



April 25, 2024

Mr. Lee Andrews
U.S. Fish and Wildlife Service
J. C. Watts Federal Building, Room 265
330 West Broadway
Frankfort, KY 40601

Dear Mr. Andrews,

East Kentucky Power Cooperative, Inc. (EKPC) plans to request financing and seek environmental approval from the U.S. Department of Agriculture (USDA), Rural Utilities Service (RUS) for construction of a new proposed solar generating facility. Because EKPC plans to apply for project financing assistance from RUS, the proposal constitutes a Federal action subject to review in accordance with Rural Development's (RD) *Environmental Policy and Procedures* for implementing the National Environmental Policy Act (7 CFR Part 1970). On behalf of RUS, EKPC has conducted a biological assessment and respectfully submits this Request for Informal Consultation to the U.S. Fish and Wildlife Service, Kentucky Field Office (USFWS KFO) in accordance with Section 7 of the Endangered Species Act (16 U.S.C. 1531 et seq.) for the following proposed project:

Northern Bobwhite Solar Generating Facility Project

IPaC Project Code: 2024-0076364

EKPC is proposing to construct the 96-megawatt alternating current (MWac) photovoltaic (PV), Northern Bobwhite Solar Generating Facility (Project) on approximately 635 acres located roughly 2.0 miles north of the city of Lebanon, Kentucky. The new solar facility would be installed on properties generally located to the east of KY Hwy 55, north of US Hwy 68, west of KY Hwy 1195, and south of the Marion/Washington County line, and centered at roughly 37.605287°N, -85.234305°W. Topographic maps and aerial photos depicting the location of the project are enclosed with this letter.

PROJECT DESCRIPTION

In 2020, EKPC established a sustainability plan that includes targets for reducing carbon dioxide emissions and increasing renewable generation resources. This sustainability plan recognizes increasing demand for renewable energy, especially among commercial and industrial electric users, and also increasing regulatory pressure for utilities to reduce emissions of carbon dioxide. In 2022, EKPC submitted an Integrated Resource Plan to the Kentucky Public Service Commission with plans for the cooperative to add nearly 1,000 megawatts of new solar energy resources over the coming decade. The proposed Northern Bobwhite Solar Generating Facility Project will contribute significantly to EKPC's Sustainability Plan goals of carbon dioxide reductions and commitment to adding new renewable energy sources to its generation portfolio.

Based on the preliminary engineering design, the proposed 96 MWac facility would require an up to 635-acre Limits of Disturbance (LOD) for installation of the solar equipment and ancillary facilities. At this time, EKPC has identified a roughly 950-acre NEPA analysis area for assessment of potential project affects. As the detailed civil engineering and equipment manufacturer selections are finalized, the final 635-acre LOD will be refined. Project components would include the up to 15-foot tall PV solar tracking panels, associated ground-mounted racking structure, access roads, inverters, medium voltage transformers, buried electrical collection cabling, a step-up transformer, a short 161-kilovolt transmission tie line, security fencing, laydown areas, and an operations and maintenance building. The existing EKPC Marion County

4775 Lexington Road 40391
P.O. Box 707, Winchester
Kentucky 40392-0707

Tel. (859) 744-4812
Fax: (859) 744-6008
<http://www.ekpc.coop>

161 kV Switching Station is located at the southwest corner of the proposed solar facility. The substation currently serves as a connection for multiple high voltage lines that run across the proposed site and will serve as the point of interconnection (POI) between the new solar generating facility and the regional transmission system.

The proposed Northern Bobwhite Solar Generating Facility Project would include roughly 180,000 PV solar panels mounted on single-axis tracking systems supported by steel piles. When operating, the solar panels will move to track the sun from east to west over the course of the day. The panels and mounting system are designed and constructed to withstand environmental conditions and applied loads for the design life of the facility. The support system will primarily be constructed with corrosion-resistant steel-piles that will be driven by truck mounted pile-driver, and in areas where rock is encountered mini-cast augured piles or equivalent will be utilized. When mounted on racks and at maximum tilt, the top edge of the solar panels will be approximately 15 feet above the ground.

Vegetation clearing necessary for construction of proposed solar panels would be minimized and all remaining vegetation will be retained to serve as a visual buffer to the surrounding areas. Due to the gently rolling topography, minimal grading is anticipated during site preparation with some steeper areas along streams being avoided. Identified wetlands and jurisdictional waters will be avoided during construction and operation to the extent practicable. If necessary, it is anticipated the Project would utilize applicable USACE Nationwide Permits for access road and collector line stream crossings. Internal gravel roads will be constructed throughout the site and used to deliver construction materials and equipment from the laydown/staging areas to other locations within the project boundary. Once construction of the facility is complete and operational, internal roads will be used for routine maintenance of the facility and emergency access. EKPC plans to sow grasses around and between the solar panels, with occasional mowing expected during the growing season to maintain the height of the grass and to prevent trees/shrubs from growing near the panels.

SITE DESCRIPTION

The proposed project is located in northcentral Marion County and lies within the Outer Bluegrass physiographic region of Kentucky on portions of the Springfield and Lebanon East USGS 7.5 minute topographic quadrangles. This physiographic region is characterized as an upland limestone area with deep valleys well dissected by normal stream drainage. Bedrock in this region, composed primarily of Ordovician-aged (~485-445 million years ago) limestone and shales, are more easily eroded than the limestones of the adjacent Inner Bluegrass region, resulting in deeper valleys and little flat land¹. However, the proposed project area is relatively flat with gently rolling hills and predominantly developed for agricultural purposes. Elevations in the project area range from approximately 925 feet Above Mean Sea Level (AMSL) on the higher ridgetops to approximately 800 feet AMSL along the larger stream valleys, with local relief in some areas between 75-100 feet. The project area contains numerous intermittent, unnamed tributaries and small streams, as well as several larger perennial streams draining the project area, including Cartwright Creek, Casey Branch, Logan Branch, and Buck Branch. Due to the gently rolling topography, the project area has largely been developed for agricultural and rural residential purposes, with these areas currently being utilized for crop, hay, and livestock production. Forested areas are limited to the steeper slopes, stream crossings, and fencerows. Private residences and farm buildings are interspersed throughout the project area, but no large-scale commercial or industrial facilities are present. Representative photographs of the project area are presented beginning on page 3.

As a result of the COVID pandemic, this project has experienced delays and there have been multiple site-specific field surveys conducted since 2020 to determine the habitat types present and the potential for

¹ McGrain, P. and J. C. Currens. 1978. *Topography of Kentucky*. Kentucky Geological Survey, Ser. X, Special Pub., 25 University of Kentucky, Lexington, KY.

Threatened and Endangered (T&E) species to occur in the proposed project area. Terracon Consultants, Inc. conducted the first T&E Species review in May of 2020 as part of the initial site development evaluations. Terracon reviewed the U.S. Fish and Wildlife Service (USFWS) – Information for Planning and Conservation (IPaC) website, which indicated the Indiana bat (*Myotis sodalis*), gray bat (*M. grisescens*), northern long-eared bat (NLEB) (*M. septentrionalis*) had the potential to occur in the vicinity of the project area. Terracon conducted field surveys to assess the habitats within the project area and ultimately concluded that the project area contains suitable habitat for the Indiana bat and NLEB. This identified habitat contains potential summer roost sites within live shaggy-barked trees and/or dead/damaged trees, and consists of forested areas on steeper slopes, stream crossings, and fencerows. In addition, there is also suitable foraging/travel habitat available within the project area for these species and gray bats in the larger stream corridors traversing the project area.

As a result of the project area containing tree species, individual trees, and foraging habitat that could provide suitable summer habitat for federally listed bat species, the developer retained Stantec Consulting Services, Inc. to conduct a Phase 2 presence/absence mist netting survey during the summer of 2022 to determine if federally listed bat species are present or likely absent. The mist netting survey was led by permitted biologists James Kiser, Josh Adams, and Shane Kelley in accordance with the USFWS 2022 Range-Wide Summer Survey Guidelines. Stantec biologists also conducted listed mussel habitat assessments of the streams within the project area. The results of the surveys are documented in the report titled *Bat Mist Net Survey and Mussel Habitat Survey for the Northern Bobwhite Solar Project, Marion County, Kentucky*, which is enclosed with this letter.

EKPC began the process to acquire the proposed solar generating project in the Fall of 2023 and EKPC biologists have also conducted assessments within the project area through April 2024. These assessments involved traversing the proposed project area while making visual observations of flora and fauna. The project area is located in the Oak-Hickory Forest Region of Kentucky, which extends across much of the western two-thirds of Kentucky. In this portion of the state, a mixture of deciduous tree species, especially oaks and hickories, as well as American elm, American basswood, black cherry, black walnut, and white ash, generally characterizes the forests². However, the proposed solar array project area predominantly contains agricultural and rural residential lands, with deciduous hardwood forest wood lots, stream corridors, and fencerows scattered throughout the project area. Common species observed within the open field portions of the project area were tall fescue (*Festuca arundinacea*), broomsedge (*Andropogon virginicus*), common teasel (*Dipsacus fullonum*), frost aster (*Symphyotrichum pilosum*), ironweed (*Vernonia fasciculata*), raspberries (*Rubus sp.*), Johnson grass (*Sorghum halepense*), white clover (*Trifolium repens*), red clover (*T. pratense*), poison hemlock (*Conium maculatum*), horse nettle (*Solanum carolinense*), chicory (*Cichorium intybus*), and goldenrod (*Solidago sp.*). The forested areas within the project area are typical of the region and included black locust (*Robinia pseudoacacia*), shagbark hickory (*Carya ovata*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), sugar maple (*Acer saccharum*), boxelder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), hackberry (*Celtis occidentalis*), sycamore (*Platanus occidentalis*), eastern red cedar (*Juniperus virginiana*), Osage orange (*Maclura pomifera*), red mulberry (*Morus rubra*), America elm (*Ulmus americana*), multiflora rose (*Rosa multiflora*), and bush honeysuckle (*Lonicera maackii*).

² Jones, R. L. 2005. *Plant Life of Kentucky*. University Press of Kentucky. Lexington, Kentucky.



Photo 1. Representative view of agricultural land in NE portion of project area, south of Simstown Rd.



Photo 2. Representative view of agricultural land in NE portion of project area, view north of drainages



Photo 3. Representative view of suitable bat habitat in NE portion of project area, south of Simstown Rd.



Photo 4. Buried collector line route in central portion of project area, view west from Gene Campbell Rd



Photo 5. Representative view of agricultural land in central portion of project area, north of Horan Lane



Photo 6. Representative view of agricultural land in south central portion of project area, view south



Photo 7. Early successional habitat in southern project area not considered suitable bat habitat



Photo 8. Representative view of agricultural land in southern portion of project, view SW to EKPC line



Photo 9. Representative view of unnamed perennial stream SE of Marion County substation



Photo 10. View south towards existing Marion County substation, SW portion of project area

SPECIES CONSIDERED AND EVALUATED

Based upon the construction activities outlined above and the resulting disturbance to the existing environment, EKPC evaluated the potential of the project to affect federally listed threatened or endangered species or critical habitats that are known to occur, or could potentially occur, within the vicinity of the proposed project area. To assess these potential effects, EKPC reviewed available information for Marion County acquired from the following sources:

- U.S. Fish and Wildlife Service (USFWS) – *Information for Planning and Conservation – IPaC website* (<https://ecos.fws.gov/ipac/>), IPaC Project Code: 2024-0076364, accessed April 12, 2024
- USFWS – *Known Indiana bat habitat in Kentucky and within 20 Miles* map, August 2019 (https://www.fws.gov/frankfort/pdf/MYSO_Habitat_map.pdf)
- USFWS – *Known northern long-eared bat habitat in Kentucky and within 20 Miles* map, August 2019 (https://www.fws.gov/frankfort/pdf/MYSE_Habitat_Map.pdf)
- Office of Kentucky Nature Preserves (OKNP) – *Kentucky Biological Assessment Tool* for OKNP-monitored species within 3.0-miles of proposed project area, April 12, 2024

Information contained within these resources identified 12 federally listed species known to occur or having the potential to occur in this region of the state. These include the Indiana bat (*Myotis sodalis*), northern long-eared bat (*M. septentrionalis*), gray bat (*M. grisescens*), tricolored bat (*Perimyotis subflavus*), clubshell (*Pleurobema clava*), fanshell (*Cyprogenia stegaria*), orangefoot pimpleback (*Plethobasus cooperianus*), pink mucket (*Lampsilis abrupta*), rabbitsfoot (*Quadrula cylindrica cylindrica*), ring pink (*Obovaria retusa*), salamander mussel (*Simpsonia ambigua*), and whooping crane (*Grus americana*).

Table 1. *Federally Listed Species Identified in Vicinity of the Northern Bobwhite Solar Project*

Group	Species	Common name	Legal Status*	Occurrence**	Comments
Mammals	<i>M. sodalis</i>	Indiana bat	E	P	Known summer 1 habitat ~17 miles N of project area in Nelson County
	<i>M. septentrionalis</i>	Northern long-eared bat	E	P	Known summer 1 habitat ~2.5 miles SE of project area in Marion County
	<i>M. grisescens</i>	Gray bat	E	K	Known within the project area, documented in 2022 mist net survey
	<i>P. subflavus</i>	Tricolored bat	P	K	Known within the project area, documented in 2022 mist net survey
Mussels***	<i>P. clava</i>	Clubshell	E	P	Relicts from Beech Fork in Nelson County, 30+ miles W (downstream)
	<i>C. stegaria</i>	Fanshell	E	P	Relicts from Beech Fork in Nelson County, 30+ miles W (downstream)
	<i>P. cooperianus</i>	Orangefoot Pimpleback	E	P	Relicts from Rolling Fork in Hardin County at confluence with OH River; 45+ miles W (downstream)
	<i>L. abrupta</i>	Pink Mucket	E	P	Relicts from Salt River in Spencer County, 35+ miles N (downstream)
	<i>Q. c. cylindrica</i>	Rabbitsfoot	T	P	Relicts from Beech Fork in Nelson County, 35+ miles W (downstream)
	<i>O. retusa</i>	Ring Pink	E	P	Relicts from Salt River in Bullitt County, 35+ miles N (downstream)

Group	Species	Common name	Legal Status*	Occurrence**	Comments
	<i>S. ambigua</i>	Salamander Mussel	P	P	Known from Chaplin River, Nelson/Washington Co line, 20+ miles N (downstream)
Bird	<i>G. americana</i>	Whooping Crane	EXPN	P	Annually migrates across western Kentucky
NOTES: Key to Notations					
* E = Endangered, T = Threatened, P = Proposed, CH = Critical Habitat, EXPN = Experimental population, Non-essential					
** K = Known occurrence record within the project area, P = Potential for the species to occur within the project area based upon historic range, proximity to known occurrence records, biological, and physiographic characteristics.					
*** Freshwater mussel occurrence data based on Haag, W.R., and R.R Cicerello, 2016. <i>A Distributional Atlas of the Freshwater Mussels of KY. Scientific and Technical Series 8.</i> KY State Nature Preserves Commission, Frankfort, KY.					

DATA REVIEW & SURVEY METHODS

To determine the likelihood of these species being impacted by the proposed project permitted Terracon, Stantec, and EKPC biologists have reviewed existing occurrence data, topographic maps, aerial photographs, and conducted a field survey to determine the presence or probable absence of these species in the proposed project area. The Springfield and Lebanon East, Kentucky USGS 7.5-minute topographic quadrangle maps and recent aerial photographs were reviewed and utilized to create the enclosed project location maps. Field surveys have consisted of traversing the project area while making visual observations of existing habitat and site-specific conditions, conducting a presence/absence mist net survey, and conducting a mussel habitat assessment.

EVALUATED SPECIES INFORMATION

Indiana and Northern long-eared bats

A review of existing data provided by the USFWS known bat habitat maps revealed that the proposed project area is located in potential habitat for the Indiana bat. Based on available information, the closest Indiana bat known habitat (Summer 1) is approximately 17 miles north of the proposed project area in Nelson County. A review of the USFWS known northern long-eared bat (NLEB) habitat map revealed that the closest NLEB known habitat (Summer 1) is approximately 2.5 miles southeast of the proposed project area in Marion County. Based on the proximity to this known habitat, historic range, biological, and physiographic characteristics, the USFWS assumes these species have the potential to occur throughout the entire region of Kentucky in which the project area is located. Therefore, forested areas present in the project area may provide suitable summer roosting, commuting, and/or foraging habitat for the Indiana bat and NLEB. Additionally, any caves, rock shelters, or underground mines located in the proposed project area may provide potential Indiana bat and NLEB winter hibernacula habitat. Any project-related impacts to this summer and/or winter habitat could adversely affect these species; therefore, initial survey efforts focused on the identification of suitable Indiana bat and NLEB habitat.

Suitable summer roosting habitat for the Indiana bat has been defined by the USFWS as live and dead trees with a diameter at breast height (DBH) of five (5) inches or greater that exhibit exfoliating bark, crevices, and/or cracks where Indiana bats could potentially roost. Indiana bats have also been observed roosting in human-made structures, such as bridges and bat houses (artificial roost structures). Suitable roosting habitat for the NLEB has been defined by the USFWS as live and dead trees and/or snags with a DBH of three (3) inches or greater that exhibit exfoliating bark, crevices, and/or cracks where NLEBs could potentially roost. NLEBs have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses. Based on the results of the field reconnaissance and subsequent desktop map review, 40.59-acres of forested habitat meeting the definition of suitable Indiana/NLEB summer habitat may be impacted

by construction of the proposed project. This suitable bat habitat is located within deciduous hardwood forest wood lots, stream corridors, and fencerows scattered throughout the project area, and contains potential roost sites within live shaggy-barked trees and/or dead/damaged standing trees (see enclosed *Suitable Bat Habitat Maps*). As a result of the project area containing tree species that could provide suitable summer roosting habitat for the Indiana bat and NLEB, Stantec conducted a Phase 2 presence/absence mist netting survey during the summer of 2022 to determine if federally listed bat species are present or likely absent. During the mist netting survey, 48 net nights of mist-netting effort were conducted and no Indiana or NLEBs were captured. Based on the data from mist net surveys in the project area, and the apparent absence of the Indiana and NLEB, Stantec recommended the project is not likely to adversely affect these species. The mist net survey did result in the capture of five gray bats (*Myotis grisescens*), one tricolored bat (*Perimyotis subflavus*), eleven big brown bats (*Eptesicus fuscus*), seven eastern red bats (*Lasiurus borealis*), one Hoary bat (*Lasiurus cinereus*), and four evening bats (*Nycticeius humeralis*).

None of the previous field surveys or data reviews have identified any caves, rock shelters, or abandoned underground mines that could provide potential winter habitat for the Indiana bat or NLEB within the project area. In addition, the review of topographic maps and GIS mine survey data did not show any records for mining or quarrying within the proposed project area. A review of the USFWS known bat habitat maps revealed the closest known hibernaculum for either species is located more than 17 miles to the southwest of the proposed project area in Taylor County. Based on the negative results of the habitat assessment and distance of the known hibernacula, no significant adverse effects to the Indiana bat or NLEB with regard to winter habitat impacts are anticipated.

Gray Bat

Gray bats were documented to occur within the project area as a result of the mist netting survey conducted in 2022. Gray bats roost, breed, rear young, and hibernate in caves, rock shelters, and underground mines year round. Therefore, any of these features that are located in the proposed project area could provide potential winter/summer roosting habitat for this species, and impacts to this habitat could adversely affect the gray bat. As previously discussed, no caves, rock shelters, or abandoned underground mines that could provide suitable winter/summer roosting habitat for the gray bat were identified within the project area. Based on the lack of suitable roosting habitat, no adverse effects to the gray bat with respect to roosting habitat are anticipated.

Gray bats typically forage for flying aquatic and terrestrial insects over streams, rivers, and lakes. As a result, any of these features that occur within, or in the vicinity of, the project area could provide potential gray bat foraging or commuting habitat. During the topographic map review and subsequent mist net survey, the project area was examined for streams, rivers, or lakes that could provide potential gray bat foraging habitat. Gray bats were captured over Cartwright Creek, Murphy Farm Creek, Casey Branch, and are likely using all of the larger streams in the project area as foraging and/or commuting habitat. However, the proposed solar array has been designed to avoid these larger streams and riparian vegetation and no direct affects to gray bat foraging and/or commuting habitat are anticipated. Other than minimal vehicular access requiring temporary ephemeral stream crossings in the project area, there are no new disturbances anticipated at the larger intermittent/perennial streams as a result of the project. Therefore, no significant direct adverse effects to gray bat foraging or commuting habitat are anticipated within the project area.

Although no direct effects to gray bat foraging or commuting habitat are anticipated, the project area contains waterbodies that provide suitable gray bat foraging habitat. To avoid and minimize potential indirect effects to gray bat foraging habitat associated with water quality degradation from the project, EKPC will prepare, implement, and maintain a Storm Water Pollution Prevention Plan (SWPPP) that outlines how and where Best Management Practices (BMPs) will be used to prevent or reduce the discharge of pollutants into Waters of the Commonwealth. The goal of this plan is to implement appropriate and

adequate erosion prevention measures, sediment control measures, and other site management practices necessary to manage stormwater runoff during the construction period. These practices are aimed primarily at controlling erosion and sediment transport, but also include controls such as good housekeeping practices aimed at other pollutants such as construction chemicals and solid waste. The plan describes the site management practices that will be utilized in order to effectively minimize such discharges for storm events up to and including a two-year, 24-hour event. Therefore, indirect impacts to water quality are not anticipated from the proposed project and the proposal is not likely to adversely affect the gray bat.

Tricolored Bat

The tricolored bat was proposed for federal listing as endangered on September 13, 2022, with this listing expected to be finalized by the end of 2024. Construction of the proposed solar project is not anticipated to start within this timeframe and project impacts to suitable tricolored bat habitat are likely to occur after the formal listing of this species as endangered. Therefore, EKPC would like to request an Informal Conference on the proposed tricolored bat with a recommended may affect, not likely to adversely affect finding for the project based on the following analysis. Once listed, EKPC will plan to follow up with the KFO to request a conversion to Informal Consultation for this species.

Prior to the impacts of WNS, this bat occurred commonly across Kentucky (documented in 109 of the 120 counties) in summer and during migration, and nearly every cave across the state harbored at least a few hibernating individuals. These tiny bats hibernate in a variety of sites including mines, rock shelters, and quarries, but they use caves most frequently. Tricolored bats are somewhat migratory, and many individuals wintering in Kentucky may go farther north for the summer. Although most summer roosting sites are unknown, it is thought that the species primarily uses high tree foliage, hollow trees, buildings, and bridges. Females gather into small maternity colonies where one or two pups are born during May/June. Males probably roost in tree cavities, high tree foliage, and in hollow trees during summer, but during spring and fall, a few individuals seem to show up just about anywhere. Tricolored bats feed entirely on minute flying insects which they capture in forest understory, along stream corridors, and along woodland edges³. A lactating female tricolored bat was captured at mist net Site 5 during the survey conducted for the proposed project in June 2022.

As previously discussed, no caves, rock shelters, or abandoned underground mines that could provide suitable winter roosting habitat for the tricolored bat were identified within the project area. Based on the lack of suitable roosting habitat, no adverse effects to the tricolored bat with respect to winter hibernacula are anticipated for the proposed solar project.

Based on the results of the field reconnaissance and subsequent desktop map review, 40.59-acres of forested habitat meeting the definition of suitable tricolored bat suitable summer roosting, commuting, and/or foraging habitat may be impacted by construction of the proposed project. This suitable bat habitat is located within deciduous hardwood forest wood lots, stream corridors, and fencerows scattered throughout the project area, and contains potential roost sites within mature tree foliage, live shaggy-barked trees and/or dead/damaged standing trees (see enclosed *Suitable Bat Habitat Maps*). There would be potential effects to tricolored bats from the proposed vegetation removal activities, however, it is not anticipated that removal of the relatively small amount of suitable habitat would jeopardize this species. Furthermore, EKPC is committed avoiding the removal of any suitable roost trees during the pupping season of May 15 – July 31 to further minimize potential project impacts to non-volant juveniles. Therefore, implementing the proposed action is not likely to adversely affect this species.

³ Kentucky Department of Fish and Wildlife Resources 2020. Small mammal and bat species accounts – online resource. <https://fw.ky.gov/Wildlife/Pages/Small-Mammals-and-Bats.aspx> (Accessed: April 2024).

Freshwater Mussels

Occurrence data obtained from the USFWS IPaC report indicates that seven federally-listed mussels (see Table 1) have the potential to occur within the project area. However, location-specific data was not available through either the OKNP or USFWS. Mapping contained in the *Kentucky State Nature Preserves Commission 2016 Distributional Atlas of the Freshwater Mussels of Kentucky* indicates that four of these species (clubshell, fanshell, rabbitsfoot, and salamander mussel) are known from Beech Fork or Chaplin River, but these records are from 30+ river miles west (downstream) of the proposed project area. The orangefoot pimpleback is known from the junction of Rolling Fork and the Ohio River in Hardin County. In addition, the ring pink and pink mucket are known from the Salt River in Spencer or Bullitt Counties.

Due to the potential for listed mussel habitat in the larger streams in Marion County, Stantec biologists assessed the streams within and near the Project area boundaries for suitable mussel habitat or the presence of mussel shells in June 2022. The Project is primarily located within the Cartwright Creek (HUC 05140103) drainage within the Lower Ohio-Salt River (HUC 0514011) and is drained by Cartwright Creek, Logan Branch and associated unnamed tributaries. The remainder of the Project is within the Pleasant Fork (HUC 05140103) watershed, which drains into the Nolin River (HUC 05110001). The Project itself consists mainly of agricultural cropland with small areas of intact forested land along Cartwright Creek, Logan Branch, and unnamed tributaries, as well as scattered woodlots and fence rows.

This assessment found that the streams located within the project area are highly impacted by livestock, do not contain suitable substrate or flows for mussels to persist, and will not be directly impacted by project activities. In addition, the known occurrences for these species are located well downstream of the project area and no mussels or relict shells were observed within the current project area. Therefore, no direct effects to listed freshwater mussels are expected from the proposed project. Although no freshwater mussels will be directly affected by the proposed project, suitable mussel habitat is ultimately located downstream of the project area in Beech Fork, Salt River, and Rolling Fork. As previously discussed, to avoid and minimize indirect effects associated with potential water quality degradation from the project, EKPC would prepare and implement a SWPPP that outlines how and where BMPs will be used to prevent or reduce the discharge of pollutants into waters of the Commonwealth during the construction period. Therefore, adverse impacts to water quality are not anticipated from the proposed project and the proposal is not likely to adversely affect the federally listed mussel species.

Federally Protected Bird Species

In addition to federally listed species or critical habitats that could be affected by the proposed project, EKPC evaluated the potential for the proposed project to impact federally-protected bird species with respect to the *Migratory Bird Treaty Act* and the *Bald and Golden Eagle Protection Act*. As a conservation measure, EKPC will incorporate the guidelines listed in the Avian Power Line Interaction Committee's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* into the proposed substation and transmission tie line design to avoid or minimize the potential electrocution risks posed to federally protected bird species from the project. The project will also be designed in accordance with recommended guidelines issued by RUS to ensure compliance with state and federal codes. Additionally, the proposed project area is not located within a major flyway or principal route for migratory birds. No other areas of significant concern were identified during the field survey. Likewise, based on information provided in the IPaC Report, there are no known eagle occurrences within the vicinity of the proposal, and there were no eagles or eagle nests observed within the project area during the field investigation. Based on information in the IPaC Report, the whooping crane is listed as an Experimental population, Non-essential (EXPN) with known populations in Kentucky, but the proposed project is not within the principle migratory route for this experimental population. Therefore, construction of the proposed project is not expected to cause significant adverse impacts to federally protected birds or eagles.

RECOMMENDATIONS FOR DETERMINATION OF EFFECT FINDINGS

Based on the existing occurrence data, negative survey results, avoidance of suitable habitat impacts during the tricolored bat pupping season (May 15 – July 31), and aquatic habitat avoidance/minimization measures to be implemented during construction, it is not anticipated the proposed project would adversely affect/jeopardize the federally-listed species that occur, or have the potential to occur, within the project area, as outlined below.

Table 3. *Recommendations for Determination of Effect Findings*

Common Name	Effects Determination
Indiana bat	May affect – not likely to adversely affect
Northern long-eared bat	May affect – not likely to adversely affect
Gray bat	May affect – not likely to adversely affect
Tricolored bat	May affect – not likely to adversely affect
Clubshell	May affect – not likely to adversely affect
Fanshell	May affect – not likely to adversely affect
Orangefoot Pimpleback	May affect – not likely to adversely affect
Pink Mucket	May affect – not likely to adversely affect
Rabbitsfoot	May affect – not likely to adversely affect
Ring Pink	May affect – not likely to adversely affect
Salamander Mussel	May affect – not likely to adversely affect
Whooping Crane	Experimental Population, Non-Essential
Federally protected bird species	May affect – not likely to jeopardize

EKPC asks that your office review these recommendations for determination of effect and provide your comments on this project as soon as possible. Please inform EKPC if any other threatened or endangered species or critical habitats should be addressed in regards to the proposed project. If you need any further information or wish to discuss this project, please feel free to contact me by phone at (859) 745-9799 or by email at josh.young@ekpc.coop.

Thank you very much for your assistance in this matter.

Sincerely,

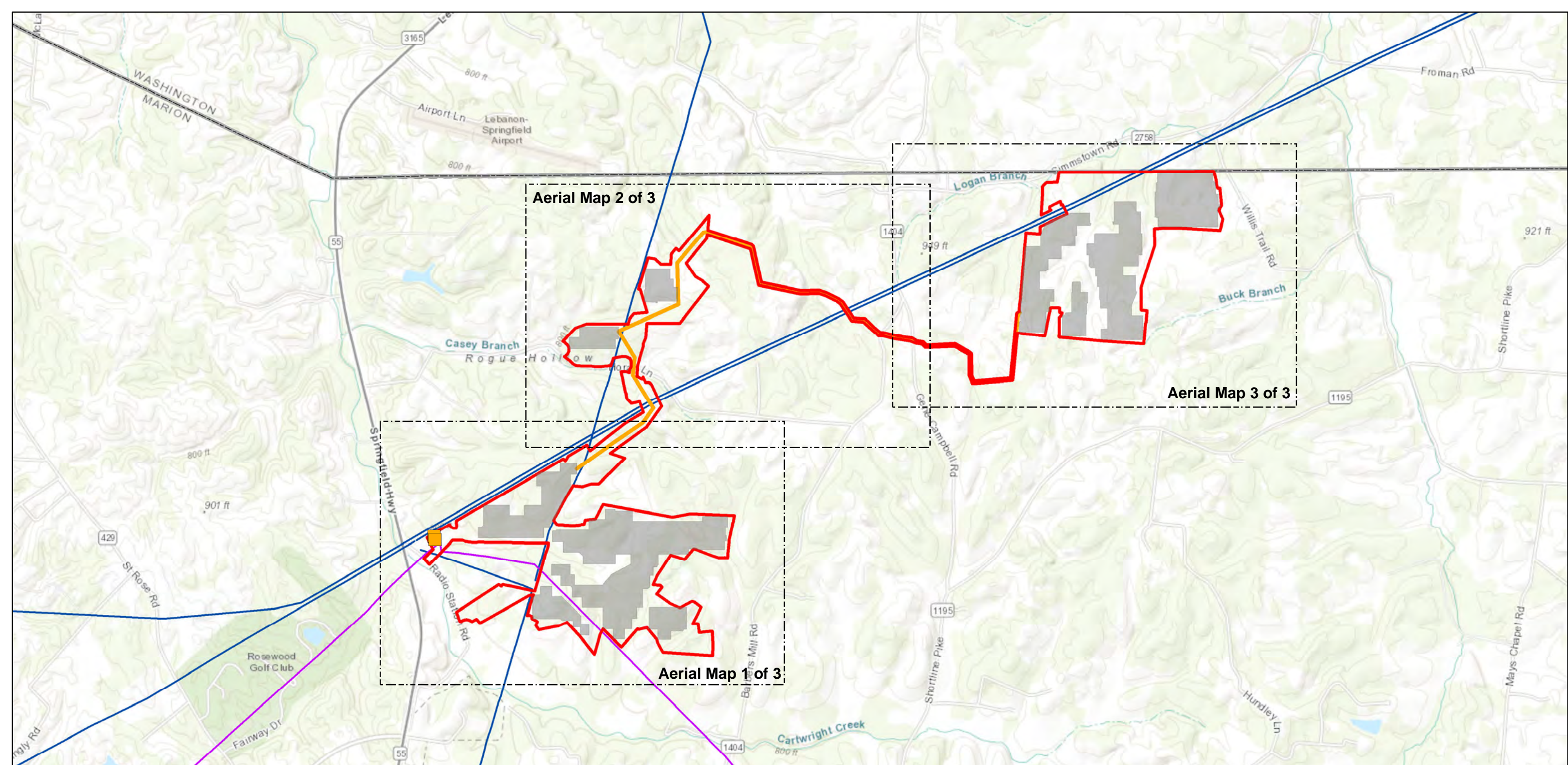


Josh Young
Supervisor, Natural Resources
& Environmental Communications

Enclosures







cc: Jerry Purvis (EKPC), Darrin Adams (EKPC), Steve Anderson (EKPC)

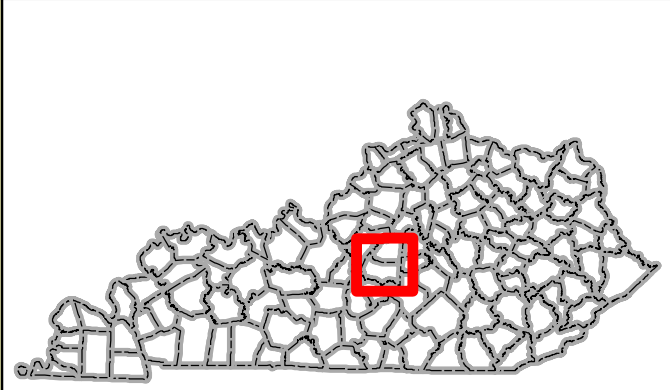
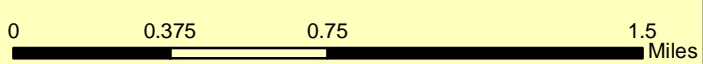
ENCLOSURES



Northern Bobwhite Solar Project

Project Vicinity Map

-  NEPA Analysis Area
-  Preliminary Panel Layout
-  Collector Line
-  Existing EKPC Marion Co. Substation
-  Existing EKPC Transmission Lines
-  Existing KU Transmission Lines



ent P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, contributors, and the GIS User Community

Northern Bobwhite Solar Project Aerial Overview Map 1 of 3

NEPA Analysis Area (Red outline)

Preliminary Panel Layout (Green outline)

Preliminary Buried Collector Line (Orange line)

Collector and Step-Up Substations (Cyan shapes)

Transmission Tie Line (Blue line)

Existing EKPC Transmission Lines (Purple line)

Existing KU Transmission Lines (Dark Blue line)

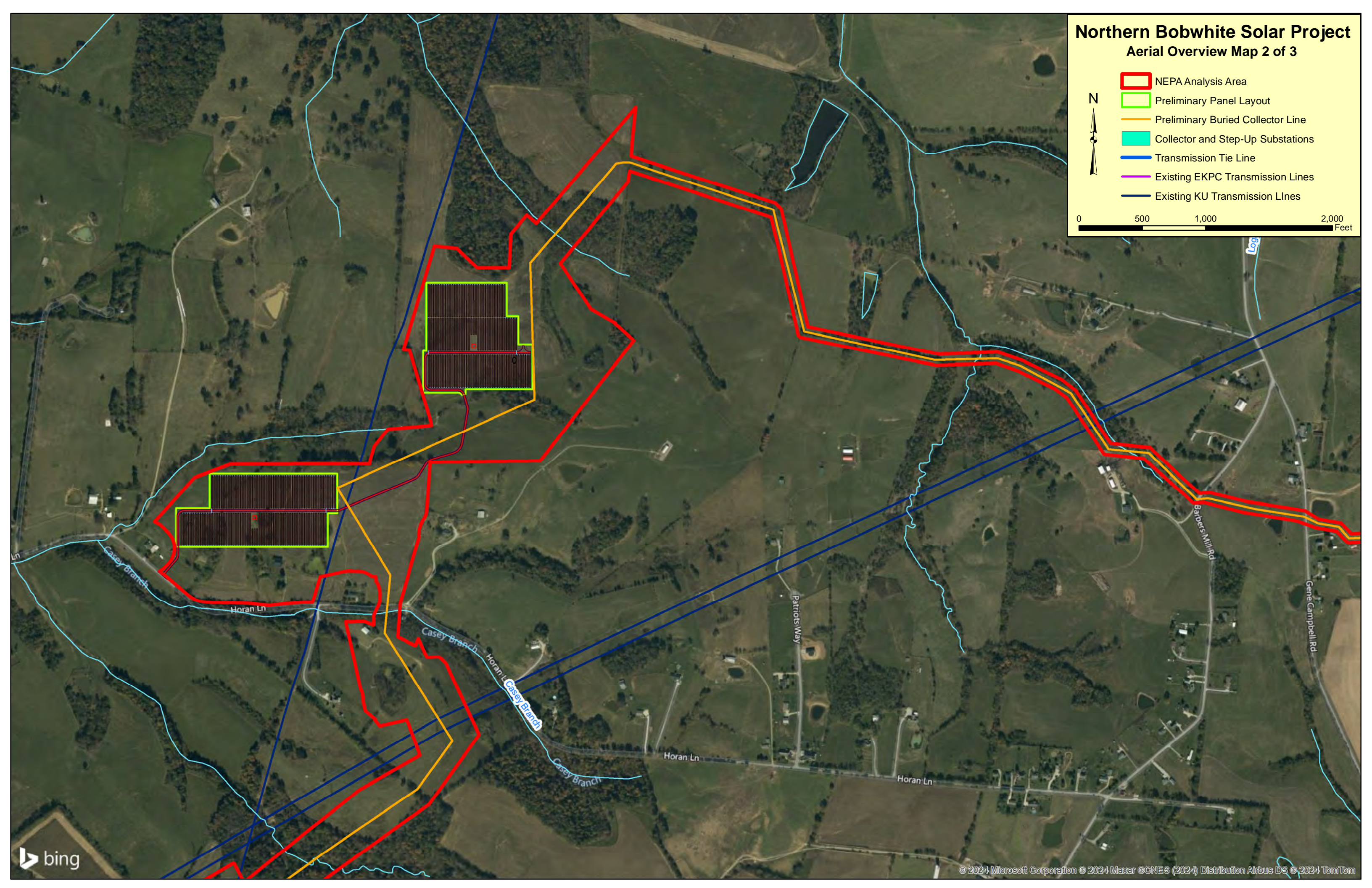
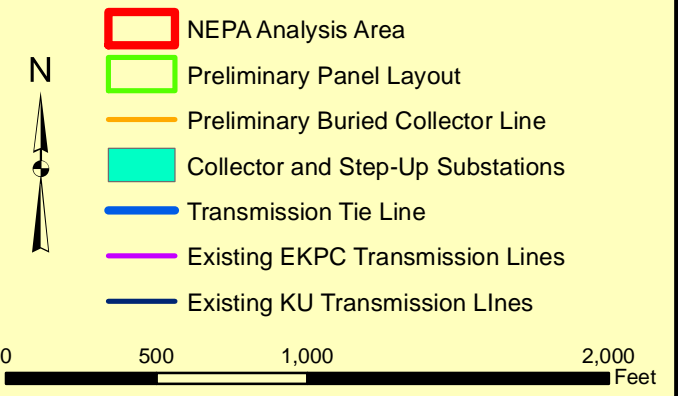
0 500 1,000 2,000 Feet

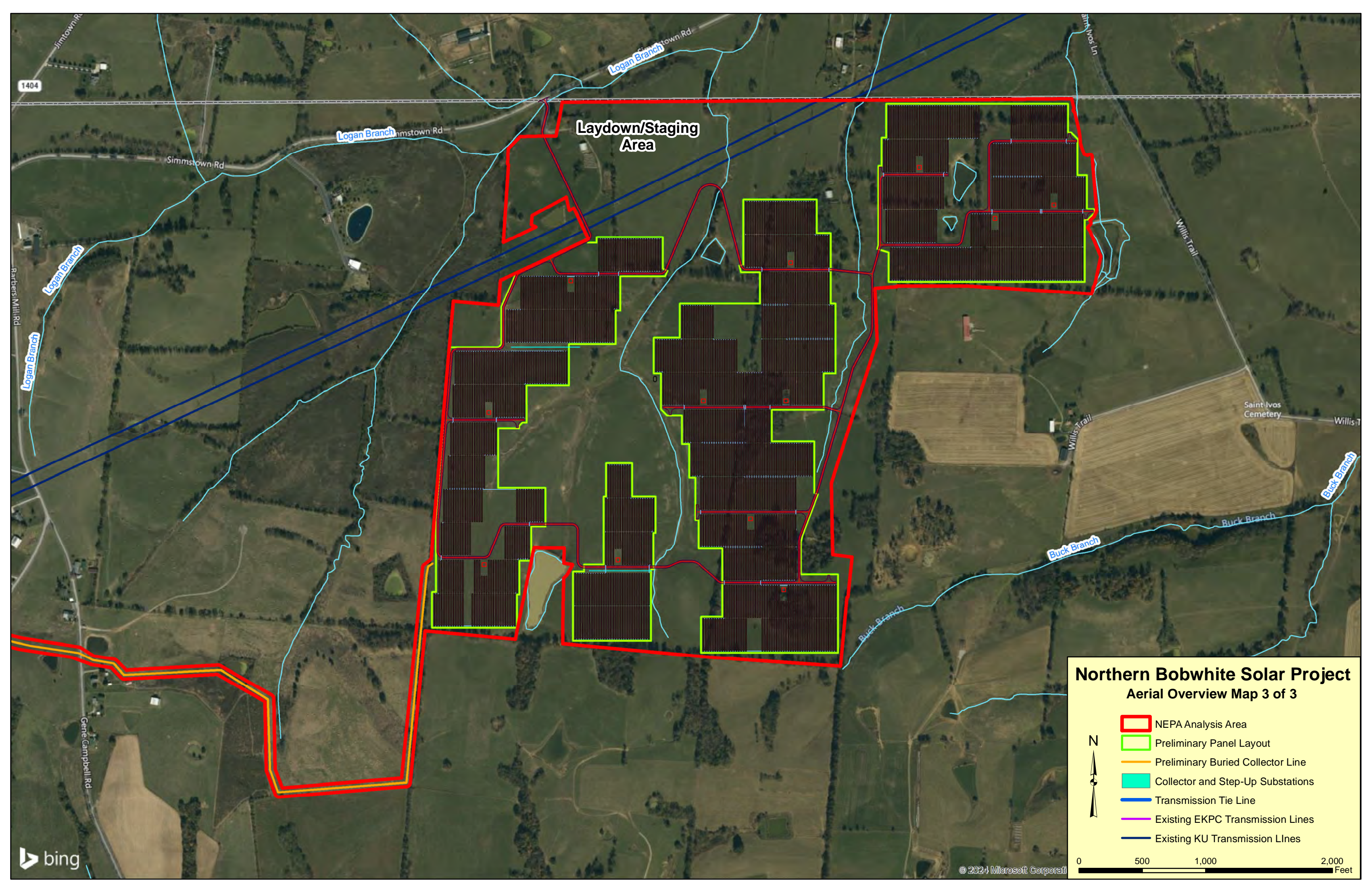
Marion County Substation

Laydown/Staging Area

Northern Bobwhite Solar Project








Aerial Overview Map 2 of 3

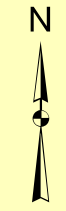




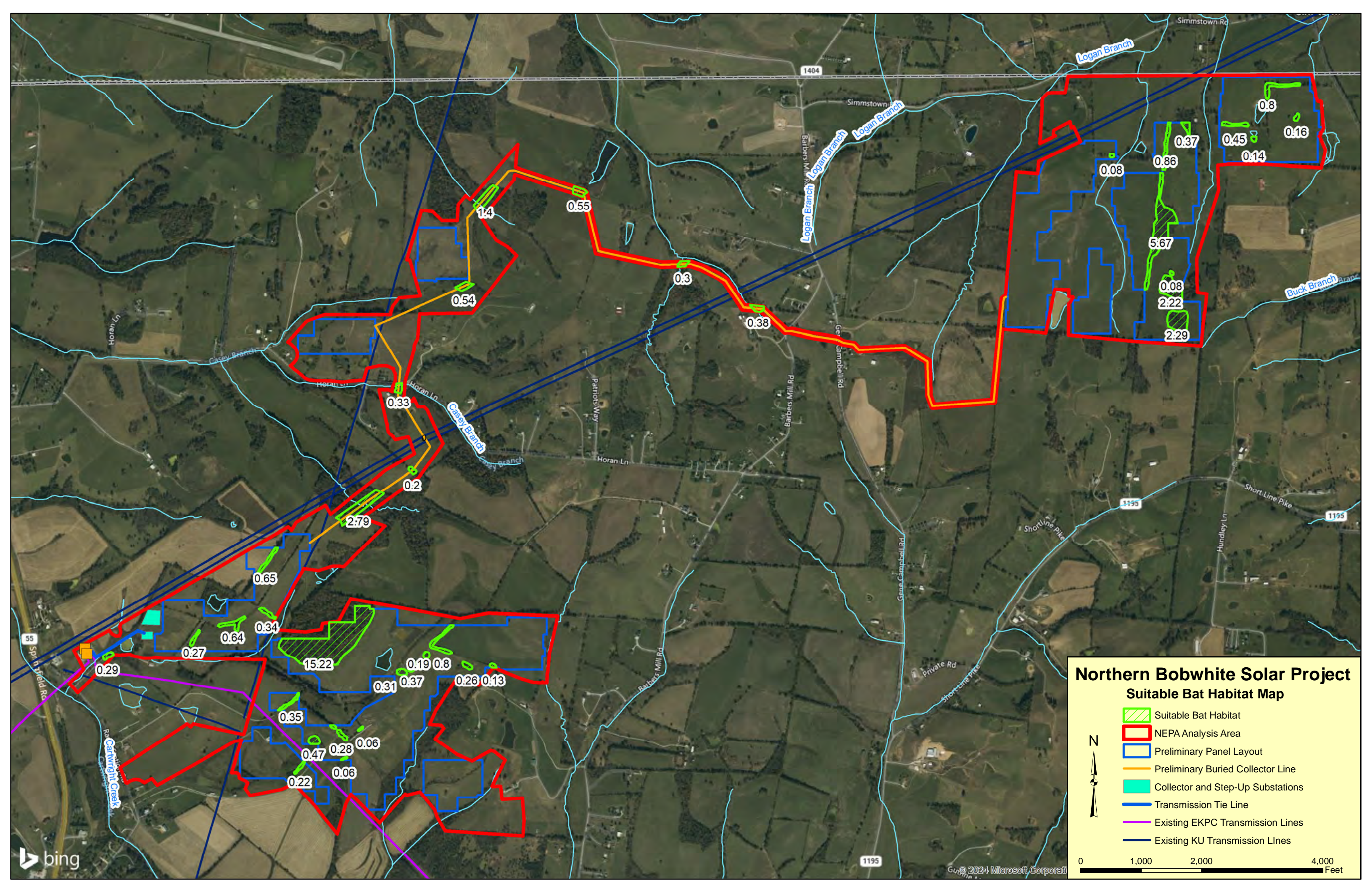
Laydown/Staging Area

Northern Bobwhite Solar Project Aerial Overview Map 3 of 3

-  NEPA Analysis Area
-  Preliminary Panel Layout
-  Preliminary Buried Collector Line
-  Collector and Step-Up Substations
-  Transmission Tie Line
-  Existing EKPC Transmission Lines
-  Existing KU Transmission Lines



0 500 1,000 2,000
Feet



Northern Bobwhite Solar Project
Suitable Bat Habitat Map

- ▨ Suitable Bat Habitat
- NEPA Analysis Area
- Preliminary Panel Layout
- Preliminary Buried Collector Line
- Collector and Step-Up Substations
- Transmission Tie Line
- Existing EKPC Transmission Lines
- Existing KU Transmission Lines

0 1,000 2,000 4,000 Feet



**Bat Mist Net Survey and Mussel
Habitat Survey for the Northern
Bobwhite Solar Project,
Marion County, Kentucky**

USFWS TAILS#: Not Defined

December 13, 2022

Prepared for:

EDF RENEWABLES DEVELOPMENT,
INC



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

This document entitled Bat Mist Survey and Mussel survey for the Northern Bobwhite Project, Marion County, Kentucky was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of EDF Renewables Development, Inc. (EDF) (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.



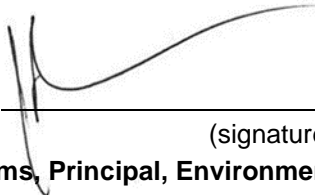
Prepared by _____
(signature)

Lee Carolan, Senior Environmental Scientist



Reviewed by _____
(signature)

Tyler Newman, Environmental Scientist



Approved by _____
(signature)

Joshua Adams, Principal, Environmental Services



Table of Contents

EXECUTIVE SUMMARY	I
1.0 INTRODUCTION.....	1
1.1 PROJECT LOCATION DESCRIPTION	1
1.2 REGULATORY SETTINGS.....	1
1.3 PURPOSE OF REPORT	2
2.0 METHODS	2
2.1 MIST NETTING GUIDELINES.....	3
2.4 BAT CAPTURE AND PROCESSING	6
2.5 WEATHER	6
3.0 RESULTS	6
3.1 BAT HABITAT DESCRIPTION	6
3.2 MUSSEL HABITAT.....	8
3.3 BAT CAPTURE	8
3.4 WEATHER AND TEMPERATURE	9
4.0 DISCUSSION.....	10
5.0 REFERENCES.....	12

LIST OF TABLES

Table 3.1. Bat species captured during mist net surveys for Northern Bobwhite Solar, Marion County, Kentucky, June 2022.	9
Table 3.2. Weather Recordings for Northern Bobwhite Solar 2022 Mist Net Survey, Marion County, Kentucky.....	10

LIST OF APPENDICES

APPENDIX A	PROJECT AREA MAP
APPENDIX B	BAT MIST NET DATA SHEETS
APPENDIX C	MUSSEL HABITAT ASSESSMENT
APPENDIX D	PHOTOGRAPHS



Executive Summary

EDF Renewables Development, Inc (EDF) is proposing to construct a utility scale solar project in Marion County, Kentucky. Due to the presence of potential summer habitat for the Indiana bat (*Myotis sodalis*), a federally endangered species, and the northern-long eared bat (*Myotis septentrionalis*), a federally threatened species, within the forested areas on the proposed project area (the "Project"), Stantec Consulting Services Inc. (Stantec) was retained by EDF to complete a presence/probable absence bat mist net survey for these two species and to conduct listed mussel habitat assessments in the streams that fall within the project area.

The objective of the mist net survey was to assess the presence, or probable absence, of Indiana and northern long-eared bats during summer within the proposed project area. Survey methods followed the U.S. Fish and Wildlife Service (USFWS) 2022 Range-wide Summer Survey Guidelines dated March 2022, and the USFWS guidance dealing with COVID dated June 12, 2020. Weather restrictions outlined in the above guidance were also followed, and mist netting was conducted in areas with potentially suitable summer habitat for Indiana and northern long-eared bats. Site specific authorization of survey methods were received from the USFWS Kentucky Field Office on May 23, 2022, and email notification was provided to the Kentucky Department of Fish and Wildlife Resources (KDFWR).

No Indiana or northern-long eared bats were captured during this 2022 summer mist netting survey. One tri-color bat (*Perimyotis subflavus*) was captured during the course of this survey. On September 13, 2022, USFWS issued a ruling that this species may be warranted for listing under the Endangered Species Act as endangered. In addition, five gray bats (*Myotis grisescens*), eleven big brown bats (*Eptesicus fuscus*), seven eastern red bats (*Lasiurus borealis*), one Hoary bat (*Lasiurus cinereus*), and four evening bats (*Nycticeius humeralis*) were captured while conducting the 2022 summer mist net survey activities.

The deciduous hardwood forest wood lots and stream corridors within the Project provided potentially suitable summer habitat for both the Indiana and northern long-eared bat, but neither species were documented at mist net locations within potential foraging and traveling habitat. Based on the data collected during mist net surveys completed for the Project following USFWS approved guidelines, and apparent absence of the Indiana bat and northern long-eared bat, it is Stantec's professional opinion that the project's May Affect – Not Likely to Adversely Affect these species. Additionally, the streams that are located within the project area are highly impacted by livestock, do not contain suitable substrate or flows for mussels to persist, and will not be directly impacted by project activities. As such, it is Stantec's professional opinion that the project's May Affect – Not Likely to Adversely Affect listed mussel species and the gray bat. In addition, on September 13, 2022, USFWS issued a proposed rule that tricolor bats were warranted to be listed as endangered. At the time of writing this report, it is unknown what a listing of this species will look like, EDF is willing to work with USFWS to implement conservation measures to reduce the potential for impacts to this species.



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

1.0 INTRODUCTION

EDF Renewables Development, Inc (EDF) proposes to construct a utility scale solar panel array in Marion County, Kentucky. This site was selected due to the proximity of electric transmission infrastructure. The Project area can be seen on Figure 1 in Appendix A.

Due to the presence of potential summer habitat for the Indiana bat (*Myotis sodalis*), a federally endangered species, and the northern long-eared bat (*Myotis septentrionalis*), a federally threatened species, within forested stands of the proposed Project, Stantec Consulting Services Inc. (Stantec) was retained by EDF to complete a bat mist net survey for these two species of bats. The objectives of this survey were as follows:

- Determine presence or probable absence of Indiana bats and northern long-eared bats in the Project area;
- Establish baseline data on bat species composition within the Project area; and
- If captured, radio-track Indiana bats to determine their roosting habitat and locations.

EDF contracted Stantec to conduct suitable habitat assessments of listed mussels and to look for the presence of mussel shells in the larger streams within the Project area boundaries while assessing for signs of bat use of culverts and bridges. None of the receiving streams in the Project contained mussel habitat.

1.1 PROJECT LOCATION DESCRIPTION

The Project is primarily located within the Cartwright Creek (HUC 05140103) drainage within the Lower Ohio-Salt River (HUC 0514011) and is drained by Cartwright Creek, Logan Branch and associated unnamed tributaries (KYDOW 2022). The remainder of the Project is within the Pleasant Fork (HUC 05140103) watershed, which drains into the Nolin River (HUC 05110001). The Project itself consists mainly of agricultural crop land with small areas of intact forested land along Cartwright Creek, Logans Branch, and unnamed tributaries, as well as scattered woodlots and fence rows throughout the property.

1.2 REGULATORY SETTINGS

The federal Endangered Species Act (ESA) [16 U.S.C. 1531 et seq.] became law in 1973. This law provides for the listing, conservation, and recovery of endangered and threatened species of plants and wildlife. Under the ESA, the U. S. Fish and Wildlife Service (USFWS) strives to protect and monitor the numbers and populations of listed species. Many states enacted similar laws.

Section 7(a)(2) of the ESA states that each federal agency shall ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of designated critical habitat. Federal actions include (1) expenditure of federal funds for roads, buildings, or other construction projects, and (2) approval of a permit or license, and the activities resulting from such permit or license. This is true regardless of whether involvement is apparent, such as



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

issuance of a federal permit, or less direct, such as federal oversight of a state-operated program, or federal funding of state highways.

Section 9 of the ESA prohibits the take of listed species. Take is defined by the ESA as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect.” The definition of harm includes adverse habitat modification. Actions of federal agencies that do not result in jeopardy or adverse modification, but that could result in a take, must be addressed under Section 7 of the ESA.

1.3 PURPOSE OF REPORT

The purpose of this document is to provide a scientifically-defensible report detailing the mist net survey efforts for KDFWR to use in consultation with USFWS. The report includes a description of methods, results and summarized data, and discussion regarding the bat mist netting survey. Maps, field data sheets, and representative photographs are provided as appendices in the report (Appendices A, B, and D respectively). This report will also be used by Stantec for annual coordination of our federal permit activities with USFWS and KDFWR.

2.0 METHODS

Based on the acreage of proposed tree clearing and size of the project, 48 net nights of mist-netting effort was suggested to meet the standards set in the USFWS 2022 Range-wide Indiana Bat & Northern Long-Eared Bat Summer Survey Guidance (USFWS 2022). There were six sites (MS-01, MS-02, MS-03, MS-04, MS-05, and MS-06), consisting of between three and five separate net sets per night, which were surveyed for two nights each. Stantec completed a total of 48 net nights to meet the USFWS summer survey guidance requirements for non-linear projects located outside of the Appalachian Recovery Unit. Mist net surveys were conducted within the Project from June 27 to July 4, 2022. Site specific authorization of survey methods were received from the USFWS Kentucky Field Office on May 23, 2022, and email notification was provided to KDFWR.

Due to the potential of listed mussel habitat in the larger streams in Marion County, the biologists on site assessed the streams within and near the Project area boundaries for suitable mussel habitat or the presence of mussel shells in June 2022. Since the tributaries within the Project were connected to the larger streams outside the Project, it was anticipated that there was no suitable habitat for mussels in the smaller streams within the Project (Appendix C).



2.1 MIST NETTING GUIDELINES

Environmental factors can be highly variable in field settings, leading to a variety of bat survey techniques. However, the USFWS has standardized certain netting and acoustic practices for endangered bat surveys, which are outlined in the USFWS 2022 Range-Wide Indiana Bat & Northern Long-Eared Bat Summer Survey Guidelines (USFWS 2022). The guidelines, a summary of which follows, were adhered to during this survey. In order to reduce or eliminate exposure to *Pseudogymnoascus destructans*, the fungus that causes White Nose Syndrome in bats (Frick et al. 2016), extra precaution was taken to follow the USFWS White Nose Syndrome (WNS) Disinfectant Protocols (version 10.14.2020; WNS Decontamination Team 2020) during the survey.

USFWS Range-Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines

1. **Netting Season:** May 15 to 15 August, when Indiana bats occupy summer habitat in Tennessee.
2. **Equipment (Mist-nets):** Constructed of the finest, lowest visibility mesh commercially available – monofilament or black nylon – with the mesh size approximately 38 mm (1¼ –1¾ in).
3. **Net Placement:** Mist-nets are traditionally placed over travel corridors in forest (e.g., streams, logging roads, two-tracks) that extend from ground- (or water-) level to overhanging canopy and are bounded by foliage on the sides. Net width and height are adjusted for the fullest coverage of the flight corridor and, when possible, extend beyond the boundaries of the corridor to prevent bats from flying around net edges. When possible, nets are placed so they bisect bends in the corridor. A “typical” net set consists of nets “stacked” on top of one another with heights from 5 m (16 ft) up to 8 m (30 ft); width may vary up to 18 m (60 ft).

For surveys targeting northern long-eared bats, mist-nets should be placed in traditional (described above) and non-traditional locations, such as small forest openings, ponds, and interior forest. Sampling non-traditional locations ensures their preferred microhabitats are sampled, which can differ slightly from Indiana bat.

4. Netting Protocols

- ◆ No disturbance near the nets between checks
- ◆ Sample Period: begin at sunset (or when darkness falls) and net for minimum of 5 hours
- ◆ Nets are monitored at approximately 10-minute intervals
- ◆ Maximum of three consecutive nights of netting at any given location. After two consecutive nights of netting at the same location without capturing Indiana or northern long-eared bats, net locations must be changed, or netting must pause and resume at this location after at least two calendar nights.

Midwest and Ozark-Central Indiana Bat Recovery Unit:



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

USFWS Range-Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines

- ◆ Linear projects: a minimum of two net nights per kilometer (0.6 miles) of suitable summer habitat.
- ◆ Non-linear projects: a minimum of nine net nights per 0.5 square kilometer (123 acres) of suitable summer habitat.

Northern Long-eared Bat (Range-wide):

- ◆ Linear projects: a minimum of four net nights per kilometer (0.6 miles) of suitable summer habitat.
- ◆ Non-linear projects: a minimum of 16 net nights per 0.5 square kilometer (123 acres) of suitable summer habitat.

5. **Weather Conditions:** Net only if the following weather conditions are met:

- ◆ Precipitation, including rain and/or heavy fog, does not exceed a total of 30 minutes (including intermittently) during the survey period
- ◆ Temperature $\geq 10^{\circ}\text{C}$ (50°F)
- ◆ Sustained wind speeds do not exceed nine miles/hour or a “3” on Beaufort Wind Scale.

6. **Moonlight:** Avoid net sets with direct exposure to a moon $\frac{1}{2}$ -full or greater – typically by utilizing forest canopy cover

2.2 MIST NET SITE SELECTION

A qualified Indiana bat mist net surveyor chose suitable net locations within the Project. Net site selection targeted areas throughout the Project area that were suspected to have high amount of bat activity. Net site selection was also influenced by property access. Net placement was based on a variety of characteristics, including canopy cover, presence of potential flight areas, proximity to water, and forest conditions found within the Project area. General habitat types selected included the following characteristics:

- Large trees (>16 inches diameter-at-breast height [DBH]) that can support primary maternity roosts;
- An open canopy, allowing solar exposure for warming of roost sites;
- An open, uncluttered understory used for travel and foraging; and
- Stream area (or other water source) for drinking and prey presence



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

While riparian areas often provide successful mist net sites, upland areas (e.g., trails or logging roads) also provide suitable sites (Kiser and MacGregor 2005). In upland areas, road ruts or other areas of standing water frequently facilitate capture of a variety of bat species. The actual location and orientation of each mist net was determined in the field.

2.3 HABITAT ASSESSMENT

A habitat description and a sketch of the mist net location was completed on bat mist net datasheets (Appendix B). The emphasis of this description was habitat form: size and relative abundance of large trees and snags that may potentially serve as roost trees, canopy closure, understory clutter/openness, distance to water, stream or pond characteristics (if mist net was placed over them), and flight areas. Habitat form is emphasized because the Indiana bat is known to roost in several different species of trees (USFWS 2007). Tree species composition is included in the assessment because it provides insight to edaphic conditions of each site. In addition, biologists completed a USFWS habitat assessment, the associated datasheet can be found in Appendix B.

Habitat characterization identifies components of the canopy and subcanopy layers. All trees that reach into the canopy are canopy trees, regardless of their diameter/size. As defined in the Indiana Bat Habitat Suitability Index Model (3D/Environmental 1995), dominant trees are the large trees in the canopy (> 16" DBH) that have the greatest likelihood of being used by maternity colonies of Indiana bats. Many smaller trees are often also found in the canopy, and in some situations, the canopy can be entirely composed of smaller-diameter trees.

Habitat for the northern long-eared bat is less understood, but apparently far more general than that of the Indiana bat (Schultes and Elliott 2002; Whitaker and Mumford 2009). While some studies have found this species using larger, older forests and roosts (Lacki and Schwierjohann 2001; Henderson and Broders 2008), others have found the species using smaller roosts and forest tracts (Whitaker and Mumford 2009; Schultes and Elliott 2002). Therefore, conditions for capture of the Indiana bat were considered adequate for sampling for northern long-eared bats as well.

The subcanopy, or understory, vegetation layer is well defined in classical ecological literature. It is that portion of the forest structure between the ground vegetation to approximately 0.6 m (2 ft) and the canopy layers, usually beginning at about 7.6 m (25 ft).

Vegetation in the understory may come from:

- Lower branches of overstory trees;
- Young overstory trees; or
- Small trees and shrubs that are confined to the understory

The amount of vegetation in the understory is termed clutter. Many species of bats, including the Indiana bat, tend to avoid areas of high clutter; however, northern long-eared bats are often found in areas of relatively high clutter (Carter and Feldhamer 2005).



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

The large streams within and nearby to the Project boundary posed potential mussel habitat. During the habitat assessment for bats, large streams and unnamed tributaries were assessed for mussel habitat and relic shells.

2.4 BAT CAPTURE AND PROCESSING

Protocols for bat capture, handling, and equipment decontamination for WNS were followed at each mist net site. Additionally, USFWS COVID-19 guidance was followed during the surveys.

2.5 WEATHER

Weather conditions were monitored each night of the survey. Conditions recorded include temperature, wind speed and direction, percent cloud cover, and moon phase (if visible). A standard digital thermometer was used to record temperature, wind speed was estimated by using the Beaufort wind scale, and cloud cover was visually estimated.

3.0 RESULTS

3.1 BAT HABITAT DESCRIPTION

The Project required 48 net nights which were split between six mist net sites as shown in Appendix A. Habitat at the six mist net sites is briefly described below.

Mist net site 01 (MS-01) contained four net sets, which were surveyed for two calendar nights (June 28 and July 1). Net A was located across Cartwright Creek just north of a bridge located on Radio Station Road that crosses the stream. Net B was located just east of Cartwright Creek downstream of Net A. Net C was located across Cartwright Creek, downstream of Net B. Net D was set along an unnamed tributary of Cartwright Creek. The overstory was dominated by boxelder (*Acer negundo*), black walnut (*Juglans nigra*), and common hackberry (*Celtis occidentalis*) that ranged from 14 to 20 inches DBH. The dominant subcanopy species (trees with DBH 4 to 10 inches) include Osage orange (*Maclura pomifera*), red mulberry (*Morus rubra*), box elder, and America elm (*Ulmus americana*). The dominant shrub species include mutli-flora rose (*Rosa multiflora*), shrub honeysuckle (*Lonicera nitida*), and sapling overstory. The site had a riparian forest along the creek and forested hedgerow with some overgrowth on field edges. The potential for roost tree habitat is estimated to be low, and an overall habitat rating of good was assigned to this site.

The second mist net site (MS-02) was located approximately along Murphy Farm Creek, 0.7 miles east from junction of Murphy Farm Lane and Radio Station Road. This site contained four net sets and was surveyed for two calendar nights (June 27 and 29). Nets A and C were located across an upland road corridor that was adjacent to stream and forested slope, upslope from Murphy Farm Creek. Net B and D were over Murphy Farm Creek with D being at the confluence of two tributaries and B downstream from D. The overstory was dominated by box elder, shagbark hickory (*Carya ovata*), black walnut and red maple (*Acer rubrum*) that ranged from 10 to 16 inches DBH. The dominant subcanopy tree species (trees ranged from 4 to 8 inches DBH) were mockernut hickory (*Carya tomentosa*), common hickory, Ohio buckeye (*Aesculus glabra*), and chinquapin oak (*Quercus muehlenbergii*). The dominant shrub species included



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

multi-flora rose, coral berry (*Symphoricarpos orbiculatus*), eastern red cedar (*Juniperus virginiana*), and shrub honeysuckle. The site had moderate canopy closure. The potential for roost tree habitat is estimated to be moderate, and an overall habitat rating of good was assigned to this site.

The third mist net site (MS-03) was located in the headwaters of Casey Branch adjacent to overhead utility line corridor. This site contained four net sets and was surveyed for two calendar nights (June 30 and July 1). Nets A and B were located across an upland road corridor that was adjacent to stream riparian zone and forested slope. Net C was located in an opening in a forested area, and Net D was located across Casey Branch. The overstory was dominated by shellbark hickory (*Carya laciniosa*), American white oak (*Quercus americanus*), and sugar maple (*Acer saccharum*) that ranged from 8 to 16 inches DBH. The dominant subcanopy tree species (3 to 7 inches DBH) were hop hornbeam (*Ostrya virginiana*), eastern redbud (*Cercis canadensis*), black walnut, and American hornbeam (*Carpinus caroliniana*). The dominant shrub species include Shrub honeysuckle, multi-flora rose, roughleaf dogwood (*Cornus drummondii*), and sapling overstory species. The site had moderate canopy closure. The potential for roost tree habitat is estimated to be moderate, and an overall habitat rating of good was assigned to this site.

The fourth mist net site (MS-04) was located on Casey Branch. This site contained three nets and was surveyed for two calendar nights (July 2-3). Nets A, B and C were located across water filled pools adjacent to Horan Lane across an upland road corridor that was adjacent to stream riparian zone and field edge. The overstory was dominated by black walnut, chinquapin oak, common hackberry, and red oak (*Quercus rubrum*) that ranged from 12 to 18 inches DBH. The dominant subcanopy tree species (3 – 8 inches DBH) were butternut hickory (*Carya cordiformis*), sugar maple, American hornbeam and shagbark hickory. The dominant shrub species include Ohio buckeye, multi-flora rose, sapling overstory species, and coral berry. The site had low canopy closure. The potential for roost tree habitat is estimated to be low, and an overall habitat rating of poor was assigned to this site.

The fifth mist net site (MS-05) was located in a small hardwood woodlot with a pond in between hayfields. This site contained four nets and was surveyed for two calendar nights (June 28 and 30). Net A was located at the north end of the pond at the edge of the pasture. Net B was located at the south end of the pond at the edge of the woodlot. Nets C and D were located between two woodlots, west of the pond within the pasture. The overstory was dominated by green ash (*Fraxinus pennsylvanica*), red oak, and hackberry that ranged from 18 to 22 inches DBH. The dominant subcanopy tree species (ranging from 5 – 6 inches DBH) were butternut hickory, sugar maple, American hornbeam and shagbark hickory. No dominant shrub or understory species due to presence of grasses. The site had high canopy closure. The potential for roost tree habitat is estimated to be high, and an overall habitat rating of good was assigned to this site.

The sixth mist net site (MS-06) was located in a linear pasture bounded by narrow wooded stream corridor and a small woodlot. This site contained five nets and was surveyed for two calendar nights (June 29 and July 1). Nets A, B and C were located across the wooded stream corridor from north to south. Net D was located across a forest path to the west of the wooded stream corridor between two woodlots. Net E was located on the south side of the site, across the pasture between a woodlot and the wooded stream corridor. The overstory was dominated by black walnut, hackberry, and black locust (*Robinia pseudoacacia*), that ranged from 16 to 20 inches DBH. The dominant subcanopy tree species was hackberry. The dominant



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

shrub species include multi- flora rose. The site had high canopy closure. The potential for roost tree habitat is estimated to be high, and an overall habitat rating of good was assigned to this site.

3.2 MUSSEL HABITAT

Due to the potential of listed mussel habitat in the larger streams in Marion County, the biologists on site assessed the streams on and near the Project area boundaries for suitable mussel habitat or the presence of mussel shells in June 2022. Since the tributaries within the Project were connected to the larger streams outside the Project, it was anticipated that there was no suitable habitat for mussels in the smaller streams within the Project which ended up being the case (Appendix C).

3.3 BAT CAPTURE

No Indiana or northern long-eared bats were captured during this mist net survey. A total of twenty-nine (29) bats were captured including five (5) gray bats (*Myotis grisescens*), seven (7) eastern red bats (*Lasiurus borealis*), one (1) hoary bat (*Lasiurus cinereus*), one (1) tri-colored bat (*Perimyotis subflavus*), eleven (11) big brown bats (*Eptesicus fuscus*), and four (4) evening bats (*Nycticeius humeralis*) were captured while conducting 2022 summer mist net survey activities (Appendix B). Three eastern red bats and one gray bat escaped from the net prior to having any measurements taken. Two big brown bats and one eastern red bat escaped from hands prior to having any measurements taken. Table 3.1 shows the number of bat species captured and gender data taken during the survey. Field data sheets containing morphometric data, capture locations, and time of capture for individual bats can be found in Appendix B.



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

Table 3.1. Bat species captured during mist net surveys for Northern Bobwhite Solar, Marion County, Kentucky, June 2022.

Site	Male		Adult Female		Total
	Adult	Juvenile	Pregnant/Lactating	Non-reproductive	
Gray bat (<i>Myotis grisescens</i>)	0	0	4	1	5
Eastern red bat (<i>Lasiurus borealis</i>)	1	0	6	0	7
Hoary Bay (<i>Lasiurus cinereus</i>)	0	0	1	0	1
Tri-colored Bat (<i>Perimyotis subflavus</i>)	0	0	1		1
Big brown bat (<i>Eptesicus fuscus</i>)	5	2	3	1	11
Evening bat (<i>Nycticeius humeralis</i>)	0	0	4	0	4
Totals	6	2	19	2	29

3.4 WEATHER AND TEMPERATURE

Weather during the survey period started in the low seventies and started dropping after sunset and throughout the night into the high sixties. Cloud cover ranged from 20 percent to 95 percent during the first two nights of the survey period and ranged from 10 percent to 100 percent. There was very little wind during the entire survey period. Table 3.2 contains onsite weather data collected during survey period.



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

Table 3.2. Weather Recordings for Northern Bobwhite Solar 2022 Mist Net Survey, Marion County, Kentucky

Site	Date	Temperature°F			Wind Speed ¹			Cloud Cover %		
		2100h	2300h	0200h	2100h	2300h	0200h	2100h	2300h	0200h
MS-01	28-Jun-22	69.7	53.7	52.0	0	0	0	0	0	0
MS-01	1-Jul-22	82.5	74.8	73.4	0	0	0	30	40	10
MS-02	27-Jun-22	71.5	61.7	58.6	1	0	0	10	0	0
MS-02	29-Jun-22	73.5	61.8	60.1	0	0	0	0	0	0
MS-03	30-Jun-22	80.4	70.1	69.3	0	0	0	40	0	0
MS-03	4-Jul-22	77.6	72.9	71.6	0	0	0	20	0	0
MS-04	2-Jul-22	83.4	73.8	73.2	0	1	0	60	20	75
MS-04	3-Jul-22	81.1	74.2	70.5	2	1	1	0	0	0
MS-05	28-Jun-22	69.7	61.9	59.0	1	0	0	10	0	0
MS-05	30-Jun-22	82.7	78.0	76.5	0	1	1	70	0	0
MS-06	29-Jun-22	68.8	62.2	57.6	0	0	0	0	0	0
MS-06	1-Jul-22	81.8	77.5	77	0	0	0	20	10	50

¹ Based on the Beaufort wind speed indicators

4.0 DISCUSSION

Five (5) gray bats (*Myotis grisescens*) were captured during this 2022 summer mist net survey in Marion County, Kentucky. Seven (7) eastern red bats (*Lasiurus borealis*), one (1) hoary bat (*Lasiurus cinereus*), one (1) tri-colored bat (*Perimyotis subflavus*), eleven (11) big brown bats (*Eptesicus fuscus*), and four (4) evening bats (*Nycticeius humeralis*) were captured during survey efforts for this project.

Mist netting was conducted during June 27 – July 4, 2022, a period during the summer Indiana bat maternity season (i.e., May 15-August 15). Mist netting was conducted in areas with suitable Indiana bat habitat, which also is suitable for the northern long-eared bat. The deciduous hardwood forests within the project area provided suitable habitat for Indiana and northern long-eared bats, but neither species were captured at mist net locations within bat commuting and foraging habitat. Based on the data from mist net surveys at the proposed Northern Bobwhite Solar project, and the apparent absence of the Indiana and northern long-eared bat, it is Stantec’s professional opinion that the project May Affect – Not likely to Adversely Affect these species.

No suitable gray bat maternity habitat was found within the project area, however gray bat captures indicate the species is utilizing the project area to forage and/or commute. Where possible, tree clearing will be limited to maintain foraging and commuting corridors for gray bats, in addition, best management practices will be used to limit sedimentation from entering the streams so that foraging habitats and prey availability



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

is not impacted by constructions activities. With the implementation of these conservation measures, it is Stantec's professional opinion that the project May Affect-Will Not Adversely Affect this species.

On September 13, 2022, USFWS issued a proposed rule that tricolor bats were warranted to be listed as endangered. At the time of writing this report, it is unknown what a listing of this species will look like, EDF is willing to work with USFWS to implement conservation measures to reduce the potential for impacts to this species.

Listed mussel potential habitat was assessed during June 2022. No listed mussel habitat was found within the Project.



BAT MIST SURVEY AND MUSSEL SURVEY FOR THE NORTHERN BOBWHITE PROJECT, MARION COUNTY, KENTUCKY

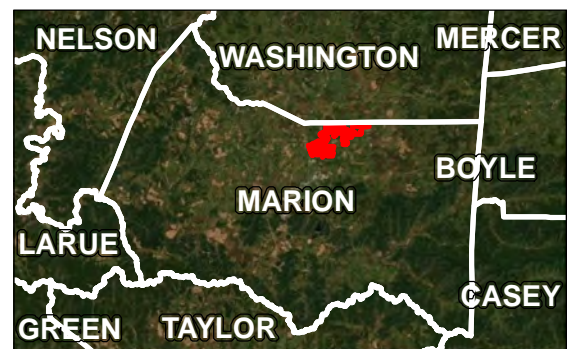
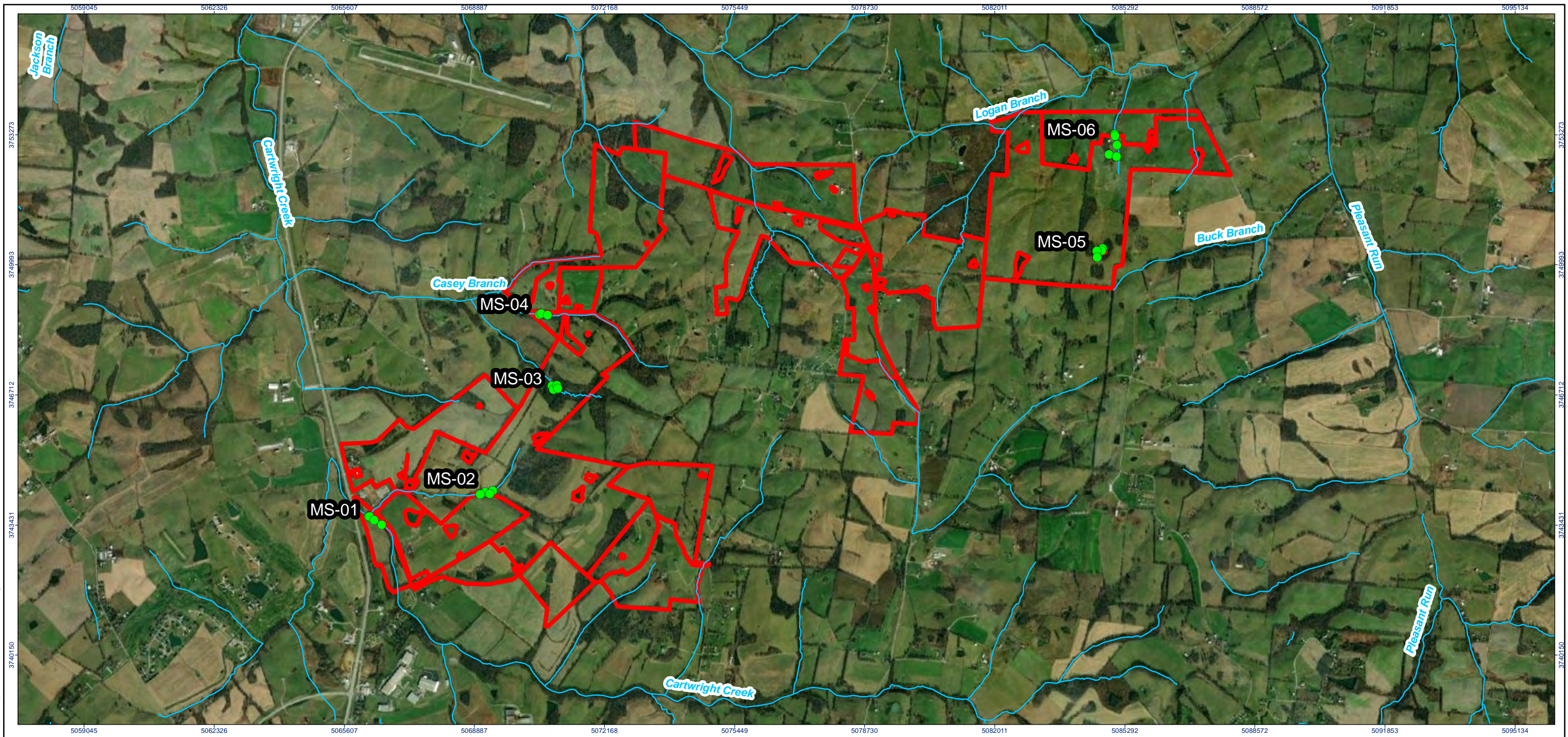
5.0 REFERENCES

- 3D/Environmental. 1995. Literature Summary and Habitat Suitability Index Mode: Components of Summer Habitat for the Indiana Bat, *Myotis sodalis*. Federal Aid Project E-1-7, Study No.8. 38 pp plus appendices.
- Braun, E. L. 1950. Deciduous forests of Eastern North American. Blackburn Press, Caldwell, New Jersey. 94 pp.
- Carter, T. C. and G. A. Feldhamer. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. *Forest Ecology and Management* 219(2005): 259-268.
- (CDC) Center for Disease Control. 2021. Guidance for unvaccinated people: How to protect yourself and others. 8 March 2021. U. S. Department of Health and Human Services. Available online: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>
- Henderson, L. E. and H. G. Broders. 2008. Movements and resource selection of the northern long-eared myotis (*Myotis septentrionalis*) in a forest-agriculture landscape. *Journal of Mammalogy* 89(4):952-963.
- Kiser, J.D. and J.R. MacGregor, 2005 Indiana bat (*Myotis sodalist*) mist net surveys for coal mining activities. Pp.45-54 in *Proceedings of Indiana bat % coal mining: a technical interactive forum* (K. Vories and a. Harrington, eds). U.S. Department of Interior, Office of Surface Mining, Alton, Illinois, 229 pp.
- Lacki, M. K., and J. H. Schwierjohann. 2001. Day-roost characteristics of northern bats in mixed mesophytic forest. *Journal of Wildlife Management* 65:482-488.
- Schultes, K. And C. Elliott. 2002. Roost tree selection by Indiana bats and northern bats on the Wayne National Forest, Ohio. Final report prepared for the USDA – Forest Service, Wayne National Forest, Athens, Ohio. 114 pp.
- USFWS. 2020. Guidance for FWS employees engaging in activities with bats. Memorandum, 12 June 2020. U.S. Fish and Wildlife Service, Washington D.C. 20240.
- USFWS. 2022. 2022 Range-wide Indiana Bat and Northern Long-Eared Bat Summer Survey Guidance. U.S. Fish and Wildlife Service, Bloomington, Indiana. 67pp.
- Whitaker, J. O., and R. E. Mumford. 2009. *Mammals of Indiana*. Indiana University Press. Bloomington, Indiana. 661 pp.
- White-nose Syndrome Disease Management Working Group. 2020. National White-Nose Syndrome Decontamination Protocol – October 2020. www.WhiteNoseSyndrome.org
- Woods, A.J., Omernik, J.M., Martin, W.H., Pond, G.J., Andrews, W.M., Call, S.M, Comstock, J.A., and Taylor, D.D., 2002, *Ecoregions of Kentucky* (color poster with map, descriptive text, summary tables, and photographs): Reston, VA., U.S. Geological Survey (map scale 1:1,000,000).

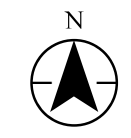
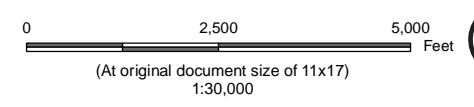


APPENDIX A

Project Area Map



- Legend**
- Northern Bobwhite Project Boundary
 - NHD Streams
 - Mist Net Locations



Project Location
 Lebanon
 Marion County, Kentucky

Client/Project
 EDF Renewables Inc.
 Northern Bobwhite Solar
 Mist Net Report

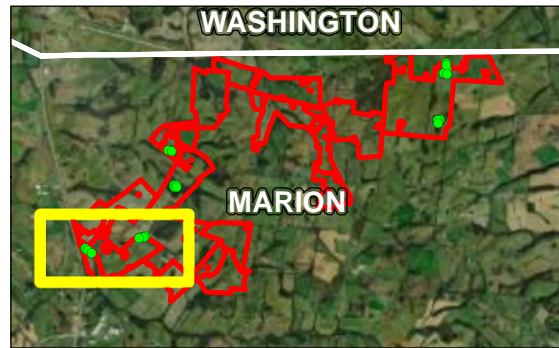
Figure No.
 172607795

Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Data Sources: NHD Streams, Project Boundary EDF Renewables Inc.
 3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure No.
1

Title
Mist Net Locations

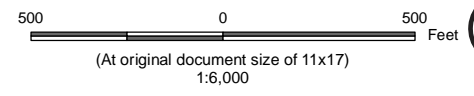
C:\Users\cknabel\OneDrive - Stantec\Desktop\Documents\2022\Northern Bobwhite\NEW_Overall_L1.mxd Revised: 2022-09-28 By: cknabel



- Legend**
- Northern Bobwhite Project Boundary
 - NHD Streams
 - Mist Net Locations

Notes

1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
2. Data Sources: NHD Streams, Project Boundary EDF Renewables Inc.
3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Project Location
 Lebanon
 Marion County, Kentucky

Client/Project
 EDF Renewables Inc.
 Northern Bobwhite Solar
 Mist Net Report

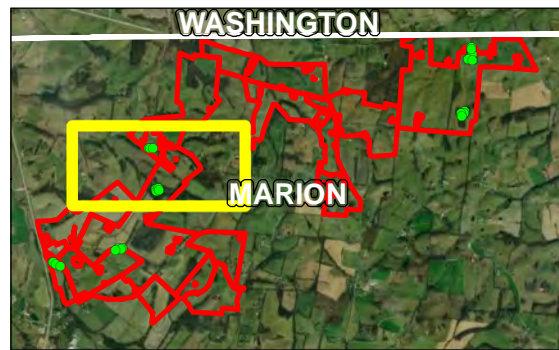
Figure No.
2

Title
Mist Net Locations- MS-01 and MS-02

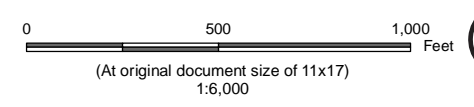
Prepared by CK on 2022-09-27
 TR Review by SK on 2022-09-28
 IR Review by LC on 2022-09-28

172607795

C:\Users\cknabel\OneDrive - Stantec\Desktop\Documents\2022\Northern Bobwhite\NEW_MS01\MS02\F2.mxd Revised: 2022-09-28 By: cknabel 3743431



- Legend**
- ▭ Northern Bobwhite Project Boundary
 - NHD Streams
 - Mist Net Locations



Project Location
 Lebanon
 Marion County, Kentucky

Prepared by CK on 2022-09-27
 TR Review by SK on 2022-09-28
 IR Review by LC on 2022-09-28

Client/Project
 EDF Renewables Inc.
 Northern Bobwhite Solar
 Mist Net Report

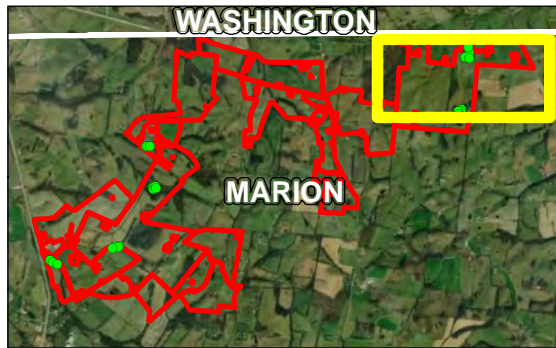
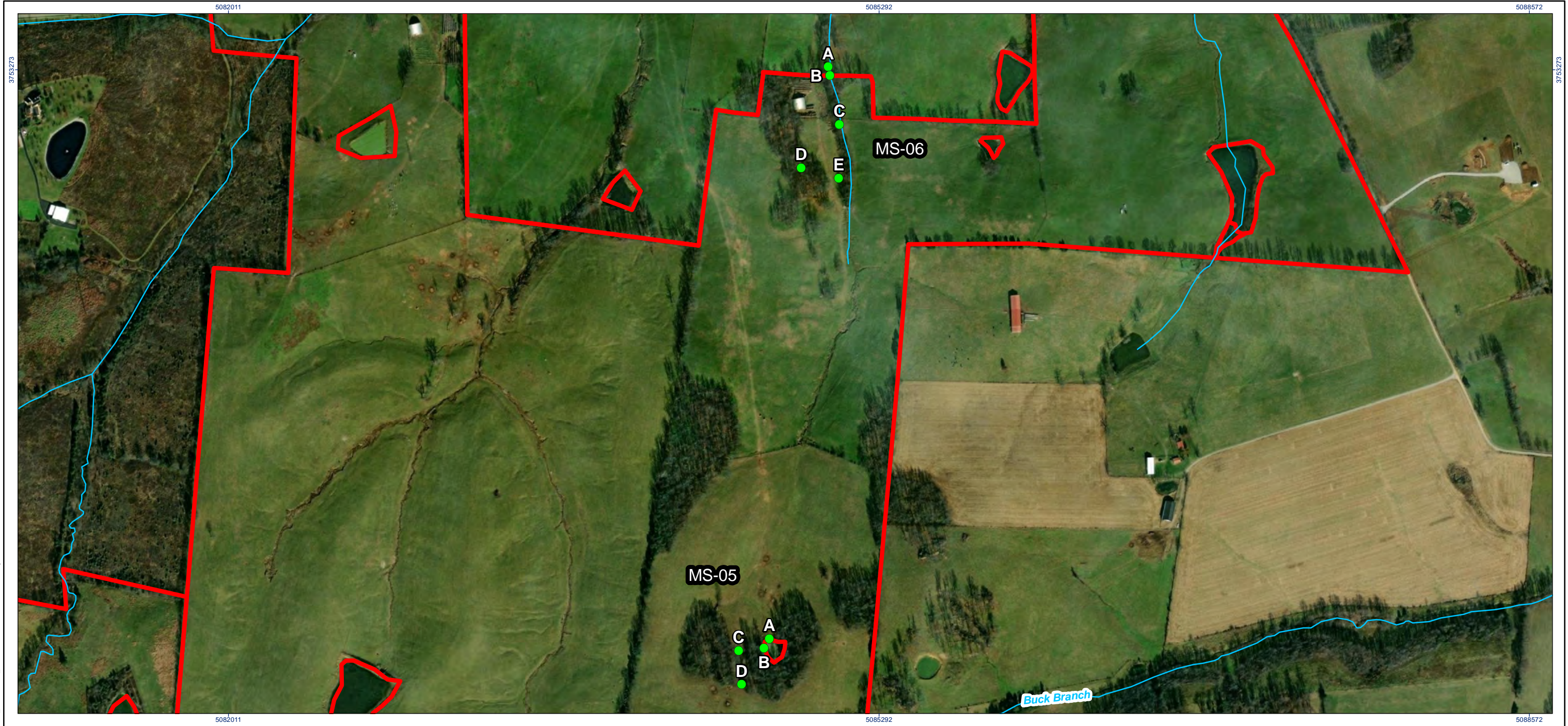
172607795

Figure No.
3

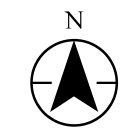
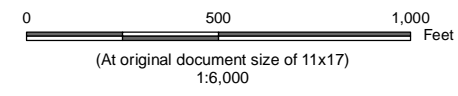
Title
Mist Net Locations- MS-03 and MS-04

Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Data Sources: NHD Streams, Project Boundary EDF Renewables Inc.
 3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

C:\Users\cknabel\OneDrive - Stantec\Desktop\Documents\2022\Northern Bobwhite\NEW_MS03MS04_F3.mxd Revised: 2022-09-28 By: cknabel 3746712



- Legend**
- Northern Bobwhite Project Boundary
 - NHD Streams
 - Mist Net Locations



Project Location
 Lebanon
 Marion County, Kentucky

Prepared by CK on 2022-09-27
 TR Review by SK on 2022-09-28
 IR Review by LC on 2022-09-28

Client/Project
 EDF Renewables Inc.
 Northern Bobwhite Solar
 Mist Net Report

172607795

Figure No.
4

Title
Mist Net Locations- MS-05 and MS-06

Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Data Sources: NHD Streams, Project Boundary EDF Renewables Inc.
 3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

C:\Users\cknabel\OneDrive - Stantec\Desktop\Documents\2022\Northern Bobwhite\NEW_MS05\MS06_F4.mxd Revised: 2022-09-28 By: cknabel

APPENDIX H: POTENTIAL HIBERNACULUM SURVEY GUIDANCE

USFWS Potential Hibernaculum Project Proposal Form

CONTACT INFORMATION

Permittee Name(s): Joshua Adams, James Kiser, Wes Cunningham, Doug Stephens, or Linda Mills
State Permit # 2022 Permits Pending Section 10 USFWS Permit # TE 91733B-0, TE38821A-4
Institution/Company Name (as on Permit): Stantec Consulting
Address: 9200 Shelbyville Road, Suite 800
City: Louisville State: KY Zip: 40222
Email address: Joshua.Adams@stantec.com, James.Kiser@stantec.com, or Wes.Cunningham@stantec.com
Phone #: 502-212-5000

PROPOSED PROJECT OR ACTIVITY INFORMATION

County: Marion County, Kentucky Quad: Lebanon East and Springfield, KY
Project location: latitude: 37.606036° longitude: -85.228744°

(You must include an 8.5" x 11" topo or aerial map with project/activity location and proposed sites identified)

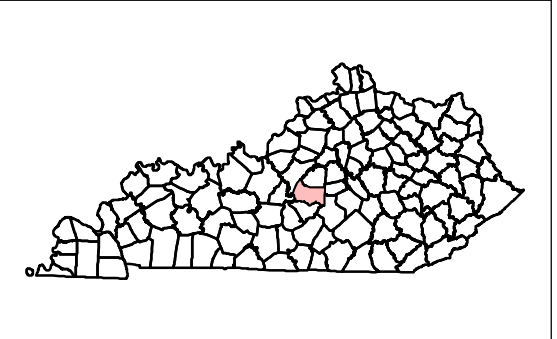
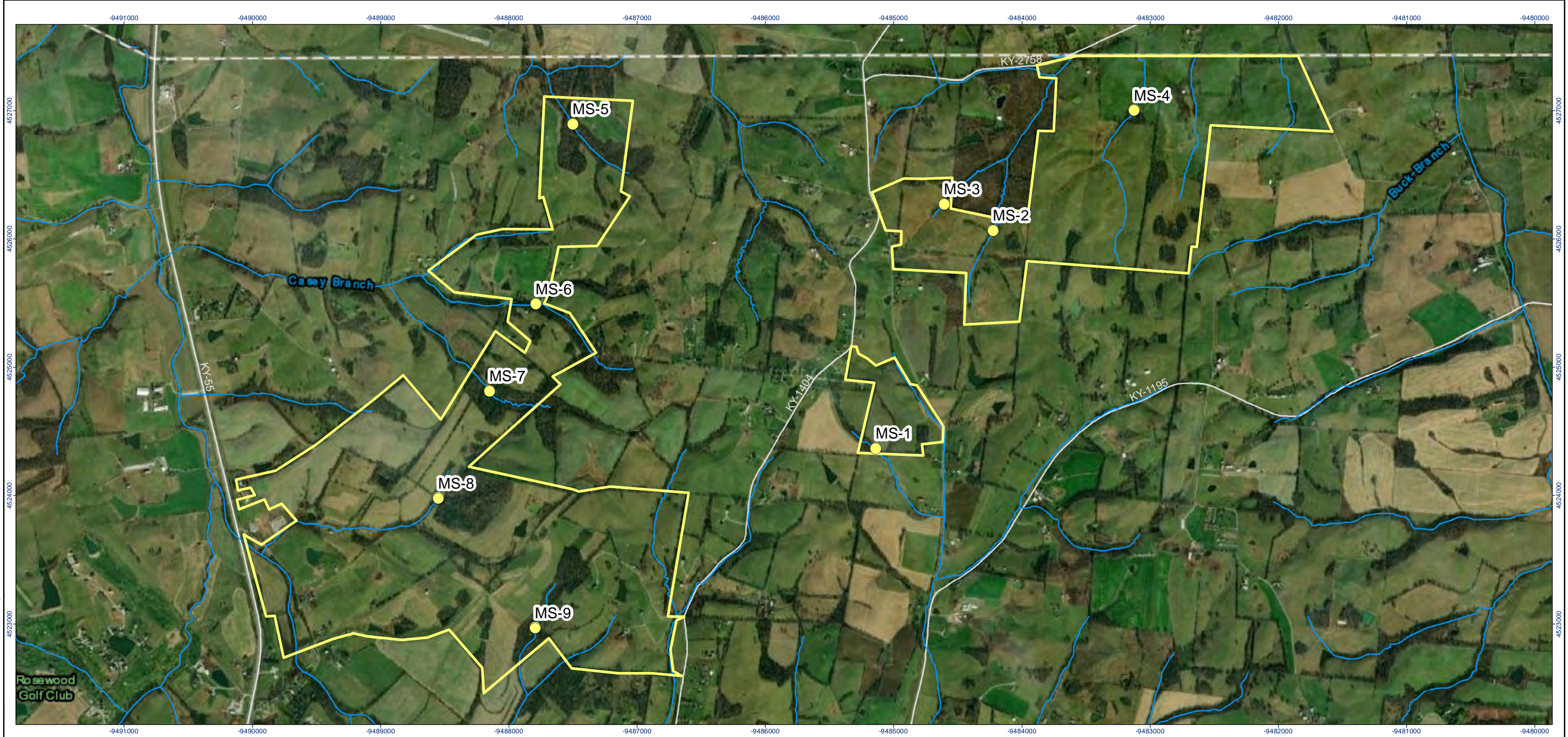
USFWS Project Number (if known): unknown
Mining Project no SMCRA Permit Number: n/a
Transportation Project no DOT Item Number: n/a
Utility Project: yes
AML Project: no
Other: Solar Project

Acres of suitable Indiana bat habitat within project/activity area: ~100
Is the project/activity linear? Yes: No: no
If yes, indicate length of suitable Indiana bat habitat in km (mi): n/a
Are caves or portals present? Yes: No: no

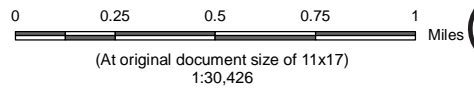
METHODOLOGY & SURVEY EFFORT

Coordinates of cave/portal (if multiple, please provide locations on project map): latitude: n/a longitude: n/a
Name of cave (if known): n/a
Estimated Start Date of Fieldwork: ~June, 15 2022
of Acoustic Activity Nights: 0 Number of Mist Net/Harp Trap Nights: 48
Other Biologists will wear PPE recommended by USGS to limit the risk of COVID transmission.

Signature Date
May 23, 2022



- Legend**
- Proposed Mistnet Sites
 - Roads
 - Marion County Streams
 - Project Boundary
 - Project Array Area



Project Location
Marion County, Kentucky

Prepared by LRA on 2022-05-02
TR by JA on 2022-05-03

Client/Project
Northern Bobwhite Solar Project

XXXXXXXX-XXXX REVA

Figure No.

5

Title
Mist Net Study Plan Map

Notes
 1. Coordinate System: NAD 1983 Lambert Conformal Conic
 2. Background: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

C:\Users\lavilla\Desktop\northern_bobwhite_bat_studyplan\northern_bobwhite_solar_mistnet_sites.mxd Revised: 2022-05-22 By: lavilla

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

APPENDIX B

Bat Mist Net Data Sheets

Bat Capture Datasheet

Project Name/No.: N. Bobwhite Solar/ Date: 28 June 2022 Biologist(s): James Kiser, Shane Kelley
 Site ID: MS-01/Cartwright Creek County/State: Marion/KY Moon Phase: New Moon/escant Sunset: 2106 h
 Map Kilometer No./Quad: Lebanon East Latitude: 37.60320° Longitude: -85.24902° Moonrise: 0540h Moonset: 2114 h
 General Site Description: Located upstream on Cartwright Creek of the SR-55 bridge between SR-55 and Radio Station Rd. Nets Open: 2100h Nets Closed: 0210 h

Time	Temp (F)	Wind ¹	% Cloud Cover	Net ID (A, B, C)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
20:00	69.7	0	0	A	9	5	45m ²	37.60279	-85.24837		✓			
21:00	56.9	0	0	B	12	7.5	90m ²	37.60303	-85.24921		✓			
22:00	55.3	0	0	C	12	7.5	90m ²	37.60326	-85.24963		✓			
00:00	53.7	0	0	D	6	5	30m ²	37.60338	-85.24944		✓			Tributary Confluence
01:00	52.9	0	0											
02:00	52.0	0	0											

* One net at full extension ~ 2.5m high

Weather Comments: Warm today with highs in upper 70's, cloudy and Breezy all Day

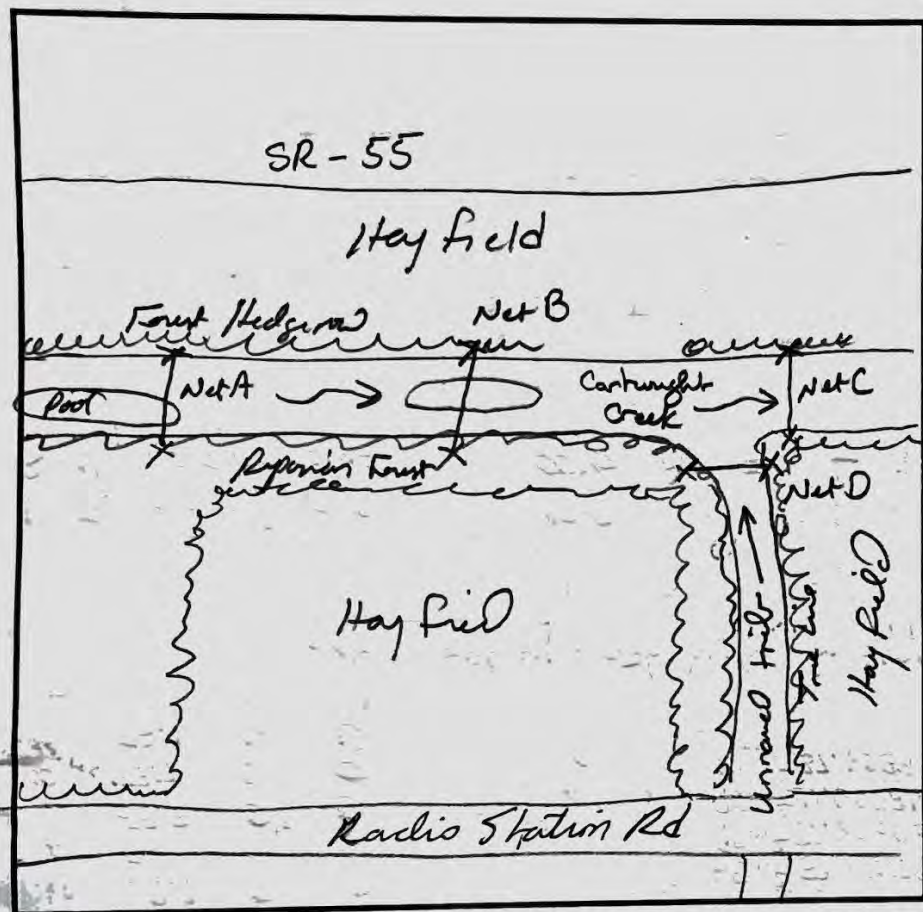
No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Eptesicus fuscus</i>	2215			Escaped				B	6		Escaped from Net
2	<i>Myotis grisescens</i>	0016	A	F	L	44.7	10.75	0	A	2.5	KYF3 U B17826	Photos: PK-7383-90; Guano Sample# MA-01-85

¹ Beaufort wind scale. 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For females: L = lactating, PL = post-lactating, NR = non-reproductive; for males: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for escaped bats



Project Name/No.: N. Bobwhite/1726 Date: 28 June 2022
 Site ID: ms-01/Cartwright Creek Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian, Field Edge

Potential Roost: Large Trees | Snags | Both | Other (e.g., structure)
 Roost Tree Potential: High | Moderate | Low

Dominant Canopy Species Avg. Canopy DBH range (in): 14-20"
 1. Acer negundo 2. Juglans nigra 3. Celtis occidentalis

Canopy Closure: Closed (80%+) | Moderate (40-80%) | Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 4-10"
 1. Osage Orange 2. Morus rubra 3. Box Elder 4. Am. Elm

Sub-Canopy Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

Dominant Shrub/Understory Species
 1. Rosa multiflora 2. Shrub Honeysuckle 3. Sapling overstory sp.

Shrub/Understory Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 4 Channel Width: 10m Stream Width: 1-8m
 Riparian Width right bank: 0-10m left bank: 0-10m Avg. Water Depth: 6"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Acris crepitans (Vo), Rana palustris (1-dead in G.), Rana clamitans (Vo), E. Screech Owl (1), Indigo Bunting (Vo), N. Cardinal (Vo), Mourning Dove (Vo), Song Sparrow (1 in Net), Blue jay (Vo), Red-winged Blackbird (Vo)
 Additional Comments: Am. Crow (Vo), Common Yellow-throat (Vo), Gray Catbird (Vo), Belted Kingfisher (Vo)

Bat Capture Datasheet

 Project Name/No.: N. Bobwhite Sdr/1726

 Date: 1 July 2022

 Biologist(s): James Kiser, Shane Kelley

 Site ID: MS-01/Cartwright Creek

 County/State: Marion/KY

 Moon Phase: Waxing Crescent Sunset: 2106h

 Map Kilometer No./Quad: Lebanon East

 Latitude: 37.60320°

 Longitude: -85.24902° Moonrise: 0823h Moonset: 1555h

 General Site Description: Located upstream on Cartwright Creek from SR-55 Bridge Nets Open: 2030h Nets Closed: 0210h
2030 86.4° 0 50 between SR-55 and Radio Station Rd.

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	82.5	0	30
22:00	76.1	1	10
22:00	74.2	0	20
00:00	74.8	0	40
06:00	74.4	0	80
08:00	73.4	0	10

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
A	9	5	45m ²	37.60279	-85.24937		✓			
B	12	7.5	90m ²	37.60303	-85.24921		✓			
C	12	7.5	90m ²	37.60326	-85.24963		✓			
D	6	5	30m ²	37.60338	-85.24944		✓			Tributary & Confluence

* One net at full extension ~ 2.5m high

 Weather Comments: Hot today with high temps in mid 90's, very humid this evening and partly cloudy

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Eptesicus fuscus</i>	2300	A	F	L	47.4	17.75	0	B	0.5	—	Hair + Guano Sample # MA-01-90
2	<i>Eptesicus fuscus</i>	2310	A	M	TD	45.0	17.5	0	B	0.5	—	Hair + Guano Sample # MA-01-91
3	<i>Lasionycter borealis</i>	2335	A	M	NR	38.4	12.2	0	B	0.5	328102	Hair + Guano Sample # MA-01-92
4	<i>Myotis grisescens</i>	0045	A	F	L	44.5	11.75	0	A	0	328103	Guano Sample # MA-01-93; Photos: DSC 7416-7428
5	<i>Eptesicus fuscus</i>	0100	A	M	NR	44.6	18.5	0	A	2.5m	—	Guano + Hair Sample # MA-01-94
6	<i>Myotis grisescens</i>	↓	U	U	U	EFN	—	—	A	0	—	Escaped from Net
7	<i>Eptesicus fuscus</i>	0230	J	M	NR	EFH	—	—	A	2m	—	" from Hand

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females**: L = lactating, PL = post-lactating, NR = non-reproductive; for **males**: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats

See Field Data Sheet
from 28 June 2022

Project Name/No.: N. Bobwhite/1726 Date: 1 July 2022
 Site ID: MS-01/Cartwright Creek Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian, Field Edge

Potential Roost: Large Trees | Snags | Both | Other (e.g., structure)

Roost Tree Potential: High | Moderate | Low

Dominant Canopy Species Avg. Canopy DBH range (in): 14-20"

1. Acer negundo 2. Juglans nigra 3. Celtis occidentalis

Canopy Closure: Closed (80%+) | Moderate (40-80%) | Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 4-10"

1. Osage Orange 2. Morus rubra 3. Box Elder 4. Am. Elm

Sub-Canopy Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

Dominant Shrub/Understory Species

1. Rosa multi-Flora 2. Shrub Honeysuckle 3. Sapling of Overstory

Shrub/Understory Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 4 Channel Width: 10m Stream Width: 1-8m

Riparian Width right bank: 0-10m left bank: 0-10m Avg. Water Depth: 6"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Red-shouldered Hawk (Vo+1), Red-winged Blackbird (Vo), E. Kingbird (2), Common Grackle (6), Song Sparrow (Vo), N. Cardinal (Vo), E. Meadowlark (Vo), Indigo Bunting (Vo), Am. Robin (Vo), Barn Swallow (1),
 Additional Comments: Carolina Wren (Vo), Eastern Screech Owl (Vo),
*Bufo fowleri (Vo), Rana clamitans (Vo), Hyla chrysocelcus (Vo), Rana palustris (1)

Bat Capture Datasheet

Project Name/No.: N. Bobwhite Sobor Date: 27 June 2022 Biologist(s): James Kiser, Shane Kelley
 Site ID: MS-02/Murphy Farm Creek County/State: Marion/KY Moon Phase: Waning Crescent Sunset: 2106h
 Map Kilometer No./Quad: Lebanon East Latitude: 37.60508° Longitude: 85.23897° Moonrise: 2350h Moonset: 0822h
 General Site Description: Site is located approx. 0.7 miles east on Murphy Farm Lane Nets Open: 2045h Nets Closed: 0210h
From junction of Radio Station Rd.

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	71.5	1	10
21:00	64.0	0	0
22:00	62.7	0	0
00:00	61.7	0	0
01:00	58.6	0	0
02:00	58.6	0	0

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
A	6	7.5		37.60486°	-85.23979°	✓				
B	15	5.0		37.60493°	-85.23933°		✓			
C	15	5.0		37.60488°	-85.23901°	✓				
D	6	5.0		37.60509°	-85.23867°		✓			

* One net at full extension ~ 2.5m high

Weather Comments: Warm and humid with high Temp 80°F, Breezy and Partly Cloudy

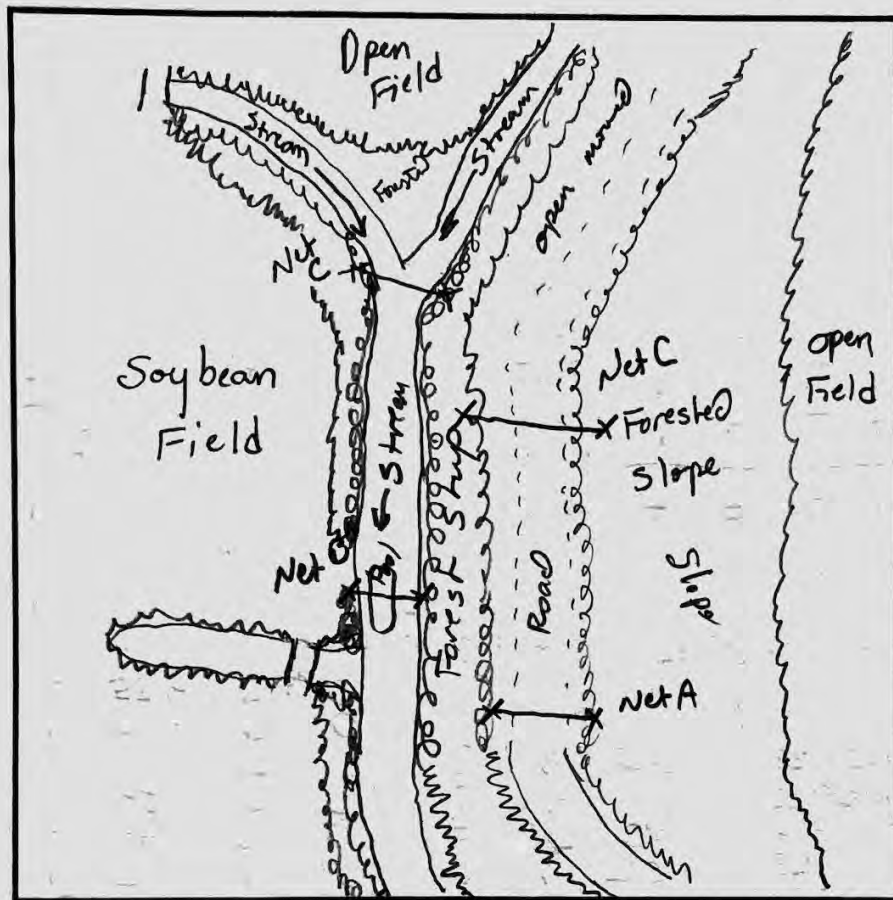
No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Lasurus borealis</i>	2125	A	F	L	40.4	EFH	0	C	4	Escaped from Hand.	
	<i>Glaucoms volans</i>	2230							A	7		
2	<i>Eptesicus fuscus</i>	2250	A	F	L	42.6	19.25	0	C	5	817827	Photos: DSC-7362-7365, Histo Grams - MA-02-83
3	<i>Myotis grisescens</i>	2315	A	F	L	43.9	10.0	0	B	1	817827	Photos: DSC-7366-7369, Histo Grams - MA-02-84
	<i>Glaucoms volans</i>	2330							A	7		
4	<i>Lasurus borealis</i>	0020	A	F	U	EFN			B	0.5		Escaped from Net

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females**: L = lactating, PL = post-lactating, NR = non-reproductive; for **males**: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats



Project Name/No.: N. Bobwhite Date: 27 June 2022
 Site ID: M5-02 / Murphy Farm Creek Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian - Lower slope Forest

Potential Roost:	Large Trees	Snags	Both	Other (e.g., structure)
Roost Tree Potential:	High	Moderate	Low	

Dominant Canopy Species Avg. Canopy DBH range (in): 10-16"
 1. Box Elder 2. Shagbark Hickory 3. Black Walnut 4. Sugar Maple

Canopy Closure:	Closed (80%+)	Moderate (40-80%)	Open (0-40%)
-----------------	---------------	--------------------------	--------------

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 4-8"
 1. Carya tomentosa 2. Celtis occidentalis 3. Ohio Buckeye 4. Quercus muhlenbergii

Sub-Canopy Clutter:	High (60%+)	Moderate (30-60%)	Low (0-30%)
---------------------	-------------	-------------------	--------------------

Dominant Shrub/Understory Species
 1. Rosa multiflora 2. Coral berry 3. Red Cedar 4. Shrub honeysuckle

Shrub/Understory Clutter:	High (60%+)	Moderate (30-60%)	Low (0-30%)
---------------------------	-------------	-------------------	--------------------

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 2-3 Channel Width: 3-5m Stream Width: 2m
 Riparian Width right bank: 2-5m left bank: 3-6m Avg. Water Depth: 12"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Song Sparrow (1 in Net), LA Water-Thrush (1 in Net), Indigo Bunting (Vo), N. Cardinal (Vo), Opossum (1)
*Rana clamitans (Vo), Hyla chrysocelma (Vo), Rana palustris (1), Rana catesbeiana (Vo), Coyote (Vo)
 Additional Comments: Barned Owl (Vo), Wood Thrush (Vo), Yellow-billed Chat (Vo), N. Mockingbird (Vo), Yellow-billed Cuckoo (Vo)
Am. Crow (Vo), Red-tailed Hawk (Vo), Carolina Chickadee (Vo), Common Yellowthroat (Vo), E. Towhee (Vo),
*Acris auriparus (Vo)

Bat Capture Datasheet

Project Name/No.: N. Bobwhite Solar Date: 29 June 2022 Biologist(s): James Kiser, Shane Kelley
 Site ID: MS-02/Murphy Farm Creek County/State: Marion/KY Moon Phase: Waxing Crescent Sunset: 2106h
 Map Kilometer No./Quad: Lebanon East Latitude: 37.60508° Longitude: 85.23897° Moonrise: 0629h Moonset: 2201h
 General Site Description: Site is located approx 0.1 miles east on Murphy Farm Lane from junction of Radio Station Rd. Nets Open: 2045h Nets Closed: 0210h
2030 76.4 0 0

Time	Temp (F)	Wind ¹	% Cloud Cover	Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
20:00	73.5°	0	0	A	6	7.5		37.60486	-85.23979	✓				
21:00	67.2	0	0	B	15	5.0		37.60493	-85.23933		✓			
22:00	64.0	0	0	C	15	5.0		37.60488	-85.23901	✓				
00:00	61.8	0	0	D	6	5.0		37.60509	-85.23867		✓			
01:00	60.4	0	0											
02:00	60.1	0	0											

* One net at full extension ~ 2.5m high

Weather Comments: Warm and humid today with high Temp in mid 80's, Calm and Sunny

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Lasius borealis</i>	2125h	A	F	L	40.1	EFH	0	A	3	KYFaw B17825	Photos: DSC-7405-7410
	<i>Glaucomys volans</i>	2255h							A	6		

¹ Beaufort wind scale. 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For females: L = lactating, PL = post-lactating, NR = non-reproductive; for males: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats

See Field Data Sheet

from 27 June 2022.

Project Name/No.: N. Bobwhite Solar Date: 29 June 2022
 Site ID: MS-02/Murphy Farm Cr. Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian - Lower Slope Forest

Potential Roost: Large Trees | Snags | Both | Other (e.g., structure)

Roost Tree Potential: High | Moderate | Low

Dominant Canopy Species Avg. Canopy DBH range (in): 10-16"

1. Box Elder 2. Shagbark Hickory 3. Black Walnut 4. Sugar maple

Canopy Closure: Closed (80%+) | Moderate (40-80%) | Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 4-8"

1. Carya tomentosa 2. Celtis occidentalis 3. Ohio Buckeye 4. Quercus muhlenbergii

Sub-Canopy Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

Dominant Shrub/Understory Species

1. Rosa multiflora 2. Coralberry 3. Red Cedar 4. Shrub Honeysuckle

Shrub/Understory Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 2-3 Channel Width: 3-5m Stream Width: 2m

Riparian Width right bank: 2-5m left bank: 3-6m Avg. Water Depth: 12"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Yellow-billed Cuckoo (Vo), N. Cardinal (Vo), Eastern Screech Owl (Vo), Indigo Bunting (Vo), Turkey Vulture (1)
*Rana catesbeiana (Vo), Rana clamitans (Vo), Hyla chrysocelma (Vo), Bufo fowleri (Vo), Acris crepitans (Vo), Pileated Woodpecker (Vo)
 Additional Comments: Coyote (Vo), Song Sparrow (Vo), E. Towhee (Vo), N. Mockingbird (Vo), Common Yellowthroat (Vo), E. Wood Pewee (Vo), Red-tailed Hawk (Vo), Wood Thrush (Vo)



Bat Capture Datasheet

Page 1 of 2

Project Name/No.: N. Bobwhite Solar/172677 Date: 30 June 2022 Biologist(s): James Kiser, Shane Kelley
 Site ID: MS-03/Casey Br. Utility Line County/State: Marion/KY Moon Phase: Waxing Crescent Sunset: 2106 h
 Map Kilometer No./Quad: Lebanon East Latitude: 37.61197° Longitude: -85.23339° Moonrise: 0724 h Moonset: 0244 h
 General Site Description: Site is in headwaters of Casey Branch in large NW flowing fork Nets Open: 2050 Nets Closed: 0210
2030 84.2 0 50 adjacent to overhead utility line corridor.

Time	Temp (F)	Wind ¹	% Cloud Cover	Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
20:00	80.4	0	40	A	6m	5m	30m ²	37.61197	-85.23339°	✓				
22:00	73.9	1	15	B	6m	5m	30m ²	37.61227	-85.23357	✓				
23:00	72.5	1	0	C	12m	7.5m	90m ²	37.61231	-85.23317				opening in forest - old road	
00:00	70.1	0	0	D	4m	5m	20m ²	37.61205	-85.23304		✓			
01:00	69.3	0	0											
02:00	69.3	0	0											

* One net at full extension ~ 2.5m high

Weather Comments: Today was hot with highs in low 90's, clear and sunny

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Eptesicus fuscus</i>	2210	A	M	NR	45.2	16.25	0	C	5	—	Hair + Guano Sample # MA-03-86
2	<i>Eptesicus fuscus</i>	2305	A	M	NR	48.6	16.0	0	C	5	—	Hair + Guano Sample # MA-03-87
3	<i>Lasionycteris borealis</i>	↓	A	F	L	42.5	15.25	0	C	2.5	KYFJW B17824	Hair + Guano Sample # MA-03-88
4	<i>Myotis grisescens</i>	0020	J	F	NR	42.6	9.0	0	A	1.5	KYFJW B28101	Photos DSC 7411-15; Guano Sample MA-03-89
	<i>Glaucomyia volans</i>	0150							A	4		
5	<i>Eptesicus fuscus</i>	0200	J	F	NR	45.6	15.25	0	C	7	—	

¹ Beaufort wind scale. 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females**: L = lactating, PL = post-lactating, NR = non-reproductive; for **males**: TD = testes descended, NR = non-reproductive

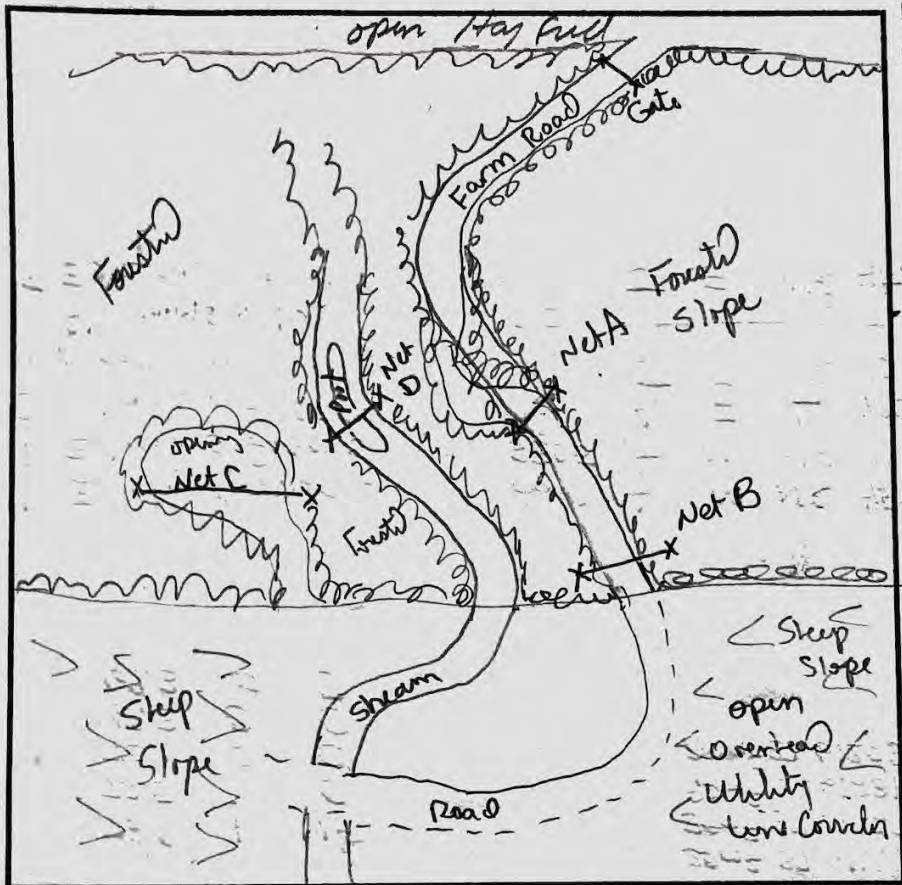
* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats

Confidential Data. If found, please return to:

Stantec Consulting Services, 9200 Shelbyville Road Suite 800, Louisville Kentucky 40222 US

Project Name/No.: N. Bobwhite Date: 30 June 2022
 Site ID: MS-03/Casey Br. Utility line Est. Distance to Water (ft): 0



VEGETATION

Primary Habitat Type: Creek/Riparian - Upland Forest

Potential Roost:	Large Trees	Snags	<u>Both</u>	Other (e.g., structure)
Roost Tree Potential:	High	<u>Moderate</u>	Low	

Dominant Canopy Species Avg. Canopy DBH range (in): 8-16"
 1. Corya lacinosa 2. Acer negundo 3. Acer saccharum 4. Alnus incana

Canopy Closure:	Closed (80%+)	<u>Moderate</u> (40-80%)	Open (0-40%)
-----------------	---------------	--------------------------	--------------

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 3-7"
 1. Ashup virginiana 2. Acer canadense 3. Juglans nigra 4. Carpinus caroliniana

Sub-Canopy Clutter:	<u>High</u> (60%+)	Moderate (30-60%)	Low (0-30%)
---------------------	--------------------	-------------------	-------------

Dominant Shrub/Understory Species
 1. Shrub honeysuckle 2. Rosa multiflora 3. Cornus drummondii 4. Sophia ovata

Shrub/Understory Clutter:	High (60%+)	<u>Moderate</u> (30-60%)	Low (0-30%)
---------------------------	-------------	--------------------------	-------------

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 1-3 Channel Width: 2-3 M Stream Width: 0-1 m
 Riparian Width right bank: >20m left bank: >20m Avg. Water Depth: 6"

1 Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Blue jay (Vo), Scarlet Tanager (Vo+I), Wood Thrush (Vo+I in Net), E. Wood Pewee (Vo), E. Screech Owl (Vo), Song Sparrow (Vo), Yellow-billed Cuckoo (Vo), Great-blue Heron (1-FO), Indigo bunting (Vo), Rana clamitars (Vo), Acris crepitans (Vo)

Additional Comments: _____

Bat Capture Datasheet

Project Name/No.: N. Bobwhite Solar/172677 Date: 04 July 2022 Biologist(s): James Kiser, Mitch Dannon
 Site ID: MS-03/Casey Br. Utilityline County/State: Marion/KY Moon Phase: Waxing Crescent Sunset: 2106h
 Map Kilometer No./Quad: Lebanon East Latitude: 37.61197° Longitude: -85.23339° Moonrise: 1125h Moonset: 0019h
 General Site Description: Site is in headwaters of Casey Br in large NW flowing fork adjacent to overhead utility line Corridor. Nets Open: 2050h Nets Closed: _____

Time	Temp (F)	Wind ¹	% Cloud Cover	Net ID (A, B, C, D)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
20:00	77.6	0	20	A	6m	5m	30m ²	37.61197	-85.23339	✓				
22:00	75.5	0	0	B	6m	5m	30m ²	37.61227	-85.23357	✓				
22:00	73.3	0	5	C	12m	7.5m	90m ²	37.61231	-85.23317				opening in Post	
00:00	72.9	0	0	D	4m	4m	20m ²	37.61205	-85.23304		✓			
01:00	72.0	0	0											
02:00	71.6	0	0											

* One net at full extension ~ 2.5m high

Weather Comments: Hot and Humid today with highs in mid 90's, Mostly Cloudy with scattered T-storms.

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Eptesicus fuscus</i>	0155	J	M	NR	46.5	15.5	0	B	3.5	—	—

¹ Beaufort wind scale. 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For females: L = lactating, PL = post-lactating, NR = non-reproductive; for males: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for escaped bats

See Field Data Sheet
from 30 June 2022.

Project Name/No.: N. Bobwhite Date: 04 July 2022
 Site ID: MS-03/Casely Br Utilityline Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian - upland Forest
 Potential Roost: Large Trees Snags Both Other (e.g., structure)
 Roost Tree Potential: High Moderate Low

Dominant Canopy Species Avg. Canopy DBH range (in):
 1. Carya lacunosa 2. Acer negundo 3. Acer saccharum 4. Ulmus americana
 Canopy Closure: Closed (80%+) Moderate (40-80%) Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 3-7"
 1. Ostrya virginiana 2. Cercis canadensis 3. Juglans nigra 4. Carpinus
 Sub-Canopy Clutter: High (60%+) Moderate (30-60%) Low (0-30%)

Dominant Shrub/Understory Species
 1. Shrub-Honey suckle 2. Rosa multiflora 3. Cornus douglasii 4. Symphoricarpos
 Shrub/Understory Clutter: High (60%+) Moderate (30-60%) Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 1-3 Channel Width: 2-3m Stream Width: 0-1m
 Riparian Width right bank: >20m left bank: >20m Avg. Water Depth: 6"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Red-tailed Hawk (Vo+FO) Black Vulture (Vo) E. Wood Pewee (Vo) Wood Thrush (Vo+1 in Net) Song Sparrow (Vo+1 in Net)
N. Cardinal (Vo) E. Towhee (Vo) Indigo Bunting (Vo) Wild Turkey (Vo) Am. Gold Finch (Vo) Rana clamitans (Vo)
 Additional Comments: Yellow-billed Cuckoo (Vo) Eastern Screech Owl (2-Vo's)

Bat Capture Datasheet

 Page 1 of

 Project Name/No.: N. Bobwhite Solar

 Date: 2 July 2022

 Biologist(s): James Kiser, Mitch Dannon

 Site ID: MS-04/Casey Branch

 County/State: Marion/KY

 Moon Phase: Waxing Crescent

 Sunset: 2106h

 Map Kilometer No./Quad: Lebanon East

 Latitude: N37.61724°

 Longitude: -85.23447

 Moonrise: 0629h

 Moonset: 2201h

 General Site Description: On Casey Branch across water-filled pools adjacent to Horan LN

 Nets Open: 2045h

 Nets Closed: 0210h

 2030 86.2 0 60

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	83.4	0	60
22:00	76.1	0	60
22:00	74.8	0	10
00:00	73.8	1	20
00:00	72.8	1	75
02:00	73.2	0	75

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
A	9	7.5		37.61721	-85.23386		✓			
B	6	5		37.61724	-85.23447		✓			
C	4	5		37.61726	-85.23465		✓			

* One net at full extension ~ 2.5m high

 Weather Comments: Hot and humid with high temps in low 90's. Numerous scattered thunderstorms around Lebanon Area.

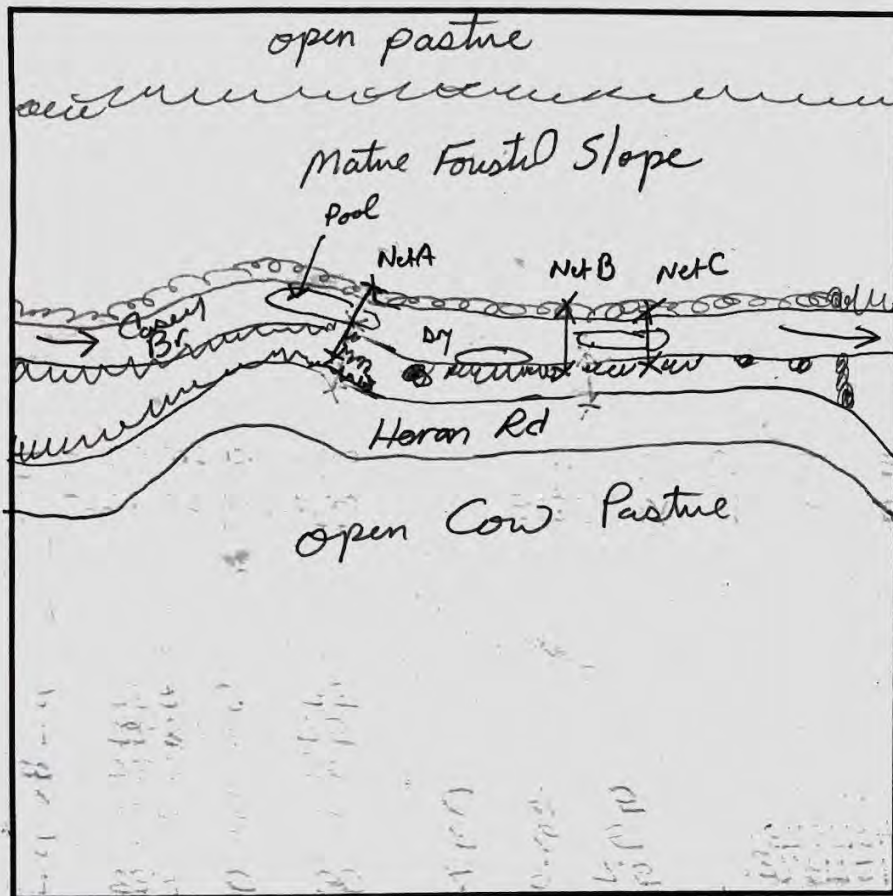
No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Lasiurus borealis</i>	2130	U	U	U	Escaped	Net	A	0.5	—	Escaped from Net	
2	<i>Lasiurus borealis</i>	↓	U	U	U	Escaped	Net	A	1.0	—	Escaped from Net	

¹ Beaufort wind scale. 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For females: L = lactating, PL = post-lactating, NR = non-reproductive; for males: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats



Project Name/No.: N. Bobwhite / 1726 Date: 2 July 2022
 Site ID: MS-04/Casey Cr. Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian - Field Edge

Potential Roost: Large Trees | Snags | Both | Other (e.g., structure)
 Roost Tree Potential: High | Moderate | Low

Dominant Canopy Species Avg. Canopy DBH range (in): 12-18"
 1. Black Walnut 2. Quercus muhlenbergii 3. Celtis occidentalis 4. Quercus rubra

Canopy Closure: Closed (80%+) | Moderate (40-80%) | Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 3-8"
 1. Carya cordiformis 2. Sugar Maple 3. Quercus caroliniana 4. Carya ovata

Sub-Canopy Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

Dominant Shrub/Understory Species
 1. Ohio Buckeye 2. Rosa multiflora 3. Sophora ovata 4. Grubberry

Shrub/Understory Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 2-3 Channel Width: 4-5m Stream Width: 0-2m
 Riparian Width right bank: 1m left bank: 50m Avg. Water Depth: 6"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: Indigo Bunting (Vo), E. Wood Pewee (Vo), Wood Thrush (Vo), Am. Robin (Vo), Killdeer (Vo)
* Hyla chrysocelis (Vo), Bufo fowleri (Vo), Rana palustris (Fresh DOR), N. Mockingbird (Vo), Acris crepitans (Vo)
 Additional Comments: E. Screech Owl (Vo)

Bat Capture Datasheet

 Project Name/No.: N. Bobwhite Solar/1726

 Date: 3 July 2022

 Biologist(s): James Kiser, Mitch Dannon

 Site ID: MS-04/Casey Branch

 County/State: Morgan/KY

 Moon Phase: Waxing Crescent Sunset: 2106h

 Map Kilometer No./Quad: Lebanon East

 Latitude: 37.61724° Longitude: -85.23447° Moonrise: 0629h Moonset: 2201h

 General Site Description: On Casey Branch across water-filled pools adjacent to Horan LV. Nets Open: 2030h Nets Closed: 0210h

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	81.1	2	0
21:00	75.7	1	0
22:00	74.6	1	0
00:00	74.2	1	0
01:00	72.8	1	0
02:00	70.5	1	0

Net ID (A, B, C)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
A	9	7.5		37.61721	-85.23386		✓			Photos work cell @ 8:24-8:54
B	6	5	30m ²	37.61724	-85.23447		✓			Photos work cell @ 8:52
C	4	5	20m ²	37.61726	-85.23465		✓			Photos work cell @ 8:52-8:53

* One net at full extension ~ 2.5m high

 Weather Comments: Hot & humid today with clear skies and high temps reaching mid 90's. No rain fall.

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Lasiurus cinereus</i>	11:50	A	F	L	55.1	28.0	0	A	5	—	Hair sample # MA-04-95; Photos: DSC_7429-7432

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females:** L = lactating, PL = post-lactating, NR = non-reproductive; for **males:** TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats

See Field Data Sheet from
Previous Day (2 July 2022)

Project Name/No.: N. Bobwhite Sdr Date: 3 July 2022
 Site ID: MS-04/Casey Branch Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Creek/Riparian - Field Edge

Potential Roost: Large Trees | Snags | Both | Other (e.g., structure)
 Roost Tree Potential: High | Moderate | Low

Dominant Canopy Species Avg. Canopy DBH range (in): 12-18"
 1. Black Walnut 2. Quercus muehlenbergii 3. Celtis occidentalis 4. Quercus rubra

Canopy Closure: Closed (80%+) | Moderate (40-80%) | Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in): 3-8"
 1. Coryna coccinea 2. Sugar Maple 3. Carpinus Caroliniana 4. Coryna ornata

Sub-Canopy Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

Dominant Shrub/Understory Species
 1. Ohio Buckeye 2. Rosa multiflora 3. Sapling Overstory 4. Coral berry

Shrub/Understory Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 2-3 m Channel Width: 4-5 m Stream Width: 0-2 m
 Riparian Width right bank: 1-4 m left bank: >50 m Avg. Water Depth: 6"

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: N. Cardinal (Vo), Cooper's Hawk (FO), Indigo Bunting (Vo), Field Sparrow (Vo), Wood Thrush (Vo),
*Rana clamitans (Vo), Killdeer (Vo), Rana catesbeiana (Vo), Eastern Screech Owl (Vo),

Additional Comments: _____



Bat Capture Datasheet

Page ___ of ___

Project Name/No.: Bobwhite Solar Date: June 28, 2022 Biologist(s): Josh Adams, Mitch Dannon
 Site ID: MS-05 County/State: Marion, KY Moon Phase: New Sunset: 2106
 Map Kilometer No./Quad: _____ Latitude: 37.621569 Longitude: -85.185920 Moonrise: 540 Moonset: 2113
 General Site Description: small hardwood woodlot with pond in between hayfields Nets Open: 2100 Nets Closed: 0207

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	69.7	1	10
22:00	64.9	0	0
23:00	64.0	0	0
00:00	61.9	0	0
01:00	60.6	0	0
02:00	59.0	0	0

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
A	18	7.5		37.621603	-85.185945			X		Field Maps
B	6	5.0		37.62475	-85.185827			X		
C	15	7.5		37.621417	-85.186035	X				
D	9	5.0		37.620975	-85.185986	X				

* One net at full extension ~ 2.5m high

Weather Comments: Highs in upper 80's clouds and wind moved in in late afternoon, skies cleared overnight

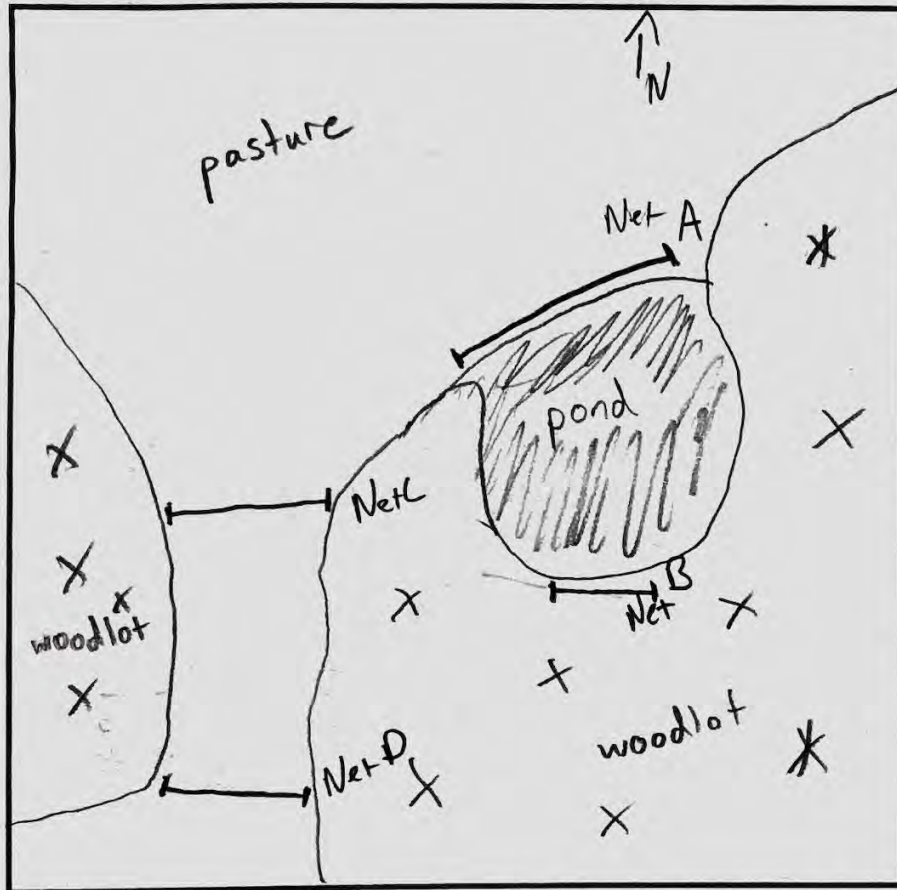
No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Perimyotis subflavus</i>	2145	A	F	L	32	7.75	0	A	4.5		Photo's on Josh's phone
2	<i>Nycticeius humeralis</i>	2235	A	F	L	38	14.5	0	A	5.0		
3	<i>Lasiurus borealis</i>	0125	A	F	L	41	14.25	0	C	5.0		

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females**: L = lactating, PL = post-lactating, NR = non-reproductive; for **males**: TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats



Project Name/No.: Bobwhite Solar
 Date: June 28, 2022
 Site ID: MS-05
 Est. Distance to Water (ft): 10

VEGETATION

Primary Habitat Type¹: Upland Forest

Potential Roost:	Large Trees	Snags	<u>Both</u>	Other (e.g., structure)
Roost Tree Potential:	<u>High</u>	Moderate	Low	

Dominant Canopy Species
 1. F. pennsylvanica 2. Q. rubrum 3. C. occidentalis
 Avg. Canopy DBH range (in): 18-22

Canopy Closure:	Closed (80%+)	Moderate (40-80%)	Open (0-40%)
-----------------	---------------	-------------------	--------------

Dominant Subcanopy Species
 1. C. ovata 2. _____ 3. _____
 Avg. Subcanopy DBH range (in): 5-6

Sub-Canopy Clutter:	High (60%+)	Moderate (30-60%)	Low (0-30%)
---------------------	-------------	-------------------	-------------

Dominant Shrub/Understory Species Not present due to grazing
 1. _____ 2. _____ 3. _____

Shrub/Understory Clutter:	High (60%+)	Moderate (30-60%)	Low (0-30%)
---------------------------	-------------	-------------------	-------------

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): NA Channel Width: NA Stream Width: NA
 Riparian Width right bank: NA left bank: NA Avg. Water Depth: NA

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: _____

Additional Comments: _____



Bat Capture Datasheet

Page ___ of ___

Project Name/No.: Northem Bobwhite SolarDate: 30 Jun 2022Biologist(s): Josh Adams, Mitch DannonSite ID: MS-05County/State: Marion, KYMoon Phase: New Sunset: 2106

Map Kilometer No./Quad: _____

Latitude: _____ Longitude: _____ Moonrise: 0724 Moonset: 2243General Site Description: _____ Nets Open: 2105 Nets Closed: 0209

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	82.7	0	70
22:00	82.5	1	40
23:00	79.3	1	0
00:00	78.0	1	0
01:00	79.1	1	0
02:00	76.5	1	0

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
See Jun 28 th Datasheet										

* One net at full extension ~ 2.5m high

Weather Comments: Warm and clear during the day very isolated showers in the area this evening, warm

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Eptesicus fuscus</i>	2200	A	F	L	50.6	20.5	0	A	6	—	
2	<i>L. borealis</i>	2235	A	F	L	42.8	18.0	0	C	2	—	
3	<i>Nycticeius humeralis</i>	2350	A	F	L	37.0	12.9	0	A	2.5	—	
4	<i>Nycticeius humeralis</i>	2350	A	F	L	35.8	11.4	0	D	30		
5	<i>N. humeralis</i>	0207	A	F	L	35	11.0		A	2		

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

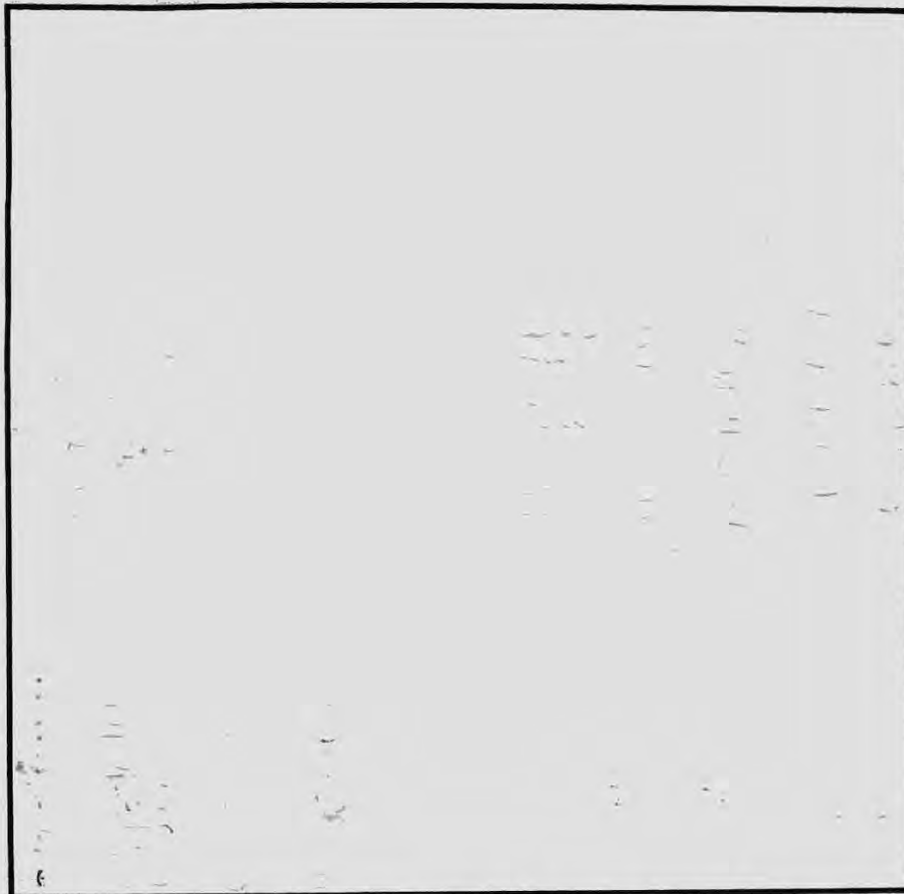
² For **females:** L = lactating, PL = post-lactating, NR = non-reproductive; for **males:** TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats

Confidential Data. If found, please return to:

Stantec Consulting Services, 9200 Shelbyville Road Suite 800, Louisville Kentucky 40222 US



Project Name/No.: _____ Date: _____

Site ID: _____ Est. Distance to Water (ft): _____

VEGETATION

 Primary Habitat Type¹: _____

Potential Roost:	Large Trees	Snags	Both	Other (e.g., structure)
------------------	-------------	-------	------	----------------------------

Roost Tree Potential:	High	Moderate	Low
-----------------------	------	----------	-----

Dominant Canopy Species _____ Avg. Canopy DBH range (in): _____

1. _____ 2. _____ 3. _____

Canopy Closure:	Closed (80% +)	Moderate (40 - 80%)	Open (0 - 40%)
-----------------	-------------------	------------------------	-------------------

Dominant Subcanopy Species _____ Avg. Subcanopy DBH range (in): _____

1. _____ 2. _____ 3. _____

Sub-Canopy Clutter:	High (60% +)	Moderate (30 - 60%)	Low (0 - 30%)
---------------------	-----------------	------------------------	------------------

Dominant Shrub/Understory Species _____

1. _____ 2. _____ 3. _____

Shrub/ Understory Clutter:	High (60% +)	Moderate (30 - 60%)	Low (0 - 30%)
-------------------------------	-----------------	------------------------	------------------

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): _____ Channel Width: _____ Stream Width: _____

Riparian Width right bank: _____ left bank: _____ Avg. Water Depth: _____

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: _____

Additional Comments: _____



Bat Capture Datasheet

Page of Project Name/No.: Bobwhite SolarDate: June 29, 2022Biologist(s): Josh Adams, Mitch DannonSite ID: MB-6County/State: Marion, KYMoon Phase: NewSunset: 2106Map Kilometer No./Quad: Latitude: 37.621588Longitude: -85.185896Moonrise: 0629Moonset: 1001General Site Description: linear pasture bounded by narrow wooded stream corridor and small woodlotNets Open: 2105Nets Closed: 0205

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	68.8	0	0
22:00	66.2	0	0
23:00	63.2	0	0
00:00	60.0	0	0
01:00	58.2	0	0
02:00	57.6	0	0

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes
A	6	2.5		37.629523	-85.184414		X			Photos on Field Map
B	9	5		37.629464	-85.184385				X	Riparian
C	4	5		37.628728	-85.184221		X			
D	6	5		37.628124	-85.184893	X				
E	18	7.5		37.627479	-85.184238	X				

* One net at full extension ~ 2.5m high

Weather Comments: Warm and humid during day, temps and humidity dropped significantly at sunset

No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* # KDFWR	Comments (e.g., samples taken, transmitter #, disposition)
1	<i>Eptesicus fuscus</i>	2300	A	M	NR	44.5	19.25	0	E	6	—	
2	<i>Lasiurus borealis</i>	2320	A	F	L	40.65	15.0	0	E	2	—	
3	<i>Myotis grisescens</i>	2355	A	F	L	42	10.0	0	E	6.5	B26951	Mitch Dannon correctly identified

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females:** L = lactating, PL = post-lactating, NR = non-reproductive; for **males:** TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats

Confidential Data. If found, please return to:

Stantec Consulting Services, 9200 Shelbyville Road Suite 800, Louisville Kentucky 40222 US

Net Site Description

Project Name/No.: Bobwhite Solar Date: June 29, 2022
 Site ID: MS-6 Est. Distance to Water (ft): 0

VEGETATION

Primary Habitat Type¹: Greek Riparian

Potential Roost: Large Trees | Snags | Both | Other (e.g., structure)

Roost Tree Potential: High | Moderate | Low

Dominant Canopy Species Avg. Canopy DBH range (in): 16-20

1. T. nigra 2. C. occidentalis 3. R. pseudoacacia

Canopy Closure: Closed (80%+) | Moderate (40-80%) | Open (0-40%)

Dominant Subcanopy Species Avg. Subcanopy DBH range (in):

1. C. occidentalis 2. _____ 3. _____

Sub-Canopy Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

Dominant Shrub/Understory Species

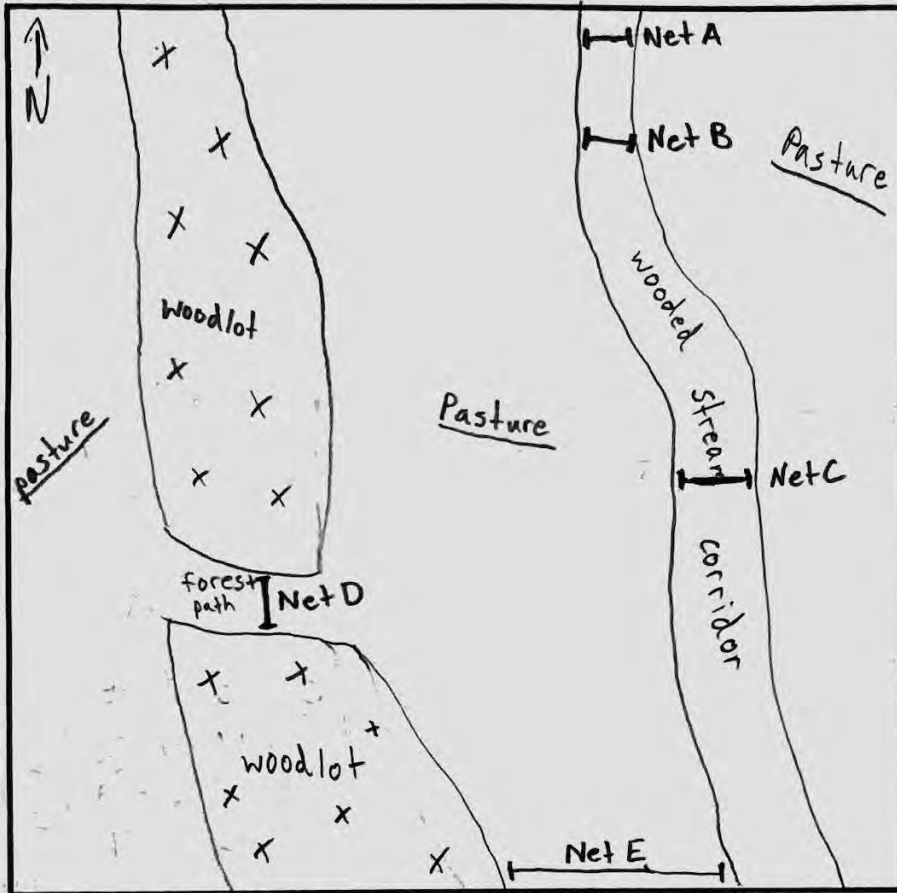
1. R. multiflora 2. _____ 3. _____

Shrub/Understory Clutter: High (60%+) | Moderate (30-60%) | Low (0-30%)

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): 5 Channel Width: 12' Stream Width: 4'

Riparian Width right bank: 5' left bank: 5' Avg. Water Depth: 2"



¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: _____

Additional Comments: _____



Bat Capture Datasheet

Page ___ of ___

Project Name/No.: Bdwhite Solar

Date: 1 Jul 22

Biologist(s): Josh Adams, Mitch Dannon

Site ID: MS-06

County/State: Marion/KY

Moon Phase: Waxing Crescent Sunset: 2106

Map Kilometer No./Quad: _____

Latitude: _____ Longitude: _____

Moonrise: 0822 Moonset: 2320

General Site Description: _____

Nets Open: 2100 Nets Closed: 2210

Time	Temp (F)	Wind ¹	% Cloud Cover
20:00	81.8	0	20
21:00	76.1	0	30
23:00	77.5	0	10
00:00	77.9	1	50
01:00	77.5	1	50
02:00	77.0	0	50

Net ID (A, B, ...)	Length (m)	Height*	Net Area	Lat. (decimal degrees)	Long.	Road	Stream	Pond	Other (specify)	Photo ID, Notes

* One net at full extension ~ 2.5m high

Weather Comments: _____

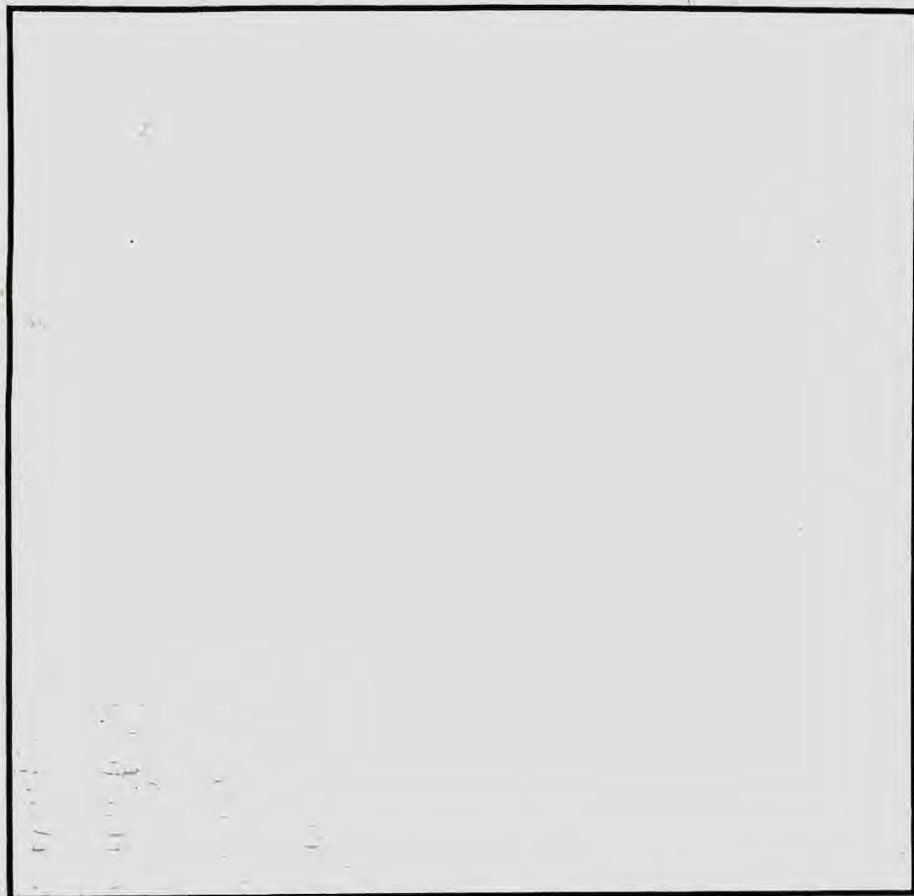
No.	Species	Time (24h)	Age (A, J, U)	Sex (M, F, U)	Repro. ²	RFA (mm)	Mass (g)	WNS Score (0-3)	Net ID	Hgt in Net (m)	Band* #	Comments (e.g., samples taken, transmitter #, disposition)

¹ **Beaufort wind scale.** 0 = smoke rises vertically (<1 mph), 1 = wind direction shown by smoke (1-3 mph), 2 = wind felt on face; leaves rustle (4-7 mph), 3 = leaves, twigs in constant motion (8-12 mph), 4 = dust rises; small branches move (13-18 mph), 5 = small trees in leaf begin to sway (19-24 mph)

² For **females:** L = lactating, PL = post-lactating, NR = non-reproductive; for **males:** TD = testes descended, NR = non-reproductive

* Apply band to LEFT arm for females and RIGHT arm for males

Note: U (unknown) only to be used for **escaped** bats



Project Name/No.: _____ Date: _____

Site ID: _____ Est. Distance to Water (ft): _____

VEGETATION

 Primary Habitat Type¹: _____

Potential Roost:	Large Trees	Snags	Both	Other (e.g., structure)
------------------	-------------	-------	------	----------------------------

Roost Tree Potential:	High	Moderate	Low
-----------------------	------	----------	-----

 Dominant Canopy Species Avg. Canopy DBH range (in): _____

1. _____ 2. _____ 3. _____

Canopy Closure:	Closed (80% +)	Moderate (40 – 80%)	Open (0 – 40%)
-----------------	-------------------	------------------------	-------------------

 Dominant Subcanopy Species Avg. Subcanopy DBH range (in): _____

1. _____ 2. _____ 3. _____

Sub-Canopy Clutter:	High (60% +)	Moderate (30 – 60%)	Low (0 – 30%)
---------------------	-----------------	------------------------	------------------

Dominant Shrub/Understory Species

1. _____ 2. _____ 3. _____

Shrub/ Understory Clutter:	High (60% +)	Moderate (30 – 60%)	Low (0 – 30%)
-------------------------------	-----------------	------------------------	------------------

STREAM CHARACTERISTICS (if relevant)

Bank Height (ft): _____ Channel Width: _____ Stream Width: _____

Riparian Width right bank: _____ left bank: _____ Avg. Water Depth: _____

¹ Bridge, Bottomland Forest, Cave Entrance, Creek/Riparian, Field Edge, Mine Portal, Pond, Structure, Upland Forest, Other (describe)

Other Wildlife Observed: _____

Additional Comments: _____

APPENDIX C

Mussel Habitat Assessment

To: Ms. Kimberly Ip

From: Joshua Adams

Louisville, KY

Project/File: 172607795

Date: June 17, 2022

Reference: Northern Bobwhite Solar Mussel Habitat Assessment of Streams and Bat Habitat Assessment of Bridges and Culverts

EDF Renewables (EDF) contracted with Stantec Consulting Services, Inc. to conduct listed mussel habitat assessments of larger streams for the Northern Bobwhite Solar Project (Project) in Marion County, Kentucky. While on site, biologists also assessed multiple culverts and bridges for their suitability as day and night roosts by listed bat species and conducted site reconnaissance for upcoming summer mist-net surveys for listed bats.

EDF provided a list of culverts and bridges that they wanted inspected (Table 1), Stantec biologists visited each one and assessed them for signs of bat use (guano, staining, insect parts, etc.). In addition, the biologists assessed the streams on and near the project area boundaries (Table 2) for suitable mussel habitat or the presence of mussel shells.

Table 1. Culvert/Bridge Bat Habitat Assessment Observations

Culvert /Bridge	Stream	Width	Height	Bat Sign	Other Observations	Lat	Long	Notes
#12	Unnamed Tributary to Logan Branch	42 in	42 in	No	Eastern Phoebe Nest	37.63152	-85.19173	
#11	Logan Branch	25 ft	6 ft	Guano	2 Eastern Phoebe Nests; No concrete beams	37.63331	-85.18649	
#9	Unnamed Tributary to Logan Branch	4.5 ft	4 ft	No	Eastern Phoebe Nest	37.63342	-85.18308	Possible Historic Structure?
#8	Logan Branch	16 ft	6.5 ft	No	Eastern Phoebe Nest	37.63408	-85.17978	

Reference: Northern Bobwhite Solar Mussel Habitat Assessment of Streams and Bat Habitat Assessment of Bridges and Culverts

Culvert /Bridge	Stream	Width	Height	Bat Sign	Other Observations	Lat	Long	Notes
#27	Unnamed Tributary to Casey Branch	36 in Diameter		No	Corrugated Metal Pipe	37.61729	-85.22967	
#28	Casey Branch	12 ft	38 in	No	No I-beams or Girders	37.61897	-85.23818	Structure Likely Floods During Highwater Events
#32	Casey Branch	25 ft	48 in	No	Evidence of Flooding	37.61837	-85.24236	
#29	Unnamed Tributary at confluence with Casey Branch	42 in Diameter		No	Corrugated Metal Pipe	37.1837	-85.2453	
#30	Unnamed Tributary to Cartwright Creek	78 in Diameter		No	Corrugated Metal Pipe	37.60395	-85.24915	

Table 2. Stream information at each culvert

Stream	Channel Width	Wetted Width	Substrate	Depth	Mussels Observed	Potential Mussel Habitat	Notes	Location
Unnamed Tributary to Logan Branch	15 ft	8-12ft	Bedrock in Runs Cobble in Riffles	12-16 inches in runs; 6 inches	No	No	Substrate covered with filamentous algae	Culvert #12

Reference: Northern Bobwhite Solar Mussel Habitat Assessment of Streams and Bat Habitat Assessment of Bridges and Culverts

				in riffles				
Logan Branch	25 ft	16-20ft	Bedrock	18 inches-38 inches	No	No	Substrate covered with filamentous algae	Culvert #11
Unnamed Tributary to Logan Branch	6 ft	2-4 ft	Sand, Bedrock, some Cobble	Less than 6 inches	No	No	-	Culvert #9
Logan Branch	30 ft	25-28 ft	Bedrock	6-12 inches	No	No	Another stream joins downstream of culvert, stream gets narrower, still no mussel habitat	Culvert #8
Unnamed Tributary to Casey Branch					No	No	36 in Diameter Corrugated Metal Pipe	Culvert 27
Casey Branch	8 ft	2-4 ft	Cobble, Gravel, Bedrock	6-12 inches	No	No	Bridge appears to be newer	Culvert 28
Casey Branch	15-20 ft'	12-15 ft	Gravel, Cobble, Sand	6-8 inches	No	No		Culvert 32
Unnamed Tributary to Casey Branch	4 ft	1-2 ft			No	No		Culvert 20

Reference: Northern Bobwhite Solar Mussel Habitat Assessment of Streams and Bat Habitat Assessment of Bridges and Culverts

Unnamed Tributary to Cartwright Creek	8 ft	3-4 ft			No	No		Culvert 30
---------------------------------------	------	--------	--	--	----	----	--	------------

None of the receiving streams surrounding the Project contained suitable mussel habitat. While conducting reconnaissance for bat mist net survey sites Stantec biologists also assessed the streams within the project area for mussels. Since these were all tributaries for the larger streams outside of the Project it was anticipated that there was no suitable habitat for mussels in the smaller streams within the Project as well. This ended up being the case, all of the streams within the project area are too small and too disturbed from agricultural activities to contain suitable habitat for listed mussel species.

Only a single bridge or culvert (Culvert 11) had recent signs of bat use. Bat guano similar in size to that of the tri-colored bat (*Perimyotis subflavus*) was found underneath this structure. However no individual bats were observed, it is likely that the bats are using this structure in some capacity as a night roost when feeding. Biologists can monitor this culvert once or twice while onsite for mist net surveys if desired.

While onsite, biologists also observed a red-tailed hawk nest with a nesting pair utilizing it. The nest was in a large oak tree located approximately at 37.62875, -85.18787.

It is not anticipated that construction activities related to the Northern Bobwhite Solar project will affect listed mussel species and Stantec will include the stream information and a photolog in a single report submittal to the U.S. Fish and Wildlife Service once bat surveys are complete.

Respectfully,

Stantec Consulting Services Inc.

Joshua Adams

Principal

Click or tap here to enter text.

Attachment: [Attachment]

APPENDIX D

Photographs


Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 1	
Net Site: MS-01	
Met Net: A	
Netted Feature: Stream	
GPS Coordinates: 37.60285000, -85.24831944	
Direction: WNW	
Survey Date: 7/2/2022	

Photograph ID: 2	
Net Site: MS-01	
Met Net: A	
Netted Feature: Stream	
GPS Coordinates: 37.60271944, -85.24852222	
Direction: ESE	
Survey Date: 7/2/2022	


Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 3	
Net Site: MS-01	
Met Net: B	
Netted Feature: Forest Gap Near Pond	
GPS Coordinates: 37.60306111, -85.24899722	
Direction: NW	
Survey Date: 7/2/2022	



Photograph ID: 4	
Net Site: MS-01	
Met Net: C	
Netted Feature: Forest Gap	
GPS Coordinates: 37.60308889, -85.24911111	
Direction: E	
Survey Date: 7/2/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 5			
Net Site: MS-01			
Met Net: C			
Netted Feature: Forest Gap			
GPS Coordinates: 37.60345278, -85.24966667			
Direction: SE			
Survey Date: 7/2/2022			
Photograph ID: 6			
Net Site: MS-01			
Met Net: D			
Netted Feature: Road Corridor			
GPS Coordinates: 37.60338611, -85.24945278			
Direction: NW			
Survey Date: 7/2/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

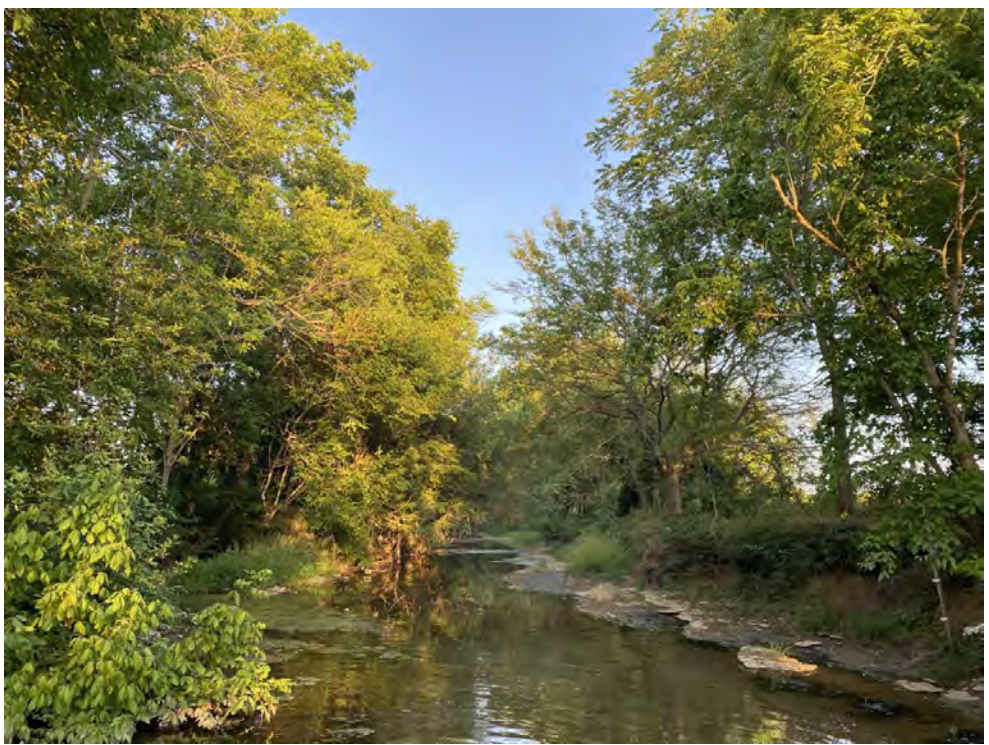
Photograph ID: 7	
Net Site: MS-01	
Met Net: D	
Netted Feature: Stream	
GPS Coordinates: 37.60333333, -85.24945278	
Direction: SSW	
Survey Date: 7/2/2022	

Photograph ID: 8	
Net Site: MS-02	
Met Net: A	
Netted Feature: Stream	
GPS Coordinates: 37.60328056, -85.24952500	
Direction: ENE	
Survey Date: 7/2/2022	


Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 9			
Net Site: MS-02			
Met Net: A			
Netted Feature: Stream			
GPS Coordinates: 37.60486944, -85.23307778			
Direction: ESE			
Survey Date: 7/5/2022			
Photograph ID: 10			
Net Site: MS-02			
Met Net: B			
Netted Feature: Stream			
GPS Coordinates: 37.62173611, -85.23319722			
Direction: S			
Survey Date: 7/5/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 11	
Net Site: MS-02	
Met Net: B	
Netted Feature: Stream	
GPS Coordinates: 37.61732500, -85.23301944	
Direction: NW	
Survey Date: 7/5/2022	

Photograph ID: 12	
Net Site: MS-02	
Met Net: C	
Netted Feature: Stream	
GPS Coordinates: 37.61729167, -85.23310278	
Direction: ESE	
Survey Date: 7/5/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 13	
Net Site: MS-02	
Met Net: C	
Netted Feature: Stream	
GPS Coordinates: 37.61735833, -85.23346111	
Direction: ENE	
Survey Date: 7/5/2022	

Photograph ID: 14	
Net Site: MS-02	
Met Net: D	
Netted Feature: Stream	
GPS Coordinates: 37.61722778, -85.23336389	
Direction: NW	
Survey Date: 7/5/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 15	
Net Site: MS-02	
Met Net: D	
Netted Feature: Stream	
GPS Coordinates: 37.60478611, -85.23349444	
Direction: S	
Survey Date: 7/5/2022	

Photograph ID: 16	
Net Site: MS-03	
Met Net: A	
Netted Feature: Forest Gap	
GPS Coordinates: 37.62170556, -85.23361389	
Direction: SSE	
Survey Date: 7/5/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 17
Net Site: MS-03
Met Net: A
Netted Feature: Forest Gap
GPS Coordinates: 37.60500833, -85.23447778
Direction: E
Survey Date: 7/4/2022



Photograph ID: 18
Net Site: MS-03
Met Net: B
Netted Feature: Stream
GPS Coordinates: 37.60486111, -85.23436944
Direction: W
Survey Date: 7/4/2022





Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky


Photograph ID: 19	
Net Site: MS-03	
Met Net: B	
Netted Feature: Stream	
GPS Coordinates: 37.60497778, -85.23456944	
Direction: WNW	
Survey Date: 7/4/2022	

Photograph ID: 20	
Net Site: MS-03	
Met Net: C	
Netted Feature: Road Corridor	
GPS Coordinates: 37.62141944, -85.23473889	
Direction: SE	
Survey Date: 7/4/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 21			
Net Site: MS-03			
Met Net: C			
Netted Feature: Road Corridor			
GPS Coordinates: 37.61231389, -85.23997778			
Direction: E			
Survey Date: 6/30/2022			
Photograph ID: 22			
Net Site: MS-03			
Met Net: D			
Netted Feature: Road Corridor			
GPS Coordinates: 37.62102778, -85.18558889			
Direction: SE			
Survey Date: 6/29/2022			

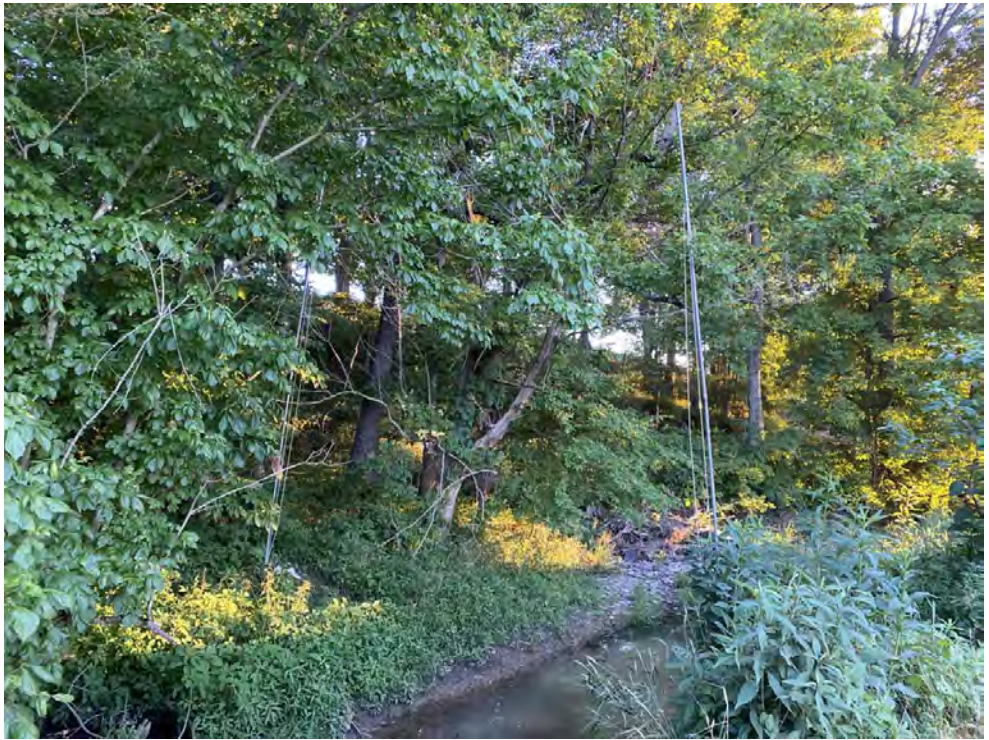
Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 23			
Net Site: MS-03			
Met Net: D			
Netted Feature: Road Corridor			
GPS Coordinates: 37.61209722, -85.23973889			
Direction: W			
Survey Date: 6/30/2022			
Photograph ID: 24			
Net Site: MS-04			
Met Net: B			
Netted Feature: Stream			
GPS Coordinates: 37.60508056, -85.18557778			
Direction: ESE			
Survey Date: 6/29/2022			



Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 25			
Net Site: MS-04			
Met Net: B			
Netted Feature: Stream			
GPS Coordinates: 37.61199444, -85.23938333			
Direction: S			
Survey Date: 6/30/2022			
Photograph ID: 26			
Net Site: MS-04			
Met Net: C			
Netted Feature: Forested entrance to small pond			
GPS Coordinates: 37.60507778, -85.18564167			
Direction: E			
Survey Date: 6/29/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 27			
Net Site: MS-04			
Met Net: C			
Netted Feature: Stream			
GPS Coordinates: 37.61201667, -85.23948056			
Direction: E			
Survey Date: 6/30/2022			
Photograph ID: 28			
Net Site: MS-05			
Met Net: A			
Netted Feature: Stream/Road Corridor			
GPS Coordinates: 37.61230556, -85.23919444			
Direction: ESE			
Survey Date: 6/30/2022			



Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 29	
Net Site: MS-05	
Met Net: A	
Netted Feature: Road Between Hay Fields	
GPS Coordinates: 37.62148889, -85.18596111	
Direction: W	
Survey Date: 6/29/2022	

Photograph ID: 30	
Net Site: MS-05	
Met Net: B	
Netted Feature: Stream/Road Corridor	
GPS Coordinates: 37.61211944, -85.23887778	
Direction: WNW	
Survey Date: 6/30/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 31			
Net Site: MS-05			
Met Net: B			
Netted Feature: Sream/Road Between Hay Fields			
GPS Coordinates: 37.62090278, -85.18601944			
Direction: SSE			
Survey Date: 6/29/2022			
Photograph ID: 32			
Net Site: MS-05			
Met Net: C			
Netted Feature: Sream Bed/Road Between Hay Fields			
GPS Coordinates: 37.61218333, -85.23860000			
Direction: W			
Survey Date: 6/30/2022			


Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 33			
Net Site: MS-05			
Met Net: C			
Netted Feature: Stream Bed/Road Between Hay Fields			
GPS Coordinates: 37.62139444, -85.18600556			
Direction: ENE			
Survey Date: 6/29/2022			
Photograph ID: 34			
Net Site: MS-05			
Met Net: D			
Netted Feature: Stream Bed/Road Between Hay Fields			
GPS Coordinates: 37.61234444, -85.23880556			
Direction: E			
Survey Date: 6/30/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 35			
Net Site: MS-05			
Met Net: D			
Netted Feature: Stream Bed/Road Between Hay Fields			
GPS Coordinates: 37.60490556, -85.18601389			
Direction: SSE			
Survey Date: 6/29/2022			
Photograph ID: 36			
Net Site: MS-06			
Met Net: A			
Netted Feature: Creek			
GPS Coordinates: 37.62807500, -85.18443611			
Direction: NNE			
Survey Date: 6/30/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 37	
Net Site: MS-06	
Met Net: A	
Netted Feature: Creek	
GPS Coordinates: 37.62780278, -85.18446111	
Direction: S	
Survey Date: 6/30/2022	

Photograph ID: 38	
Net Site: MS-06	
Met Net: B	
Netted Feature: Riparian	
GPS Coordinates: 37.62815278, -85.18443056	
Direction: S	
Survey Date: 6/30/2022	

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 39			
Net Site: MS-06			
Met Net: C			
Netted Feature: Creek			
GPS Coordinates: 37.62814167, -85.18423056			
Direction: NNW			
Survey Date: 6/30/2022			
Photograph ID: 40			
Net Site: MS-06			
Met Net: D			
Netted Feature: Agriculture Road			
GPS Coordinates: 37.62943889, -85.18497222			
Direction: E			
Survey Date: 6/30/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky
Photograph ID: 41			
Net Site: MS-06			
Met Net: D			
Netted Feature: Agriculture Road			
GPS Coordinates: 37.62870278, -85.18498056			
Direction: NNE			
Survey Date: 6/30/2022			
Photograph ID: 42			
Net Site: MS-06			
Met Net: E			
Netted Feature: Ag Road Beside Cluttered Creek			
GPS Coordinates: 37.62957222, -85.18428333			
Direction: S			
Survey Date: 6/30/2022			

Client:	EDF Renewables Inc.	Project:	Mist Net Survey
Site Name:	Northern Bobwhite Solar	Site Location:	Marion County, Kentucky

Photograph ID: 43	
Net Site: MS-06	
Met Net: E	
Netted Feature: Ag Road Beside Cluttered Creek	
GPS Coordinates: 37.62950278, -85.18420556	
Direction: NNW	
Survey Date: 6/30/2022	