meter cleared dog plots). Trials across both projects were combined because the same searchers conducted searches at both projects (i.e., SE was assumed to not vary by Project since searchers consistently and systematically searched turbines at both projects). SE decay (k) was fixed at 0.67. This value represents the decrease in SE on subsequent searches (i.e., if a carcass is missed the first time it is available, it is less likely to be found on subsequent searches than a “fresh” carcass).

GenEst returns numerous models depending on the number of variables included in the analysis following a model selection approach, applying Akaike information criterion (AIC) values for each model.

The AIC value is a parsimonious statistical score for the quality of a model fit, where smaller AIC values are considered better models. However, models within 5 ΔAIC (the difference between each models AIC value) are generally considered indistinguishable by this measure (Dalthorp et al. 2018). Therefore, “best” model selection was based on a manual review of models with the lowest AIC values, and a “best” model was chosen from the models within 5 ΔAIC of the top model. Confidence intervals were generated using 1,000 bootstrapped iterations.

2.2.2 Carcass Persistence

CP represents the average amount of time (in days) that a carcass persists on the landscape after arriving, before being scavenged or decaying, or the probability that a carcass persists on the ground until the next search interval. A CP model is generated in GenEst using the data collected as part of the CP trials (Section 2.1.3). CP models in GenEst include censored exponential, Weibull, lognormal, and loglogistic distributions. CP was calculated separately for each Project. Analysis included an evaluation of whether CP varied by season and/or plot type.

CP model selection was done using similar methods to SE model selection (see Section 2.2.1) with the following modifications. Graphical evaluation was used by comparing modeled persistence probabilities to the "step curve" and identifying models that appeared to have closest fit to decay pattern. If two models had similar graphical fits and were within 5 ΔAIC values, the most parsimonious model was chosen. Confidence intervals were generated using 1,000 bootstrapped iterations.

2.2.3 Density-weighted Proportion (DWP)

The density-weighted proportion (DWP) is an area correction factor calculated using several parameters, described below. Data used included four sampling seasons of data (fall 2021, spring, summer, and fall of 2022) across both Projects for road and pad plot types as well as the 100-m cleared plots (i.e., only plot types that searched out to the full 100-m, thus excluding the 60-m full plots). The following parameters and equations were then used:

$$X_i = number\ of\ carcasses\ found\ within\ distance\ band\ i$$

$$a_i = fraction\ of\ ground\ searched\ within\ distance\ band\ i$$

$$\widehat{M}_i = relative\ mortality\ rate\ in\ each\ distance\ band = \frac{X_i}{a_i}$$

$$\hat{p}(M_i) = fraction\ of\ total\ in\ each\ distance\ band = \widehat{M}_i \,/\, \sum_i \widehat{M}_i$$

The number of carcasses found within each distance band (X_i) is the total number of carcasses found within that distance band at road and pad or 100-m full plot turbines. When each carcass was found, searchers recorded the location of the carcass using a sub-meter accuracy global positioning system in a digital datasheet (Collector for ArcGIS). The distance between these locations and the nearest turbine were calculated in GIS, and these values were used to calculate the DWP.

To determine the fraction of ground searched within each distance band (a_i), the turbine roads and pads were digitized, and the proportion of each distance band that included the road and pad was calculated for each of the 82 road and pad plots out to 100 m from the turbine base. These values were then averaged across all road and pad turbines to determine the percentage of each distance band that was searched on roads and pads. For 100-m cleared plot turbines, 100% of the area within 100 m was searched. It was assumed that all carcasses fell within 100 m of the turbine base. The weighted average of these values was then calculated for each distance band based on the proportion of road and pad plots to 100-m full plot turbines.

In 2023, Stantec used the distribution of the 195 bats found during standardized searches from 2021 and 2022 searches on road and pad and 100-m cleared plots at both Projects to calculate the fraction of total mortality in each distance band $(\hat{p}(M_i))$ for bat carcasses found at control turbines (3.0 m/s) and treatment turbines (5.0 m/s) – see Table 2-1 and Table 2-2. Based on data from carcasses found, it is assumed that, on average, 95% of all bat carcasses fall within 80 m of the turbine base (and therefore within the 80-m cleared plot searches) when turbines are operating at 3.0 m/s and 85% of all bat carcasses when turbines are operating at 5.0 m/s. Thus, on average, 5% fall beyond the 80-m cleared plots at control turbines and 15% fall beyond the 80-m cleared plots at treatment turbines.

Table 2-1. Calculation of the fraction of total mortality in each distance band for control turbines (3.0 m/s) for use in Density-weighted Proportion (DWP) calculations at the Kings Point and North Fork Ridge Wind Projects based on bat carcasses found during the Permit period of 2021 and 2022 (excluding winter).

Distance Band (meters)	Number of Carcasses	Percent of Distance Band Searched	Relative Fatality Rate	Relative Fraction of Total Mortality	Cumulative Fraction of Total Mortality
0-10	3	49.9%	6.0	0.7%	0.7%
10-20	35	16.1%	217.9	24.7%	25.4%
20-30	7	15.1%	46.4	5.3%	30.6%
30-40	14	13.6%	102.6	11.6%	42.2%
40-50	24	12.1%	198.2	22.4%	64.7%
50-60	12	11.4%	104.8	11.9%	76.5%
60-70	9	10.8%	83.1	9.4%	86.0%
70-80	9	10.5%	85.3	9.7%	95.6%

Distance Band (meters)	Number of Carcasses	Percent of Distance Band Searched	Relative Fatality Rate	Relative Fraction of Total Mortality	Cumulative Fraction of Total Mortality
80-90	4	10.3%	38.7	4.4%	100.0%
90-100	0	10.1%	0.0	0.0%	100.0%

Table 2-2. Calculation of the fraction of total mortality in each distance band for turbines operating at 5.0 m/s for use in Density-weighted Proportion (DWP) calculations at the Kings Point and North Fork Ridge Wind Projects based on bat carcasses found during the Permit period of 2021 and 2022 (excluding winter).

Distance Band (meters)	Number of Carcasses	Fraction of Area Searched (%)	Relative Fatality Rate	Relative Fraction of Total Mortality	Cumulative Fraction of Total Mortality
0-10	1	49.9%	2.0	0.3%	0.3%
10-20	25	16.1%	155.7	25.6%	26.0%
20-30	6	15.1%	39.8	6.5%	32.5%
30-40	5	13.6%	36.7	6.0%	38.5%
40-50	8	12.1%	66.1	10.9%	49.4%
50-60	8	11.4%	69.9	11.5%	60.9%
60-70	10	10.8%	92.4	15.2%	76.1%
70-80	6	10.5%	56.9	9.4%	85.5%
80-90	5	10.3%	48.4	8.0%	93.5%
90-100	4	10.1%	39.7	6.5%	100.0%

Once the fraction of total mortality in each distance band $(\hat{p}(M_i))$ was calculated, 2025 turbine-specific DWPs were calculated by multiplying the fraction of each distance band searched at a particular turbine by the fraction of the total mortality for that distance band. This utilized the 2025 turbine-specific GIS data from the digitized roads and pads (since the road and pad configuration can vary by turbine) and turbine-specific searchable areas (eliminating unsearchable land cover types [e.g., trees, water, swales]) within 80 m of the turbine base for 80-m cleared plots.

2.2.4 Adjusted Fatality Estimates (GenEst)

GenEst was used to calculate overall fatality rates for the Projects (per turbine, per MW, for all operational turbines at Kings Point and North Fork Ridge). All estimates include 90% confidence intervals. "Per turbine estimates" were calculated by dividing the GenEst estimate (and confidence intervals) by the number of operational turbines, and "per MW estimates" were calculated by dividing the GenEst estimate (and confidence intervals) by the total MW of operational turbines for each Project. Fatality estimates were split by season and by treatment type.

2.3 Data Analysis – Evidence of Absence

EofA (Dalthorp et al. 2017) was used for estimating the overall detection probability (g) and the estimated take of gray bats and tricolored bats (M* and λ). These analyses were completed to evaluate if take is within the limits allowed by the Permit and to provide estimates of fatality when sample sizes were small or zero. All data for detection dog teams used in this analysis were obtained from WEST (2026a and 2026b).

2.3.1 Estimation of Detection Probability (g)

For this analysis, 2025 monitoring data was split into distinct strata. Stratum followed date periods within which the monitoring protocols (i.e., number of turbines, ratio of plot types) were equal. Date periods were split to account for changes in turbine operations during the monitoring season that influenced the relative risk to bats and to account for monthly differences in arrivals. This resulted in four distinct sub-seasons in summer and three distinct sub-seasons in fall. In addition, sub-seasons when treatment turbines and control turbines were operated under different operational protocols were split out by treatment type, resulting in 11 distinct strata (see **Error! Reference source not found.**).

Table 2-3. Dates and Turbine Operations status for Evidence of Absence strata used in the 2024 detection probability and take estimation analysis at Kings Point and North Fork Ridge

Strata Name	Season	Start Date	End Date	Turbine Operations
Spring	Spring	2024-04-01	2024-05-31	Normal
June	Summer	2024-06-01	2024-06-30	Normal
July 1	Summer	2024-07-01	2024-07-25	Normal
July 2_norm	Summer	2024-07-18	2024-07-31	Normal
July 2_curtailed				Curtailed
August_norm	Summer	2024-08-01	2024-08-31	Normal
August_curtailed				Curtailed
September 1_norm	Fall	2024-09-01	2024-09-15	Normal
September 1_curtailed				Curtailed
September 2	Fall	2024-09-16	2024-09-30	Normal
October	Fall	2024-10-01	2024-10-31	Normal

Each stratum consisted of searches conducted at three different plot types (i.e., classes): road and pad plots searched by humans (roads and pads), cleared full plots searched by humans (full human plots), and cleared plots searched by detection dog teams (full dog plots); except for spring when only road and pads and full human plots were searched. Stantec used the EofA "Multiple Classes Module" to combine searches at the different plot types within each stratum to estimate $g_{stratum}$.

Site-specific monitoring data were used to calculate the g-value and associated beta parameters for each stratum, including the following inputs:

- Search interval (I), calculated as the average time between searches per plot type.
- Number of searches, calculated as the average number of times each turbine was visited.
- Temporal coverage (v), set to 1 since monitoring occurred during the strata's entire date range.
- SE, calculated using the "carcasses removed after one search" option and inputting the total number of carcasses available and found per plot type across all searchers.
- Factor by which SE changes with each search (k) was fixed at 0.67.
- CP distribution calculated using field trials to estimate the parameters, and the top model was selected based on results from within EofA.

The DWP in EofA's Multiple Classes Module represents the fraction of the total carcasses expected to arrive in a given class and is used to combine detection probabilities. DWPs for each class within each stratum were calculated by multiplying the proportion of each plot type by the site-specific average DWP area correction for all combinations of Project, plot type, and treatment type. The unsearched class's DWP was set to 1 minus the sum of the individual class DWPs to account for unsearched areas (e.g., unsearchable areas within full plots, areas outside of road and pad plots that were not searched, unsearched turbines) since EofA requires DWP to sum to 1 to reflect the distribution of each $g_{stratum}$.

Stratum, sub-seasons, and seasons were combined as shown in Table 2-4 using the appropriate weights. The weights are used to calculate the DWP which directs how the detection probabilities should be combined and are described further below.

Table 2-4. Evidence of Absence strata used in the 2025 detection probability and take estimation analysis at Kings Point and North Fork Ridge.

<table>
<tr><th>Strata[1]</th><th>Sub-Season</th><th>Season</th><th>Year</th></tr>
<tr><td>Spring (April and May)</td><td>Spring</td><td>Spring</td><td rowspan="11">2025</td></tr>
<tr><td>June</td><td>June</td><td rowspan="6">Summer</td></tr>
<tr><td>July 1</td><td>July 1</td></tr>
<tr><td>July 2 normal</td><td rowspan="2">July 2</td></tr>
<tr><td>July 2 curtailed</td></tr>
<tr><td>August normal</td><td rowspan="2">August</td></tr>
<tr><td>August curtailed</td></tr>
<tr><td>September 1 normal</td><td rowspan="2">September 1</td><td rowspan="4">Fall</td></tr>
<tr><td>September 1 curtailed</td></tr>
<tr><td>September 2</td><td>September 2</td></tr>
<tr><td>October</td><td>October</td></tr>
</table>

[1]normal and curtailed refer to turbine operations implemented where normal indicates control treatment operations (i.e., 3.0 m/s blanket curtailment) and curtailed indicated treatment turbine operations (increased cut-in speeds as shown in Section 1.1.5; "EP1")

2.3.1.1 Arrival Proportions

Arrival proportions represent the proportion of annual fatalities expected to occur within a given season. Arrival proportions were based on 2023 acoustic data and were broken down into the following categories: Spring (0.066), June (0.035) and July/August (0.671) (together, summer), and September (0.12) and October (0.059) (together, fall). As previously stated, the summer season was split into four sub-seasons and fall was split into three sub-seasons based on when turbine curtailment was implemented and monthly differences in weights. The arrival proportion weights were rescaled to each sub-season based on the number of days within the season, assuming uniform carcass arrival within each time period (Table 2-5). The arrival proportions in Table 2-5 do not sum to 1 because approximately 4.9% of carcasses are expected to arrive outside of April – October. Arrival proportions were used to combine sub-seasons and seasons.

Table 2-5. Arrival proportions by sub-season for the 2025 Evidence of Absence detection probability and take estimation analysis at Kings Point and North Fork Ridge.

Sub-season	Start Date	End Date	Arrival Proportion
Spring	2024-04-01	2024-05-31	0.066
June	2024-06-01	2024-06-30	0.035
July 1	2024-07-01	2024-07-25	0.184
July 2	2024-07-26	2024-07-31	0.152
August	2024-08-01	2024-08-31	0.336
September 1	2024-09-01	2024-09-08	0.06
September 2	2024-09-09	2024-09-30	0.06
October	2024-10-01	2024-10-31	0.059

2.3.1.2 Minimization Weights

Minimization weights represent the fraction of risk remaining after minimization techniques are implemented and are calculated as the percent of exposed bat passes. Simulated acoustic exposure was calculated by applying the 2025 curtailment strategy (increased cut-in speeds from July 18 through September 14) and the control curtailment strategy (blanket 3.0 m/s) to the pooled acoustic data from 2022 and 2023 to obtain separate minimization weights for each strategy. Minimization weights were calculated monthly for each treatment group by dividing the number of exposed bat calls (those that occurred at a wind speed when curtailment was not enacted and therefore may be subject to turbine blade strike) by the total number of bat calls to combine detection probability distributions across strata, sub-seasons, and seasons. Minimization weights were calculated for each sub-season and season where treatment and control turbines operated under different parameters (i.e., 3.0 m/s for control and raised cut-in speeds for treatment) by dividing the number of exposed bat calls across treatment groups by the total number of bat calls across treatment groups to account for differences in treatments and combine detection probability distributions across sub-seasons and seasons.

2.3.2 Estimation of Gray Bat and Tricolored Bat Fatalities

For analysis of the 2025 data, the “Multiple Years Module” included the results of the overall 2025 g-value (see Section 2.3.1), along with the number of observed gray bat and tricolored bat fatalities. This analysis was run separately for each Project and each treatment to determine the total estimated mortality (M), and the annual fatality rate (λ) for gray bats and for tricolored bats by Project and treatment group. Credible intervals were evaluated assuming α=0.8.

2.4 Data Analysis – Acoustic Monitoring and Turbine Operation

Stantec processed acoustic bat data collected at the Projects using Kaleidoscope Pro (KPro; Wildlife Acoustics, Inc.; version 5.7.0 or later) to eliminate noise (e.g., insects, rain, wind) and assign automated identifications of species to files using the Bats of North America classifier (version 5.7.0; 0 Balanced [Neutral] setting). Trained bat biologists visually reviewed all files in AnalookW (version 4.4n or newer) to confirm they contained a bat pass (i.e., at least 2 bat echolocation call pulses). Files that did not contain a bat pass were manually removed and not analyzed further. Files not attributed to species were reviewed to identify possible misclassifications of bat passes. All files classified by KPro as species of interest, including federally endangered gray bats and the proposed endangered tricolored bat, along with files labeled as other species that could potentially be confused with these species were manually vetted by a trained bat biologist.

File-level information from all bat passes was extracted using the CountLabels tool in AnalookW software and attributed all bat passes with timestamp (rounded to the nearest 10-minute interval), species, and metadata including Project, turbine number, and operational treatment. All turbine data files were evaluated to determine whether detectors were functioning properly on a nightly basis.

Acoustic exposure refers to the subset of bat passes recorded when wind turbines are operating (rotor speed > 1 revolutions per minute [rpm]) and is the metric by which curtailment was evaluated. To assess acoustic exposure, wind speed, temperature, and rotor speed data were recorded at 10-minute intervals at each of the 15 turbines outfitted with acoustic detectors. The number of bat passes per 10-minute interval for each turbine was calculated using program R. Intervals were defined as meeting or not meeting the criteria of each curtailment strategy as implemented and categorized as whether the turbine rotor speed was less than 1 rpm during the corresponding interval. The resulting two distinct metrics for acoustic exposure were “measured exposure”, which indicates bat passes detected when turbine rotor speed was above 1 rpm, and “simulated exposure”, which indicates bat passes detected when curtailment conditions were not met (i.e., when turbines should be spinning based on wind speed, temperature, and time of year). Simulated exposure enables comparing effectiveness of curtailment and control treatments across all Project turbines and allowed assessment of the reduction in risk relative to turbine operation without any operational curtailment or feathering applied. The threshold wind speed (above which exposure would occur) for uncurtailed turbine operation was calculated as the median wind speed at which turbine rotor speed exceeded 1 rpm more than 50% of the time, limiting analyses to daytime periods.

Following methods used to compare acoustic exposure and fatalities previously at Kings Point and North Fork Ridge, the cumulative rate of biweekly exposure was used to compare acoustic exposure among sites and curtailment treatments. Cumulative biweekly exposure was calculated as the number of exposed bat passes recorded per detector-night within biweekly intervals (pooling data among detectors per site and treatment, as appropriate), summed across the monitoring period. We compared cumulative biweekly exposure as measured at each site by the curtailment treatment and also for all turbines as if they had been operated according to uncurtailed operation, the control treatment, and the EP1 curtailment treatment. To evaluate the success of the EP1 curtailment treatment as proposed in the draft HCP, we calculated the 3-year mean cumulative acoustic exposure for uncurtailed operation and the EP1 strategy for each site for 2023 – 2025 and compared this to baseline values calculated in 2022 – 2024.

Previous comparisons of fatality and acoustic exposure at Kings Point and North Fork Ridge also used biweekly exposure and cumulative biweekly exposure; we did not analyze biweekly relationships between acoustic exposure and fatalities in 2025 but did compare overall fatality rates and acoustic exposure by site and treatment.

3 Results

Results include summaries of the raw data, including counts of species, the number of searches conducted, and the average search interval (calculated as the number of operational turbine days within a season divided by the sum of the number of visits to a turbine).

3.1 Shared Results

Calculations for SE and DWP were shared between Projects[2]. Searchers rotated through turbine searches systematically at both Projects and generally did not exclusively search only one of the Projects. Therefore, SE was evaluated and combined for both projects. Additionally, combining projects allowed for a more robust estimation of DWP.

3.1.1 Searcher Efficiency

SE trials were conducted during all three seasons (spring, summer, and fall) in 2025 and included a total of 298 trials across the two Projects. The unmodeled (i.e., raw) searcher efficiency trial results are shown in Table 3-1. Data were analyzed in GenEst, with season and plot type as the potential predictor variables. For this analysis, SE decay (k) was fixed at 0.67.

Table 3-1. Raw Searcher efficiency results during 2025 post-construction monitoring at the Kings Point and North Fork Ridge Wind Projects

Plot Type	Spring		Summer		Fall	
	Available	**Found**	**Available**	**Found**	**Available**	**Found**
80-m Cleared Plot (Detection Dog Teams)	NA	NA	111	78	92	72
80-m Cleared Plot (Human Searchers)	24	14	NA	NA	NA	NA
Road and Pad (Human Searchers)	23	22	24	24	23	23

[2] DWPs were unique to each individual turbine; however, data from both projects were used to determine the fraction of total mortality expected to occur within each distance band (see Section 3.1.2).

The model with the lowest AIC was selected which included plot type as factors (Appendix B, Table B-1). This resulted in a total of three SE estimates that were used in fatality estimation. A summary of these estimates is provided below.

Based on the results of the top model, SE was highest on average at road and pad plots searched by humans (98.6%), followed by 80-m cleared plots searched by detection dog teams (73.9%), and 80-m cleared plots searched by humans (58.3%, see Table 3-2).

Table 3-2. GenEst Modeled Searcher efficiency during 2025 post-construction monitoring at the Kings Point and North Fork Ridge Wind Projects.

Plot Type	Searcher Efficiency (90% CI)
80-m Cleared Plot (Detection Dog Teams)	0.739 (0.685 - 0.786)
80-m Cleared Plot (Human Searchers)	0.583 (0.415 – 0.735)
Road and Pad (Human Searchers)	0.986 (0.929 – 0.997)

3.1.2 Density-weighted Proportion (DWP)

While treatment turbines in 2025 operated at various cut-in speeds above 3.0 m/s, due to very small sample sizes at these various raised cut-in speeds, updated fractions of total mortality in each distance band were unable to be calculated; therefore, the fraction of total mortality in each distance band from the 2021 and 2022 data at 5.0 m/s was used for treatment turbines during periods when cut-in speeds were raised above 3.0 m/s.

DWPs were calculated using turbine-specific GIS data from the digitized roads and pads (since the road and pad configuration can vary by turbine), as well as removing digitized unsearchable areas from full plots to determine the fraction of each distance band searched at a particular turbine. These values were multiplied by the values presented in Table 2-1 and Table 2-2. Individual turbines in the treatment group had both a “control” and “treatment” DWP calculated so that the different DWPs could be applied throughout the year based on when cut-in speeds were raised above 3.0 m/s. DWP varied by treatment type, plot type, and Project due to differences in site-specific road and pad configurations. Results indicate that overall, cleared plot turbines have a DWP ranging from 79.6% to 95.6% and road and pad turbines have a DWP ranging from 3.4% to 11.1%. On average, DWP at Kings Point was 0.05 for roads and pads when turbines were operating at 3.0 m/s, 0.046 for roads and pads under treatment operations, 0.95 for full plots when turbines were operating at 3.0 m/s, and 0.844 for full plots under treatment operations. At North Fork Ridge, DWP averaged 0.05 for roads and pads when turbines were operating at

3.0 m/s and under treatment operations, 0.96 for full plots when turbines were operating at 3.0 m/s, and 0.854 for full plots under treatment operations.

3.2 Kings Point

3.2.1 Carcass Searches

A total of 3,521 searches were completed between April 1 and October 31, 2025. A summary of search effort by season with total numbers of bats found is presented in Table 3-3. A total of 622 bat carcasses were found during standardized carcass searches, and 6 bat carcasses were found incidentally.

Table 3-3. Summary of bat fatality monitoring completed between April 1 and October 31, 2025, at the Kings Point Wind Project.

Season	Dates	Number of Searches Conducted	Average Search Interval	Number of bats found in standardized searches	Number of bats found incidentally
Spring	April 1 – May 31	650	6.95	23	1
Summer	June 1 – August 31	1,741	3.72	398	5
Fall	September 1 – October 31	1,170	3.64	201	0
Total	April 1 – October 31	3,521	4.77	622	6

3.2.2 Species Composition

Of the 622 bat carcasses found during standardized carcass searches, one was an unidentified *Lasiurus* species and the other bats were identified to a species or species group. A summary of species composition by season for bats found during the standardized carcass searches is shown in Table 3-4. Of the 622 bat carcasses, the most common species found was the eastern red bat (*Lasiurus borealis*; 440 individuals). The hoary bat (*Lasiurus cinereus*; 118 individuals) was the second most common species followed by evening bat (*Nycticieus humeralis*; 16 individuals). Silver-haired bats (*Lasionycteris noctivagans)* made up 1.8% (11) of overall carcasses. Gray bats and tricolored bats comprised 3.7% of total finds with 11 and 12 carcasses each, respectively. One gray bat and one tri-colored bats were found outside of the survey area and categorized as incidentals.

Table 3-4. Summary of bat carcasses found during standardized carcass searches between April 1 and October 31, 2025, at the Kings Point Wind Project.

Species	Spring	Summer	Fall	Total
Big Brown Bat *Eptesicus fuscus*	0 0.0%	3 0.5%	3 0.5%	6 1.0%
Eastern Red Bat *Lasiurus borealis*	9 1.4%	303 48.7%	128 20.6%	440 70.7%
Evening Bat *Nycticeius humeralis*	4 0.6%	8 1.3%	4 0.6%	16 2.6%
Gray Bat[1, 2] *Myotis grisescens*	0 0.0%	6 1.1%	5 0.8%	11 1.8%
Hoary Bat[1] *Lasuirus cinereus*	10 1.6%	66 10.6%	42 6.8%	118 19.0%
Silver-haired Bat[1] *Lasionycteris noctivagans*	0 0.0%	1 0.2%	15 2.4%	16 2.6%
Tricolored Bat[1] *Perimyotis subflavus*	0 0.0%	10 1.6%	2 0.3%	12 1.9%
Unidentified Bat	0 0.0%	0 0.0%	1 0.2%	1 0.2%
Eastern Red or Seminole Bat	0 0.0%	0 0.0%	1 0.2%	1 0.2%
Unidentified *Lasiurus* Bat	0 0.0%	1 0.2%	0 0.0%	1 0.2%
Total	23 3.7%	398 64.0%	201 32.3%	622 100.0%

[1]Missouri Department of Conservation Species of Conservation Concern
[2]State and Federal listed Endangered

3.2.3 Carcass Persistence

CP was tested using 84 bat carcasses across the 3 seasons, with a minimum of 10 trials for each combination of plot type and season. The top model for CP in GenEst included a Weibull distribution with effects for season (Appendix B, Table B-2). That model was selected and had a median CP was highest in the spring at 7.90 days, followed by summer at 5.12 days, and fall at 1.29 days (Table 3-5).

Table 3-5. Carcass persistence during 2025 post-construction monitoring at the Kings Point Wind Project.

Season	Trial Carcasses	Carcass Persistence (90% CI)
Spring	32	7.90 (4.61 – 13.00)
Summer	36	5.12 (2.00– 12.49)
Fall	36	1.29 (0.78 – 2.03

3.2.4 Adjusted Fatality Estimates - GenEst

Fatality rate estimates were calculated based upon the carcasses found during the standardized carcass searches within the search plots and did not include any incidental finds. Observed bat fatality estimates were adjusted to account for SE, CP, the search schedule, and the turbine-specific DWP area corrections.

3.2.4.1 Seasonal Fatality Estimates

Across all three survey seasons, 622 carcasses were found during standardized searches at the Kings Point Wind Project. The total estimated fatality for all bats was highest during the summer season (2,176 bats), followed by fall (1,213 bats), and lowest in the spring (217 bats) as summarized in Table 3-6 and shown in Figure 3-1.

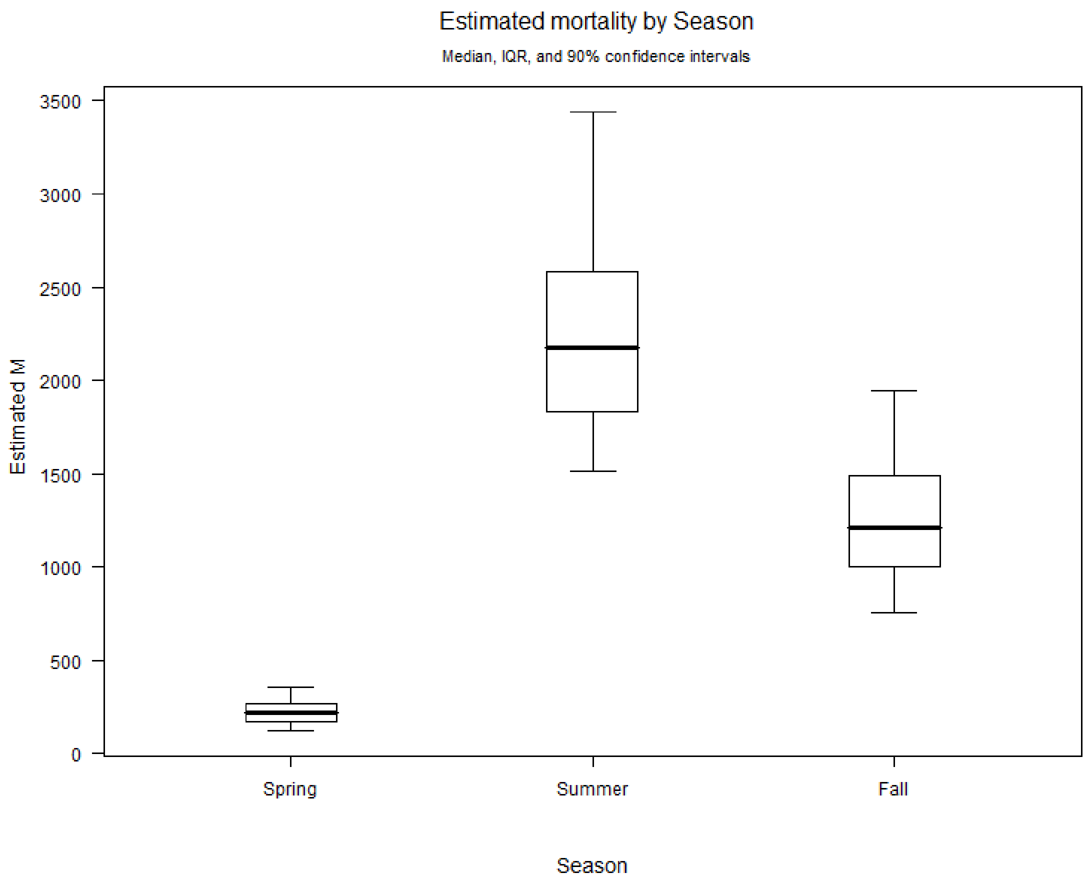

Figure 3-1. Seasonal all bat fatality estimates for 2025 at the Kings Point Wind Project.

Table 3-6. Bat fatality rates by season estimated using GenEst from the 2025 post-construction monitoring data at the Kings Point Wind Project.

Season	Dates	Facility-wide Estimated Fatalities (90% CI)	Per-turbine Estimated Fatalities (90% CI)	Per-MW Estimated Fatalities (90% CI)
Spring	April 1 – May 31	216.10 (119.22 – 353.34)	3.13 (1.73 – 5.12)	1.45 (0.80 – 2.37)
Summer	June 1 – August 31	2,175.78 (1,512.95 – 3,439.86)	31.53 (21.93 – 49.85)	14.56 (10.13 – 23.02)
Fall	September 1 – October 31	1,212.43 (757.5 – 1,941.49)	17.57 (10.98 – 28.14)	8.12 (5.07 – 13.00)
Annual	April 1 – October 31	3,596.49 (2,589.12 – 5,467.74)	52.12 (37.52 – 79.24)	24.07 (17.33 – 36.60)

3.2.4.2 Control Vs. Treatment Fatality Estimates

Median annual fatality estimates for all bats were higher for control turbines (3.0 m/s cut-in) than treatment turbines (EP1). Annual bat fatality was 2,041.24 (90% CI: 1,643.08 – 2,553.84) at control turbines and 1,534.21 (90% CI: 731.17 – 3,269.88) at treatment turbines (see Figure 3-2). Per turbine estimates are 58.32 (90% CI: 46.95 – 72.97) for control turbines and 45.12 (90% CI: 21.51 – 96.17) for treatment turbines. Per MW estimates are 26.86 (90% CI: 21.62 – 33.60) for control turbines and 20.90 (90% CI: 9.96 – 44.55) for treatment turbines.

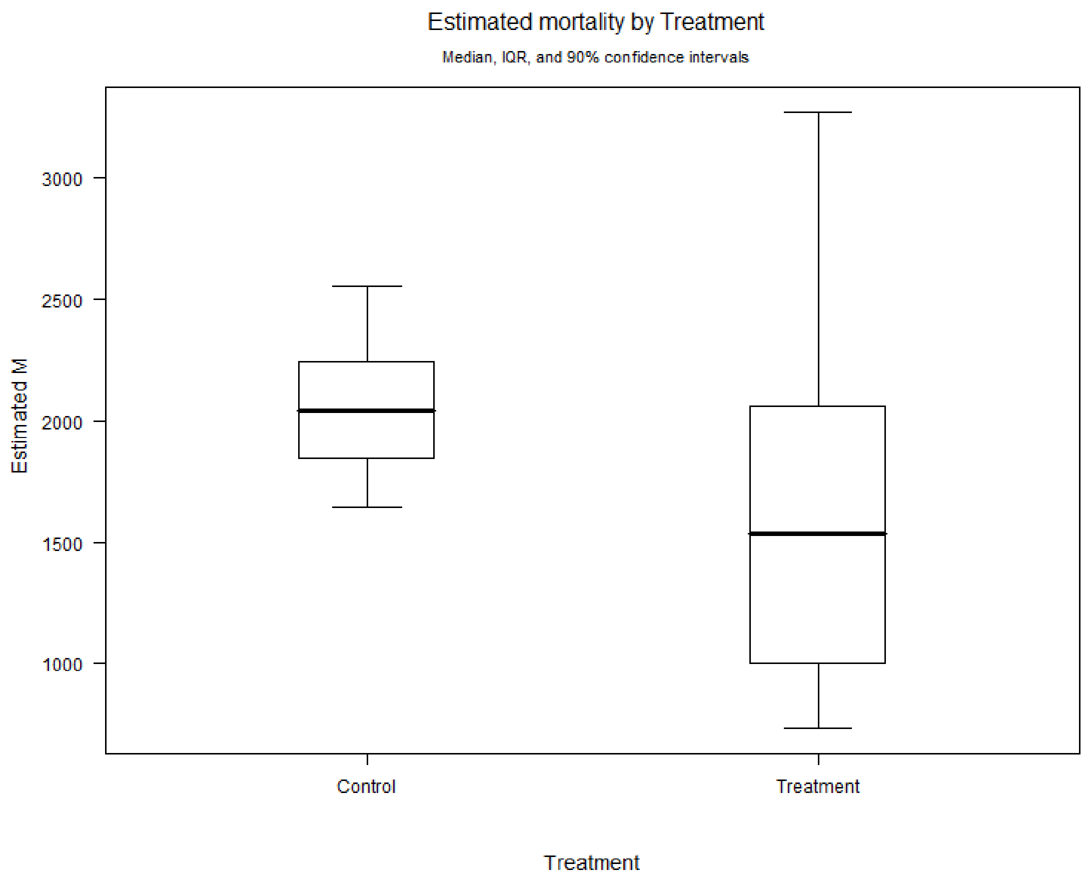

Figure 3-2. Annual all bat fatality estimates at control (3 m/s) vs. treatment (EP1) turbines for 2025 at the Kings Point Wind Project.

3.2.5 Gray Bat and Tricolored Bat Fatality Estimates - EofA

3.2.5.1 Bat In-hand Fatalities

Stantec and WEST found 11 gray bats and 12 tricolored bats during standardized searches at Kings Point. One gray bat and one tricolored bat fatalities were recovered and processed as incidentals. No other federal or state endangered species were found. The locations of the gray bat and tricolored bat fatalities are shown in Appendix A, Figure A-4. See Table 3-7 for a summary of the details for gray bats and tricolored bats found.

Table 3-7. Gray bats and tricolored bats found during 2025 at the Kings Point Wind Project.

Species	Date Found	Est. Time Since Death	Season	Turbine	Sex	Plot Type	Cut-in Speed (m/s)
Gray Bat	7/10/2025	4-7 days	Summer	T-114	Female	80-m Detection Dog	3
	7/15/2025	2-3 days	Summer	T-008	Female	80-m Detection Dog	3
	7/28/2025	4-7 days	Summer	T-044	Female	80-m Detection Dog	3
	7/31/2025	2-4 days	Summer	T-009	Unknown	100-m Human	3
	8/8/2025	4-7 days	Summer	T-060	Male	80-m Detection Dog	3
	8/8/2025	8-14 days	Summer	T-126	Female	80-m Detection Dog	3
	8/21/2025	4-7 days	Summer	T-025	Female	80-m Detection Dog	3
	9/9/2025	4-7 days	Fall	T-113	Unknown	100-m Human	3
	9/19/2025	0-1 days	Fall	T-090	Female	80-m Detection Dog	3
	10/13/2025	0-1 days	Fall	T-063	Male	80-m Detection Dog	3
	10/23/2025	2-3 days	Fall	T-056	Male	80-m Detection Dog	3

Species	Date Found	Est. Time Since Death	Season	Turbine	Sex	Plot Type	Cut-in Speed (m/s)
Tricolored Bat	7/31/2025	4-7 days	Summer	T-034	Female	80-m Detection Dog	3
	8/7/2025	0-1 days	Summer	T-031	Unknown	80-m Human	3
	8/11/2025	4-7 days	Summer	T-044	Female	80-m Detection Dog	10.5
	8/12/2025	8-14 days	Summer	T-090	Male	80-m Detection Dog	3
	8/12/2025	2-3 days	Summer	T-008	Male	80-m Detection Dog	10.5
	8/15/2025	2-3 days	Summer	T-126	Female	80-m Detection Dog	3
	8/19/2025	0-1 days	Summer	T-114	Male	80-m Detection Dog	3
	8/20/2025	4-7 days	Summer	T-090	Female	80-m Detection Dog	3
	8/21/2025	4-7 days	Summer	T-025	Female	80-m Detection Dog	3
	8/29/2025	2-3 days	Summer	T-074	Male	80-m Detection Dog	3
	9/2/2025	2-3 days	Fall	T-128	Female	80-m Detection Dog	3
	9/5/2025	2-3 days	Fall	T-128	Female	80-m Detection Dog	3
Incidental Gray bat	10/31/2025	0-1 days	Fall	T-009	Unknown	80-m Human	3
Incidental Tricolored bat	8/14/2025	4-7 days	Summer	T-008	Male	80-m Detection Dog	10.5

3.2.5.2 Evidence of Absence

3.2.5.2.1 Detection Probability (g)

EofA inputs and outputs for the Multiple Classes Module runs are provided in Appendix B. The detection probability (g) for the bat active season (March 1 through November 15, 2024) was 0.18 (95% CI: 0.16 – 0.19) and varied by season (Table 3-8).

Table 3-8. Seasonal and Annual Detection Probability for the King's Point Wind Project from the 2025 post-construction monitoring season.

Season	g-value (95% CI)
Spring	0.18 (0.14-0.24)
Summer	0.19 (0.17-0.22)
Fall	0.13 (0.11-0.14)
Annual	**0.18 (0.16-0.19)**

3.2.5.2.2 Annual Fatality Estimates (M and λ)*

Analysis in the EofA “Multiple Years Module” included calculation of the annual take estimate (M_{2025}) and the annual take rate (λ) for gray bats and tricolored bats based on the 11 and 12 carcasses found, respectively, for each species during standardized monitoring and the detection probability (g) from the 2025 study. Results are summarized in Figure 3-9. Seasonal all bat fatality estimates for 2025 at the North Fork Ridge Wind Project..

Table 3-9. Summary of EofA outputs for gray bats from 2025 post-construction monitoring at the Kings Point Wind Project. Analysis done with α=0.8.

Species	Number of detected fatalities (X)	Annual Take Estimate (M_{2025})	Annual Take Rate (λ) (95% CI)
Gray Bat	11	79	65.1 (32.8 – 109)
Tricolored Bat	12	85	70.7 (36.8 – 116)

Treatment vs. Control Turbines

Annual fatality estimates were also split by treatment using the EofA “Multiple Classes Module” and the eight (8) distinct strata identified. G-values differed between treatment and control turbines during the time periods in which cut-in speeds were raised (July 2, August, and September 1 sub-seasons; see Table 2-5) due to differences in minimization during those periods. DWPs for this analysis were calculated using arrival and minimization weights specific to the treatment vs. control strategy (see Appendix B). Results are summarized in Table 3-10.

Table 3-10. Summary of EofA outputs for gray bats and tricolored bats from 2025 post-construction monitoring at the Kings Point Wind Project. Analysis done with α=0.8.

	Control Turbines			Treatment Turbines		
Species	**Number of detected fatalities (X)**	**Annual Take Estimate (M_{2025})**	**Annual Take Rate (λ) (95% CI)**	**Number of detected fatalities (X)**	**Annual Take Estimate (M_{2025})**	**Annual Take Rate (λ) (95% CI)**
Gray Bat	8	58	46.9 (20.7, 84.16)	3	28	20.5 (4.92, 47.71)
Tricolored Bat	11	71	58.0 (28.1, 99.01)	2	20	14.6 (2.42, 37.719)

3.2.6 Acoustic Monitoring

3.2.6.1 2021 – 2024 Monitoring

Detailed results of the acoustic monitoring from 2021 – 2024 are available in the 2023 annual report (Stantec 2024) and 2024 annual report (Stantec 2025). Where relevant, this report includes results from 2022 – 2024 for comparison to 2025 results to provide a comprehensive analysis of acoustic bat activity as it relates to exposure and bat fatality.

3.2.6.2 2025 Monitoring

Acoustic bat detectors were deployed at the same turbines as were monitored during previous monitoring periods. Detectors were installed on 15 turbine nacelles between March 4 and March 20, 2025 and were demobilized between November 14 and November 19, 2025. The detector monitoring Turbine 063 failed to operate properly during the season because of a mechanical malfunction, resulting in no useable detector-nights. The remaining 14 detectors that functioned during the monitoring season recorded a total of 11,211 bat passes during 2,892 successful detector-nights (83% of nights when detectors were deployed), for an overall rate of 3.88 bat passes per detector-night during the 2025 monitoring period (Table 3-11).

Table 3-11. Acoustic survey effort at the Kings Point Wind Project from March through November 2025.

Treatment	Turbine and Position	Installation Date	Demobilization Date	Functional Detector Nights (DN)	#Passes, Species of Interest		Total Bat Passes	Overall Rate (bat passes/DN)
					Gray Bat	Tricolored Bat		
Control	Turbine 025 Nacelle	10-Mar	19-Nov	160	24	0	312	1.6
	Turbine 035 Nacelle	10-Mar	14-Nov	246	23	19	923	3.8
	Turbine 056 Nacelle	10-Mar	19-Nov	164	0	1	224	1.4
	Turbine 060 Nacelle	10-Mar	18-Nov	242	3	0	360	1.5
	Turbine 091 Nacelle	20-Mar	18-Nov	239	4	5	739	3.1
	Turbine 114 Nacelle	4-Mar	18-Nov	194	4	1	439	2.7
	Turbine 128 Nacelle	20-Mar	19-Nov	13	0	0	4	0.3
	Total			*1,258*	*58*	*26*	*3,001*	*2.4*
EP1	Turbine 008 Nacelle	4-Mar	17-Nov	255	186	2	1,336	5.2
	Turbine 017 Nacelle	10-Mar	17-Nov	247	19	3	1,472	6.0
	Turbine 026 Nacelle	20-Mar	19-Nov	168	1	1	197	1.2
	Turbine 044 Nacelle	20-Mar	19-Nov	239	28	4	1,161	4.9
	Turbine 063 Nacelle	10-Mar	19-Nov	0	-	-	-	-
	Turbine 068 Nacelle	12-Mar	18-Nov	245	11	5	1,176	4.8
	Turbine 080 Nacelle	20-Mar	18-Nov	240	9	4	1,003	4.2
	Turbine 124 Nacelle	20-Mar	18-Nov	240	4	9	1,865	7.8
	Total			*1,634*	*258*	*28*	*8,210*	*5.0*
Total				**2,892**	**316**	**54**	**11,211**	**3.9**

3.2.6.3 Acoustic Results

As in previous years, acoustic bat activity at Kings Point was relatively low from March through early July and increased rapidly in mid-July, peaking in early-August, before dropping back to low levels in mid-September (Figure 3-3). The biweekly peak in eastern red bat activity was slightly earlier than that of hoary bats, although all species were most commonly detected between late July and early September (Acoustic Bat Activity FiguresAppendix C, Figure C-1). The seasonal peak in bat activity documented at Kings Point in 2025 was similar to that documented in previous years. Gray bats and tricolored bats followed a generally similar biweekly pattern in activity to all bat activity, as in prior years, though represented only 3% of total bat passes throughout the 2025 monitoring period (Figure 3-4).

Although timing of bat activity varied among nights, overall timing of bat activity during each monitoring year peaked 1–3 hours after sunset and was consistent among years (Figure 3-5) and species (Appendix C, Figure C-3). The hourly distribution of gray bat and tricolored bat activity was more variable among years, although this is attributable to fewer counts recorded for these species (Figure 3-6).

Temperature, wind speed, and turbine rotor speed data measured at nacelle height were available during 10-minute intervals in which 11,184 bat passes (99% of 11,211 total bat passes) were detected at Kings Point in 2025. These passes were used to measure acoustic exposure associated with the two operational treatments implemented at Kings Point in 2025. Of the 2,977 bat passes with operations data recorded at control turbines in 2025, 2,592 (87%) were recorded during intervals when turbine rotor speed exceeded 1 rpm. For the EP1 curtailment treatment, 1,355 (17%) of 8,207 bat passes were exposed to turbine operation. The curtailment treatment reduced the percent of gray bat passes exposed to turbine operation from 86% to 4% and tricolored bat passes from 96% to 4% (Table 3-12).

Overall bat activity rates were higher at curtailed turbines versus control turbines in 2025, although the EP1 curtailment strategy resulted in substantially lower cumulative biweekly exposure among curtailed turbines (Table 3-12). Cumulative biweekly acoustic exposure stayed low across both treatments until early July (Figure 3-7). Bat activity rates increased rapidly after mid-July, although the EP1 curtailment strategy maintained acoustic exposure at low levels relative to control turbines. Cumulative exposure for gray bats and tricolored bats was substantially lower for curtailed versus control turbines at Kings Point in 2024, though sample sizes were small (Figure 3-8).

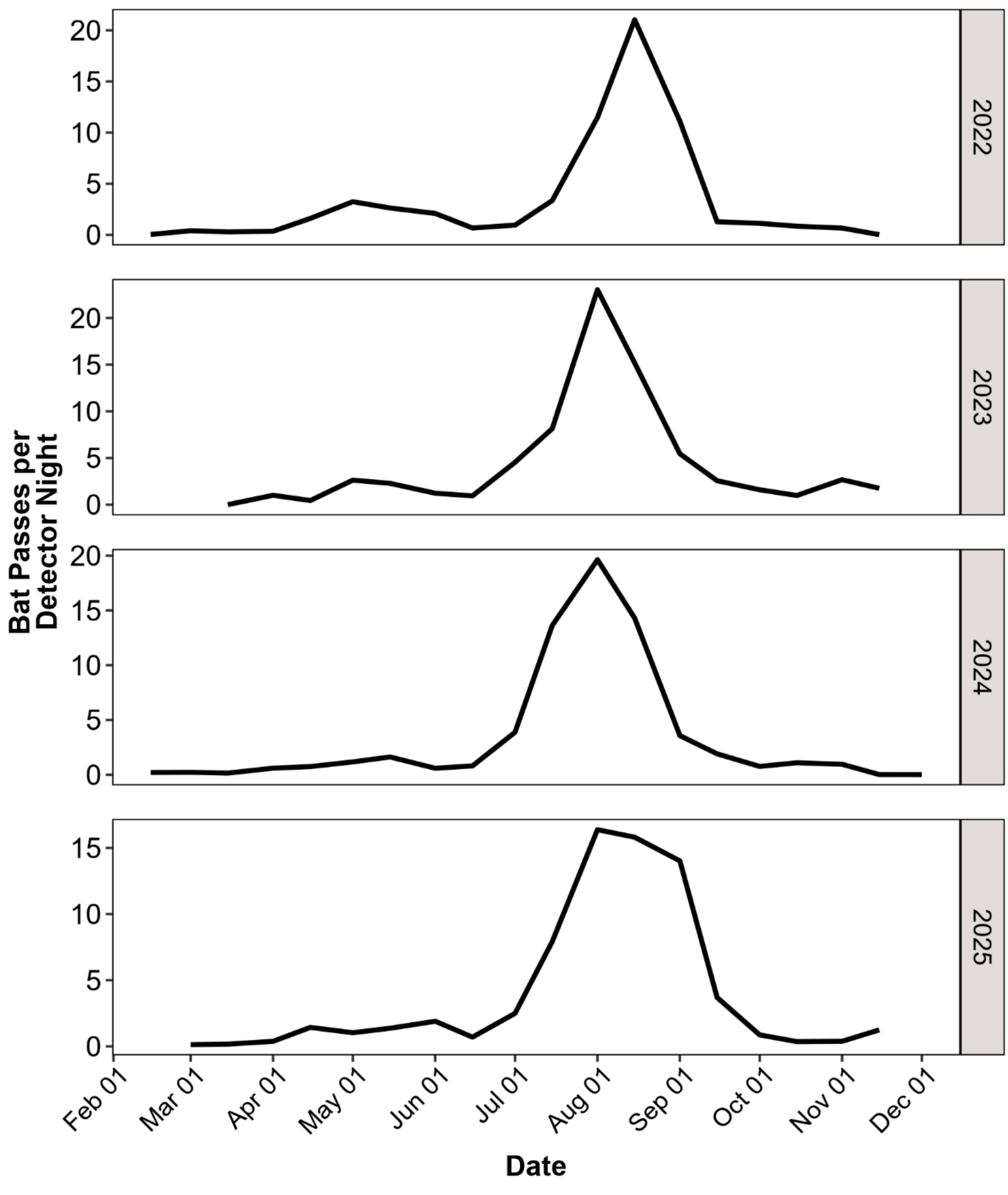

Figure 3-3. Biweekly acoustic bat activity detected at nacelle-height detectors the 2022–2025 monitoring periods at the Kings Point Wind Project.

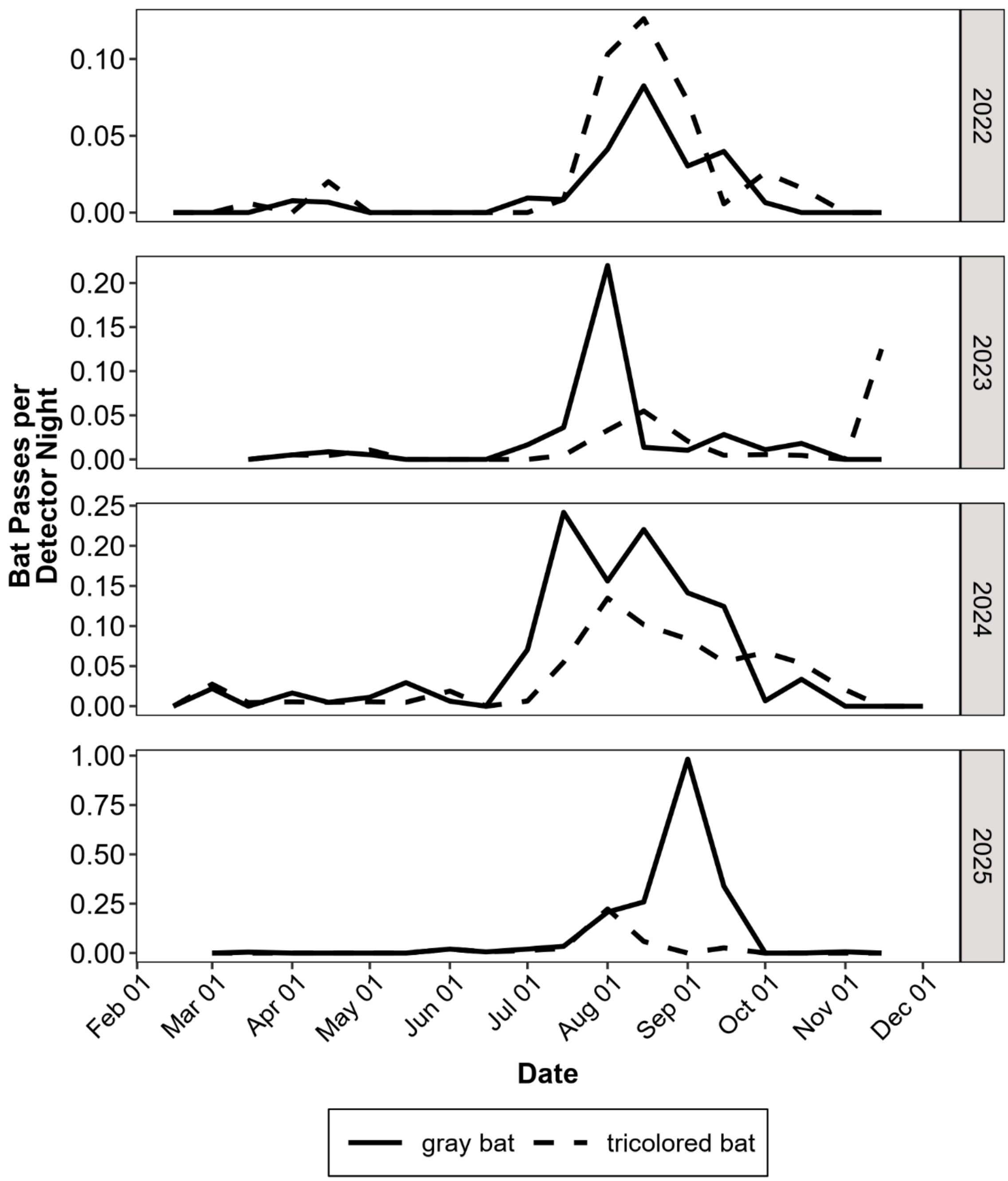

Figure 3-4. Biweekly acoustic bat activity for gray bats and tricolored bats detected at nacelle-height detectors during the 2022–2025 monitoring periods at the Kings Point Wind Project.

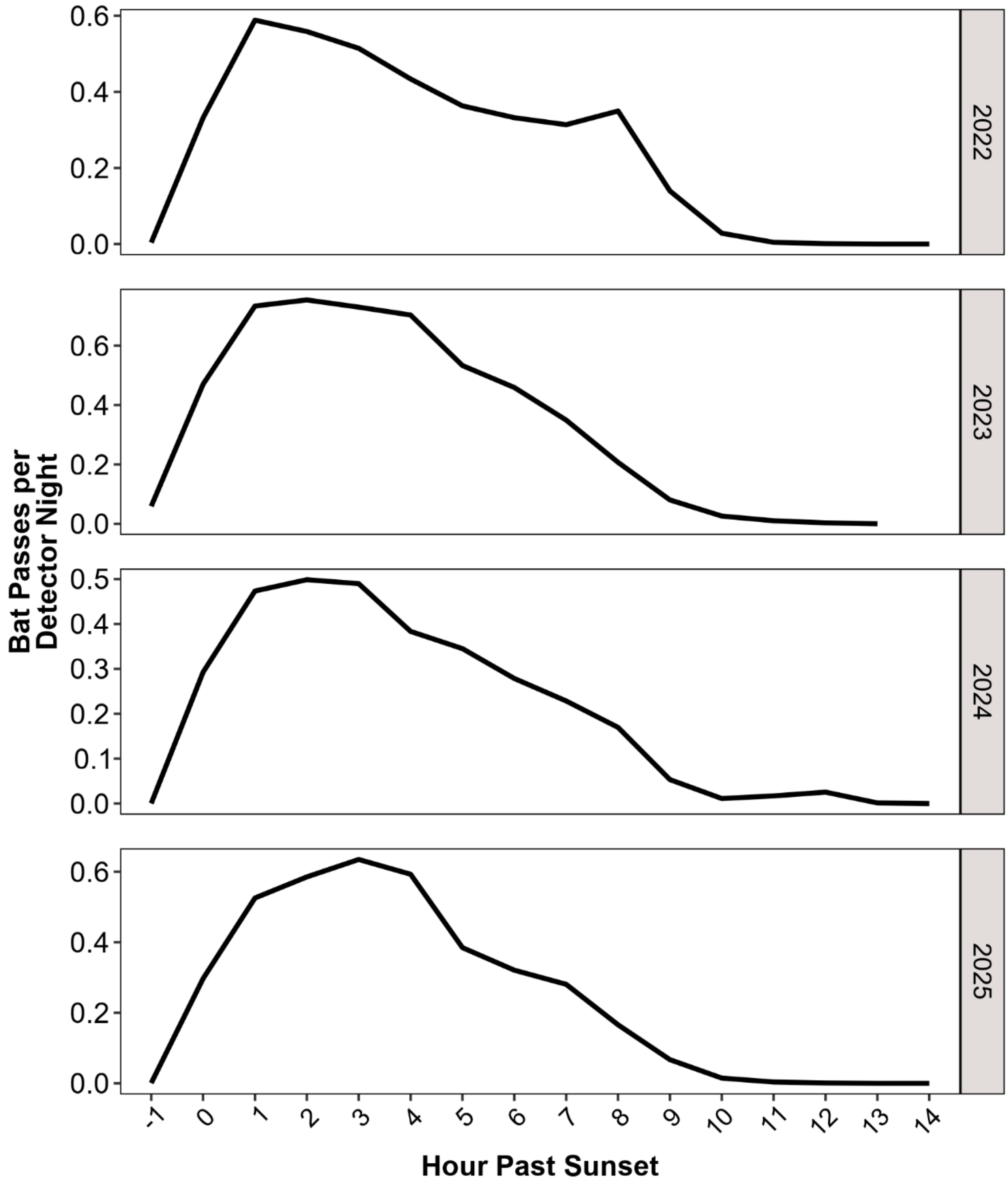

Figure 3-5. Nightly timing of bat activity (by hour past sunset) detected at nacelle detectors during the 2022 – 2025 monitoring periods at the Kings Point Wind Project.

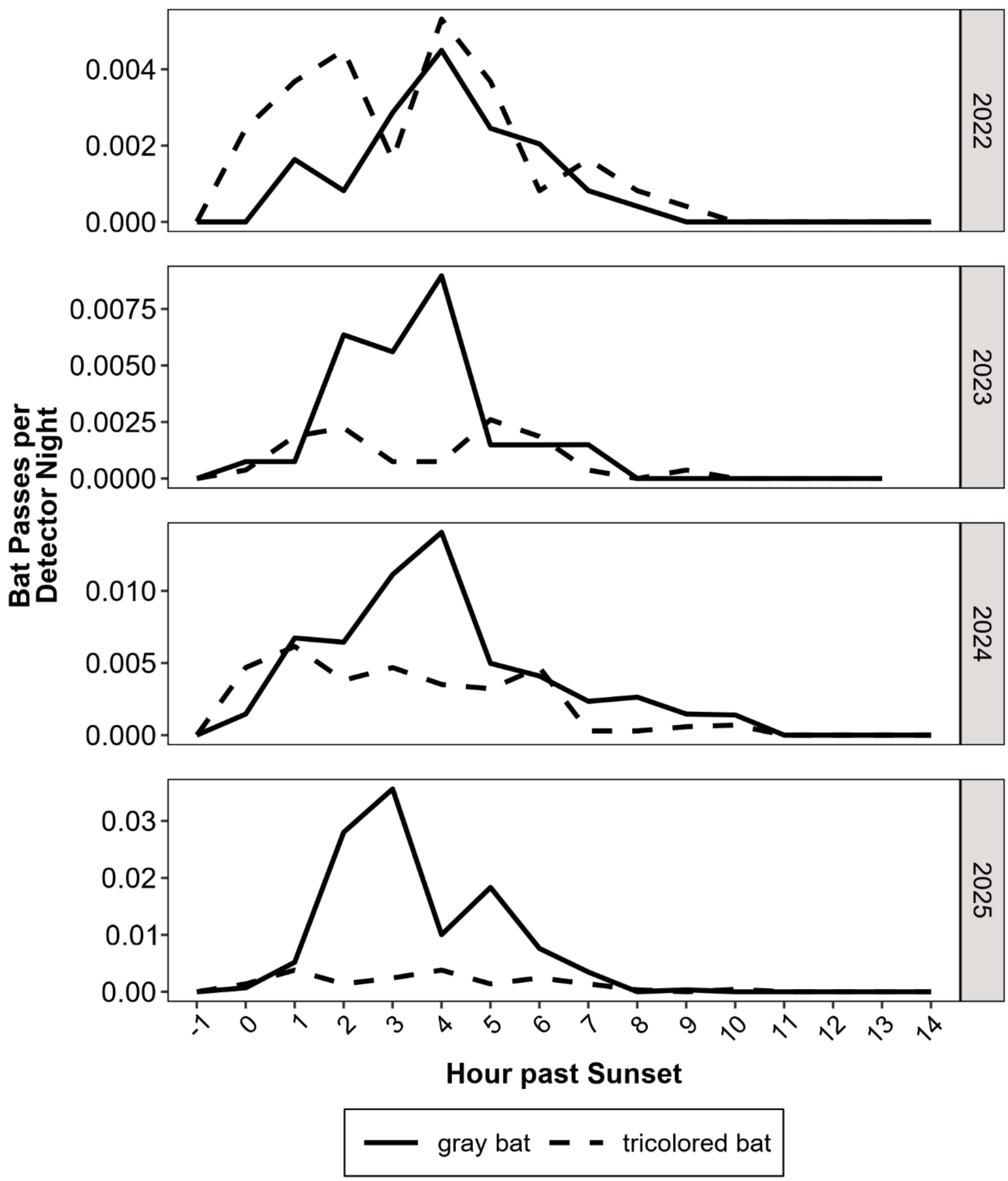

Figure 3-6. Nightly timing of gray bat and tricolored bat activity (by hour past sunset) detected at nacelle detectors during the 2022 – 2025 monitoring periods at the Kings Point Wind Project.

Table 3-12. Acoustic exposure of gray bat, tricolored bat, and all bat passes to turbine operation (detection when turbine rotor speed > 1 rpm) associated with operational treatments implemented during the 2025 monitoring period at the Kings Point Wind Project.

Year	Treatment	# Turb.	All Bats		Gray Bats		Tricolored Bats	
			Total Passes	Exposed Passes (%)	Total Passes	Exposed Passes (%)	Total Passes	Exposed Passes (%)
2025	Control	7	2,977	2,592 (87.1%)	51	44 (86.3%)	26	25 (96.2%)
2025	EP1	8	8,207	1,355 (16.5%)	258	10 (3.9%)	28	1 (3.6%)

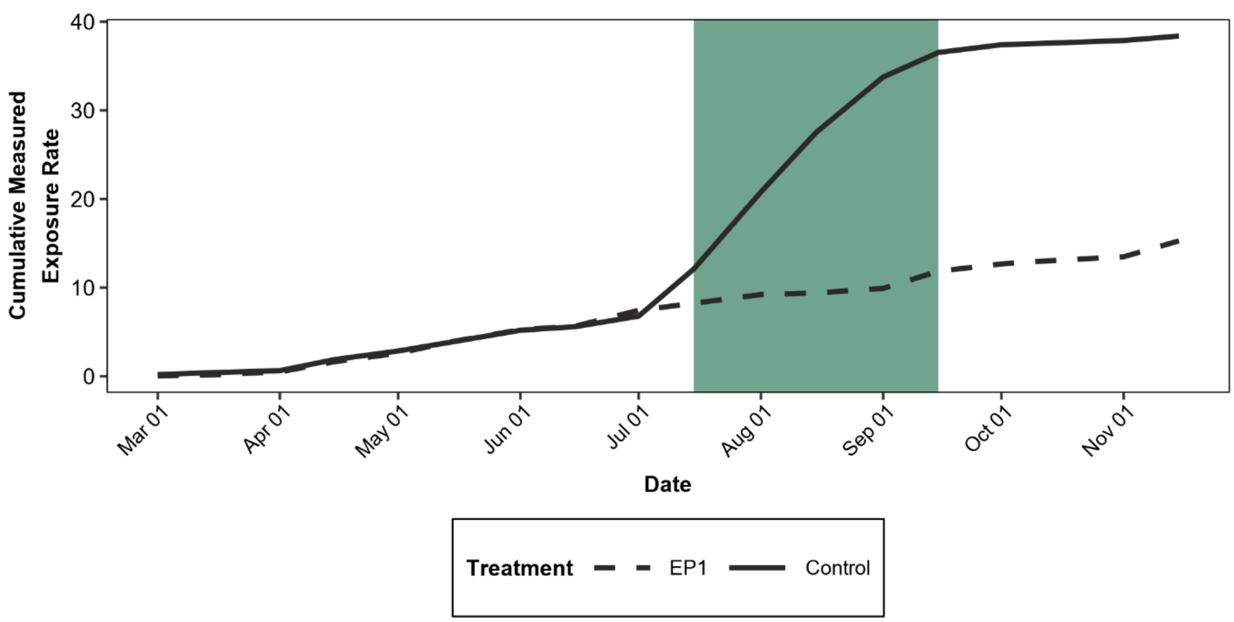

Figure 3-7. Cumulative biweekly acoustic exposure (measured) of bat activity recorded by nacelle height detectors at turbines operating with 3.0 m/s (control) and according to the 2025 curtailment strategy (EP1) implemented at the Kings Point Wind Project. Green shaded region indicates dates where curtailment was implemented.

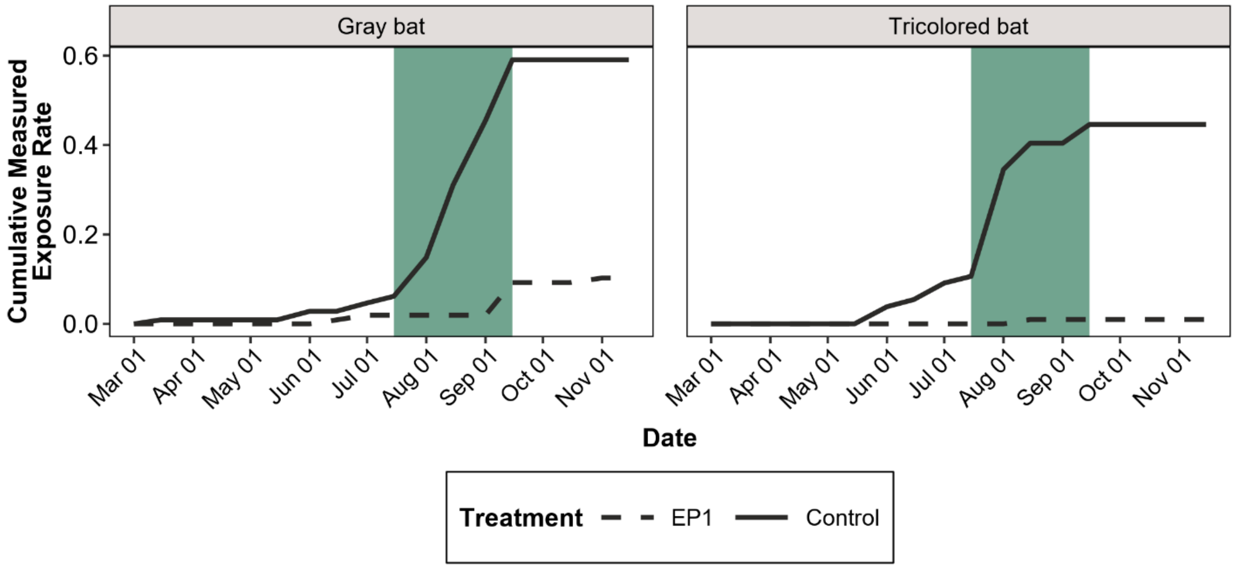

Figure 3-8. Cumulative biweekly acoustic exposure (measured) of gray bat and tricolored activity recorded by nacelle height detectors at turbines operating with 3.0 m/s (control) and according to the 2025 curtailment strategy (EP1) implemented at the Kings Point Wind Project. Green shaded region indicates dates where curtailment was implemented.

3.3 North Fork Ridge

3.3.1 Carcass Searches

A total of 3,318 searches were completed between April 1 and October 31, 2025, at the North Fork Ridge Wind Project. A summary of search effort by season with total numbers of bats found is presented in Table 3-13. A total of 486 bat carcasses were found during standardized carcass searches, and 10 bat carcasses were found incidentally.

Table 3-13. Summary of post-construction monitoring completed between April 1 and October 31, 2025, at the North Fork Ridge Wind Project.

Season	Dates	Number of Searches Conducted	Average Search Interval	Number of bats found in standardized searches	Number of bats found incidentally
Spring	April 1 – May 31	594	6.98	20	3
Summer	June 1 – August 31	1,651	3.86	298	6
Fall	September 1 – October 31	1,073	3.90	168	2
Total	April 1 – October 31	3,318	4.91	486	11

3.3.2 Species Composition

There were 486 bat carcasses found during standardized carcass searches including 3 unidentified *Lasiurus* species. The most common species was the eastern red bat (348 individuals; 71.6%), and the hoary bat (65 individuals; 13.4%) was the second most common species. Zero gray bats and seven tri-colored bats were found during standard carcass searches. A summary of all bat carcasses found during the standardized carcass searches is shown in Table 3-14.

Table 3-14. Summary of bat carcasses found during standardized carcass searches between April 1 and October 31, 2025 at the North Fork Ridge Wind Project.

Species	Spring	Summer	Fall	Total
Big Brown Bat *Eptesicus fuscus*	0 0.0%	13 2.5%	11 2.3%	24 4.8%
Eastern Red Bat *Lasiurus borealis*	9 1.9%	249 51.2%	90 18.5%	348 71.6%

Species	Spring	Summer	Fall	Total
Evening Bat *Nycticeius humeralis*	6 1.2%	2 0.4%	12 2.5%	20 4.1%
Gray Bat[1, 2] *Myotis grisescens*	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Hoary Bat[1] *Lasuirus cinereus*	5 1.0%	26 5.3%	34 7.1%	65 13.4%
Mexican Free-tailed Bat *Tadarida brasiliensis*	0 0.0%	0 0.0%	1 0.2%	1 0.2%
Silver-haired Bat[1] *Lasionycteris noctivagans*	0 0.0%	0 0.0%	12 2.5%	12 2.5%
Tricolored Bat[1] *Perimyotis subflavus*	0 0.0%	6 1.2%	1 0.2%	7 1.4%
Seminole Bat *Lasiurus seminolus*	0 0.0%	1 0.2%	0 0.0%	1 0.2%
Eastern Red or Seminole Bat	0 0.0%	1 0.2%	5 1.0%	6 1.2%
Unidentified *Lasiurus* Bat	0 0.0%	1 0.2%	2 0.4%	3 0.6%
Total	20 4.1%	298 61.3%	168 34.6%	486 100.0%

[1]Missouri Department of Conservation Species of Conservation Concern
[2]State and Federal listed Endangered

3.3.3 Carcass Persistence

CP was tested using 87 bat carcasses distributed among plot type and season. The top model for CP in GenEst included a loglogistic distribution with no effects for plot type or season (Appendix B, Table B-3). That model was selected, and the median CP was 3.70 days (90% CI: 2.67 – 5.13).

3.3.4 Adjusted Fatality Estimates - GenEst

Fatality rate estimates were calculated based upon the carcasses found during the standardized carcass searches within the search plots and did not include any incidental finds. Observed bat fatality estimates were adjusted to account for SE, CP, the search schedule, and the turbine-specific DWP area corrections.

3.3.4.1 Seasonal Fatality Estimates

Across all three survey seasons, 486 bat carcasses were found during standardized searches. The total estimated fatality for all bats was highest during the summer season (1,559 bats), followed by spring

(489 bats), and lowest in the fall (427 bats) as summarized in Table 3-15 and Figure 3-9. The median annual fatality estimate, combining all seasons, resulted in an overall bat fatality estimate of 2,506.24 bats (90% CI: 1,963.90 – 3,161.81) across all 68 operational turbines (147.2 MW; Turbine T-002 was a 2.2 MW WTG that was non-operational for the entire study period) between April 1 and October 31, 2025 – equivalent to 36.86 bats/turbine (90% CI: 28.88 – 46.50) or 17.03 bats/MW (90% CI: 13.34 – 21.48).

Table 3-15. Bat fatality rates by season from 2025 post-construction monitoring at the North Fork Ridge Wind Project.

Season	Dates	Facility-wide Estimated Fatalities (90% CI)	Per-turbine Estimated Fatalities (90% CI)	Per-MW Estimated Fatalities
Spring	April 1 – May 31	488.54 (270.05 – 803.14)	7.18 (3.97 – 11.81)	3.32 (1.83 – 5.46)
Summer	June 1 – August 31	1,559.07 (1,192.61 – 2,084.47)	22.93 (17.54 – 30.65)	10.59 (8.10 – 14.16)
Fall	September 1 – October 31	426.75 (317.05 – 584.64)	6.28 (4.66 – 8.60)	2.90 (2.15– 3.97
Annual	**April 1 – October 31**	**2,506.24** **(1,963.90 – 3,161.81)**	**36.86** **(28.88 – 46.50)**	**17.03** **(13.34 – 21.48)**

3.3.4.2 Control Vs. Treatment Fatality Estimates

Annual fatality estimates were higher for control turbines (3.0 m/s cut-in) than for treatment turbines (EP1). Estimated annual bat fatality was 1,697.22 (90% CI: 1,284.15 – 2,205.71) at control turbines and 786.49 (90% CI: 567.31 – 1,076.78) at treatment turbines (Figure 3-10). Per turbine estimates are 49.92 (90% CI: 37.77 – 64.87) for control turbines and 23.13 (90% CI: 16.69 – 31.67) for treatment turbines. Per MW estimates are 23.06 (90% CI: 17.45 – 29.97) for control turbines and 10.69 (90% CI: 7.71 – 14.63) for treatment turbines.

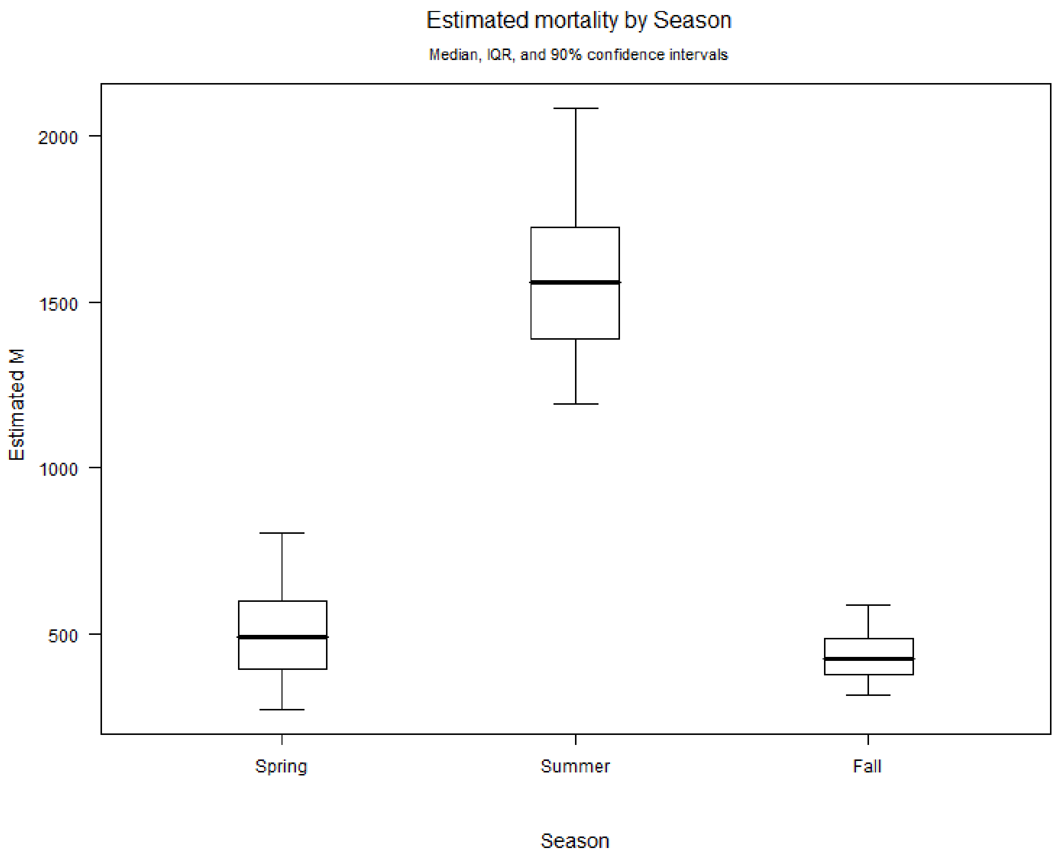

Figure 3-9. Seasonal all bat fatality estimates for 2025 at the North Fork Ridge Wind Project.

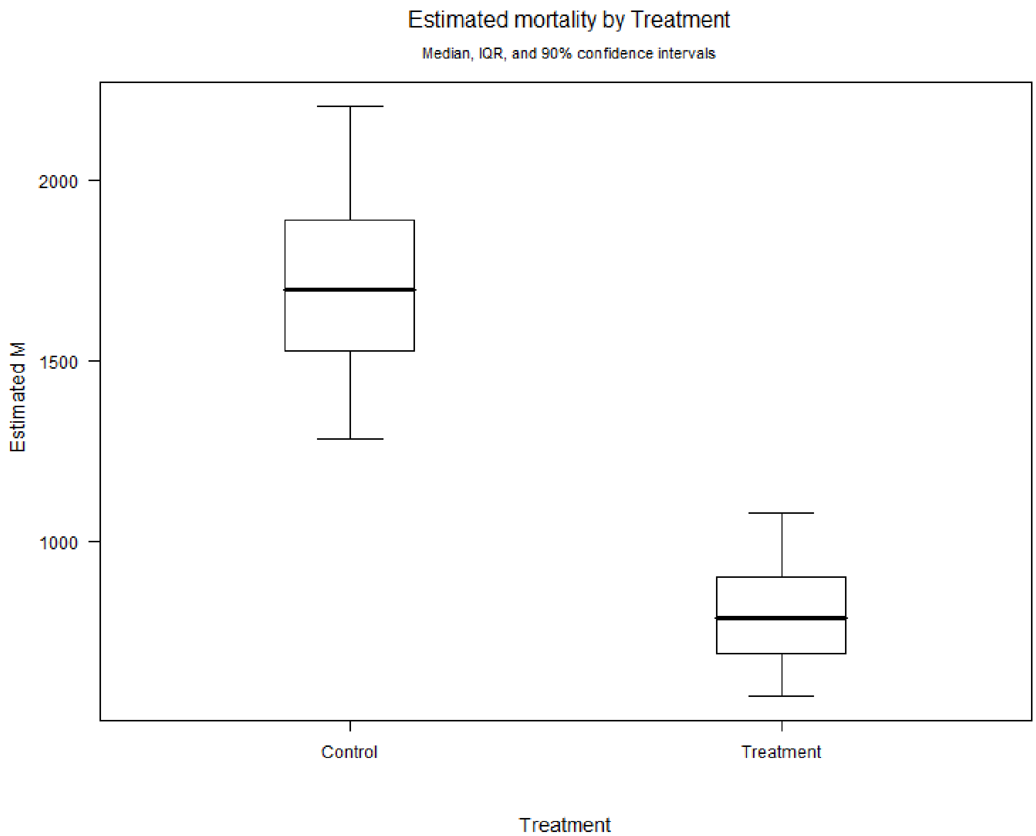

Figure 3-10. All bat fatality estimates at control (3 m/s) vs. treatment (EP1) turbines for 2025 at the North Fork Ridge Wind Project.

3.3.5 Gray Bat and Tricolored Bat Fatality Estimates - EofA

3.3.5.1 Bat In-hand Fatalities

Stantec and WEST found zero gray bats and seven tricolored bats in 2025 during standardized searches at North Fork Ridge (Appendix A, Figure A-5). A summary of the details for the tricolored bats found are available in Table 3-16.

Table 3-16. Tricolored bats found during 2025 at the North Fork Ridge Wind Project.

Species	Date Found	Est. Time Since Death	Season	Turbine	Sex	Plot Type	Cut-in Speed (m/s)
Tricolored Bat	7/1/2025	4-7 days	Summer	T-013	Female	80-m Detection Dog	3
	8/7/2025	0-1 days	Summer	T-041	Male	80-m Detection Dog	3
	8/8/2025	2-3 days	Summer	T-072	Male	80-m Detection Dog	3
	8/11/2025	4-7 days	Summer	T-024	Male	80-m Detection Dog	3
	8/21/2025	2-3 days	Summer	T-009	Female	80-m Detection Dog	3
	8/22/2025	2-3 days	Summer	T-068	Male	80-m Detection Dog	3
	9/5/2025	2-3 days	Summer	T-058	Female	80-m Detection Dog	3

3.3.5.2 Evidence of Absence

3.3.5.2.1 Detection Probability (g)

EofA inputs and outputs for the Multiple Classes Module runs are provided in Appendix B. The detection probability (g) for the bat active season (March 1 through November 15, 2024) was 0.20 (95% CI: 0.19 – 0.21) and varied by season (Table 3-17).

Table 3-17. Seasonal and Annual Detection Probability for the North Fork Ridge Wind Project from the 2025 post-construction monitoring season.

Season	g-value (95% CI)
Spring	0.17 (0.13-0.22)

Season	g-value (95% CI)
Summer	0.20 (0.19-0.21)
Fall	0.21 (0.19-0.22)
Annual	**0.20 (0.19-0.21)**

3.3.5.2.2 Annual Fatality Estimates (M and λ)*

Analysis in the EofA "Multiple Years Module" included calculation of the annual take estimate (M_{2025}) and the annual take rate (λ) for the gray bats and tricolored bats found during standardized searches and the overall detection probability from the 2025 study. Results are summarized in Table 3-18 and Table 3-19.

Table 3-18. Summary of EofA outputs for gray bats and tricolored bats from 2025 post-construction monitoring at the North Fork Ridge Wind Project. Analysis done with α=0.8.

Species	Number of detected fatalities (X)	Annual Take Estimate (M_{2024})	Annual Take Rate (λ) (95% CI)
Gray Bat	0	3	2.5 (0.003 – 12.8)
Tricolored Bat	7	47	15.2 (15.9 – 69.9)

Treatment vs. Control Turbines

Annual fatality estimates were also split by treatment using the EofA "Multiple Classes Module" and the eight (8) distinct strata identified. G-values differed between treatment and control turbines during the time periods in which cut-in speeds were raised (July 2, August, and September 1 sub-seasons; see Table 2-5) due to differences in minimization during those periods. DWPs for this analysis were calculated using arrival and minimization weights specific to the treatment vs. control strategy (see Appendix B). Results are summarized in Table 3-19.

Table 3-19. Summary of EofA outputs for gray bats and tricolored bats from 2024 post-construction monitoring at the North Fork Ridge Wind Project. Analysis done with α=0.8.

	Control Turbines			Treatment Turbines		
Species	**Number of detected fatalities (X)**	**Annual Take Estimate (M_{2024})**	**Annual Take Rate (λ) (95% CI)**	**Number of detected fatalities (X)**	**Annual Take Estimate (M_{2024})**	**Annual Take Rate (λ) (95% CI)**
Gray Bat	0	3	2.53 (0.00246, 12.7)	0	3	2.59 (0.00256, 13.01)
Tricolored Bat	7	47	37.9 (15.8, 69.61)	0	3	2.59 (0.00256, 13.01)

3.3.6 Acoustic Monitoring

3.3.6.1 2021 – 2024 Monitoring

Detailed results of the acoustic monitoring from 2021 – 2024 are available in the 2023 annual report (Stantec 2024) and 2024 annual report (Stantec 2025). Where relevant, this report includes results from 2022 – 2024 for comparison to 2025 results to provide a comprehensive analysis of acoustic bat activity as it relates to exposure and bat fatality.

3.3.6.2 2025 Monitoring

Acoustic bat detectors were deployed at the same turbines as were monitored during previous monitoring periods. Detector installation on 15 turbine nacelles began on February 25, 2025, and most detectors were in place by March 8. The detector monitoring Turbine 044 was deployed on August 25 due to a mechanical issue with the turbine that caused a delay in installation. Detectors were demobilized on November 24, 2025. Acoustic detectors recorded a total of 14,089 bat passes during 2,915 successful detector-nights (79% of nights when detectors were deployed). Nacelle-mounted detectors recorded 4.8 bat passes per detector-night during the 2025 monitoring period (Table 3-20).

Table 3-20. Acoustic survey effort at the North Fork Ridge Wind Project from February through November 2025.

Treatment	Turbine and Position	Installation Date	Demobilization Date	Functional Detector Nights (DN)	#Passes, Species of Interest		Total Bat Passes	Overall Rate (bat passes/DN)
					Gray Bat	Tricolored Bat		
Control	Turbine 009 Nacelle	8-Mar	24-Nov	256	1	0	741	2.9
	Turbine 013 Nacelle	8-Mar	24-Nov	39	0	0	44	1.1
	Turbine 024 Nacelle	8-Mar	24-Nov	211	5	2	841	4.0
	Turbine 041 Nacelle	10-Apr	24-Nov	226	6	3	876	3.9
	Turbine 044 Nacelle	25-Aug	24-Nov	91	1	1	380	4.2
	Turbine 058 Nacelle	8-Mar	24-Nov	96	0	0	159	1.7
	Turbine 084 Nacelle	10-Apr	24-Nov	226	0	5	1,748	7.7
	Total			*1,145*	*13*	*11*	*4,789*	*4.2*
EP1	Turbine 017 Nacelle	8-Mar	24-Nov	259	2	0	629	2.4
	Turbine 032 Nacelle	8-Mar	24-Nov	175	4	1	588	3.4
	Turbine 059 Nacelle	2-Mar	24-Nov	227	2	6	1,143	5.0
	Turbine 061 Nacelle	25-Feb	24-Nov	270	3	7	1,009	3.7
	Turbine 069 Nacelle	8-Mar	24-Nov	136	2	3	1,433	10.5
	Turbine 078 Nacelle	8-Mar	24-Nov	174	1	0	1,006	5.8
	Turbine 093 Nacelle	8-Mar	24-Nov	259	7	5	2,001	7.7
	Turbine 103 Nacelle	25-Feb	24-Nov	270	3	2	1,491	5.5
	Total			*1,770*	*24*	*24*	*9,300*	*5.3*
Total				**2,915**	**37**	**35**	**14,089**	**4.8**

3.3.6.3 Acoustic Results

As in previous years, acoustic bat activity at North Fork Ridge was low from March through early July and increased rapidly in mid-July, peaking in mid-August, before dropping back to low levels in mid-September (Figure 3-11). The biweekly peak in eastern red bat activity was slightly earlier than that of hoary bats, although all species were most commonly detected between August and early September (Appendix C, Figure C-2). Gray bats and tricolored bat activity peaked in a similar time of year as overall bat activity, although tricolored activity occurred slightly earlier than gray bats; these species represented less than 1% of detected passes throughout the monitoring period (Figure 3-12).

Although timing of bat activity varied among nights, overall timing of bat activity during each monitoring year peaked 2–4 hours after sunset and was consistent among years (Figure 3-13) and species (Appendix C, Figure C-4). The hourly distribution of gray bat and tricolored bat activity was more variable among years, although this is attributable to smaller sample sizes recorded for these species (Figure 3-14).

Temperature, wind speed, and turbine rotor speed data measured at nacelle height were available during 10-minute intervals in which 14,020 bat passes (99% of 14,089 total bat passes) were detected at North Fork Ridge in 2025. We used these data to measure acoustic exposure associated with the two operational treatments implemented at North Fork Ridge in 2025. Of the 4,785 bat passes with operations data recorded at control turbines in 2025, 3,562 (74%) were recorded during intervals when turbine rotor speed exceeded 1 rpm. For the curtailment treatment, 1,202 (13%) of 9,235 bat passes were exposed to turbine operation. The curtailment treatment reduced the percent of gray bat passes exposed to turbine operation from 69% to 13% and tricolored bat passes from 60% to 29% (Table 3-12).

Overall bat activity rates were higher at curtailed turbines versus control turbines in 2025, although the EP1 curtailment strategy resulted in substantially lower cumulative biweekly exposure among curtailed turbines (Table 3-21). Cumulative biweekly acoustic exposure stayed low across both treatments until early July (Figure 3-15). Bat activity increased sharply after mid-July, although the EP1 curtailment strategy maintained a low level of acoustic exposure relative to the control turbines, where exposure increased rapidly. Cumulative exposure for gray bats and tricolored bats was lower for curtailed versus control turbines at North Fork Ridge in 2025, though sample sizes were small (Figure 3-16).

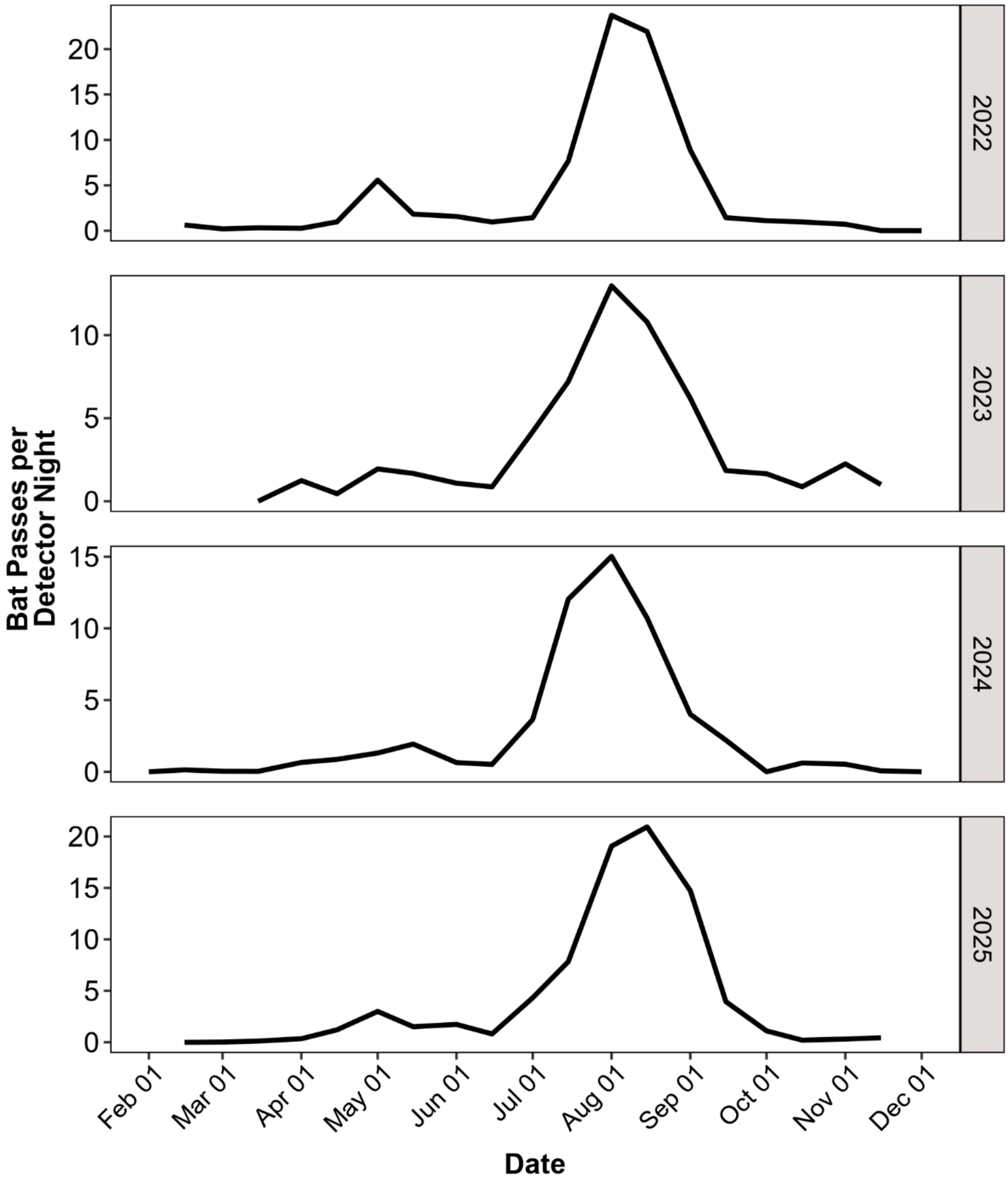

Figure 3-11. Biweekly acoustic bat activity detected at nacelle-height detectors during the 2022–2025 monitoring periods at the North Fork Ridge Wind Project.

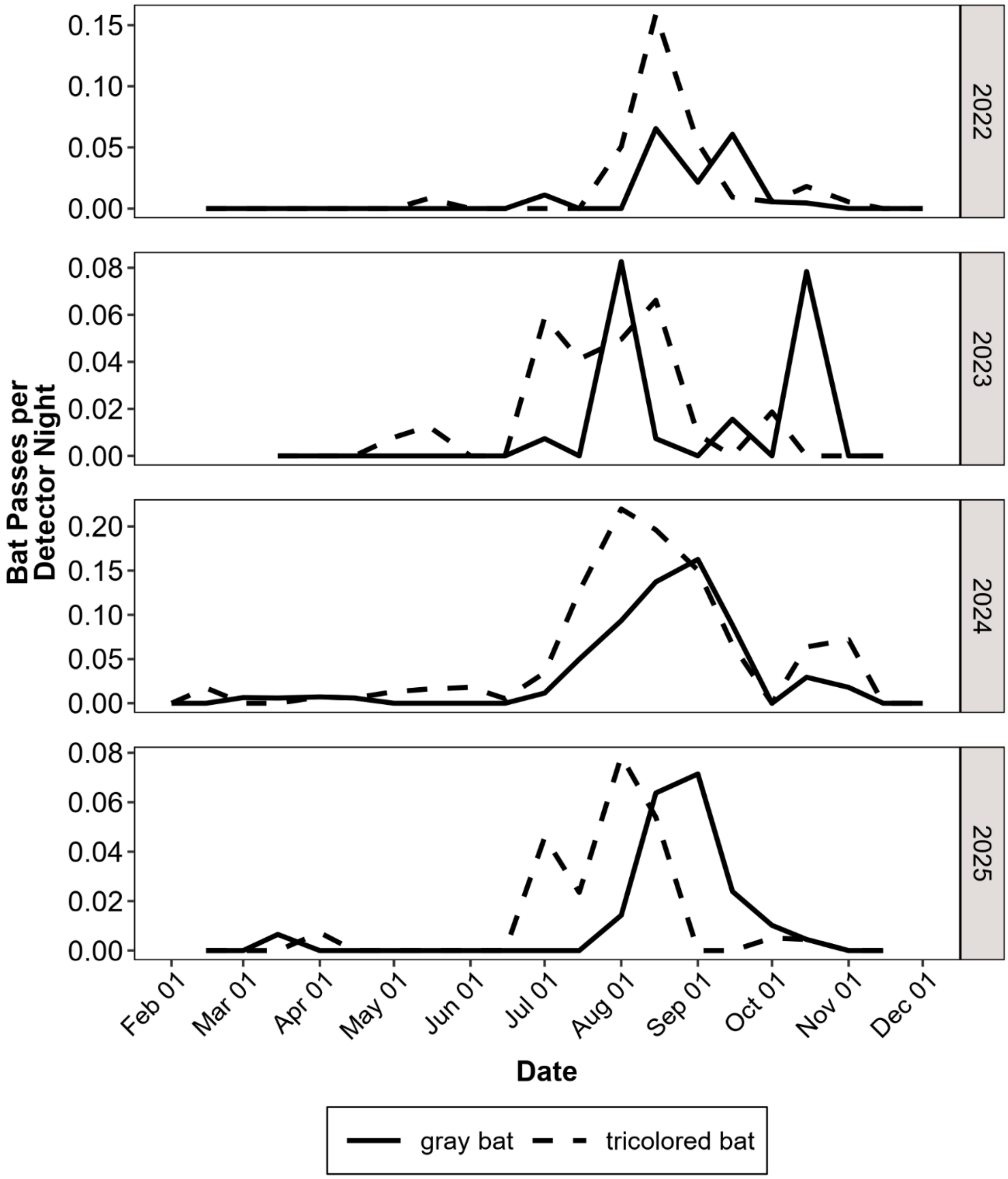

Figure 3-12. Biweekly acoustic bat activity for gray bats and tricolored bats detected at nacelle-height detectors during the 2022–2025 monitoring periods at the North Fork Ridge Wind Project.

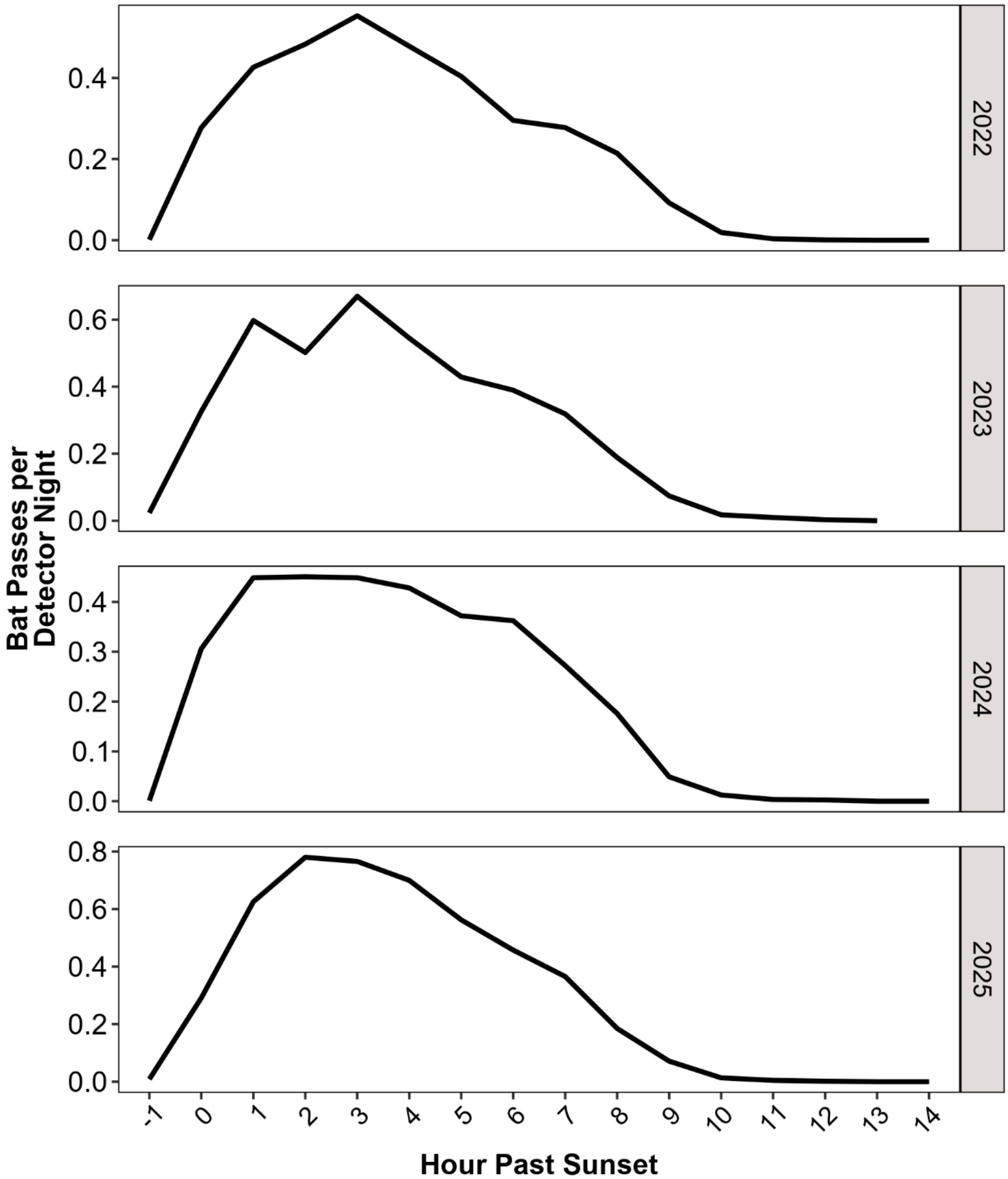

Figure 3-13. Nightly timing of bat activity (by hour past sunset) detected at nacelle detectors during the 2022–2025 monitoring periods at the North Fork Ridge Wind Project.

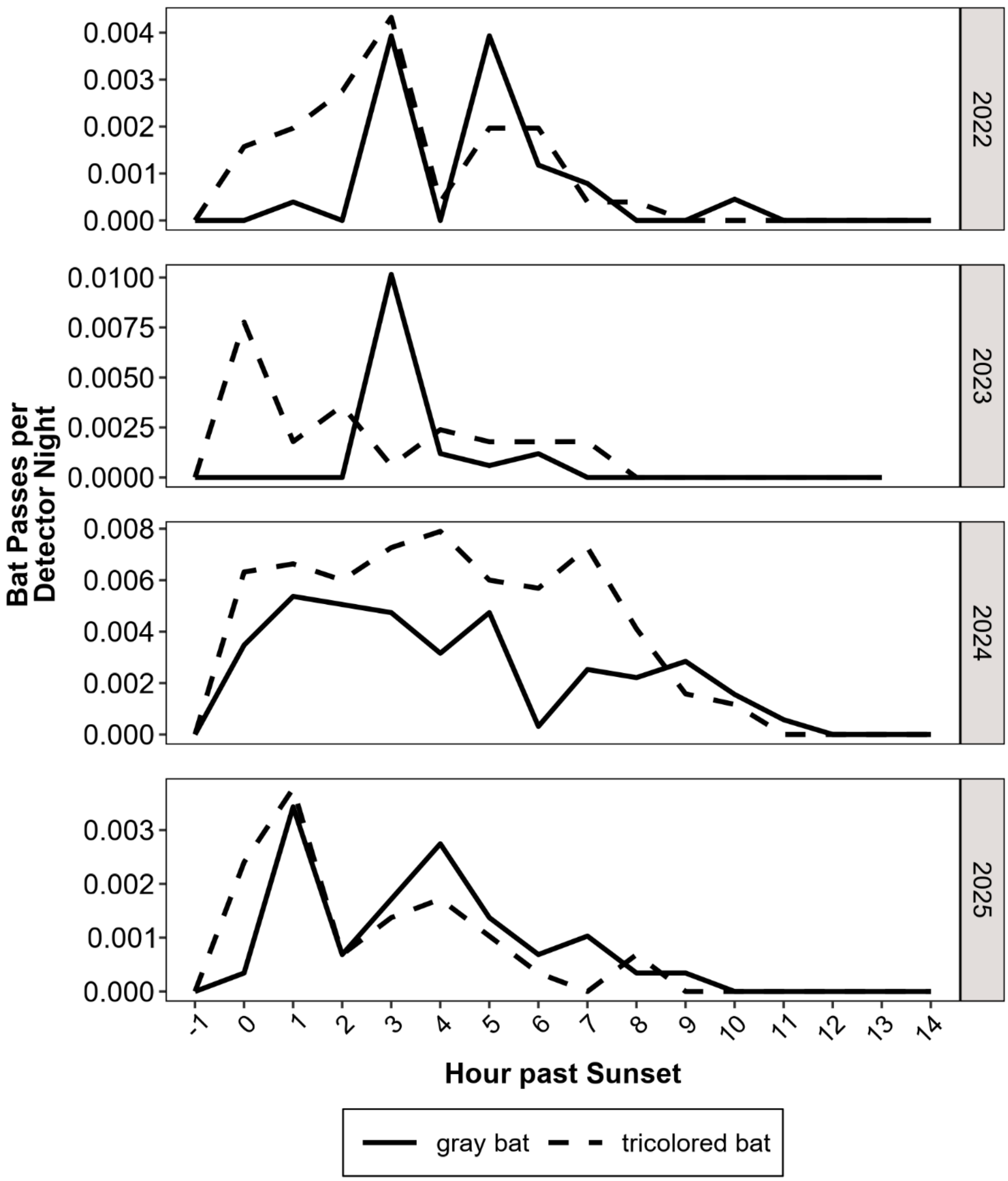

Figure 3-14. Nightly timing of gray bat and tricolored bat activity (by hour past sunset) detected at nacelle detectors during the 2022–2025 monitoring periods at the North Fork Ridge Wind Project.

Table 3-21. Acoustic exposure of gray bat, tricolored bat, and all bat passes to turbine operation (detection when turbine rotor speed > 1 rpm) associated with operational treatments implemented during the 2025 monitoring period at the North Fork Ridge Wind Project.

Year	Treatment	# Turb.	All Bats		Gray Bats		Tricolored Bats	
			Total Passes	Exposed Passes (%)	Total Passes	Exposed Passes (%)	Total Passes	Exposed Passes (%)
2025	Control	7	4,785	3,562 (74.4%)	13	9 (69.2%)	10	6 (60.0%)
2025	EP1	8	9,235	1,202 (13.0%)	24	3 (12.5%)	21	6 (28.6%)

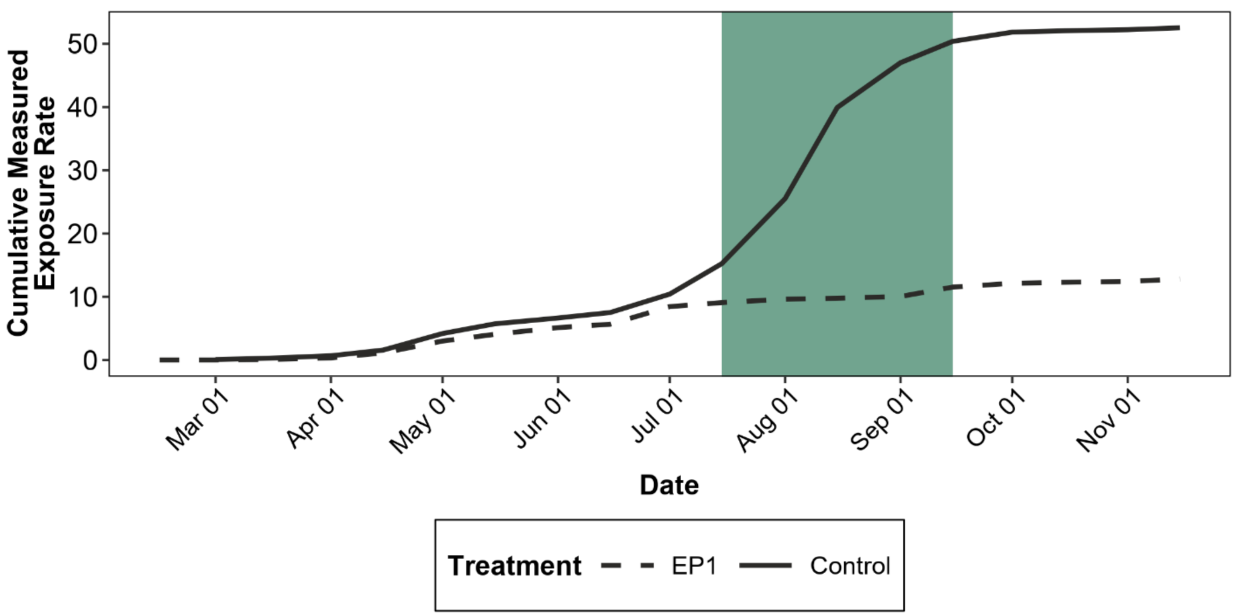

Figure 3-15. Cumulative biweekly acoustic exposure (measured) of bat activity recorded by nacelle height detectors at turbines operating with 3.0 m/s (control) and according to the 2025 curtailment strategy implemented at the North Fork Ridge Wind Project. Green shaded region indicates dates where curtailment was implemented.

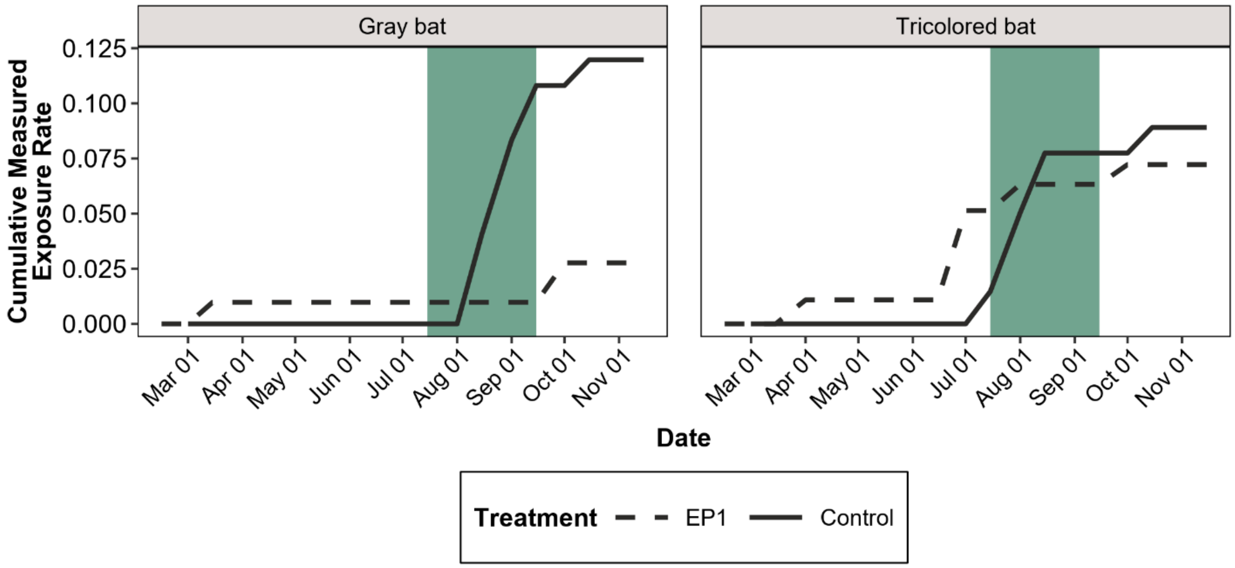

Figure 3-16. Cumulative biweekly acoustic exposure (measured) of gray bat and tricolored bat activity recorded by nacelle height detectors at turbines operating with 3.0 m/s (control) and according to the 2024 curtailment strategy implemented at the North Fork Ridge Wind Project. Green shaded region indicates dates where curtailment was implemented.

3.4 Simulated Acoustic Exposure and Curtailment Evaluation

Based on a comparison of the alignment between measured and simulated exposure, curtailment treatments were implemented as designed at Kings Point and North Fork Ridge in 2025 (Figure 3-17). As such, we were able to simulate how the control and EP1 curtailment alternatives would have affected acoustic exposure had they been applied at all turbines. This also enabled us to simulate how turbines would have operated without any curtailment (the “control” strategy involved feathering turbine blades below manufacturer’s cut-in of 3.0 m/s). We calculated the cumulative biweekly acoustic exposure for each of these strategies (uncurtailed, control, and EP1) as if they had been applied at all turbines in 2025.

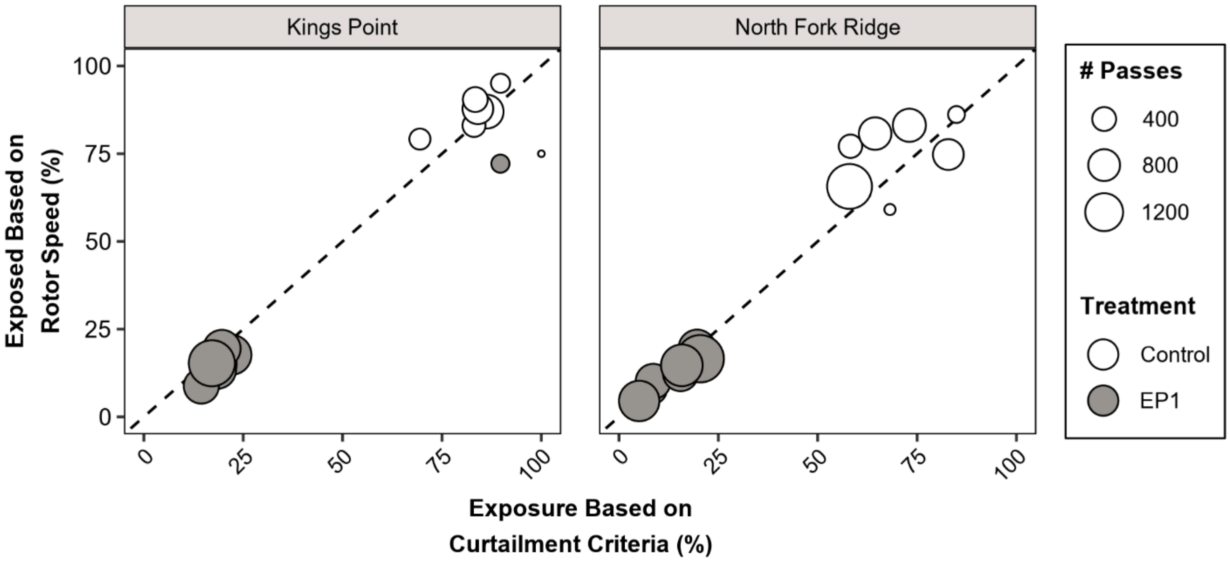

Figure 3-17. Measured versus simulated acoustic exposure calculated per turbine and treatment based on nacelle height acoustic monitoring at Kings Point and North Fork Ridge Wind Energy Projects in 2025. One turbine in the EP1 treatment at Kings Point (Turbine 026) had unusually high exposure due to an extended period of data loss when curtailment was implemented.

The EP1 curtailment strategy implemented in 2025 was designed to reduce overall acoustic exposure of bats and maintain the cumulative acoustic exposure of gray bats and tricolored bats below targeted levels outlined in the draft Habitat Conservation Plan (HCP) for the Projects. Although the HCP is not yet in effect, the proposed targets for exposure reduction for overall bat activity and cumulative exposure for Covered Species are summarized in Table 3-22. During the 2025 monitoring period, EP1 achieved 95% and 97% reductions in acoustic exposure during the curtailment period, exceeding the target ranges proposed in the HCP (Table 3-22). Cumulative biweekly exposure rates from April through October were also within the expected thresholds for all bat activity, as well as gray bat and tricolored bat activity.

Across the full 2025 monitoring period, general patterns of acoustic exposure under simulated curtailment strategies were consistent with prior years for all species (Figure 3-19), gray bats (Figure 3-20), and tricolored bats (Figure 3-21). From the start of monitoring in March through the end of November, EP1 reduced exposure for all bat activity by approximately 72% at Kings Point and 75% at North Fork Ridge, relative to control turbines.

Table 3-22. Acoustic exposure thresholds proposed in draft Habitat Conservation Plan in development for Kings Point and North Fork Ridge

Site	Metric	Species	Target	2025 Result	3-year Mean (2023 – 2025)
Kings Point	% Reduction in Cumulative Biweekly Exposure in Curtailment Period (July 18-September 14)	All Bats	85 – 89 %	95%	89%
	Cumulative biweekly rate of exposed bat passes per detector-night (April – October)	Gray Bat	0.18	0.15	0.15
		Tricolored Bat	0.16	0.15	0.11
		All Bats	22.0	14.4	19.3
North Fork Ridge	% Reduction in Cumulative Biweekly Exposure in Curtailment Period	All Bats	89 – 92 %	97%	94%
	Cumulative biweekly rate of exposed bat passes per detector-night (April – October)	Gray Bat	0.12	0.02	0.09
		Tricolored Bat	0.19	0.06	0.13
		All Bats	18.2	14.9	16.2

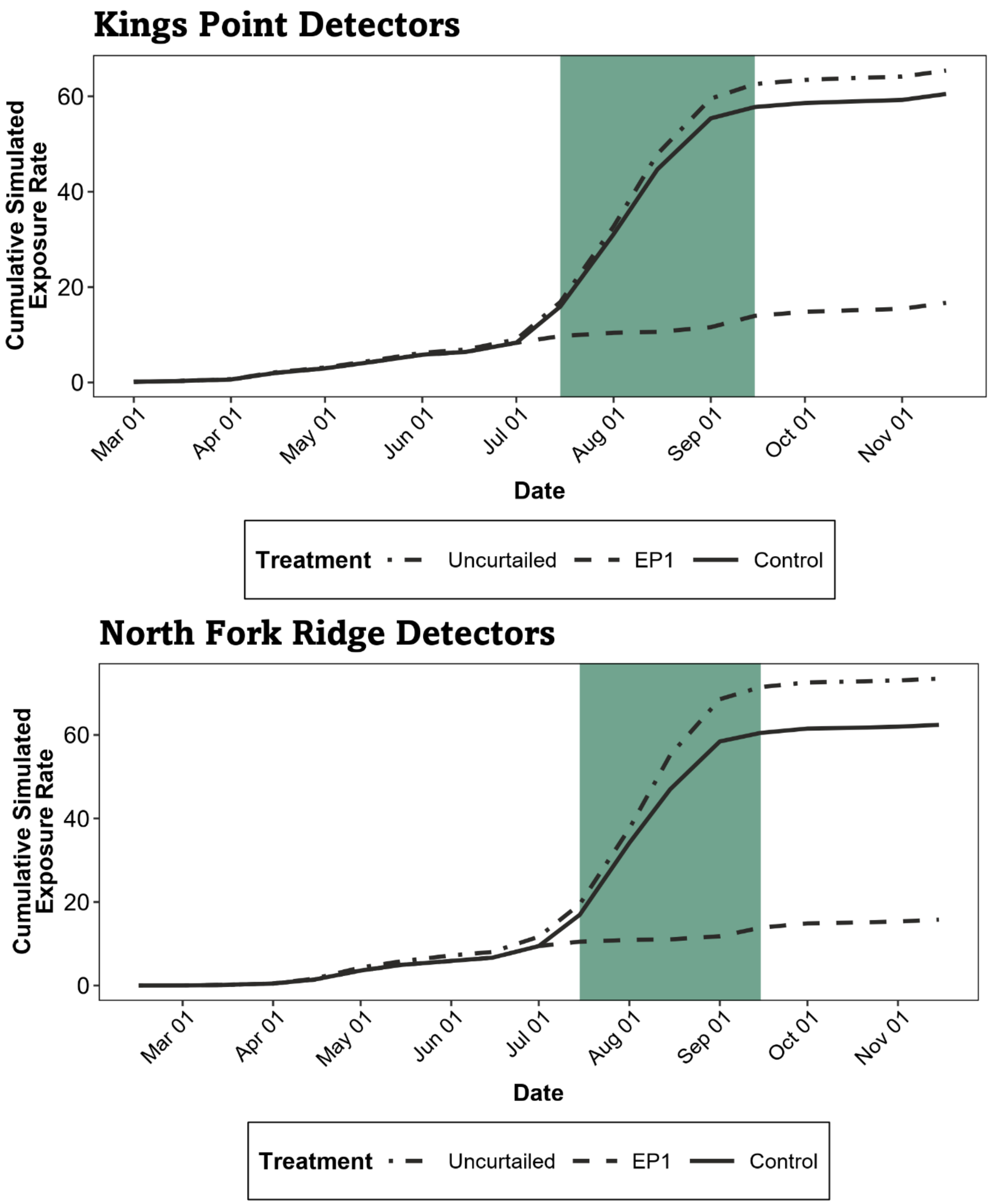

Figure 3-18. Cumulative biweekly acoustic exposure for simulated operational treatment based on nacelle height monitoring in 2025 at Kings Point and North Fork Ridge. Green shaded region indicates dates where curtailment was implemented.

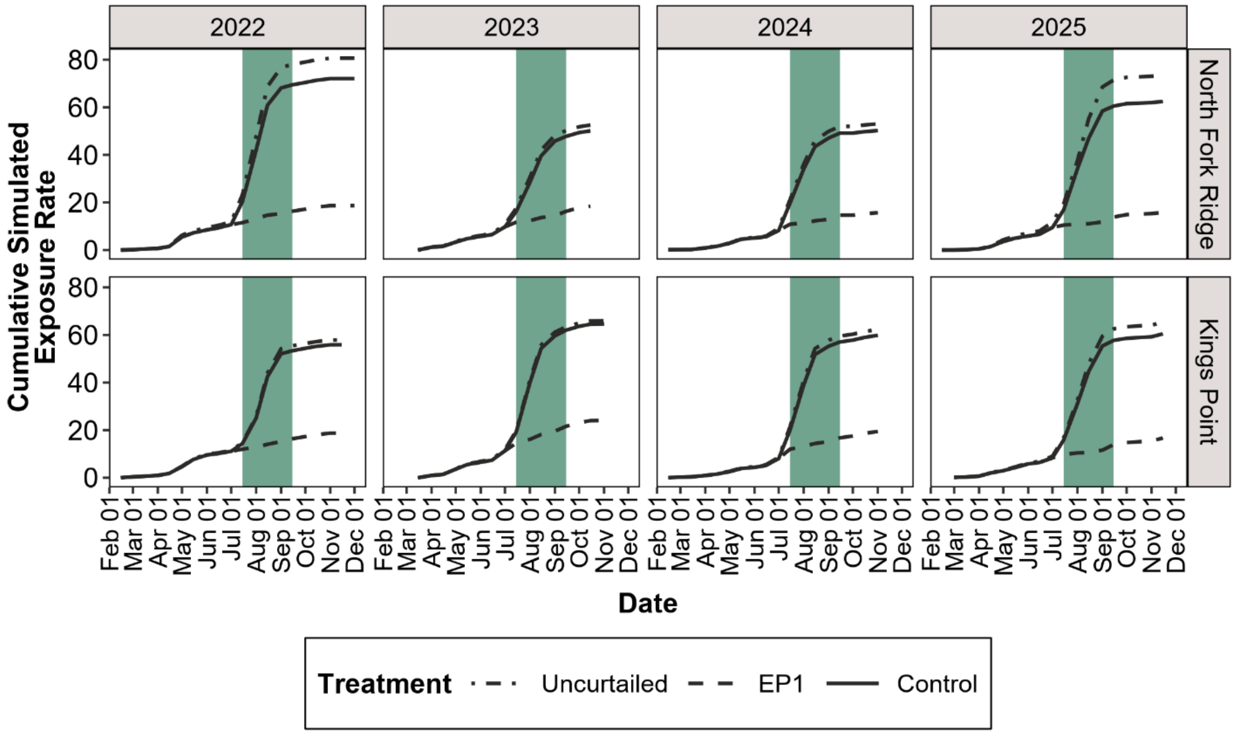

Figure 3-19. Biweekly acoustic exposure (bat passes detected when turbine rotor speed was 1 rpm or greater) for all bat species simulated by operational treatment on nacelle height monitoring in 2022–2025 at Kings Point and North Fork Ridge Wind Projects. Green shaded region indicates dates where curtailment was implemented.

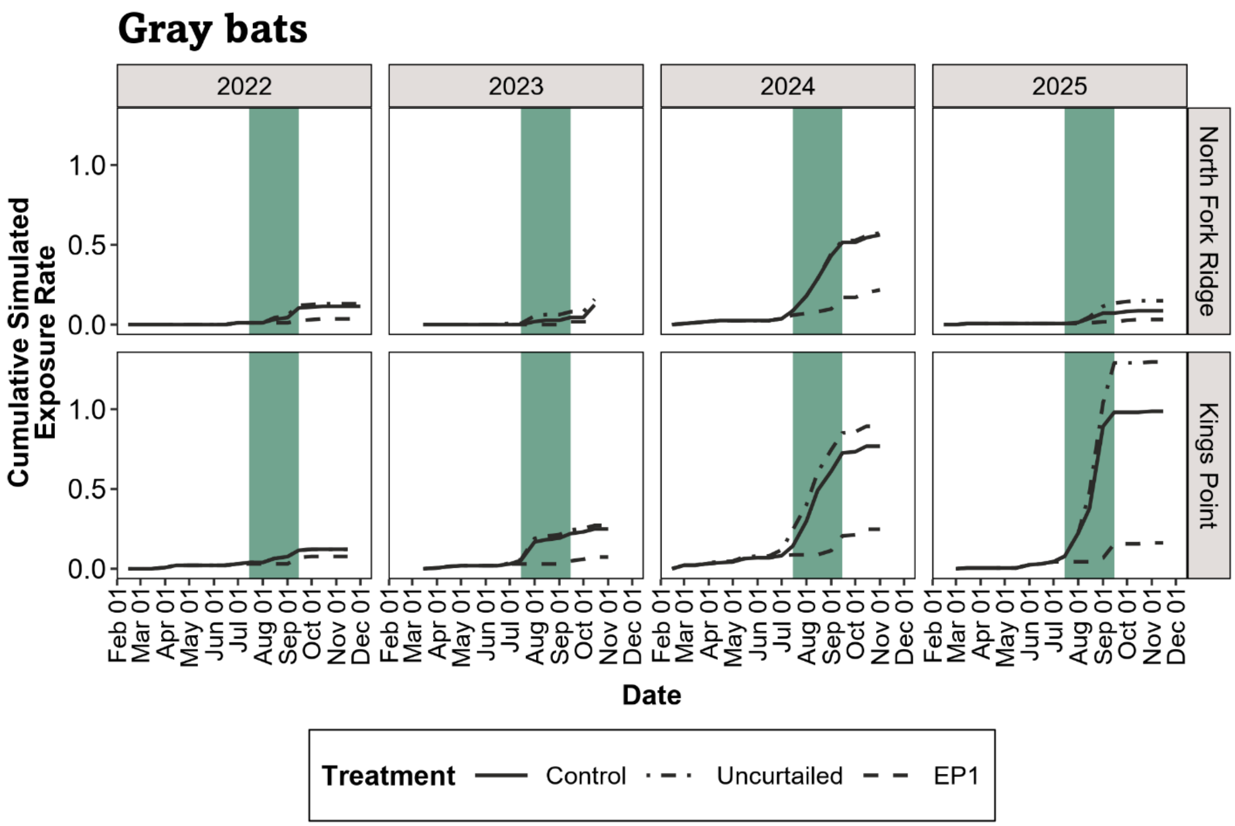

Figure 3-20. Biweekly acoustic exposure (bat passes recorded when turbine rotor speed was 1 rpm or greater) for gray bats simulated by operational treatment based on nacelle height monitoring in 2022–2025 at Kings Point and North Fork Ridge Wind Projects. Green shaded region indicates dates where curtailment was implemented.

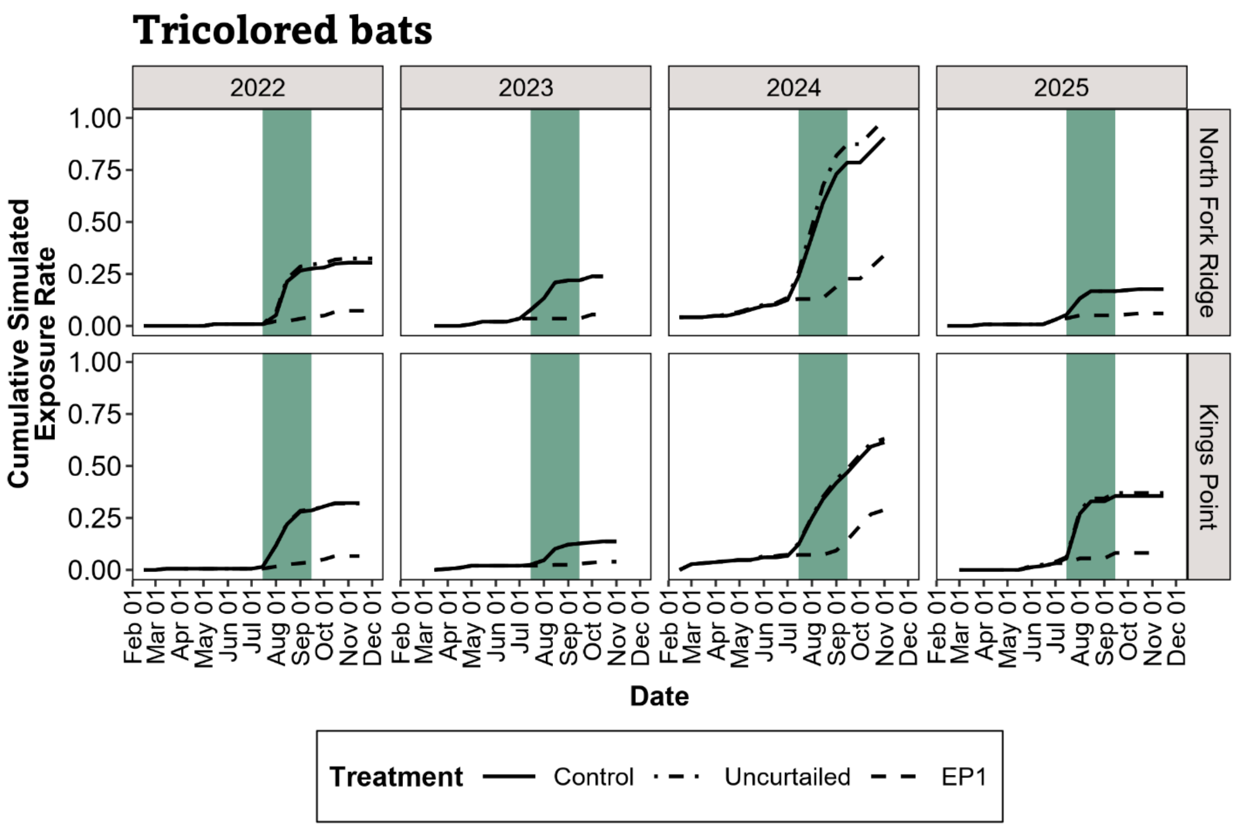

Figure 3-21. Biweekly acoustic exposure (bat passes recorded when turbine rotor speed was 1 rpm or greater) for tricolored bats simulated by operational treatment based on nacelle height monitoring in 2021–2024 at Kings Point and North Fork Ridge Wind Projects. Green shaded region indicates dates where curtailment was implemented.

4 Discussion

This report includes the results of the post-construction fatality monitoring and acoustic monitoring from 2025 as well as data from previous years, where applicable, and concludes Year 2, Phase II of the study. The study is ongoing, and additional data collected in 2026 will further evaluate the efficacy of the EP1 curtailment strategy at achieving targeted reduction in gray bat and tricolored bat acoustic exposure and associated fatalities.

The targeted reductions in fatalities for gray bats and tricolored bats were achieved at both projects using the EP1 curtailment. At Kings Point, annual fatality rates at treatment turbines for gray bats were 56.3% lower than at control turbines (20.5 gray bats/year at treatment turbines and 46.9 gray bats/year at control turbines) and 74.8% lower for tricolored bats (14.6 tricolored bats/year at treatment turbines and 58.0 tricolored bats/year at control turbines). At North Fork Ridge, annual fatality rates at treatment and control turbines for gray bats were the same (2.59 gray bats/year at treatment turbines and 2.53 gray bats/year at control turbines) and annual fatality rates at treatment turbines were 93.2% lower for tricolored bats than at control turbines (2.59 tricolored bats/year at treatment turbines and 37.9 tricolored bats/year at control turbines).

4.1 Turbine-Related Fatality Rates for Gray bats

Annual turbine-related gray bat fatality rates have varied by year and by Project and ranged from 2.5 gray bats at North Fork Ridge in 2025 to 65.1 gray bats at Kings Point in 2025 (Table 4-1). Annual gray bat take rates have been 2-5 times higher at Kings Point compared to North Fork Ridge during Phase 1 of the study, but the difference between the Project's median annual fatality rates was least pronounced in 2023.

Table 4-1. Summary of turbine-related gray bat fatality rates from 2021 - 2025 at Kings Point Wind Project and North Fork Ridge Wind Project.

Project	Year	Curtailment Regime Implemented	Annual Take Rate
Kings Point	2021	8 m/s, 5 m/s, 3 m/s	38.6 (11.40 – 82.62)
	2022	5 m/s, 3 m/s	45.7 (15.2 – 94.72)
	2023	5 m/s, 3 m/s	44.6 (24.6 – 70.54)
	2024	10 m/s, 7.5 m/s, 3.0 m/s	53.4 (27.9 – 87.1)
	2025	9.0 m/s, 10.0 m/s, 3.0 m/s	65.1 (32.8 – 109)
North Fork Ridge	2021	8.0 m/s, 5.0 m/s, 3.0 m /s	7.66 (0.01 – 38.88)
	2022	5.0 m/s, 3.0 m /s	10.6 (0.755 – 33.4)
	2023	5.0 m/s, 3.0 m/s	17.2 (5.98 – 37.41)
	2024	10.0 m/s, 7.5 m/s, 6.5 m/s, 3.0 m/s	6.5 (0.5 – 20.3)

Project	Year	Curtailment Regime Implemented	Annual Take Rate
	2025	9.0 m/s, 10.0 m/s, 3.0 m/s	2.5 (0.003 – 12.8)

4.2 Curtailment Evaluation

Acoustic detectors deployed at Kings Point and North Fork Ridge provided quantitative feedback on the effectiveness of the curtailment strategy implemented at the Projects during the 2025 monitoring period. The EP1 curtailment strategy implemented in 2025 successfully reduced the cumulative acoustic exposure of all bats by targeted levels within the curtailment period and maintained acoustic exposure for gray bats and tricolored bats below targeted levels outlined in the draft Habitat Conservation Plan (HCP) being developed for the Projects. These reductions exceeded the target ranges proposed in the draft Habitat Conservation Plan. Cumulative exposure rates from April through October for all bat activity, as well as gray bat and tricolored bat activity, remained below thresholds that would trigger further review under adaptive management.

As in previous years, activity of all bats in 2025, including gray bats and tricolored bats, occurred primarily between mid-July and early September, with very little bat passes detected outside this period. The cut-in speed applied within the curtailment period, which ranged from 9 – 10.5 m/s, was high and encompassed well over 90% of bat passes within the curtailment period. In 2025 and in previous years, the July 18 – September 14 curtailment period adequately encompassed the majority of bat passes, overall and for target species. If the seasonality of bat activity shifts during subsequent years, the start and end dates of the curtailment period could be adjusted accordingly, in which case the cut-in speeds within the curtailment period could be reevaluated.

5 References

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Appendix A Figures

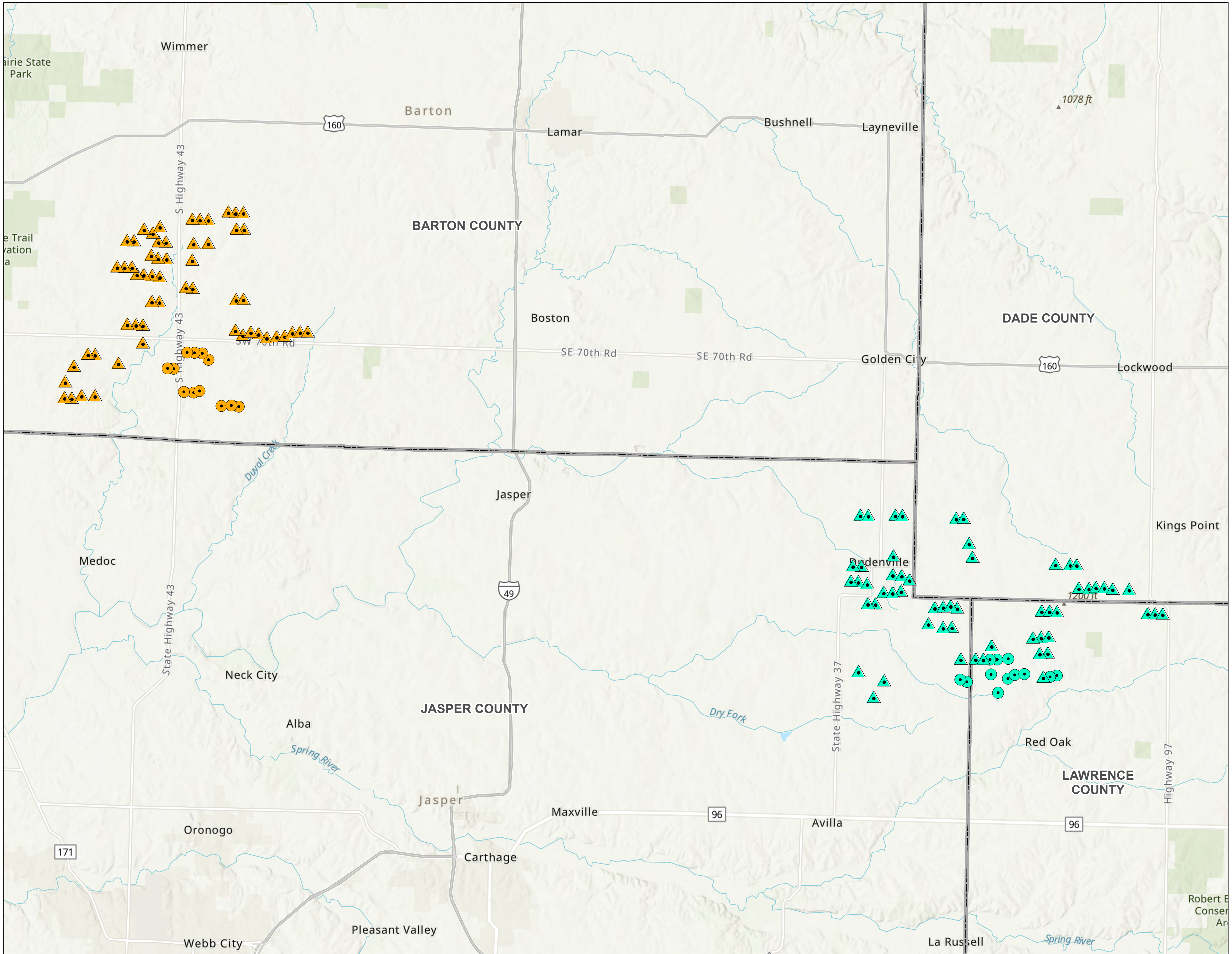


Figure No.

A-1

Title

Kings Point and North Fork Ridge Wind Project Locations

Client/Project 193708398

Empire District – Liberty Utilities Central
Kings Point Wind Project
North Fork Ridge Wind Project

Project Location
Barton, Dade, Jasper, and Lawrence Co., MO

Prepared by SP on 2022-01-27
TR by RA on 2022-01-28
IR by JF on 2022-01-28

N

0 1.5 3 Miles

(At original document size of 11x17)
1:190,080

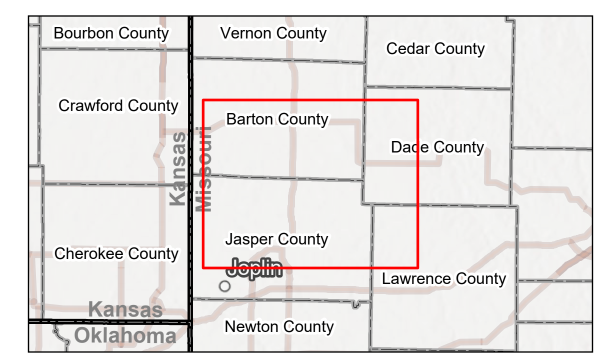
Legend

Kings Point Wind Turbine

- Vestas 110 2.0 MW
- Vestas 120 2.2 MW

North Fork Ridge Wind Turbine

- Vestas 110 2.0 MW
- Vestas 120 2.2 MW



Notes
1. Coordinate System: NAD 1983 StatePlane Missouri West FIPS 2403 Feet
2. Data Sources: Empire, Stantec, Esri, NADS
3. Background: Esri Topographic

Stantec

Figure No.
A-2

DRAFT

Title
Post Construction Fatality Monitoring Turbine Plot Type - 2025

Client/Project 193708398
Empire District - Liberty Utilities Central
Kings Point Wind Project

Project Location
Barton, Dade, Jasper, and Lawrence Co., MO

Prepared by SP on 2025-06-12
TR by SR on 2025-06-12
IR by XX on 2025-XX-XX

N

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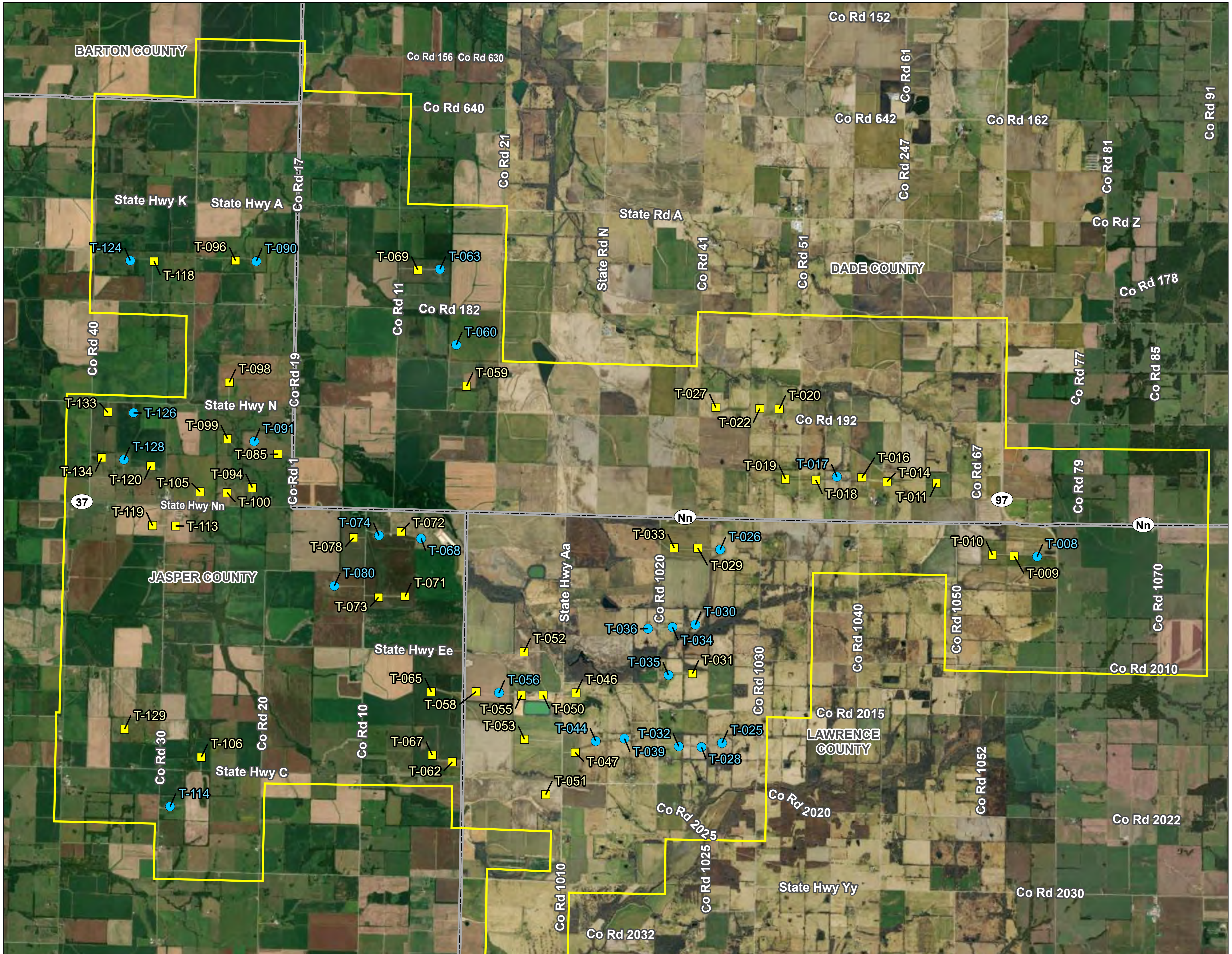
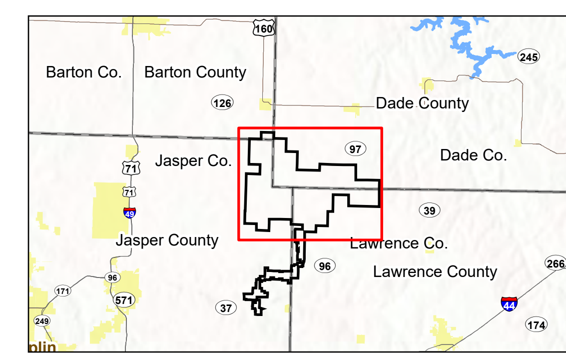
(At original document size of 11x17)
1:63,360

Legend
Project Boundary
Turbine
80-m Cleared Plot
Road and Pad





Notes
1. Coordinate System: NAD 1983 StatePlane Missouri West FIPS 2403 Feet
2. Data Sources: Empire, Stantec, Esri, USCB
3. Background: 2023 NAIP

Stantec

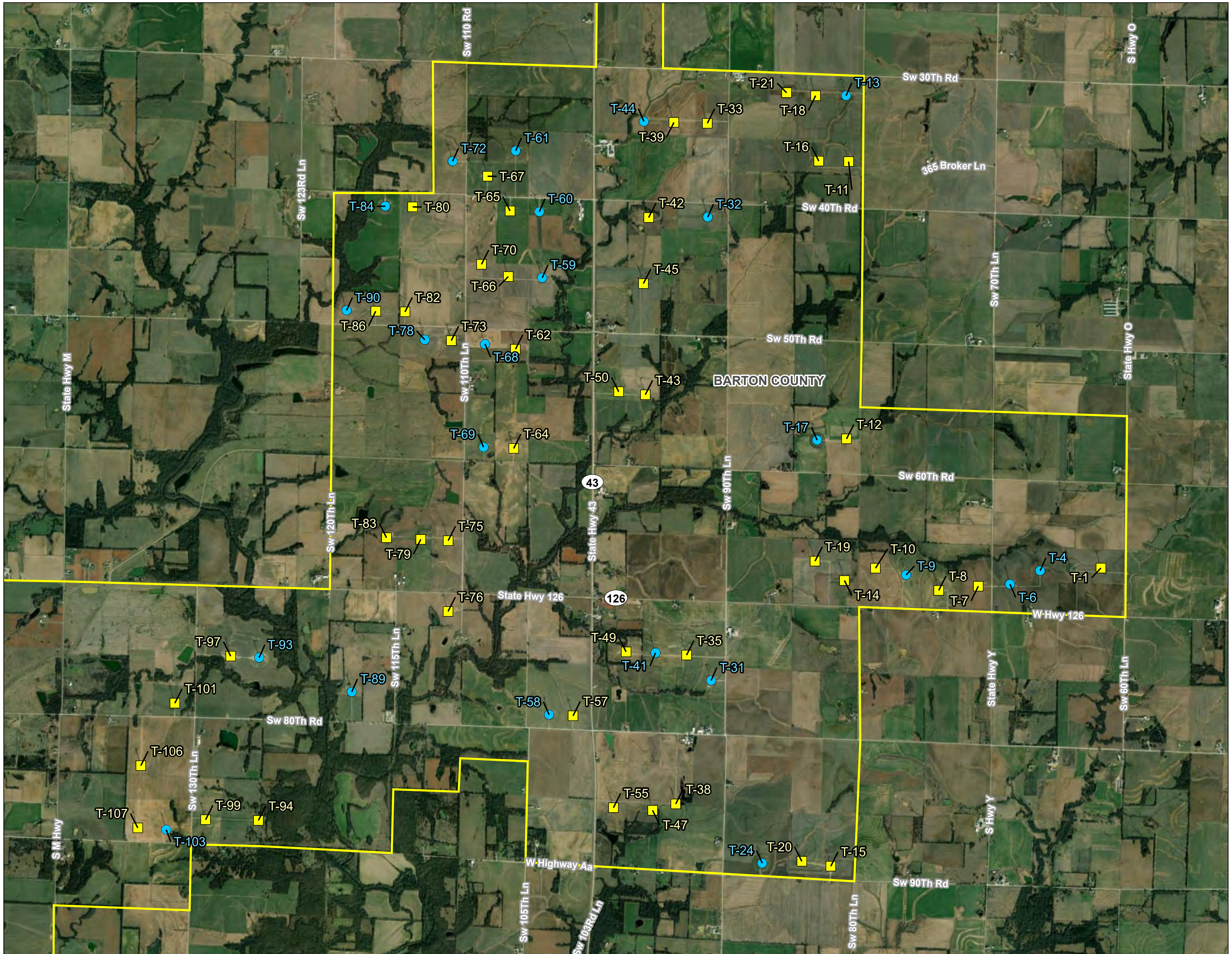


Figure No.
A-3

DRAFT

Title
Post Construction Fatality Monitoring Turbine Plot Type - 2025

Client/Project 193710448
Empire District - Liberty Utilities Central
North Fork Ridge Wind Project

Project Location
Barton and Jasper Co., MO

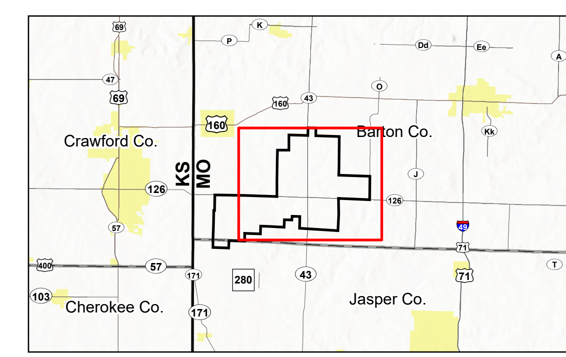
Prepared by SP on 2025-06-12
TR by SR on 2025-06-12
IR by XX on 2025-XX-XX

N

0 2,000 4,000 US Feet
(At original document size of 11x17)
1:48,000

Legend
- Project Boundary

Turbine
- 80-m Cleared Plot
- Road and Pad



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3. Background: 2023 NAIP

Stantec

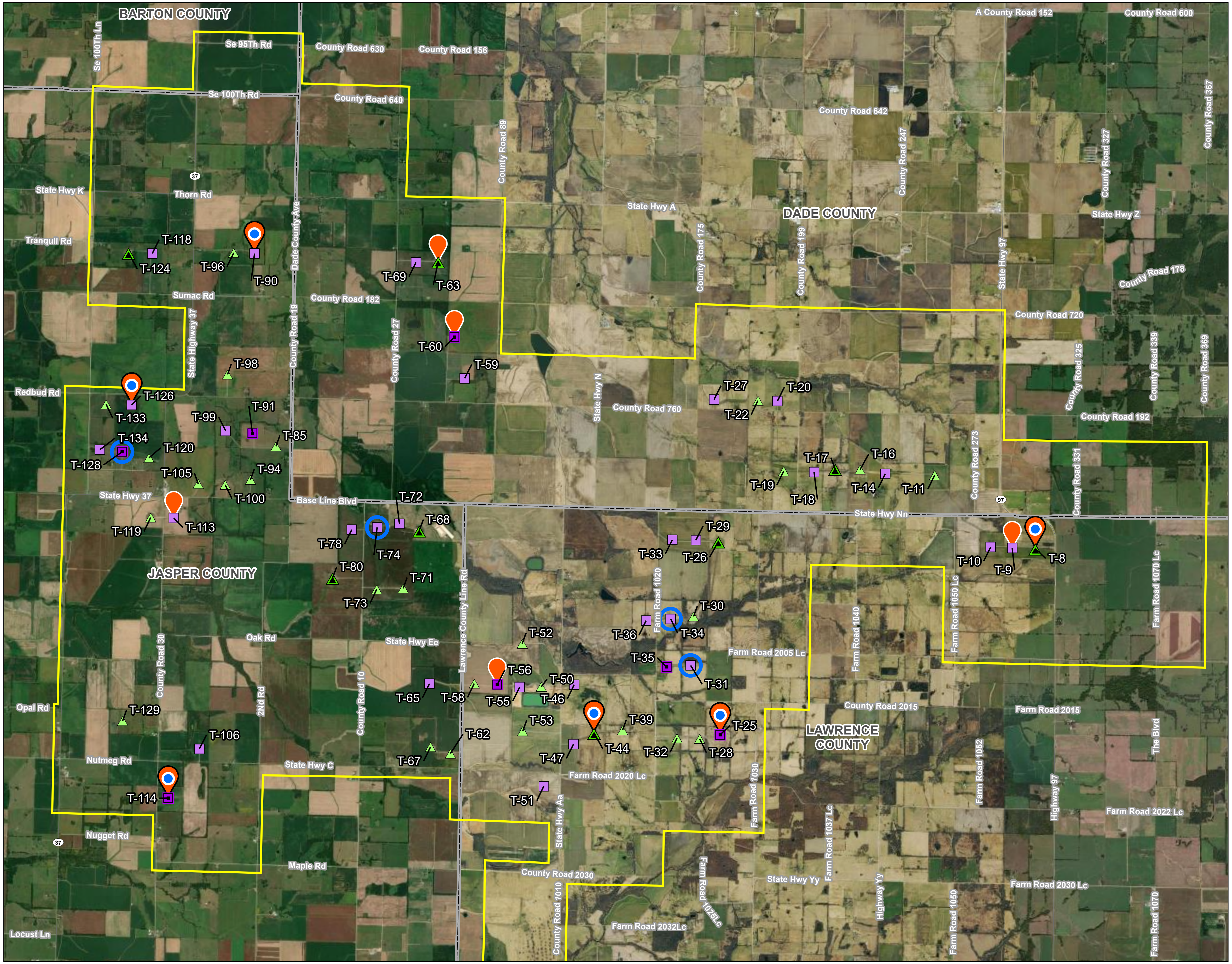


Figure No.
A-4

DRAFT

Title
Kings Point Turbine Curtailment - 2025 Gray Bat and Tricolored Bat Carcass Observations

Client/Project 227707876
Empire District - Liberty Utilities Central
Kings Point Wind Project

Project Location
Barton, Dade, Jasper, and Lawrence Co., MO

Prepared by SP on 2026-01-26
TR by JS on 2026-01-27
IR by XX on 2026-XX-XX

N

0 0.5 1 Miles
(At original document size of 11x17)
1:63,360

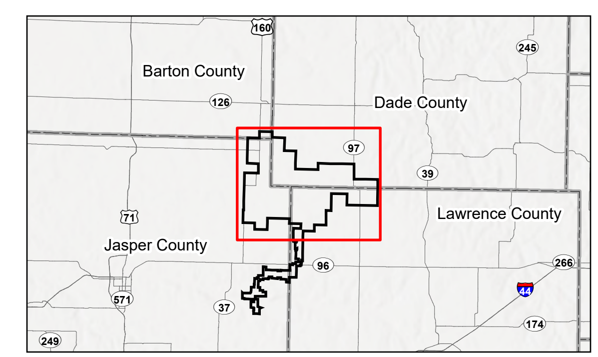
Legend

- Project Boundary

Turbine

Detector Type and Cut in Speed

- No Bat Detector - Control Cut-in Speed (3m/s)
- Nacelle-mounted - Control Cut-in Speed (3m/s)
- No Bat Detector - Treatment Cut-in Speed (EP1)
- Nacelle-mounted - Treatment Cut-in Speed (EP1)
- Gray Bat Carcass Observed
- Tricolored Bat Carcass Observed
- Gray Bat and Tricolored Bat Carcass Observed



Notes
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2. Data Sources: Empire, Stantec, Esri, NADS
3. Background: 2023 NAIP

Stantec

Figure No.
A-5

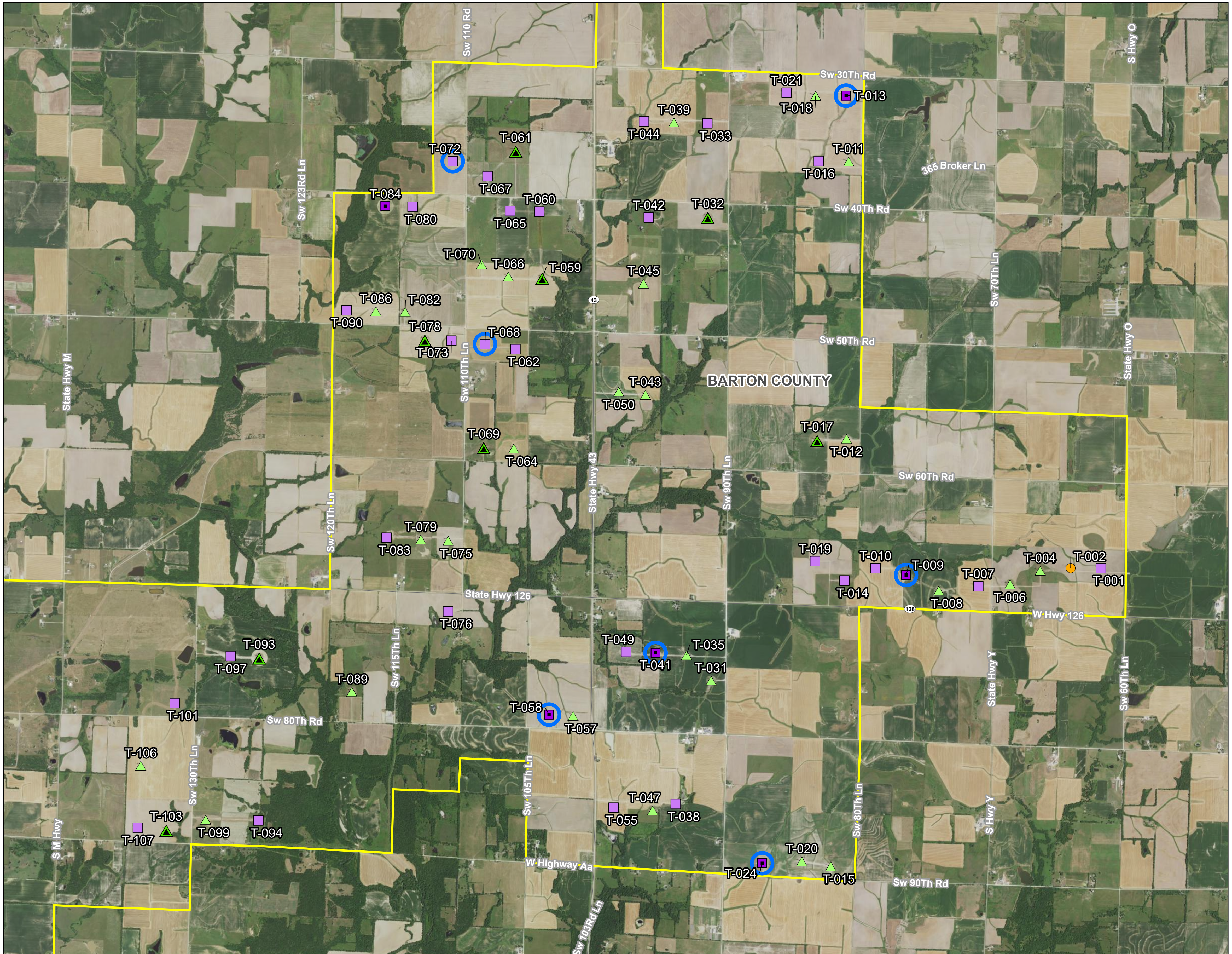
DRAFT

Title
North Fork Ridge Turbine Curtailment - 2025 Tricolored Bat Carcass Observations

Client/Project 227707875
Empire District - Liberty Utilities Central
North Fork Ridge Wind Project

Project Location
Barton and Jasper Co., MO

Prepared by SP on 2026-01-26
TR by JS on 2026-01-27
IR by XX on 2026-XX-XX

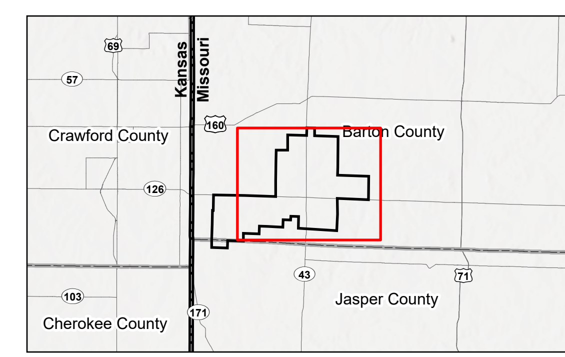


N

0 2,000 4,000 US Feet
(At original document size of 11x17)
1:48,000

Legend
- Project Boundary

Turbine
Detector Type and Cut in Speed
- No Bat Detector - No Searches (Turbine Non-Operational)
- No Bat Detector - Control Cut-in Speed (3m/s)
- Nacelle-mounted - Control Cut-in Speed (3m/s)
- No Bat Detector - Treatment Cut-in Speed (EP1)
- Nacelle-mounted - Treatment Cut-in Speed (EP1)
- Tricolored Bat Carcass Observed



Notes
1. Coordinate System: NAD 1983 StatePlane Missouri West FIPS 2403 Feet
2. Data Sources: Empire, Stantec, Esri, NADS
3. Background: 2023 NAIP

Stantec

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Appendix B GenEst and EofA Model Results

Table B-1. Model comparison results for searcher efficiency trials conducted 2025 at the Kings Point and North Fork Ridge Wind Projects. Selected model shown in bold.

p Formula	k Formula	AICc	deltaAICc
p ~ Plottype	**k fixed at 0.67**	**282.29**	**0**
p ~ Plottype + Season	k fixed at 0.67	282.48	0.19
p ~ constant	k fixed at 0.67	311.57	29.28
p ~ Season	k fixed at 0.67	313.66	31.37

Table B-2. Model comparison results for carcass persistence trials conducted in 2025 at the Kings Point Wind Project. Selected model is shown in bold.

Distribution	Location Formula	Scale Formula	AICc	deltaAICc
weibull	**l ~ Season**	**s ~ Season**	**363.08**	**0**
weibull	l ~ Season	s ~ Season + plot_type	363.32	0.24
weibull	l ~ Season	s ~ constant	364.07	0.99
weibull	l ~ Season + plot_type	s ~ constant	364.5	1.42
weibull	l ~ Season + plot_type	s ~ Season	364.57	1.49
lognormal	l ~ Season	s ~ Season + plot_type	366.05	2.97
lognormal	l ~ Season	s ~ Season	366.2	3.12
weibull	l ~ Season + plot_type	s ~ Season + plot_type	367.2	4.12
weibull	l ~ Season + plot_type	s ~ plot_type	367.41	4.33
loglogistic	l ~ Season	s ~ Season	367.99	4.91
loglogistic	l ~ Season	s ~ Season + plot_type	368.2	5.12

Table B-3. Model comparison results for carcass persistence trials conducted in 2025 at the North Fork Ridge Wind Project. Selected model is shown in bold.

Distribution	Location Formula	Scale Formula	AICc	deltaAICc
loglogistic	**l ~ constant**	**s ~ constant**	**409.01**	**0**
loglogistic	l ~ plot_type	s ~ constant	409.29	0.28
loglogistic	l ~ Season + plot_type	s ~ constant	409.5	0.49
loglogistic	l ~ Season	s ~ constant	410.12	1.11
lognormal	l ~ constant	s ~ constant	410.15	1.14
loglogistic	l ~ constant	s ~ Season	410.45	1.44
loglogistic	l ~ Season + plot_type	s ~ Season	410.97	1.96
lognormal	l ~ plot_type	s ~ constant	411.06	2.05
lognormal	l ~ constant	s ~ Season	411.66	2.65
lognormal	l ~ Season + plot_type	s ~ constant	411.98	2.97
lognormal	l ~ Season	s ~ constant	412.26	3.25

KINGS POINT

Strata Multiple Classes Inputs

Table 1. Inputs for EofA multiple classes model run to combine detection probabilities across strata at the Kings Point Wind Project

strata	Plot Type	turbine operation	# of Turbines	% of turbines	Search Interval (days)	Average # of Searches	Average area correction	DWP	Searcher Efficiency		Carcass Persistence			
									Carcasses Available	Carcasses Found	Distribution	Shape (α)	Scale (β)	β CI (95%)
spring	full_human	normal	24	0.348	7	9	0.95	0.330	24	14	weibull	0.68595	13.525	7.629, 23.98
	RP	normal	45	0.652	7	9	0.05	0.033	70	69	weibull	0.68595	13.525	7.629, 23.98
	unsearched							0.637						
June	RP	normal	45	0.652	3.75	8	0.05	0.033	70	69	lognormal	6.509	1.33	0.193, 2.466
	full_dogs	normal	24	0.348	3.75	8	0.95	0.330	203	150	lognormal	6.509	1.33	0.193, 2.466
	unsearched							0.637						
July 1	RP	normal	45	0.652	3.75	5	0.05	0.033	70	69	lognormal	6.509	1.33	0.193, 2.466
	full_dogs	normal	24	0.348	3.75	5	0.95	0.330	203	150	lognormal	6.509	1.33	0.193, 2.466
	unsearched							0.637						
July 2 normal	RP	normal	23	0.657	3.75	4	0.05	0.033	70	69	lognormal	6.509	1.33	0.193, 2.466
	full_dogs	normal	12	0.343	3.75	4	0.95	0.326	203	150	lognormal	6.509	1.33	0.193, 2.466
	unsearched							0.641						
July 2 curtailed	RP	curtailed	22	0.647	3.75	4	0.046	0.030	70	69	lognormal	6.509	1.33	0.193, 2.466
	full_dogs	curtailed	12	0.353	3.75	4	0.844	0.298	203	150	lognormal	6.509	1.33	0.193, 2.466
	unsearched							0.672						
August normal	RP	normal	23	0.657	3.75	8	0.05	0.033	70	69	lognormal	6.509	1.33	0.193, 2.466
	full_dogs	normal	12	0.343	3.75	8	0.95	0.326	203	150	lognormal	6.509	1.33	0.193, 2.466
	unsearched							0.641						
August curtailed	RP	curtailed	22	0.647	3.75	8	0.046	0.030	70	69	lognormal	6.509	1.33	0.193, 2.466
	full_dogs	curtailed	12	0.353	3.75	8	0.844	0.298	203	150	lognormal	6.509	1.33	0.193, 2.466
	unsearched							0.672						
September 1 normal	RP	normal	23	0.657	3.75	5	0.05	0.033	70	69	exponential	0.49564	2.01760	1.339, 3.041
	full_dogs	normal	12	0.343	3.75	5	0.95	0.326	203	150	exponential	0.49564	2.01760	1.339, 3.041
	unsearched							0.641						
September 1 curtailed	RP	curtailed	22	0.647	3.75	5	0.046	0.030	70	69	exponential	0.49564	2.01760	1.339, 3.041
	full_dogs	curtailed	12	0.353	3.75	5	0.844	0.298	203	150	exponential	0.49564	2.01760	1.339, 3.041
	unsearched							0.672						

strata	Plot Type	turbine operation	# of Turbines	% of turbines	Search Interval (days)	Average # of Searches	Average area correction	DWP	Searcher Efficiency		Carcass Persistence			
									Carcasses Available	Carcasses Found	Distribution	Shape (α)	Scale (β)	β CI (95%)
September 2	RP	normal	45	0.652	3.75	3	0.05	0.033	70	69	exponential	0.49564	2.01760	1.339, 3.041
	full_dogs	normal	24	0.348	3.75	3	0.95	0.330	203	150	exponential	0.49564	2.01760	1.339, 3.041
	unsearched							0.637						
October	full_dogs	normal	45	0.652	3.75	9	0.05	0.033	203	150	exponential	0.49564	2.01760	1.339, 3.041
	RP	normal	24	0.348	3.75	9	0.95	0.330	70	69	exponential	0.49564	2.01760	1.339, 3.041
	unsearched							0.637						

Strata Multiple Classes Weights

Table 2. Weights for the EofA multiple classes model to combine detection probabilities across strata at the Kings Point Wind Project

Strata	Turbine Operations	Sampling Weight	Minimization Weight	DWP
July 2 Normal	Normal	0.51	0.94	0.59
July 2 Curtailed	Curtailed	0.49	0.68	0.41
August Normal	Normal	0.51	0.89	0.80
August Curtailed	Curtailed	0.49	0.23	0.20
September 1 Normal	Normal	0.51	0.89	0.61
September 1 Curtailed	Curtailed	0.49	0.58	0.39

Strata Multiple Classes Inputs

Table 3. Data inputs for EofA multiple classes model to combine detection probabilities across strata at the Kings Point Wind Project

Strata	Turbine Operations	DWP	Ba	Bb	g-hat (95% CI)
July 2 Normal	Normal	0.59	51.1132	215.7087	0.192 (0.15-0.24)
July 2 Curtailed	Curtailed	0.41	53.6623	252.8779	0.175(0.14-0.22)
August Normal	Normal	0.80	52.1935	212.9714	0.197(0.15-0.25)
August Curtailed	Curtailed	0.20	51.2606	233.4002	0.18 (0.14-0.23)
September 1 Normal	Normal	0.61	54.7014	375.8129	0.127 (0.10-0.16)
September 1 Curtailed	Curtailed	0.39	56.8998	434.4522	0.116 (0.09-0.15)

Sub-season Multiple Classes Weights

Table 4. Weights for the EofA multiple classes model to combine detection probabilities across sub-seasons at the Kings Point Wind Project

Sub-season	Season	Minimization Weight	Arrival proportion	DWP
Spring (April - May)	Spring	0.88	0.066	1
June	Summer	0.91	0.035	0.065
July 1		0.81	0.184	0.303
July 2		0.81	0.152	0.250
August		0.56	0.336	0.383
September 1	Fall	0.73	0.06	0.31
September 2		0.73	0.06	0.31
October		0.91	0.059	0.38

Sub-season Multiple Classes Inputs

Table 5. Data inputs for EofA multiple classes model to combine detection probabilities across sub-seasons at the Kings Point Wind Project

Sub-season	Season	DWP	Ba	Bb	g-hat
Spring (April - May)	Spring	1	40.65	181.63	0.18 (0.14-0.24)
June	Summer	0.065	54.64	218.83	0.20 (0.16-0.25)
July 1		0.303	51.33	210.68	0.20 (0.15-0.25)
July 2		0.250	99.16	437.44	0.19 (0.15-0.22)
August		0.383	75.26	313.77	0.19 (0.16-0.23)
September 1	Fall	0.31	103.60	740.98	0.12 (0.10-0.15)
September 2		0.31	55.38	380.52	0.13 (0.10-0.16)
October		0.38	54.40	368.11	0.13 (0.10-0.16)

Season Multiple Classes Weights

Table 6. Weights for the EofA multiple classes model to combine detection probabilities across seasons at the Kings Point Wind Project

Season	Minimization Weight	Arrival proportion	DWP
Spring (April – May)	0.88	0.066	0.091
Summer (June – August)	0.63	0.706	0.694
Fall (September – October)	0.77	0.179	0.215

Season Multiple Classes Inputs

Table 7. Data inputs for EofA multiple classes model to combine detection probabilities across seasons at the Kings Point Wind Project

Season	DWP	Ba	Bb	g-hat
Spring (April – May)	0.091	40.65	181.63	0.18 (0.14-0.24)
Summer (June – August)	0.694	224.0436	940.1414	0.19 (0.17-0.22)
Fall (September – October)	0.215	186.1167	1287.0556	0.13 (0.11-0.14)

Annual g-value and species of interest take estimation inputs

Table 8. Data inputs for EofA multiple years model to estimate take of tricolored and gray bats at the Kings Point Wind Project

Year	ρ	Gray Bat Fatalities (X)	Tricolored Bat Fatalities (X)	Ba	Bb	g-hat
2025	1	11	12	353.1394	1637.9216	0.18 (0.16-0.19)

Treatment vs. Control Weights

Control Weights

Table 9. Weights for EofA multiple classes model to combine detection probabilities across sub-seasons for control turbines at the Kings Point Wind Project

Sub-season	Minimization Weight	Arrival proportion	DWP
Spring (April - May)	0.88	0.066	0.067
June	0.91	0.035	0.037
July 1	0.94	0.184	0.200
July 2	0.94	0.152	0.165
August	0.89	0.336	0.345
September 1	0.89	0.060	0.062
September 2	0.89	0.060	0.062
October	0.91	0.059	0.062

Treatment Weights

Table 10. Weights for EofA multiple classes model to combine detection probabilities across sub-seasons for treatment turbines at the Kings Point Wind Project

Sub-season	Minimization Weight	Arrival proportion	DWP
Spring (April - May)	0.88	0.066	0.058
June	0.91	0.035	0.032
July 1	0.68	0.184	0.173
July 2	0.68	0.152	0.142
August	0.23	0.336	0.299
September 1	0.58	0.060	0.053
September 2	0.58	0.060	0.053
October	0.90	0.059	0.054

Treatment vs. Control Inputs

Control Inputs

Table 11. Data inputs for EofA multiple classes model to combine detection probabilities across sub-seasons and estimate tricolored bat and gray bat take for control turbines at the Kings Point Wind Project

Sub-season	Gray Bat Fatalities	Tricolored Bat Fatalities	DWP	Ba	Bb	g-hat	g-hat 95% CI
Spring (April - May)	0	0	0.067	40.65	181.63	0.18	[0.135, 0.236]
June	0	0	0.037	54.64	218.83	0.20	[0.155, 0.249]
July 1	1	0	0.200	51.33	210.68	0.20	[0.15, 0.246]
July 2	0	1	0.165	51.11	215.71	0.19	[0.147, 0.241]
August	3	7	0.345	52.19	212.97	0.20	[0.151, 0.247]
September 1	2	2	0.062	54.70	375.81	0.13	[0.097, 0.16]
September 2	0	0	0.062	55.38	380.52	0.13	[0.097, 0.16]
October	2	0	0.062	54.40	368.11	0.13	[0.099, 0.162]

Treatment Inputs

Table 12. Data inputs for EofA multiple classes model to combine detection probabilities across sub-seasons and estimate tricolored bat and gray bat take for treatment turbines at the Kings Point Wind Project

Sub-season	Gray Bat Fatalities	Tricolored Bat Fatalities	DWP	Ba	Bb	g-hat	g-hat 95% CI
Spring (April - May)	0	0	0.112	40.65	181.63	0.18	[0.135, 0.236]
June	0	0	0.062	54.64	218.83	0.20	[0.155, 0.249]
July 1	1	0	0.242	51.33	210.68	0.20	[0.15, 0.246]
July 2	1	0	0.199	53.6623	252.9	0.175	[0.135, 0.219]
August	0	2	0.149	51.2606	233.4	0.18	[0.138, 0.227]
September 1	0	0	0.067	56.8998	434.5	0.116	[0.089, 0.146]
September 2	0	0	0.067	55.38	380.52	0.13	[0.097, 0.16]
October	1	0	0.103	54.40	368.11	0.13	[0.099, 0.162]

North Fork Ridge

Strata Multiple Classes Inputs

Table 13. Inputs for EofA multiple classes model run to combine detection probabilities across strata at the North Fork Ridge Wind Project

strata	Plot Type	turbine operation	# of Turbines	% of turbines	Search Interval (days)	Average # of Searches	Average area correction	DWP	Searcher Efficiency		Carcass Persistence			
									Carcasses Available	Carcasses Found	Distribution	Shape (α)	Scale (β)	β CI (95%)
spring	full_human	normal	28	0.41	7	9	0.96	0.3953	24	14	lognormal	3.213	1.367	0.9697, 1.764
	RP	normal	40	0.59	7	9	0.05	0.0294	70	69	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.5753						
June	RP	normal	45	0.66	3.75	9	0.05	0.033	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	normal	23	0.34	3.75	9	0.96	0.325	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.642						
July 1	RP	normal	45	0.66	3.75	4	0.05	0.033	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	normal	23	0.34	3.75	4	0.96	0.325	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.642						
July 2 normal	RP	normal	23	0.68	3.75	2	0.05	0.034	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	normal	11	0.32	3.75	2	0.95	0.307	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.659						
July 2 curtailed	RP	curtailed	22	0.65	3.75	2	0.05	0.032	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	curtailed	12	0.35	3.75	2	0.85	0.300	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.668						
August normal	RP	normal	23	0.68	3.75	7	0.05	0.034	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	normal	11	0.32	3.75	7	0.95	0.307	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.659						
August curtailed	RP	curtailed	22	0.65	3.75	7	0.05	0.032	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	curtailed	12	0.35	3.75	7	0.85	0.300	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.668						
September 1 normal	RP	normal	23	0.68	4	5	0.05	0.034	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	normal	11	0.32	4	5	0.95	0.307	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.659						
September 1 curtailed	RP	curtailed	22	0.65	4	5	0.05	0.032	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	curtailed	12	0.35	4	5	0.85	0.300	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.668						

strata	Plot Type	turbine operation	# of Turbines	% of turbines	Search Interval (days)	Average # of Searches	Average area correction	DWP	Searcher Efficiency		Carcass Persistence			
									Carcasses Available	Carcasses Found	Distribution	Shape (α)	Scale (β)	β CI (95%)
September 2	RP	normal	45	0.66	4	3	0.05	0.033	70	69	lognormal	3.213	1.367	0.9697, 1.764
	full_dogs	normal	23	0.34	4	3	0.95	0.321	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.646						
October	full_dogs	normal	23	0.34	4	8	0.95	0.321	70	69	lognormal	3.213	1.367	0.9697, 1.764
	RP	normal	45	0.66	4	8	0.05	0.033	203	150	lognormal	3.213	1.367	0.9697, 1.764
	unsearched							0.646						

Strata Multiple Classes Weights

Table 14. Weights for the EofA multiple classes model to combine detection probabilities across strata at the North Fork Ridge Wind Project

Strata	Turbine Operations	Sampling Weight	Minimization Weight	DWP
July 2 Normal	Normal	0.50	0.84	0.71
July 2 Curtailed	Curtailed	0.50	0.35	0.29
August Normal	Normal	0.50	0.85	0.79
August Curtailed	Curtailed	0.50	0.22	0.21
September 1 Normal	Normal	0.50	0.87	0.63
September 1 Curtailed	Curtailed	0.50	0.52	0.37

Strata Multiple Classes Inputs

Table 15. Data inputs for EofA multiple classes model to combine detection probabilities across strata at the North Fork Ridge Wind Project

Strata	Turbine Operations	DWP	Ba	Bb	g-hat (95% CI)
July 2 Normal	Normal	0.71	342.29	1483.15	0.19 (0.17-0.21)
July 2 Curtailed	Curtailed	0.29	320.71	1527.25	0.17 (0.16-0.19)
August Normal	Normal	0.71	243.56	981.42	0.20 (0.18-0.22)
August Curtailed	Curtailed	0.20	224.49	943.62	0.19 (0.17-0.22)
September 1 Normal	Normal	0.63	221.82	929.39	0.19 (0.17-0.22)
September 1 Curtailed	Curtailed	0.37	232.55	1016.42	0.19 (0.17-0.21)

Sub-season Multiple Classes Weights

Table 16. Weights for the EofA multiple classes model to combine detection probabilities across sub-seasons at the North Fork Ridge Wind Project

Sub-season	Season	Minimization Weight	Arrival proportion	DWP
Spring (April - May)	Spring	0.87	0.066	1
June	Summer	0.89	0.035	0.076
July 1		0.59	0.195	0.282
July 2		0.59	0.141	0.204
August		0.54	0.336	0.438
September 1	Fall	0.70	0.032	0.16
September 2		0.70	0.088	0.45
October		0.91	0.059	0.39

Sub-season Multiple Classes Inputs

Table 17. Data inputs for EofA multiple classes model to combine detection probabilities across sub-seasons at the North Fork Ridge Wind Project

Sub-season	Season	DWP	Ba		Bb	g-hat
Spring (April - May)	Spring	1	43.49	212.77	0.17 (0.13-0.22)	
June	Summer	0.076	229.42	866.13	0.21 (0.19-0.23)	
July 1		0.282	239.74	933.84	0.20 (0.18-0.23)	
July 2		0.204	565.63	2517.47	0.18 (0.17-0.20)	
August		0.438	359.60	1461.80	0.20 (0.18-0.22)	
September 1	Fall	0.16	417.56	1776.87	0.19 (0.17-0.21)	
September 2		0.45	205.85	859.37	0.19 (0.17-0.22)	
October		0.39	251.85	828.03	0.23 (0.21-0.26)	

Season Multiple Classes Weights

Table 18. Weights for the EofA multiple classes model to combine detection probabilities across seasons at the North Fork Ridge Wind Project

Season	Minimization Weight	Arrival proportion	DWP
Spring (April – May)	0.87	0.066	0.098
Summer (June – August)	0.56	0.706	0.681
Fall (September – October)	0.72	0.179	0.221

Season Multiple Classes Inputs

Table 19. Data inputs for EofA multiple classes model to combine detection probabilities across seasons at the North Fork Ridge Wind Project

Season	DWP	Ba		Bb	g-hat
Spring (April – May)	0.098	43.49	212.77	0.17 (0.13-0.22)	
Summer (June – August)	0.681	1022.7642	4157.8045	0.20 (0.19-0.21)	
Fall (September – October)	0.221	607.3285	2307.4483	0.21 (0.19-0.22)	

Annual g-value and species of interest take estimation inputs

Table 20. Data inputs for EofA multiple years model to estimate take of tricolored and gray bats at the North Fork Ridge Wind Project

Year	ρ	Gray Bat Fatalities (X)	Tricolored Bat Fatalities (X)	Ba	Bb	g-hat
2025	1	0	7	1404.832	5721.782	0.20(0.19-0.21)

Treatment vs. Control Weights

Control Weights

Table 21. Weights for EofA multiple classes model to combine detection probabilities across sub-seasons for control turbines at the North Fork Ridge Wind Project

Sub-season	Minimization Weight	Arrival proportion	DWP
Spring (April - May)	0.88	0.066	0.071
June	0.89	0.035	0.038
July 1	0.84	0.195	0.202
July 2	0.84	0.141	0.146
August	0.85	0.336	0.352
September 1	0.87	0.032	0.034
September 2	0.87	0.088	0.095
October	0.84	0.059	0.061

Treatment Weights

Table 22. Weights for EofA multiple classes model to combine detection probabilities across sub-seasons for treatment turbines at the North Fork Ridge Wind Project

Sub-season	Minimization Weight	Arrival proportion	DWP
Spring (April - May)	0.87	0.066	0.146
June	0.89	0.035	0.080
July 1	0.35	0.195	0.174
July 2	0.35	0.141	0.126
August	0.22	0.336	0.189
September 1	0.52	0.032	0.043
September 2	0.52	0.088	0.117
October	0.83	0.059	0.125

Treatment vs. Control Inputs

Control Inputs

Table 23. Data inputs for EofA multiple classes model to combine detection probabilities across sub-seasons and estimate tricolored bat and gray bat take for control turbines at the North Fork Ridge Wind Project

Sub-season	Gray Bat Fatalities	Tricolored Bat Fatalities	DWP	Ba	Bb	g-hat
Spring (April - May)	0	0	0.071	43.49	212.77	0.17 (0.13-0.22)
June	0	0	0.038	229.42	866.13	0.21 (0.19-0.23)
July 1	0	1	0.202	239.74	933.84	0.20 (0.18-0.23)
July 2	0	0	0.146	342.29	1483.15	0.19 (0.17-0.21)
August	0	5	0.352	243.56	981.42	0.20 (0.18-0.22)
September 1	0	1	0.034	221.82	929.39	0.19 (0.17-0.22)
September 2	0	0	0.095	205.85	859.37	0.19 (0.17-0.22)
October	0	0	0.061	251.85	828.03	0.23 (0.21-0.26)

Treatment Inputs

Table 24. Data inputs for EofA multiple classes model to combine detection probabilities across sub-seasons and estimate tricolored bat and gray bat take for treatment turbines at the North Fork Ridge Wind Project

Sub-season	Gray Bat Fatalities	Tricolored Bat Fatalities	DWP	Ba	Bb	g-hat
Spring (April - May)	0	0	0.146	43.49	212.77	0.17 (0.13-0.22)
June	0	0	0.080	229.42	866.13	0.21 (0.19-0.23)
July 1	0	0	0.174	239.74	933.84	0.20 (0.18-0.23)
July 2	0	0	0.126	320.7146	1527.2508	0.17 (0.16-0.19)
August	0	0	0.189	224.4936	943.6204	0.19 (0.17-0.22)
September 1	0	0	0.043	232.5514	1016.4211	0.19 (0.17-0.21)
September 2	0	0	0.117	205.85	859.37	0.19 (0.17-0.22)
October	0	0	0.125	251.85	828.03	0.23 (0.21-0.26)

Appendix C Acoustic Bat Activity Figures

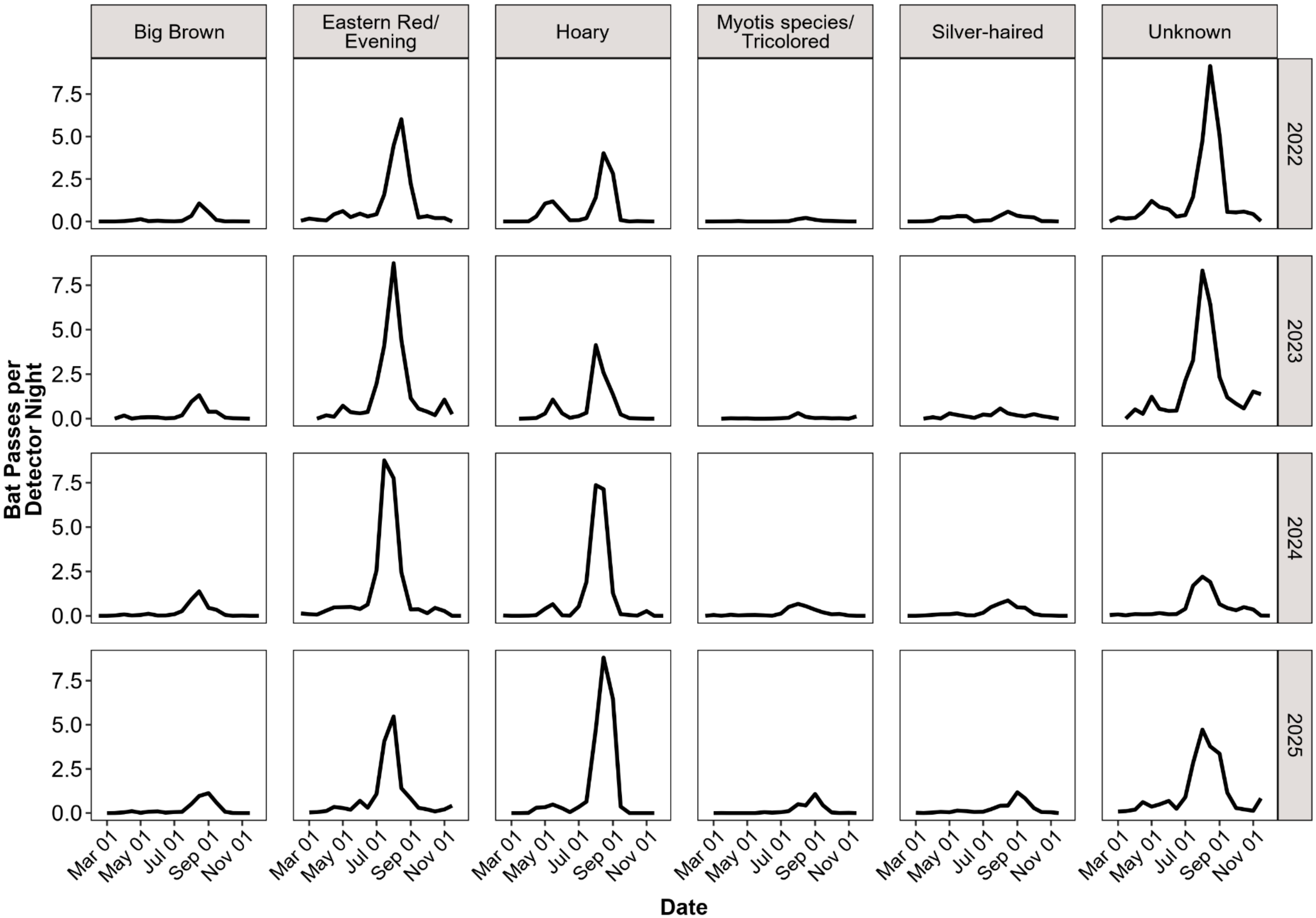

Figure C-1. Biweekly acoustic bat activity of each species or species group detected at nacelle-height detectors the 2022–2025 monitoring periods at the Kings Point Wind Project.

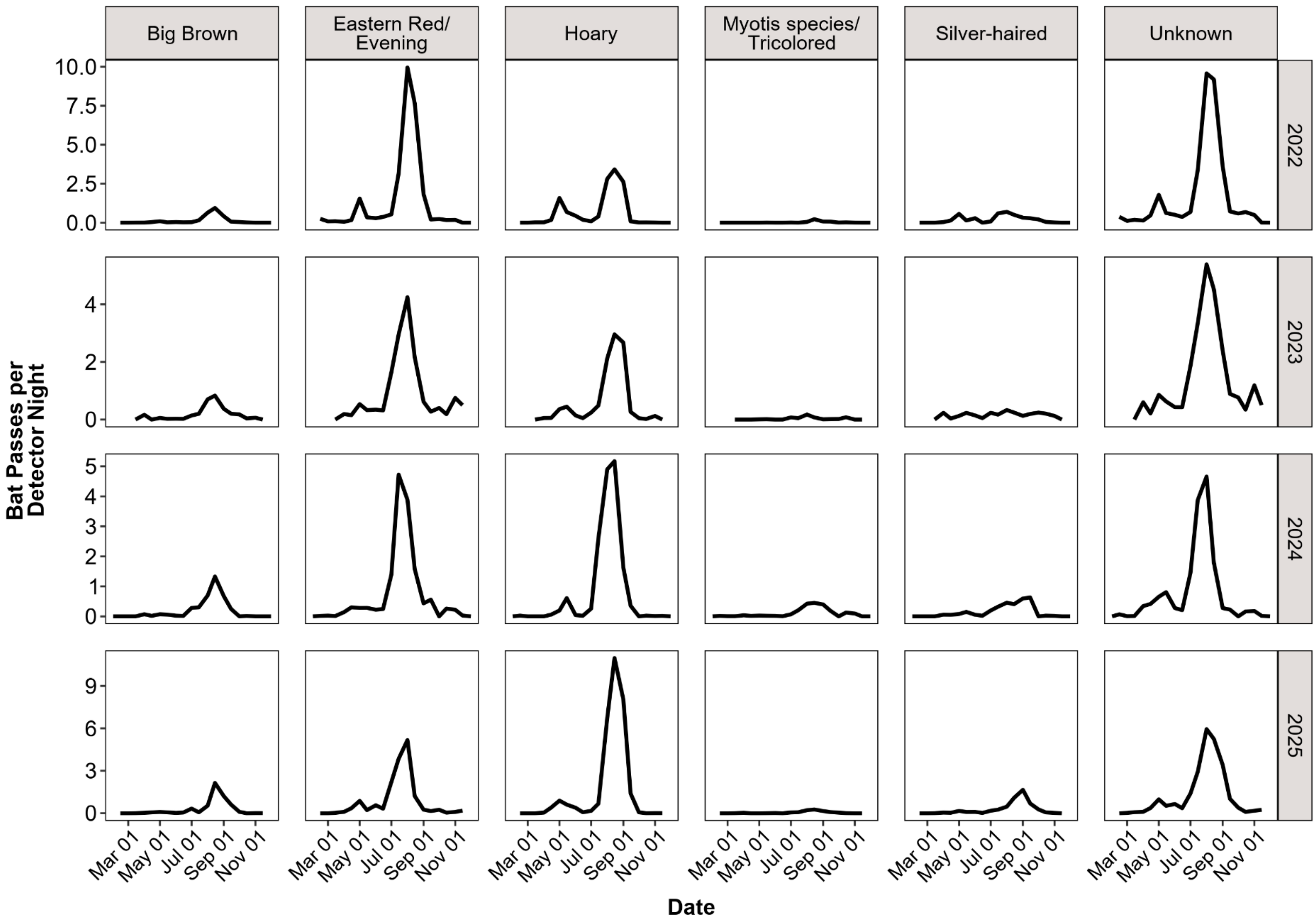

Figure C-2. Biweekly acoustic bat activity of each species or species group detected at nacelle-height detectors the 2022–2025 monitoring periods at the North Fork Ridge Wind Project.

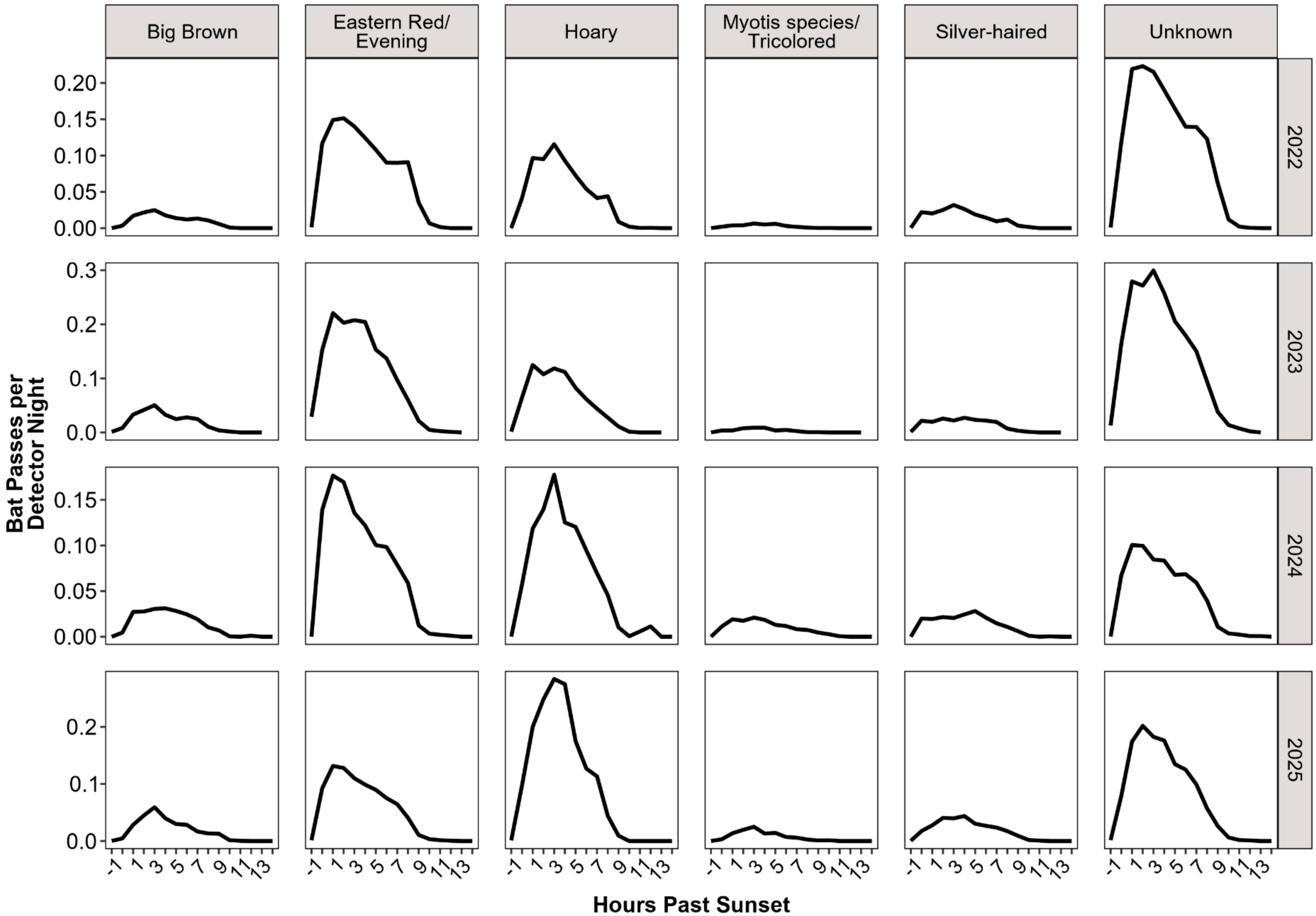

Figure C-3. Nightly timing of bat activity by species (by hour past sunset) detected at nacelle detectors during the 2022 – 2025 monitoring periods at the Kings Point Wind Project.

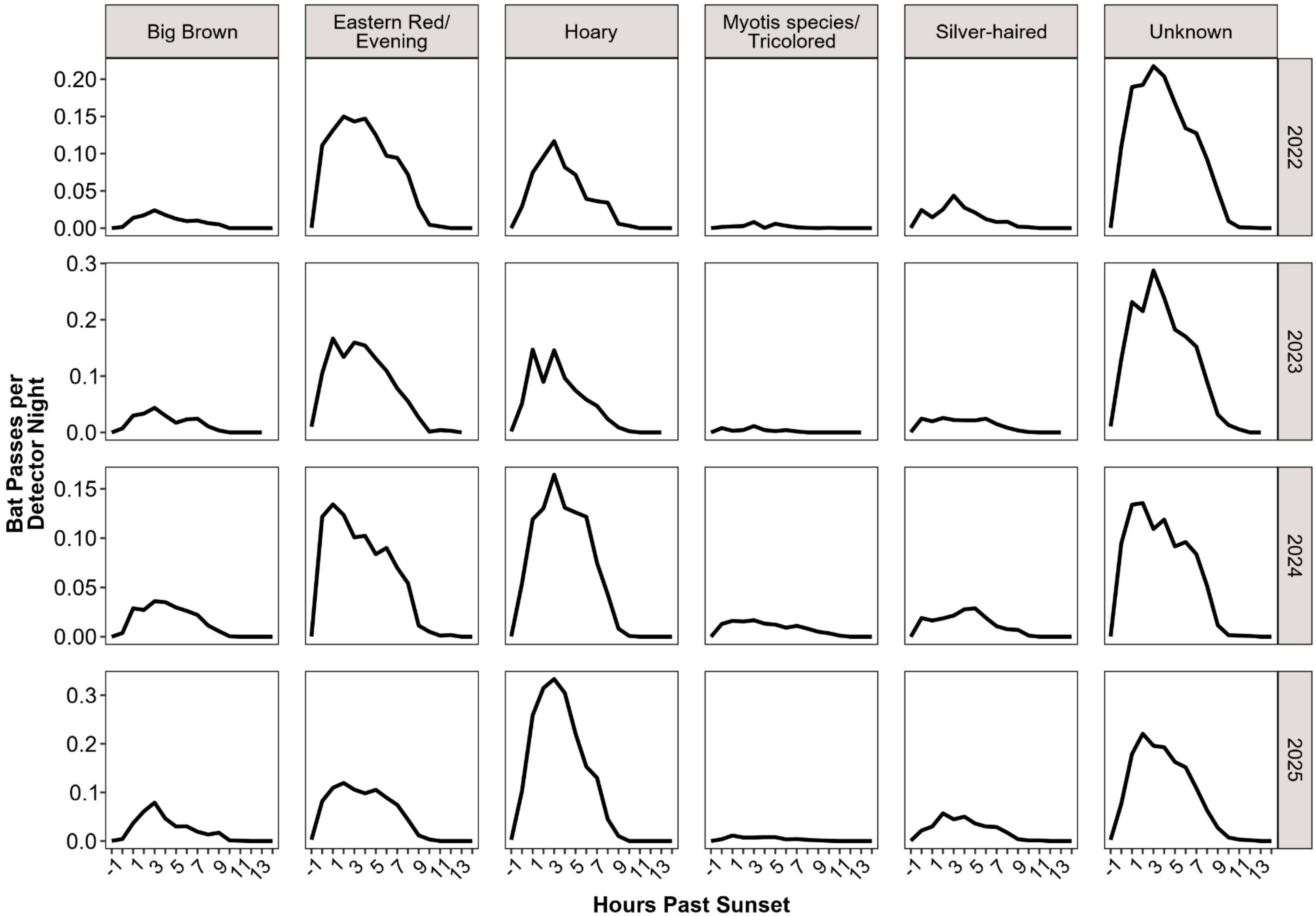

Figure C-4. Nightly timing of bat activity by species (by hour past sunset) detected at nacelle detectors during the 2022 – 2025 monitoring periods at the North Fork Ridge Wind Project.

Appendix D Genetics Results

Lab ID	Casualty ID	Species ID	Gender
WY-UNK-NF-191-1	070125-TRBA-NFR13-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-2	080725-TRBA-NFR41-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-3	080825-TRBA-NFR72-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-4	081125-TRBA-NFR24-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-5	081125-TRBA-KP44-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-6	081225-TRBA-KP90-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-7	081225-TRBA-KP8-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-8	081525-TRBA-KP126-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-9	081925-TRBA-KP114-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-10	082025-TRBA-KP90-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-11	082125-TRBA-NFR9-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-12	082225-TRBA-NFR68-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-13	090225-TRBA-KP128-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-14	090525-TRBA-KP128-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-15	090525-TRBA-NFR58-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-16	071025-GRBA-KP114-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-17	071525-GRBA-KP8-1	*Myotis grisescens* (Gray bat)	Female

WY-UNK-NF-191-18	072825-GRBA-KP44-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-19	080825-GRBA-KP60-1	*Myotis grisescens* (Gray bat)	Male
WY-UNK-NF-191-20	082125-GRBA-KP25-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-21	070325-UNBA-NFR31-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-191-22	073125-UNBA-KP34-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-23	080425-UNBA-NFR60-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-24	080825-UNBA-NFR13-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-25	080825-UNBA-KP126-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-26	081225-UNBA-KP60-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-27	081425-UNBA-KP36-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-28	081425-UNBA-KP36-2	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-29	082125-UNBA-KP25-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-30	082525-UNBA-KP56-1	*Lasiurus cinereus* (Hoary Bat)	Male
WY-UNK-NF-191-31	082625-UNBA-KP60-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-32	082625-UNBA-KP60-2	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-33	082825-UNBA-KP126-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-34	082925-UNBA-KP74-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-35	083125-UNBA-KP114-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-36	090125-UNBA-NFR84-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-37	090525-UNBA-KP126-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-191-38	090525-UNBA-KP91-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-191-39	090525-UNBA-NFR58-1	*Eptesicus fuscus* (Big brown bat)	Female

WY-UNK-NF-191-40	081425-UINM-KP8-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-41	STN_KP_20250807_PESU_KP-031	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-42	STN_KP_20250731_MYGR_KP-009	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-204-1	091025-UNBA-KP25-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-204-2	091025-UNBA-KP126-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-204-3	091125-UNBA-NFR9-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-204-4	091225-UNBA-NFR72-1	*Lasiurus cinereus* (Hoary Bat)	Male
WY-UNK-NF-204-5	091625-UNBA-KP90-1	*Lasiurus cinereus* (Hoary Bat)	Male
WY-UNK-NF-204-6	091925-GRBA-KP90-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-204-7	092325-UNBA-NFR78-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-204-8	093025-UNBA-NFR89-1	*Lasionycteris noctivagans* (Silver-haired bat)	Male
WY-UNK-NF-204-9	100225-UNBA-KP35-1	*Lasionycteris noctivagans* (Silver-haired bat)	Female
WY-UNK-NF-204-10	100725-UNBA-NFR72-1	*Nycticeius humeralis* (Evening bat)	Female
WY-UNK-NF-204-11	101325-UNBA-NFR103-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-204-12	101325-UNBA-KP90-1	Lasiurus cinereus (Hoary Bat)	Female
WY-UNK-NF-204-13	101325-GRBA-KP63-1	*Myotis grisescens* (Gray bat)	Male
WY-UNK-NF-204-14	101325-UNBA-KP74-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-204-15	102025-UNBA-NFR17-1	*Nycticeius humeralis* (Evening bat)	Female
WY-UNK-NF-204-16	102125-UNBA-KP17-1	Failed Sample Analysis	N/A
WY-UNK-NF-204-17	102225-UINM-NFR17-1	*Nycticeius humeralis* (Evening bat)	Female
WY-UNK-NF-204-18	102325-GRBA-KP56-1	*Myotis grisescens* (Gray bat)	Male
WY-UNK-NF-204-19	102725-UNBA-NFR89-1	*Eptesicus fuscus* (Big brown bat)	Female

Dr. Jane Huffman Wildlife Genetics Institute
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DNA EVALUATION REPORT

October 2, 2025

Submitted by:
Amanda Hale
Nicole Pierro
Western EcoSystems Technology
415 W. 17th St. Suite 200
Cheyenne WY, 82001

Laboratory ID # WY-UNK-NF-191
Services Requested: Species Identification and Gender Identification
Date Received at DNA Lab: September 10, 2025

Description of Sample Submitted: Samples were submitted to the Dr. Jane Huffman Wildlife Genetics Institute on September 10, 2025. Samples included: (Items 1-42) all items submitted for analysis were labeled WY-UNK-NF-191 with a unique number, sample item highlighted in detail within Table 1.

Summary of Methods: Samples submitted to the Dr. Jane Huffman Wildlife Genetics Institute were evaluated. Following laboratory standards of practice, a DNA extraction was performed using a Qiagen DNeasy Blood and Tissue kit. To confirm species, a portion of the mitochondrial cytochrome oxidase subunit 1 (CO1) gene and cytochrome b (cytb) gene were targeted. Successful sequence fragments were analyzed using the National Centers for Biotechnology Information (BLAST) database and Barcode of Life Database (BOLD). To determine gender, the zinc finger Y-chromosomal protein (ZFY) gene was used to target the Y chromosome. Successful amplification of the Y chromosome was visualized using gel electrophoresis.

Summary of Results and Conclusion: To confirm species, DNA was successfully extracted from sample items 1-42. Final DNA analysis, species identification, and gender identification is highlighted in detail within Table 1.

Table 1: Results of species and gender identification for sample items 1-42 submitted for testing.

Lab ID	Casualty ID	Species ID	Gender
WY-UNK-NF-191-1	070125-TRBA-NFR13-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-2	080725-TRBA-NFR41-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-3	080825-TRBA-NFR72-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-4	081125-TRBA-NFR24-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-5	081125-TRBA-KP44-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-6	081225-TRBA-KP90-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-7	081225-TRBA-KP8-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-8	081525-TRBA-KP126-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-9	081925-TRBA-KP114-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-10	082025-TRBA-KP90-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-11	082125-TRBA-NFR9-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-12	082225-TRBA-NFR68-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-13	090225-TRBA-KP128-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-14	090525-TRBA-KP128-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-15	090525-TRBA-NFR58-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-16	071025-GRBA-KP114-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-17	071525-GRBA-KP8-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-18	072825-GRBA-KP44-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-19	080825-GRBA-KP60-1	*Myotis grisescens* (Gray bat)	Male
WY-UNK-NF-191-20	082125-GRBA-KP25-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-21	070325-UNBA-NFR31-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-191-22	073125-UNBA-KP34-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-23	080425-UNBA-NFR60-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-24	080825-UNBA-NFR13-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-25	080825-UNBA-KP126-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-191-26	081225-UNBA-KP60-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-27	081425-UNBA-KP36-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-28	081425-UNBA-KP36-2	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-29	082125-UNBA-KP25-1	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-30	082525-UNBA-KP56-1	*Lasiurus cinereus* (Hoary Bat)	Male
WY-UNK-NF-191-31	082625-UNBA-KP60-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-32	082625-UNBA-KP60-2	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-33	082825-UNBA-KP126-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-191-34	082925-UNBA-KP74-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-35	083125-UNBA-KP114-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-36	090125-UNBA-NFR84-1	*Lasiurus cinereus* (Hoary Bat)	Female
WY-UNK-NF-191-37	090525-UNBA-KP126-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-191-38	090525-UNBA-KP91-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-191-39	090525-UNBA-NFR58-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-191-40	081425-UINM-KP8-1	*Perimyotis subflavus* (Tricolored bat)	Male
WY-UNK-NF-191-41	STN_KP_20250807_PESU_KP-031	*Perimyotis subflavus* (Tricolored bat)	Female
WY-UNK-NF-191-42	STN_KP_20250731_MYGR_KP-009	*Myotis grisescens* (Gray bat)	Female

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DNA EVALUATION REPORT

November 20, 2025

Submitted by:
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Nicole Pierro
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Cheyenne WY, 82001

Laboratory ID # WY-UNK-NF-204
Services Requested: Species Identification and Gender Identification
Date Received at DNA Lab: November 4, 2025

Description of Sample Submitted: Samples were submitted to the Dr. Jane Huffman Wildlife Genetics Institute on November 4, 2025. Samples included: (Items 1-19) all items submitted for analysis were labeled WY-UNK-NF-204 with a unique number, sample items are highlighted in detail within Table 1.

Summary of Methods: Samples submitted to the Dr. Jane Huffman Wildlife Genetics Institute were evaluated. Following laboratory standards of practice, a DNA extraction was performed using a Qiagen DNeasy Blood and Tissue kit. To confirm species, a portion of the mitochondrial cytochrome oxidase subunit 1 (CO1) gene and cytochrome b (cytb) gene were targeted. Successful sequence fragments were analyzed using the National Centers for Biotechnology Information (BLAST) database and Barcode of Life Database (BOLD). To determine gender, the zinc finger Y-chromosomal protein (ZFY) gene was used to target the Y chromosome. Successful amplification of Y chromosome was visualized using gel electrophoresis.

Summary of Results and Conclusion: To confirm species, DNA was successfully extracted from sample items 1-15 and 17-19. Sample item 16 failed to isolate mammal DNA as a result of decomposition and gender identification was not performed on this sample. Final DNA analysis, species identification, and gender identification is highlighted in detail within Table 1.

Table 1: Results of species and gender identification for sample items 1-19 submitted for testing.

Lab ID	Casualty ID	Species ID	Gender
WY-UNK-NF-204-1	091025-UNBA-KP25-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-204-2	091025-UNBA-KP126-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-204-3	091125-UNBA-NFR9-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-204-4	091225-UNBA-NFR72-1	*Lasiurus cinereus* (Hoary Bat)	Male
WY-UNK-NF-204-5	091625-UNBA-KP90-1	*Lasiurus cinereus* (Hoary Bat)	Male
WY-UNK-NF-204-6	091925-GRBA-KP90-1	*Myotis grisescens* (Gray bat)	Female
WY-UNK-NF-204-7	092325-UNBA-NFR78-1	*Eptesicus fuscus* (Big brown bat)	Female
WY-UNK-NF-204-8	093025-UNBA-NFR89-1	*Lasionycteris noctivagans* (Silver-haired bat)	Male
WY-UNK-NF-204-9	100225-UNBA-KP35-1	*Lasionycteris noctivagans* (Silver-haired bat)	Female
WY-UNK-NF-204-10	100725-UNBA-NFR72-1	*Nycticeius humeralis* (Evening bat)	Female
WY-UNK-NF-204-11	101325-UNBA-NFR103-1	*Lasiurus borealis* (Eastern red bat)	Male
WY-UNK-NF-204-12	101325-UNBA-KP90-1	Lasiurus cinereus (Hoary Bat)	Female
WY-UNK-NF-204-13	101325-GRBA-KP63-1	*Myotis grisescens* (Gray bat)	Male
WY-UNK-NF-204-14	101325-UNBA-KP74-1	*Lasiurus borealis* (Eastern red bat)	Female
WY-UNK-NF-204-15	102025-UNBA-NFR17-1	*Nycticeius humeralis* (Evening bat)	Female
WY-UNK-NF-204-16	102125-UNBA-KP17-1	Failed Sample Analysis	N/A
WY-UNK-NF-204-17	102225-UINM-NFR17-1	*Nycticeius humeralis* (Evening bat)	Female
WY-UNK-NF-204-18	102325-GRBA-KP56-1	*Myotis grisescens* (Gray bat)	Male
WY-UNK-NF-204-19	102725-UNBA-NFR89-1	*Eptesicus fuscus* (Big brown bat)	Female

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