Mist Netting Data Form

Site No. 4 Project No./Name 513 / Republic Date 7-21-16

Site Location Woodlot of TR0164

County Seneca State OH Time Up 8:58 Time Down 2:00

Lat/Lon ; UTM: N/E 41.22067 W/N -83.10469 Zone — Datum NAD83 Observers MTM, MSG

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	10:40	EPFU	A	M	S	17	44	B	4.5	0	—	—	—
2 (RECAPTURE)	12:30	EPFU	A	M	S	17	44	A	6.5	0	—	—	—
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase	%	Wax / Wane
	Rise	Set
Sun	6:17	2058
Moon	2203	0804

Time	Temp (F)	Sky	Wind	No. Bats
9:00	79°	3	0	0
10:00	77	1	0	1
11:00	75	1	0	0
12:00	73	1	1	1
1:00	73	0	1	0
2:00				

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

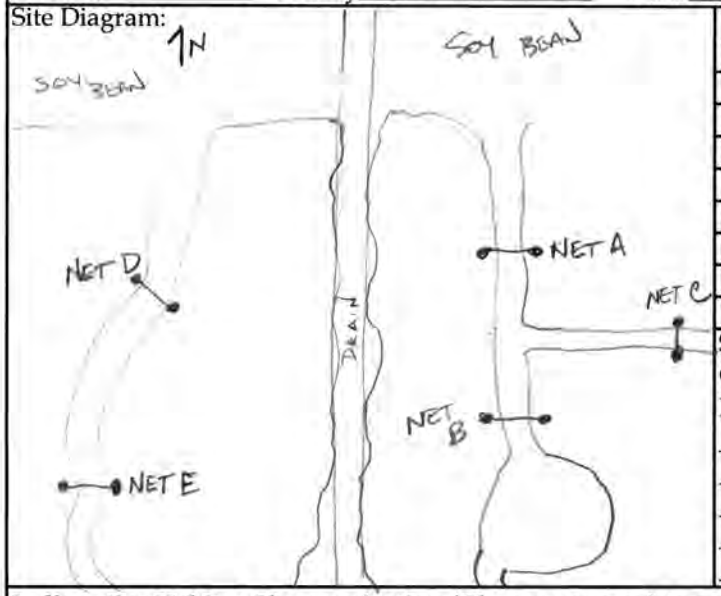
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 4 Project No./Name 513 / REPUBLIC Date 7-19-16

Lat/Lon ; UTM: N/E 41.22067 W/N -83.10469 Zone — Observers TODD MEDANIEL, MARK GAVULA

Datum: County SENECA State OH Quad WATSON MTM MJG

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	7.8	9	7/19 & 7/21
B	6	6	7/19 & 7/21
C	6	6	7/19
D	6	6	7/19 & 7/21
E	6	6	7/19 & 7/21
F	6	6	7/19 & 7/21

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. MAPLE
2. AMERICAN ELM
3. SHAGBARK HICKORY
4. RED OAK
5.
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond						
Corridor	✓	✓	✓	✓	✓	✓
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

2 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

1 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

2 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

7 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD ENVIRONMENTAL CONSULTING

Mist Netting Data Form

Sheet 1 of 2

Site No. 5 Project No./Name 513 / Republic Date 19 July 2016

Site Location Wide corridors leading to ag fields

County Seneca State OH Time Up 2100 Time Down 0201

Lat/Lon ; UTM: N/E 41.20766 W/N -83.05096 Zone ____ Datum NAD 83 Observers G. Janos, K. DeBeck

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	2130	EPFU	A	M	S	15.0	47.0	A	4.0	O	—	—	—
2	2145	LABO	A	M	S	3.0	42.0	F	0.5	O	—	—	—
3	2145	EPFU	A	M	NR	11.25	43.0	A	4.0	O	—	—	—
4	2130	EPFU	J	F	NR	13.5	50.0	C	4.0	O	—	—	—
5	2130	EPFU	J	M	NR	9.25	44.0	C	4.0	O-P	—	—	—
6	2200	EPFU	A	F	PL	17.5	47.0	B	3.0	O-P	—	—	—
7	2225	EPFU	J	M	NR	17.0	49.0	A	5.0	O	—	—	—
8	2240	EPFU	J	M	NR	13.25	44.0	B	1.5	O	—	—	—
9	2225	EPFU	J	M	NR	13.25	45.0	A	5.0	O	—	—	—
10	2225	EPFU	J	M	NR	15.0	46.0	A	5.0	O	—	—	—
11	2305	EPFU	J	M	NR	17.0	47.0	A	5.0	O	—	—	—
12	2315	EPFU	J	F	NR	16.25	49.0	B	1.0	O	—	—	—
13	2345	LABO	J	M	NR	8.5	39.0	A	4.0	O-P	—	—	—
14	2345	EPFU	A	F	PL	21.75	46.0	A	5.0	O	—	—	—
15	2345	EPFU	A	F	PL	22.25	47.0	D	3.0	O	—	—	—
* 16	2350	EPFU	A	F	PL	20.5	47.0	D	4.0	O	—	—	—
17	0030	EPFU	J	F	NR	16.25	47.0	C	5.0	O	—	—	—
18	0045	LABO	A	M	S	11.25	39.0	C	1.0	O	—	—	—
19	0125	EPFU	A	F	L	17.5	45.0	B	2.5	O	—	—	—
20	0240	EPFU	A	F	PL	19.25	47.0	E	1.0	O	—	—	—
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

* Possible broken ulna before capture.

Moon Phase 100% Wax / Wane

	Rise	Set
Sun	0615	2101
Moon	2041	0603

Time	Temp (F)	Sky	Wind	No. Bats
2100	69	0	2	5
2200	69	0	2	5
2300	66	0	1	6
0000	63	0	1	2
0100	62	0	1	1
0200	60	0	1	1

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 5 Project No./Name 513.01 / Republic Date 21 July 2016

Site Location Wide cooridors leading to ag fields

County Seneca State OH Time Up 2100 Time Down 0200

Lat/Lon ; UTM: (N)/E 41.20766 (W)/N -83.05096 Zone — Datum NAD 83 Observers G. Janos, M. Gordon

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	2130	EPFU	J	F	NR	11.5	46.5	B	3.0	0	—	—	—
2	2145	EPFU	J	F	NR	11.0	46.0	A	4.0	0	—	—	—
3	2150	LABO	A	F	NR	14.25	44.0	E	2.0	0	—	—	—
4	2200	EPFU	J	M	NR	13.75	44.0	A	3.5	0	—	—	—
5	2200	EPFU	J	F	NR	14.75	45.0	A	3.0	0	—	—	—
6	2200	EPFU	J	F	NR	12.25	45.0	B	4.0	0-P	—	—	—
7	2230	EPFU	A	M	S	17.00	43.0	E	1.5	0	—	—	—
8	2230	EPFU	A	F	PL	17.50	48.0	C	2.0	0	—	—	—
* 9	2250	EPFU	A	F	PL	20.50	47.0	A	1.5	0	—	—	—
10	2310	EPFU	J	F	NR	13.0	43.0	B	4.0	OP	—	—	—
11	2320	EPFU	J	M	NR	15.25	46.0	C	3.0	0	—	—	—
12	2340	LABO	A	M	S	9.5	36.0	C	3.0	0	—	—	—
13	0050	LACI	A	F	PL	30.25	57.0	E	0.5	0	—	—	—
14	0220	EPFU	A	F	L	21.75	49.0	A	4.5	0	—	—	—
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Moon Phase 95 % Wax / Wane

	Rise	Set
Sun	0617	2100
Moon	2204	0806

Time	Temp (F)	Sky	Wind	No. Bats
2100	76	3	0	3
2200	70	2	0	6
2300	68	1	0	3
0000	71	3	1	1
0100	70	2	1	0
0200	69	2	1	1

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

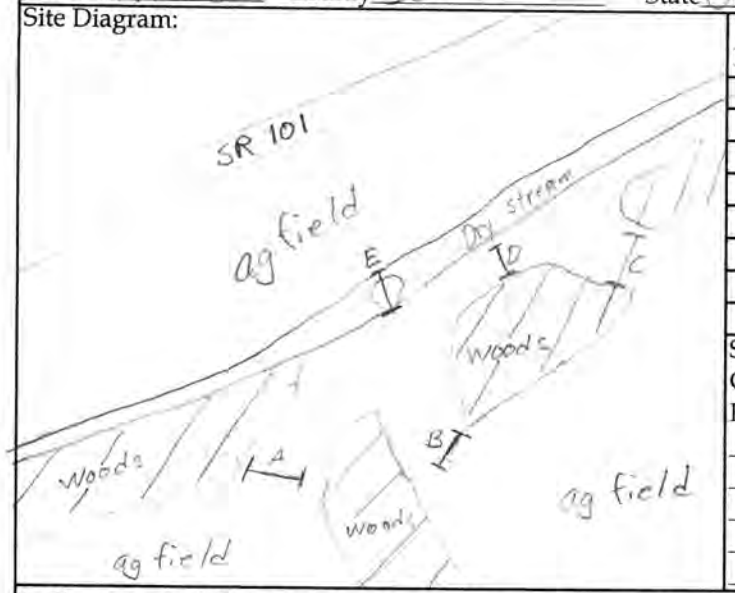
* Recapture of bat 16 from 7/19/16

Mist Net Site Habitat Sheet Site No. E Project No./Name 513 / Republic Date 19 July 2016

Lat/Lon ; UTM: N/E 41.20760 W/N -83.05096 Zone ____ Observers G. Janos, K. Debeck

Datum: NAD83 County Seneca State OH Quad Watson

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	5.2	12	7/19, 7/21
B	5.2	12	7/19 7/21
C	5.2	6	7/19 7/21
D	7.8	9	7/19
E	2.6	4	7/19 7/21
F			

Site Photographs
Camera: Fujifilm
Photo Log:

Dominant Vegetation

1. Prunus serotina
2. Morus rubra
3. Acer saccharum
4. Juglans nigra
5.
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream					✓	
Pond						
Corridor	✓	✓	✓	✓		
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

2 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

2 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

1 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

7 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD ENVIRONMENTAL CONSULTING

APPENDIX B

Mist-Net Site Photographs

Site 1 Net A

Site 1 Net B

Site 1 Net C

Site 1 Net D

Site 1 Net E

Site 2 Net A

Site 2 Net B

Site 2 Net C

Site 2 Net D

Site 2 Net E

Site 3 Net A

Site 3 Net B

Site 3 Net C

Site 3 Net D

Site 3 Net E

Site 4 Net A

Site 4 Net B

Site 4 Net C

Site 4 Net D

Site 4 Net E

Site 5 Net A

Site 5 Net B

Site 5 Net C

Site 5 Net D

Site 5 Net E

APPENDIX C

Bat Capture Photographs

Representative photos bat species captured

Lasiurus cinerus

Eptesicus fuscus

Lasiurus borealis

COPPERHEAD
ENVIRONMENTAL CONSULTING

Summer 2015 and 2016 Bat Surveys for the Proposed Emerson West Wind Project, Seneca County, Ohio

USFWS No. 16-014

Completed by:

Theresa Wetzel, Piper Roby, Chris McNees, and Chris Leftwich

12 April 2017

COPPERHEAD ENVIRONMENTAL CONSULTING, INC.
P.O. BOX 73 • 11641 RICHMOND RD. • PAINT LICK, KENTUCKY, 40461
(859) 925-9012 OFFICE (859) 925-9816 FAX
mwgumbert@copperheadconsulting.com

www.copperheadconsulting.com

Business Confidential – Not for Public Disclosure

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

PROJECT BACKGROUND

Copperhead Environmental Consulting, Inc. (Copperhead) conducted a bat mist-net and telemetry survey for the proposed Emerson West Wind Project (Project) in Seneca County in 2015 and 2016 (Figure 1). Sites surveyed in 2015 were originally surveyed as part of another project (USFWS No. 15-045), but due to changes in project boundaries now fall within the Emerson West Wind Project. The goals of this survey were to document bat species diversity and abundance within the Project boundary, and inform understanding of roosting habitat, foraging range, and spatial distribution of federally listed Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*), and state listed Rafinesque's big-eared bats (*Corynorhinus rafinesquii*) and eastern small-footed bats (*Myotis leibii*), if captured. Both 2015 and 2016 survey efforts are included in this report.

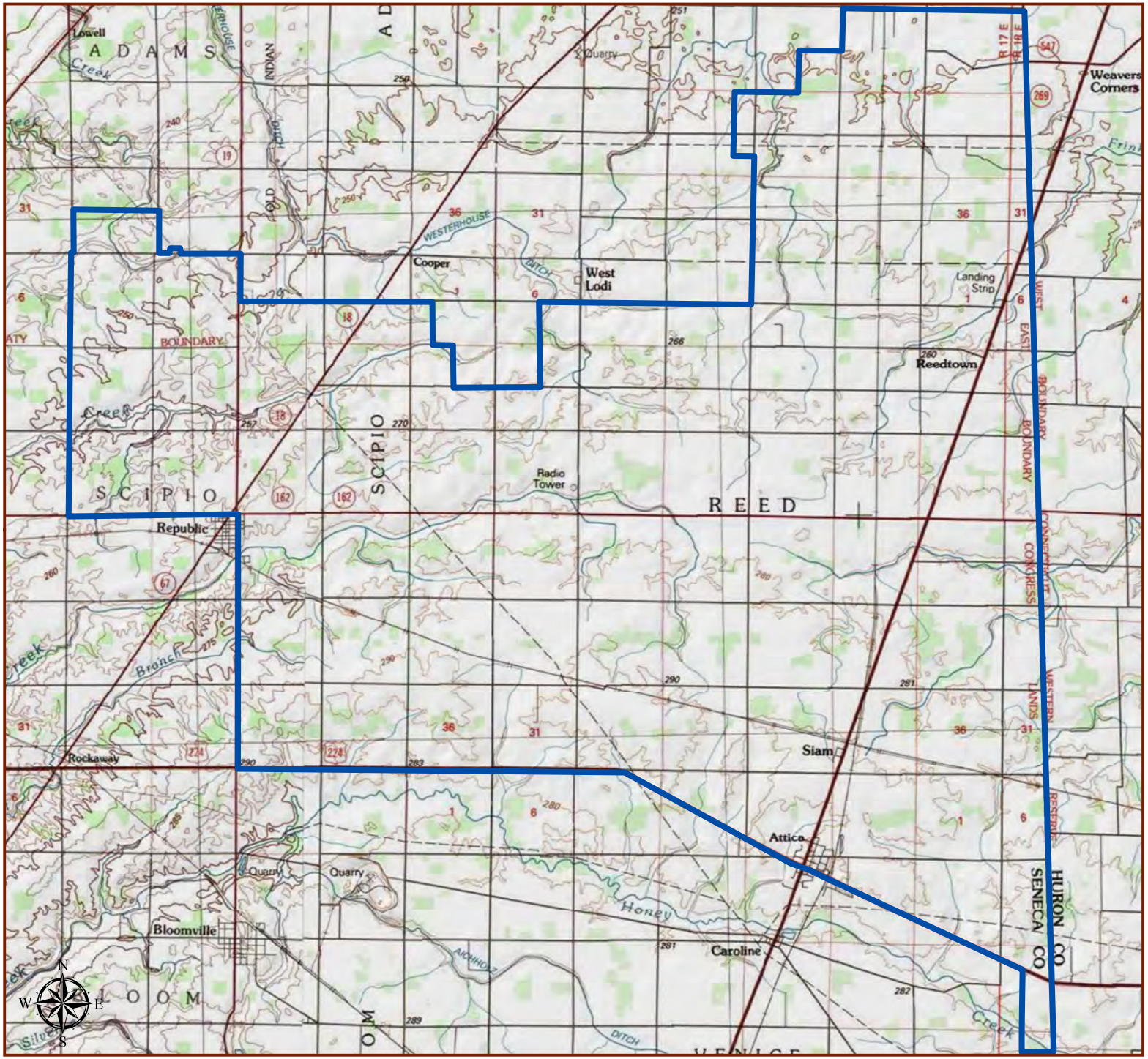
METHODOLOGY

Level of Effort/Site Selection

Mist-net surveys were implemented in accordance with guidelines outlined in the 2015 and 2016 *Range-wide Indiana Bat Summer Survey Guidelines* (USFWS 2015, 2016), 2009 Ohio Department of Natural Resources (ODNR) *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio* (ODNR 2009), and the most recent *Ohio Division of Wildlife Guidance for Bat Permitted Biologist* (ODNR-DOW 2015). The 2015 study plan was submitted to USWFS and ODNR on 7 July 2015; concurrence was received on 13 July 2015 (USFWS) and 22 July 2015 (ODNR). The 2016 study plan was submitted to USFWS and ODNR on 25 May 2016 and concurrence was received on 27 May 2016 (USFWS) and 3 June 2016 (ODNR).

The level of effort outlined in the study plan was based on the estimated amount of forested habitat within the Study Area (~5,133 ac) resulting in 42 mist-net sites (Figure 2). Thirteen of the sites were surveyed in July 2015 and 29 sites were surveyed in July 2016. Locations of mist-net sites were chosen based on the best available habitat present within parcels where landowner access was granted, and deemed most likely to yield Indiana and northern long-eared bat captures.

Business Confidential – Not for Public Disclosure



COPPERHEAD
ENVIRONMENTAL CONSULTING

Emerson West Wind Project 2016 Overview

Seneca County, Ohio

Project Boundary

1:105,000
or
1 inch = 8,750 ft

0 8,800 Ft

Coordinate System: NAD 1983 2011 StatePlane Ohio North FIPS 3401 Ft US
Projection: Lambert Conformal Conic
Datum: NAD 1983 2011
Sources: Apex Clean Energy, ESRI, USGS
Date: 3/30/2017

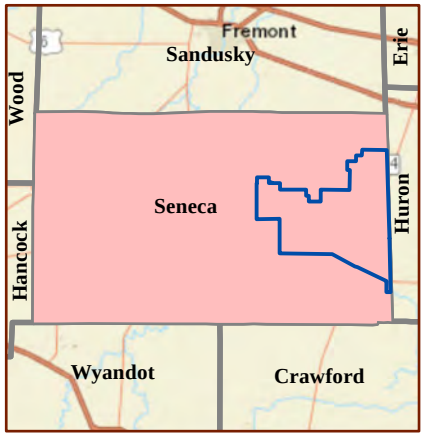


Figure 1. Proposed Emerson West Wind Project and bat study area overview, Seneca County, Ohio, 2016

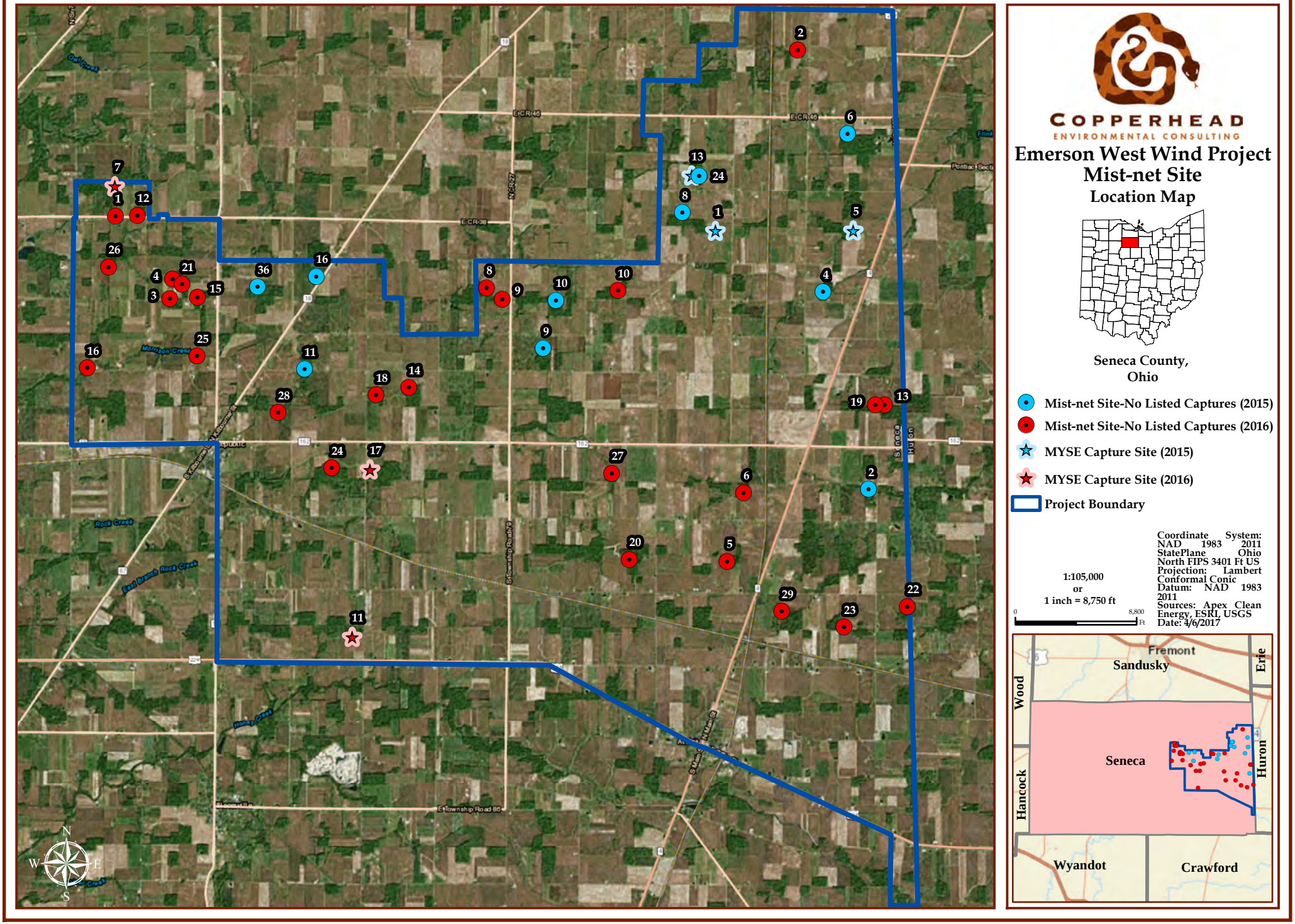


Figure 2. Mist-net site locations, Emerson West Wind Project study area, Seneca County, Ohio, 2015 and 2016.

Mist-Net Surveys

Mist-nets were set-up to maximize coverage of flight paths used by bats along suitable travel corridors, foraging areas, or drinking areas. Placement of mist-nets was based on the extent of canopy cover, presence of an open flyway, and forest conditions near the site. Actual location and orientation of each net was determined in the field by permitted biologists and mapped with ArcGIS (v. 10.3.1 ESRI, Redlands, CA).

Each mist-net site consisted of three to four double high net sets (two nets stacked; 5.2 m tall) and one high net set (three mist-nets stacked; 7.5 m tall). Mist-net sites were surveyed for two nonconsecutive nights (due to an access issue, site 3 in 2015 was surveyed for only one night).

Low visibility, high-quality, nylon nets, 4 to 12 meters (~13 - 42 ft.) in length (depending upon the width of the corridor) were used for each net set. Nets were deployed at sunset each night, left open for at least five hours, and checked every 10 minutes. Disturbance near the nets was kept to a minimum between checks. Weather data, including temperature, wind speed, and cloud cover, were recorded for each site on an hourly basis to ensure compliance with the mist-netting guidelines (e.g., temperature during survey > 50°F).

Bats were live-caught in mist-nets and released unharmed near the point of capture. Biological and morphometric data, i.e., species, sex, age class, reproductive condition, mass, and forearm length were recorded on data sheets for each bat captured. In addition, the height and the specific net set of each bat capture was recorded. Processing of bats was completed within 30 minutes from the time the bat was removed from the net. All captured northern long-eared bats were banded utilizing ODNR, Division of Wildlife (DOW) bands as required by ODNR and OH USFWS.

White-Nose Syndrome Protocol

In an effort to minimize the transmission of White-Nose Syndrome (WNS) between captured bats, all netting and field activities followed the most up-to-date guidelines established by USFWS. All hard, non-porous netting equipment was sanitized with a Lysol® IC solution [2015] or Isopropyl alcohol wipes (70%) [2016] prior to arrival at the project site and after each survey night; all other equipment was submersed in hot water (140°F) for a minimum of 20 minutes. Disposable latex gloves were worn over sanitized handling gloves and changed following the handling of each bat. All non-disposable equipment, e.g., PESOLA® scales, rulers, calipers, etc., coming into contact with bats was sanitized immediately following the handling of each bat. Bats were

evaluated for potential WNS infection through wing scoring following the Wing-Damage Index (Reichard and Kunz 2009).

Radio Telemetry

Radio Transmitter Attachment

Captured northern long-eared bats were radio-tagged to locate diurnal roosts and to collect foraging data. Radio transmitters (Holohil Systems Ltd. LB-2X, frequency 172 kHz, 0.30 g and Lotek PicoPip Ag337, 172 kHz, <0.32g) were tested before being attached between the scapulae of the bat with Permatype, a nontoxic surgical adhesive that degrades over time allowing the transmitter to fall off the bat. Each transmitter had a unique frequency, which was used to identify individual bats during radio-tracking.

Diurnal Radio Telemetry & Emergence Counts

Model TRX-1000S (Wildlife Materials Inc., Carbondale, Illinois, USA) tracking receivers and 172-3 FB 3- and 5-element Yagi directional antennas were used to track radio-tagged bats to day roosts. Once located, each roost tree was photographed and coordinates were obtained using a handheld GPS unit. In addition, a variable radius plot was established around each roost tree using a 10-factor English prism (Cruise Master Prisms, Inc.) to determine stand characteristics and basal density. Data recorded for each tree within the plot included species, diameter at breast height (dbh), tree height, roost height, canopy cover, and bark condition. Roost tree locations were mapped with ArcGIS (v. 10.3.1 ESRI, Redlands, CA).

Emergence counts were conducted on each roost tree located during telemetry efforts. The number of roost trees monitored on a given evening was determined by availability of personnel and access to roost trees, with priority given to roost trees that were occupied by a radio-tagged bat. Emergence counts were conducted by a biologist and/or recorded with a night vision video camera allowing emergence counts to be conducted on several trees concurrently each night. Observers arrived at roosts before sunset and positioned themselves so that the roost was backlit by the evening sky and remained at the roost until darkness inhibited further counts. Video cameras were positioned at a roost tree before sunset and retrieved after emergence was finished for the night. Videos were watched the next day by biologists and the number of bats emerging was counted. Emergence data were recorded on roost tree data sheets.

Business Confidential – Not for Public Disclosure

Foraging Telemetry

Foraging telemetry was conducted using a Cessna Sky Hawk 172 fitted with aircraft strut mount assemblies (Advanced Telemetry Systems Inc., [ATS] 1997, Isanti, MN) with two 172-3FB 4-element ATS Yagi directional antennas (ATS model #13886). The use of fixed-winged aircraft to collect foraging data allowed for the collection of data on multiple bats each night, and the ability to move long distances between multiple foraging areas in one night. The aerial crew consisted of a pilot and a navigator/copilot. The pilot maintained an elevation of approximately 455 meters (1500 ft.) above ground level. The navigator monitored the transmitter signal through the receiver estimating bat location on mapping software (DeLorme Topo North America 9.0, Yarmouth, ME).

Two strategies were employed for determining a bat's location. For one method, the pilot flew the airplane in tight circles above the bat with the airplane positioned so the inside antenna was always pointed toward the bat. The other method utilized multiple crosses over the bat, listening to signal strength, switching antennas, and viewing the airplane's GPS location on the laptop. When enough information was gathered and the navigator felt confident with the bat's approximate location, a foraging point was plotted on the electronic map and labeled with a bat frequency and time. To estimate error associated with location data collected from the airplane, the aerial crew estimated locations of stationary bats in their roosts during the day (n=3) and compared them to the actual locations of those roosts as documented via ground telemetry. The aerial crew also estimated locations of test transmitters that were activated in the field and placed in a location unknown to the aerial crew (n=4). The mean error was 151.7±44.4 (SE) meters (range: 47.8.0 – 392.1 m).

Locations of foraging bats and capture locations were pooled and examined using fixed kernel density estimates and isopleth surface proportions conducted with Geospatial Modeling Environment version 0.7.4.0 Beyer, H.L (Spatial Ecology LLC 2015) and Statistical Software R version 3.2.2 (R Core Team 2016) to determine foraging area for each individual. The foraging areas were imported into ArcGIS to calculate the 50%, 75%, and 95% probability contour for each individual bat and for all bats combined. Foraging areas were defined based on the area of use within these probability contours. Most of the foraging area with outlier locations eliminated was defined by the 95% probability contours (majority foraging area), areas within the 75% probability contours were considered intermediate foraging usage areas, and 50% probability contours were considered core foraging areas. Probability contours were imported into ArcGIS for additional analysis using aerial photography, USGS spatial analysis, and GIS layers

provided by Apex to characterize foraging areas. Analysis of foraging area size was conducted in ANOVA and results were evaluated at the alpha = 0.05 level.

RESULTS AND DISCUSSION

Mist-Net Survey

Mist-net surveys were conducted at 42 sites: 13 sites from 23 – 31 July 2015 and 29 sites from 11-22 July 2016 (Table 1, Figure 2). A total of 438 bats of four species were captured, including eight (6 female, 2 male) northern long-eared bats (Table 2). Big brown bats (*Eptesicus fuscus*) comprised 79 percent of total captures (n=344) and eastern red bats (*Lasiurus borealis*) comprised 19 percent of total captures (n=82). Completed bat capture data sheets are provided in Appendix A, photographs of mist-net sites are provided in Appendix B, and representative photographs of each bat species captured are provided in Appendix C.

Table 1. Mist-net site locations, Emerson West Wind Project, Ohio, 2015 and 2016.

Site No. (2015)	Latitude	Longitude	Site Location
1	41.16711	-82.88433	N. County Rd. 29, Schriner Prop., Woodlot Near Pond
2	41.11582	-82.84374	Stream Corridor SE of Township Rd. And Trail 0197
4	41.15500	-82.85590	Woodlot off Reedtown Rd.
5	41.16730	-82.84803	Woodlot W of CR 4 With Intermittent Stream
6	41.18653	-82.84962	Woodlot S of CR 46
8	41.17072	-82.89307	Stream off CR 136
9	41.14356	-82.92948	Woodlot S of E Township Rd. 124
10	41.15312	-82.92621	Forest Gap; Logging Road; Pond in Forest
11	41.13920	-82.99223	CR 122
13	41.17809	-82.89062	Woodlot Logging Road off Stream
16	41.15765	-82.98926	Pond in Woodlot W of CR 28 and S Of East CR 24
24	41.17804	-82.88861	Logging Rd. Through Woodlot; Open Water of Emergent Wetland
36	41.15548	-83.00470	Woodlot S of County Rd. 24

Business Confidential – Not for Public Disclosure

Site No. (2016)	Latitude	Longitude	Site Location
1	41.16944	-83.04229	Sugar Creek and Adjacent Ag. Field North of CR38
2	41.20319	-82.86285	Narrow Wood Lot Between Cornfields
3	41.15308	-83.02780	Small Woodlot South of E Township Rd. 130
4	41.15697	-83.02715	Open Woodlot Between Ag. Fields
5	41.10144	-82.88085	Woodlot and Ag. Field
6	41.11510	-82.87659	Woodlot N of Shrine Ditch
7	41.17536	-83.04250	Open Woodlot Adjoining Wheat Field
8	41.15554	-82.94446	Woodlot
9	41.15329	-82.94029	Inside Woodlot with Dry Stream Bed
10	41.15516	-82.90984	Woodlot W of Township Rd. 81
11	41.08601	-82.97935	Woodlot N of Hwy. and W of Cooper Rd.
12	41.16958	-83.03641	Small Woodlot off CR38
13	41.13262	-82.83958	Woodlot S of East Township Rd. 122
14	41.13567	-82.96475	Logged Woodlot Adjoining Corn Field
15	41.15335	-83.02054	Woodlot N of E Township Rd. 130
16	41.13923	-83.04941	Morrison Creek Near E Township Rd. 122
17	41.11934	-82.97486	Trails in Woodlot
18	41.13416	-82.97333	Nets in Open Areas and Dry Stream Bed in Woodlot and Edge
19	41.13266	-82.84191	Woodlot South of E Township Rd. 122
20	41.10168	-82.90656	Woodlot W of Center Heights Rd.
21	41.15591	-83.02460	Forested Area with Pond
22	41.09254	-82.83337	Woodlot Adjacent to County Line Rd. 10S
23	41.08845	-82.85002	Woodlot S of E Township Rd. 106
24	41.11955	-82.98499	Woodlot E of Powerline Cut S of 162
25	41.14166	-83.02054	Small Woodlot with Dry Creek, Surrounded by Bean
26	41.15928	-83.04395	Woodlot/Forest Edge
27	41.11877	-82.91131	Small Woodlot Surrounding Carpenter Ditch
28	41.13056	-82.99911	Woodlot W of N Township Rd. 181
29	41.09148	-82.86643	Woodlot South of Trail 0106

Business Confidential – Not for Public Disclosure

Table 2. Total bat captures by species, age, sex, and reproductive status, Emerson West Wind Project, Ohio, 2015 and 2016.

Species	Adult Male		Adult Female				Juvenile		Escaped	Total
	NR	S	P	L	PL	NR	Female	Male		
Eptesicus fuscus	43	49	0	42	86	8	48	58	10	344
Lasiurus borealis	2	8	0	9	13	1	25	19	5	82
Lasiurus cinereus	0	0	0	0	0	0	1	3	0	4
Myotis septentrionalis	2	0	0	4	0	0	1	0	1	8

* NR=non-reproductive, S=scrotal, P=pregnant, L=lactating, PL=post-lactating

Diurnal Radio Telemetry

In accordance with the ODNR/USFWS approved study plans, three northern long-eared bats were radio-tagged and tracked to locate diurnal roost trees (Table 3). The three northern long-eared bats from sites 13, 1, and 5 captured in 2015 were not tracked because the maximum number of northern long-eared bats to be tracked had been met prior to their capture. Those individuals are not included here because they are not located within this Project. The juvenile female captured in 2016 was not radio-tagged due to its low mass (5.75 g). One of the two MYSE captured on the same night at Site 7 (2016) was not radio-tagged because they were assumed to be part of the same colony and biologists wanted to spread the telemetry effort across the Project as much as possible.

Radio-tagged bats were tracked for at least seven days each, resulting in the identification of 10 roost trees (Table 4, Figures 3-5). If a bat was roosting within a parcel where access was not allowed, the roost tree was not located for that day. The most commonly used tree species were green ash (*Fraxinus pennsylvanica;* n=4) followed by American elm (*Ulmus americana*; n=2) (Table 4). Two of the roost trees were only identifiable to genus (*Fraxinus* and *Quercus* respectively). Completed roost tree data sheets are in Appendix D and roost tree photographs are in Appendix E.

Business Confidential – Not for Public Disclosure

Table 3. Northern long-eared bats captured and radio-tagged during the mist-net survey, Emerson West Wind Project, Ohio, 2015 and 2016.

Species[1]	Site No. (2015)	Band Number (ODNR)	Age[2]	Sex[3]	Reproductive Status[4]	Mass (g)	Transmitter Freq. (172.xxx) BAT ID
MYSE	13	17178	A	F	L	7.50	205
MYSE	13	17179	A	F	L	7.00	-
MYSE	1	17172	A	M	NR	7.00	-
MYSE	5	-[5]	J	F	NR	6.00	-
Species	**Site No. (2016)**	**Band Number (ODNR)**	**Age**	**Sex**	**Reproductive Status**	**Mass (g)**	**Transmitter Freq. (172.xxx) BAT ID**
MYSE	7	23528	A	F	L	7.00	-
MYSE	7	23529	A	F	L	7.50	387
MYSE	17	23580	A	M	NR	7.00	267
MYSE	11	22705	J	F	NR	5.75	-

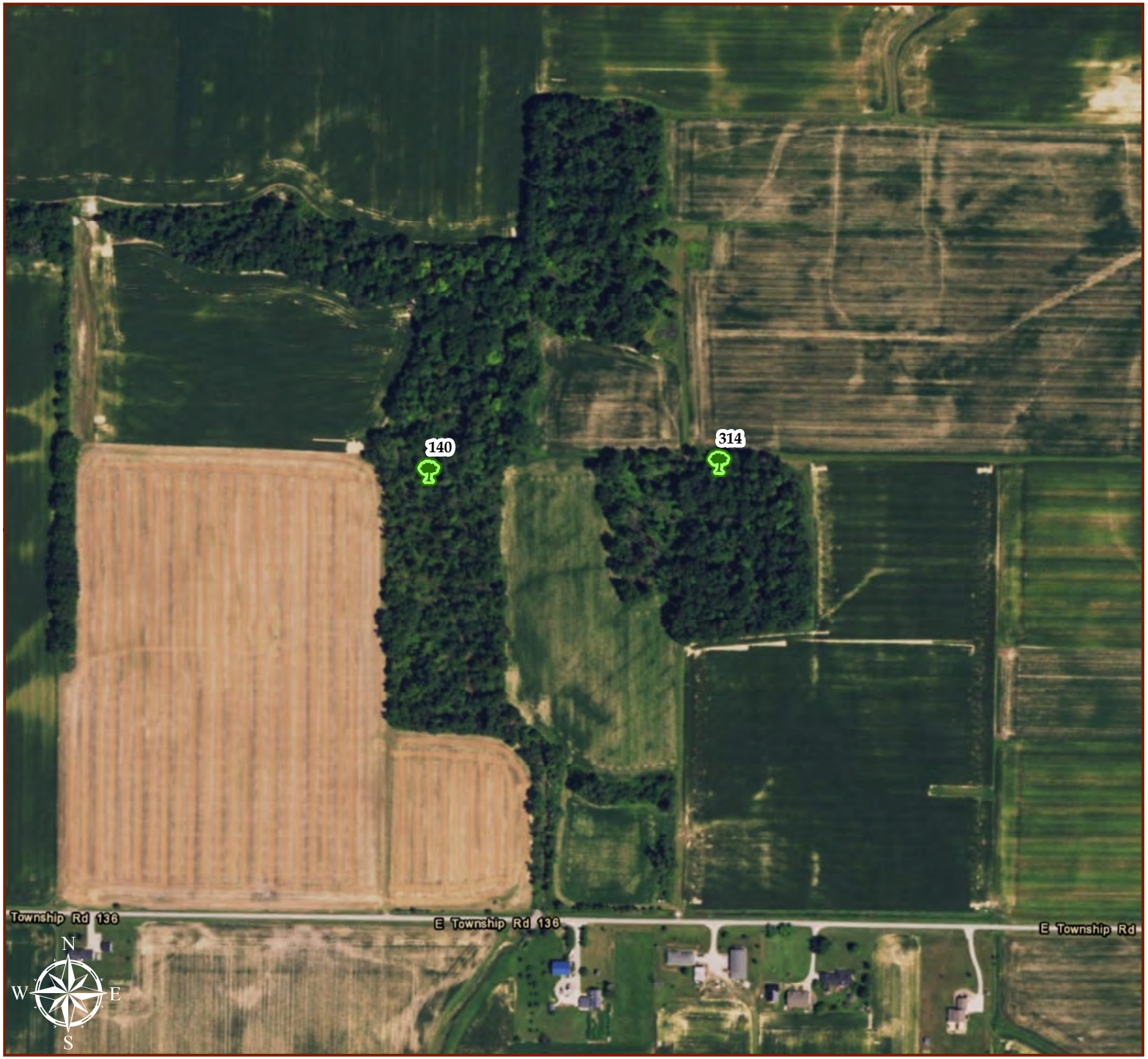
[1] MYSE=northern long-eared bat
[2] A=adult, J=juvenile
[3] F=female, M=male
[4] NR=non-reproductive, L=lactating
[5] Escaped before band could be fitted

Table 4. Northern long-eared bat roost trees located during radio telemetry efforts, Emerson West Wind Project, Ohio, 2015 and 2016.

Roost Tree No.	Year	Tree Species	DBH (cm)	Estimated Height (m)		Condition[1]	Tree Ranking[2]	Bat Species Use_BAT ID	No. Calendar Days Used
				Tree	Roost				
140	2015	*Fraxinus* sp.	48.5	25.0	20.0	S	C	MYSE_205	2
314	2015	*Quercus* sp.	91.0	18.5	-	S	C	MYSE_205	2
860	2016	*Fraxinus pennsylvanica*	45.5	12.0	6.0	S	C	MYSE_387	1
196	2016	*Ulmus americana*	19.9	16.0	5.0	S	S	MYSE_387	1
610	2016	*Fraxinus pennsylvanica*	29.5	7.0	6.5	S	S	MYSE_387	1
602	2016	*Fraxinus pennsylvanica*	40.5	18.0	9.0	S	C	MYSE_387	1
603	2016	*Fraxinus pennsylvanica*	44.5	17.0	5.0	S	C	MYSE_387	1
309	2016	*Populus deltoides*	35.0	12.0	-	S	C	MYSE_267	1
258	2016	*Carya ovata*	28.1	18.0	-	S	C	MYSE_267	2
251	2016	*Ulmus americana*	23.7	12.0	9.0	S	S	MYSE_267	1

[1] S = snag; [2] C= canopy, S = sub canopy

Business Confidential – Not for Public Disclosure



COPPERHEAD
ENVIRONMENTAL CONSULTING

Emerson West Wind Project
Roost Tree Location
Bat 205, Adult Female
Myotis septentrionalis

Seneca County,
Ohio

Roost Tree (2015)

Project Boundary

1:4,800
or
1 inch = 400 ft

0 400 Ft

Coordinate System: NAD 1983 StatePlane Ohio North FIPS 3401 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: ESRI, USGS, Apex Clean Energy, Copperhead Consulting
Date: 3/30/2017

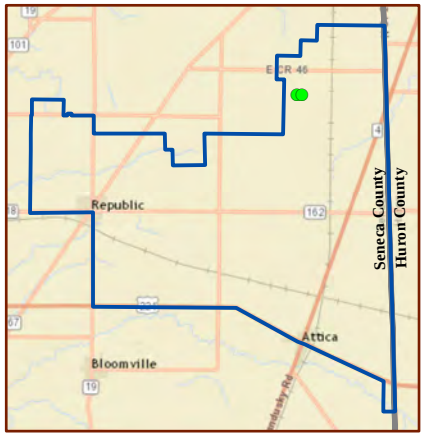


Figure 3. Roost trees used by northern long-eared bat, MYSE 205, Emerson West Wind Project, Seneca County, Ohio, 2015.

COPPERHEAD
ENVIRONMENTAL CONSULTING

Emerson West Wind Project
Roost Tree Location
Bat 387, Adult Female
Myotis septentrionalis

Seneca County,
Ohio

Roost Tree (2016)

Project Boundary

1:2,400
or
1 inch = 200 ft

0 200 Ft

Coordinate System: NAD 1983 StatePlane Ohio North FIPS 3401 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: ESRI, USGS, Apex Clean Energy, Copperhead Consulting
Date: 3/30/2017

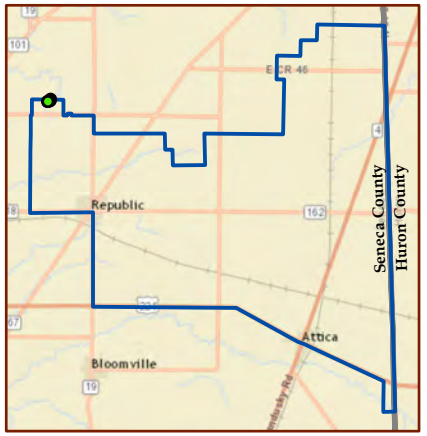


Figure 4. Roost trees used by northern long-eared bat, MYSE 387, Emerson West Wind Project, Seneca County, Ohio, 2016.

COPPERHEAD
ENVIRONMENTAL CONSULTING

Emerson West Wind Project
Roost Tree Location
Bat 267, Adult Male
Myotis septentrionalis

Seneca County, Ohio

Roost Tree (2016)

Project Boundary

1:12,000
or
1 inch = 1,000 ft

0 1,000 Ft

Coordinate System: NAD 1983 StatePlane Ohio North FIPS 3401 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: ESRI, USGS, Apex Clean Energy, Copperhead Consulting
Date: 3/30/2017

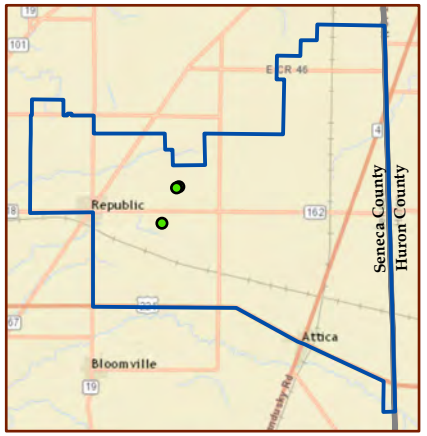


Figure 5. Roost trees used by northern long-eared bat, MYSE 267, Emerson West Wind Project, Seneca County, Ohio, 2016.

Radio-tagged bat(s) not located by ground crew(s) after a few hours of searching were located by an aerial telemetry crew the same day. In these cases, the aerial crew provided coordinates of the bat's estimated location to the ground crew, allowing them to quickly pick up the transmitter signal and locate the roost tree. All radio-tagged bats were accounted for during each day of tracking, except for MYSE 205, which could not be located by either the ground or aerial crew on 29 July 2015. However, MYSE 205 was heard again on 30 July 2015 where it was found in roost tree 314 (Table 5).

During tracking, all northern long-eared bats switched roost trees at least three times (Tables 5-7). The greatest number of roost tree switches (n = 8) was done by an adult female northern long-eared bat (MYSE 387) that used at least seven different roost trees over nine days (Table 6).

Table 5. Roost tree (RT) use by radio-tagged northern long-eared bat, MYSE 205, Emerson West Wind Project, Ohio, 2015.

Bat ID	Bat[1]	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug
205	AF-MYSE	RT140	RT140	no signal	RT314	RT314	off parcel	off parcel

[1] AF = adult female, MYSE=northern long-eared bat

Table 6. Roost tree (RT) use by radio-tagged northern long-eared bat, MYSE 387, Emerson West Wind Project, Ohio, 2016.

Bat ID	Bat[1]	12-Jul	13-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul
387	AF-MYSE	RT860	RT196	RT610	off parcel	RT602	off parcel	RT603	off parcel	RT309

[1] AF = adult female, MYSE=northern long-eared bat

Table 7. Roost tree (RT) use by radio-tagged northern long-eared bat, MYSE 267, Emerson West Wind Project, Ohio, 2016.

Bat ID	Bat[1]	19-Jul	20-Jul	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul
267	AM-MYSE	off parcel	off parcel	off parcel	RT258	RT251	RT258	off parcel

[1] AM = adult male, MYSE=northern long-eared bat

Business Confidential – Not for Public Disclosure

Emergence Counts

A total of 21 emergence counts were conducted in 2015 and 2016. The highest emergence count from a single roost tree was six bats, which occurred only once at RT603 on 18 July 2016 (Tables 8-10).

Table 8. Number of emerging bats from roosts used by northern long-eared bat, MYSE 205, Emerson West Wind Project, Ohio, 2015.

Roost No.	27-Jul	28-Jul	30-Jul
140	2	2	-
314	-	-	3
Total Bats	2	2	3

Table 9. Number of emerging bats from roosts used by northern long-eared bat, MYSE 387, Emerson West Wind Project, Ohio, 2016.

Roost No.	12-Jul	14-Jul	15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
860	3	0	-	-	-	-	-	-	-
196	-	0	0	-	-	-	-	-	-
610	-	4	0	-	-	-	-	-	-
602	-	-	-	2	1	-	-	-	-
603	-	-	-	-	-	6	0	-	-
309	-	-	-	-	-	-	-	1	0
Total Bats	3	4	0	2	1	6	0	1	0

Table 10. Number of emerging bats from roosts used by northern long-eared bat, MYSE 267, Emerson West Wind Project, Ohio, 2016.

Roost No.	22-Jul	23-Jul	24-Jul	25-Jul
258	1	2	3	1
251	-	1	1	-
Total Bats	1	3	4	1

Business Confidential – Not for Public Disclosure

Foraging Telemetry

Foraging data were collected for three radio-tagged northern long-eared bats within the project area: one in 2015 and two in 2016. MYSE 205 was tracked in 2015 from 28 July-1 August (Figure 6). MYSE 387 was tracked from 12-18 July, but no data were collected on 13 July due to inclement weather, resulting in six nights of foraging data (Figure 7). MYSE 267 was tracked for four nights from 19-22 July (Figure 8). The number of foraging location points collected for each bat ranged from 63 to 295 (Table 11).

Table 11. Number of nights tracked and number of foraging location points collected for three adult northern long-eared bats, Emerson West Wind Project, Ohio, 2015 and 2016.

Year	Dates	Bat ID	Sex	Repro. Status*	No. Nights Tracked	No. Points Collected
2015	28 July - 1 Aug	205	Female	L	5	63
2016	12 - 18 July	387	Female	L	6	295
2016	19 - 22 July	267	Male	NR	4	147

* L = lactating, NR = non-reproductive

Business Confidential – Not for Public Disclosure

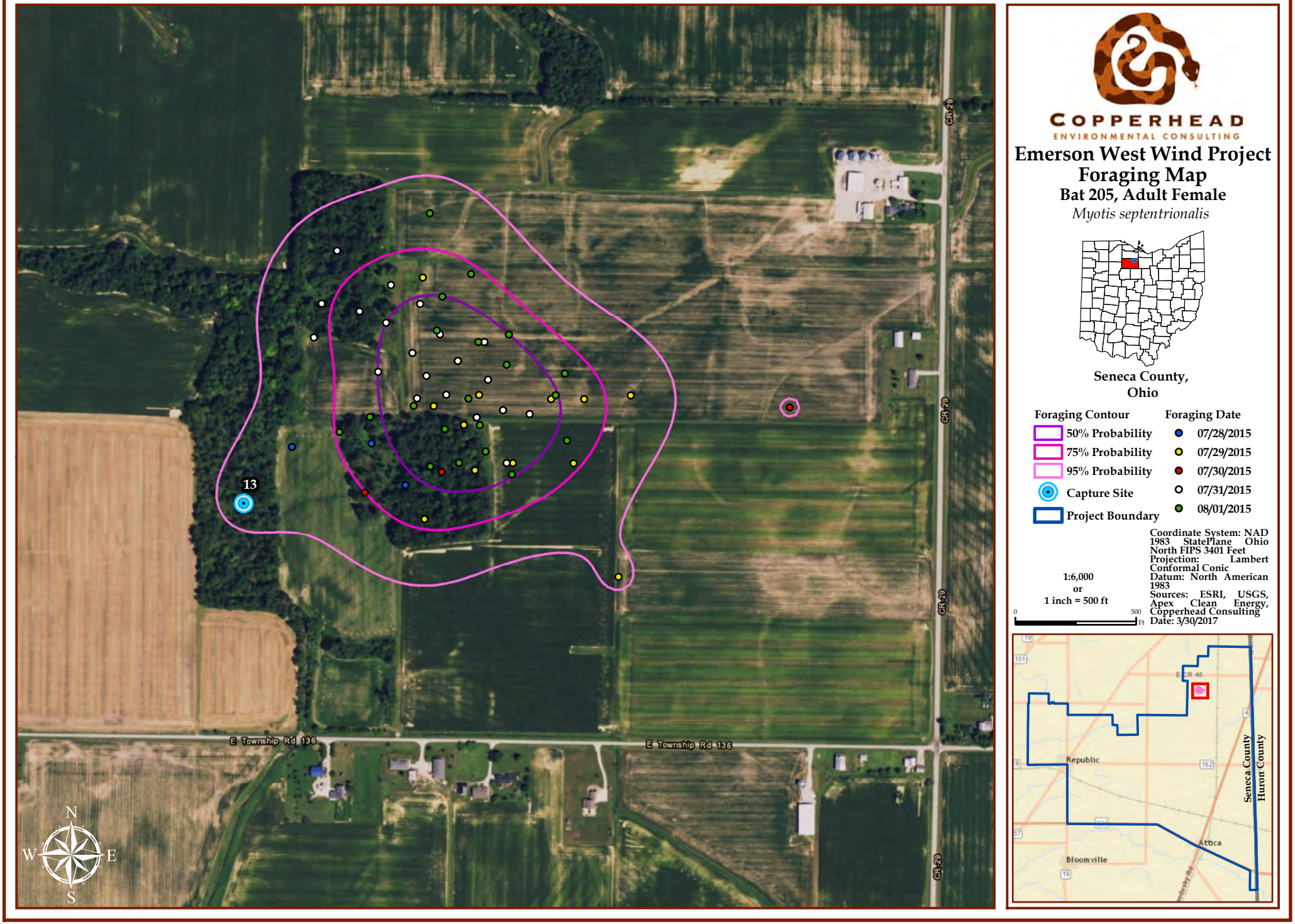


Figure 6. Foraging area utilized by female northern long-eared bat, MYSE 205, Emerson West Wind Project, Ohio, 2015.

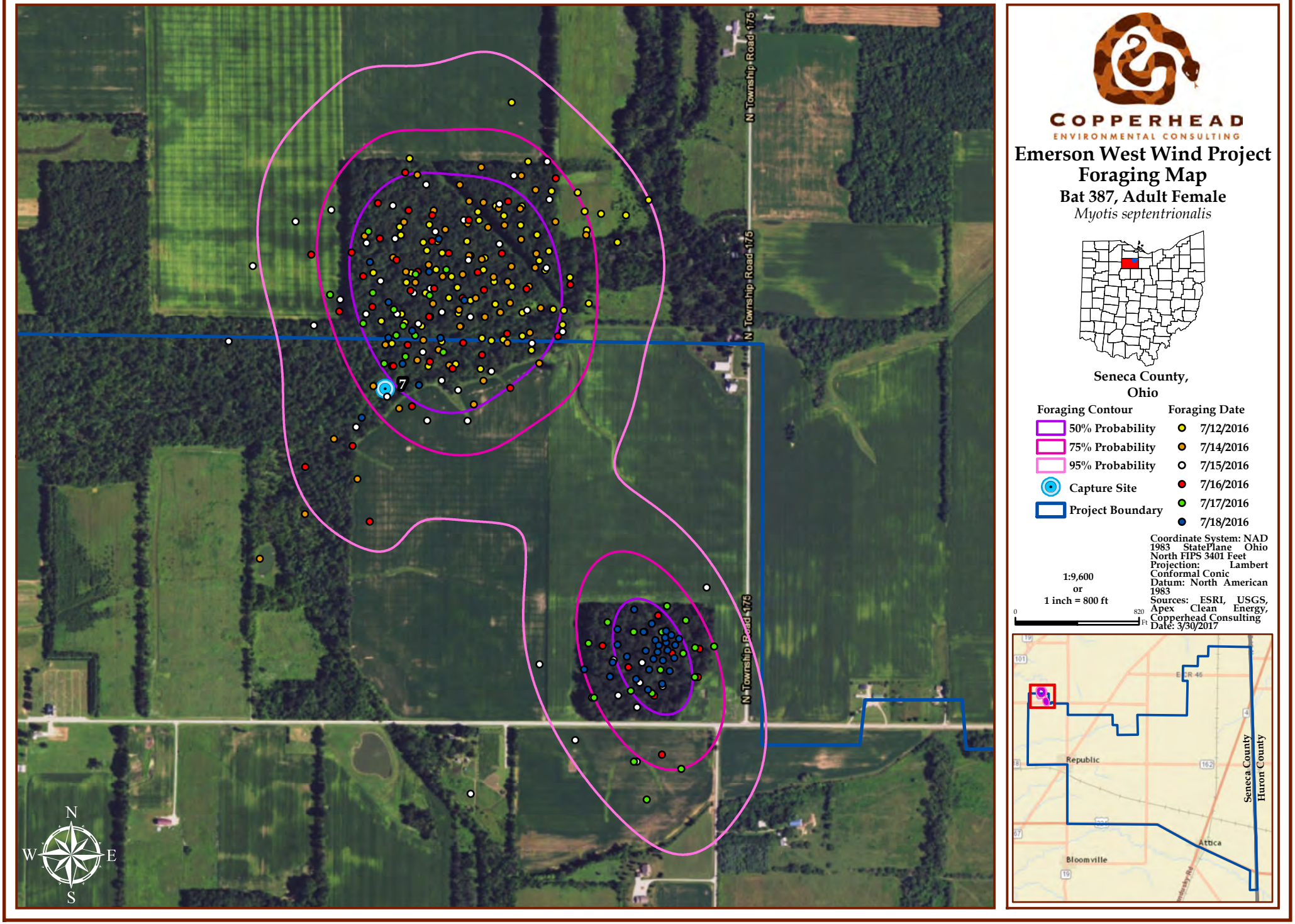
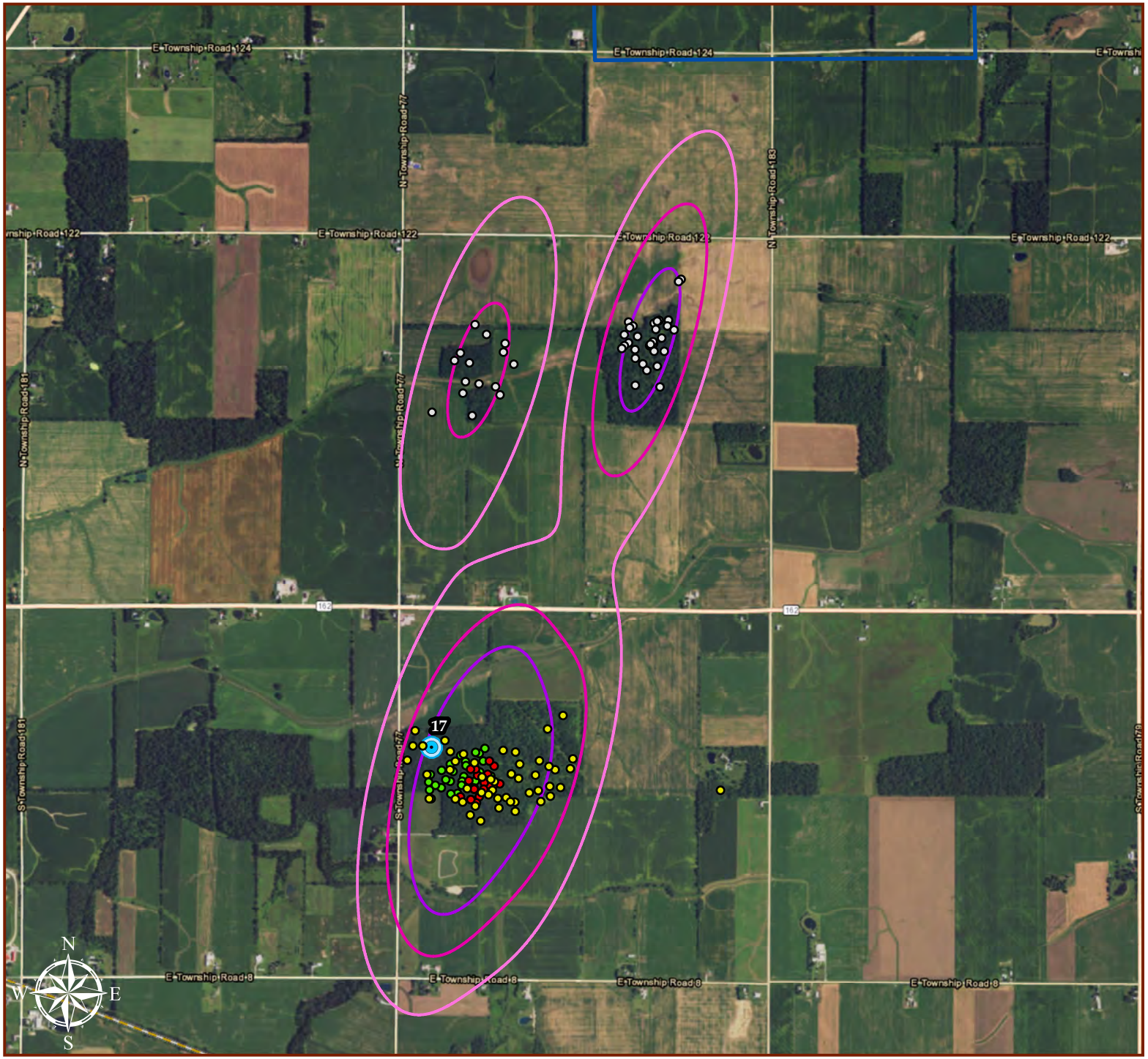


Figure 7. Foraging area utilized by female northern long-eared bat, MYSE 387, Emerson West Wind Project, Ohio, 2016.



COPPERHEAD
ENVIRONMENTAL CONSULTING

Emerson West Wind Project
Foraging Map
Bat 267, Adult Male
Myotis septentrionalis

Seneca County,
Ohio

Foraging Contour
- 50% Probability
- 75% Probability
- 95% Probability
- Capture Site
- Project Boundary

Foraging Date
- 7/19/2016
- 7/20/2016
- 7/21/2016
- 7/22/2016

1:24,000
or
1 inch = 2,000 ft

0 2,000 Ft

Coordinate System: NAD 1983 StatePlane Ohio North FIPS 3401 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: ESRI, USGS, Apex Clean Energy, Copperhead Consulting
Date: 3/30/2017

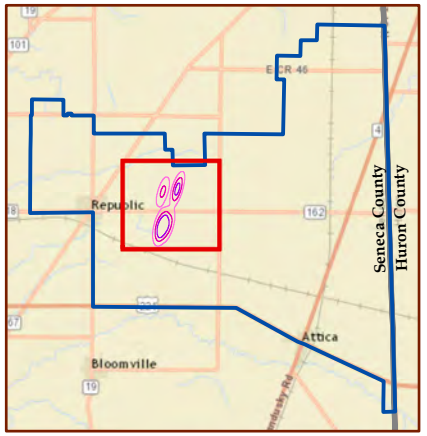


Figure 8. Foraging areas utilized by male northern long-eared bat, MYSE 267, Emerson West Wind Project, Ohio, 2016.

There was a large range in the size of foraging areas among bats within each foraging area contour (Table 12, Figure 9), but no difference in individual foraging area sizes ($F_{4,4}$ = 4.923, P = 0.076, Figure 13) within each foraging area contour (Table 13). The farthest foraging point from a known roost for MYSE 205 was 0.5 kilometers, 1.0 kilometers for MYSE 387, and 2.2 kilometers for MYSE 267.

Table 12. Mean foraging area sizes for three adult northern long-eared bats, Emerson West Wind Project, Ohio, 2015 and 2016.

Foraging Area (acres)					
mean 95% contour	**range**	**mean 75% contour**	**range**	**mean 50% contour**	**range**
353.7	52.6 - 786.6	152.9	22.7 - 338.6	68.6	10.6 - 148.1

Table 13. Foraging area sizes for adult northern long-eared bats, Emerson West Wind Project, Ohio, 2015 and 2016.

				Foraging Area (acres)		
Year	**Dates**	**Bat ID**	**Sex**	**95% contour**	**75% contour**	**50% contour**
2015	28 July - 1 Aug	205	Female	52.6	22.7	10.6
2016	12 - 18 July	387	Female	221.8	97.3	47.1
2016	19 - 22 July	267	Male	786.6	338.6	148.1

Most foraging location points of all bats were within forested habitat (81.4%), with some points within agricultural fields (16.6%) and some within forested fencerows (1.4%, Table 14, Fig 10). For those points outside forest or forested fencerows, the mean and median distance from forest edge for all bats were 58.2 meters and 41.5 meters, respectively.

Table 14. Foraging habitat use by number of location points of three northern long-eared bats, Emerson West Wind Project, 2015 and 2016.

Habitat	**Female Bat 387**	**Male Bat 267**	**Female Bat 205**	***Total***
Forest	259	130	22	*411*
Fence Row	4	3	0	*7*
Field	32	14	38	*84*
Total No. points	*295*	*147*	*60*	*502*

Business Confidential – Not for Public Disclosure

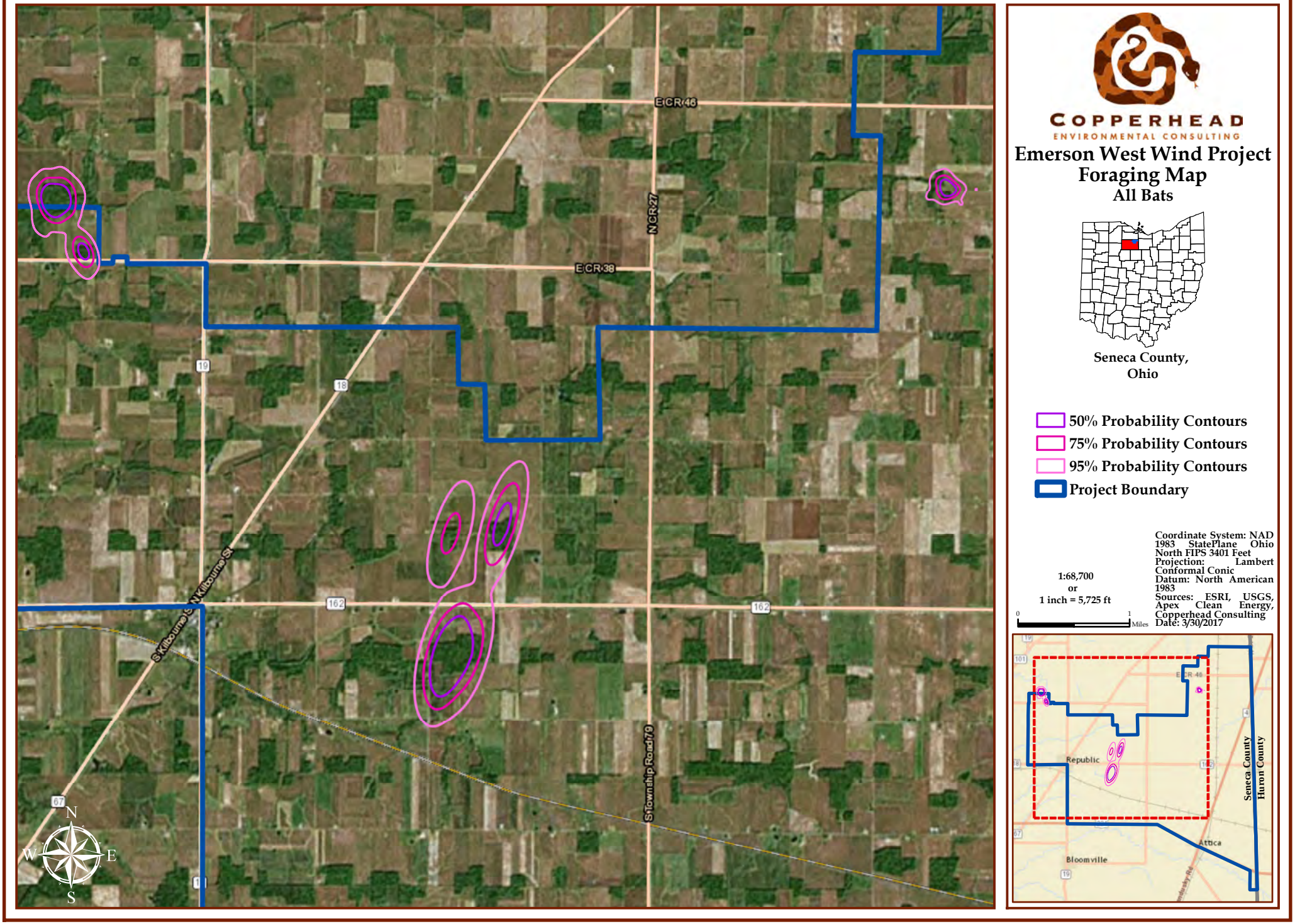


Figure 9. Foraging areas of three northern long-eared bats, Emerson West Wind Project, Ohio, 2015 and 2016.

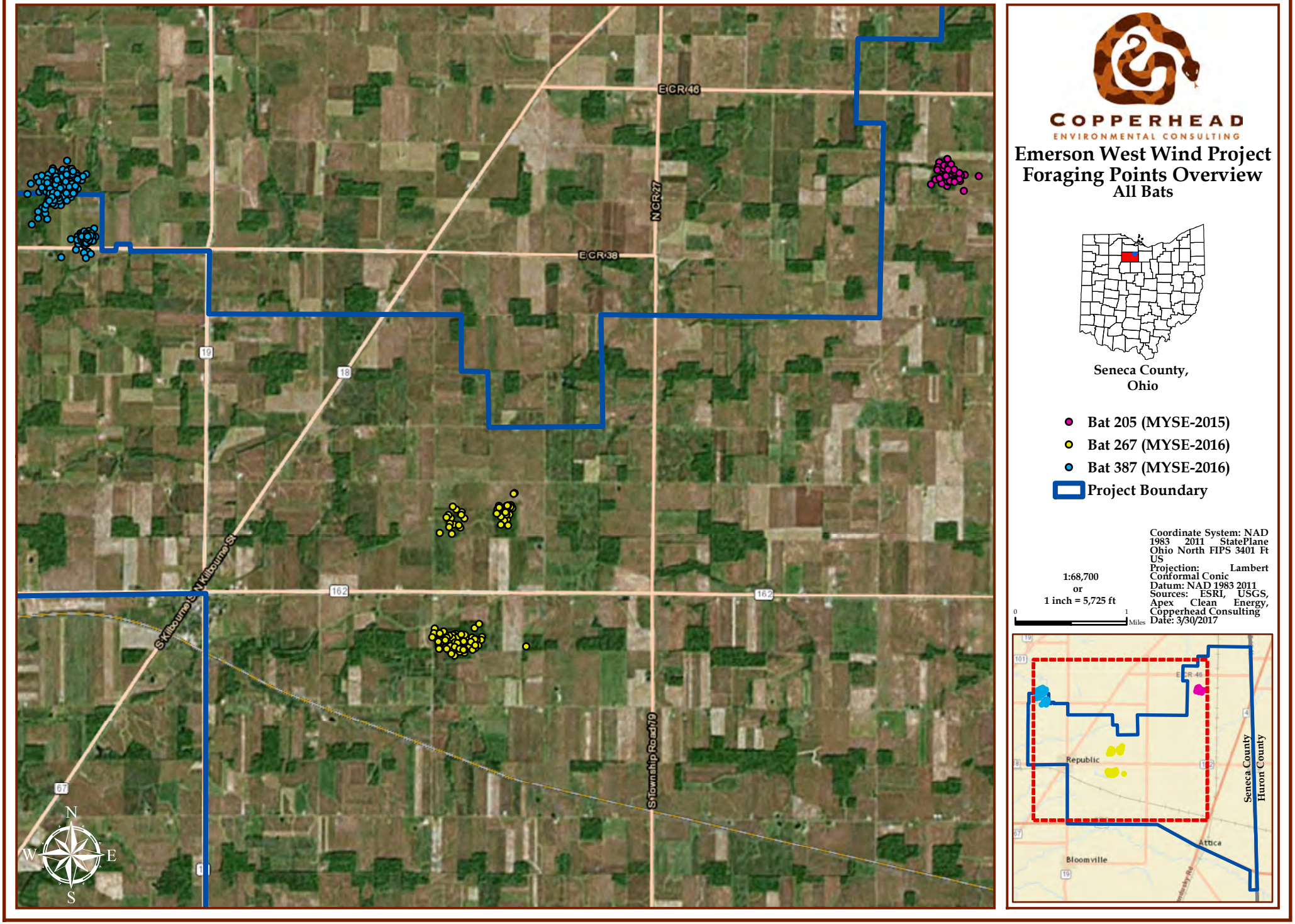


Figure 10. All foraging location points collected on three adult long-eared bats, Emerson West Wind Project, Ohio, 2015 and 2016.

CONCLUSIONS

No Indiana bats were captured within the Project area in 2015 or 2016. Eight northern long-eared bats were captured. No other state-listed bats were captured.

Foraging areas of northern long-eared bats were primarily restricted to forest and forest edges, with individual foraging location points well clustered. All northern-long eared bats were captured within their respective estimated foraging areas. On average, bats located foraging or commuting in open areas were within 58 meters of forest habitat, suggesting that northern long-eared bats in this area show a preference for foraging and commuting within forests, forested fence rows, and forested waterways.

The range of foraging area sizes identified during this study was consistent with the foraging telemetry study conducted on Myotid bats in 2015 (Wetzel et al. 2016). The male northern long-eared bat had the largest foraging area of the three bats analyzed in this study, utilizing a greater number of woodlots than the other bats during the time they were tracked. The 2015 female bat had the smallest home range, but also appeared to be using an area with less available forested habitat based on the aerial imagery, which was the preferred habitat for the three bats overall.

Results of this study suggest that siting of turbines away from forested habitat should greatly reduce the risk of turbine collision during summer for female northern long-eared bats and to a lesser extent for males.

Business Confidential – Not for Public Disclosure

LITERATURE CITED

Brack Jr., V. and Whitaker. 2001. Foods of the northern myotis, *Myotis septentrionalis*, from Missouri and Indiana, with notes on foraging. Acta Chiropterologica 3(2): 230-210.

Hall, E. R. 1981. The Mammals of North America. Volume I. John Wiley & Sons, New York, NewYork

Ohio Division of Natural Resources (ODNR). 2009. On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio: An Addendum to the Ohio Department of Natural Resource's Voluntary Cooperative Agreement.

Ohio Division of Natural Resources – Division of Wildlife. 2015. Ohio Division of Wildlife and USFWS (OH Field Office) Guidance for Bat Permitted Biologist.

R Core Team (2016). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Reichard, J. D. and T. H. Kunz. 2009. White-nose syndrome inflicts lasting injuries to the wings of little brown myotis (*Myotis lucifugus)*. Acta Chiropterologica, 11(2) 457-464.

United States Fish and Wildlife Service (USFWS). 2015. Range-wide Indiana Bat Summer Survey Guidelines.

United States Fish and Wildlife Service (USFWS). 2016. Range-wide Indiana Bat Summer Survey Guidelines.

Wetzel, T.A.N., P.L. Roby, S.T. Samoray, S. Burke, and C.A. Leftwich. 2016. Revised: Summer 2015 Bat Survey for the Proposed Republic Wind Project, Seneca and Sandusky Counties, Ohio. Business Confidential – Not for Public Disclosure. 251 pp.

APPENDIX A

Mist-Net Data Sheets

Mist Netting Data Form

Sheet_____ of _____

Site No. 1 Project No./Name 412.01 / Emerson Creek Date 7/31/2015

Site Location N CR 19, Woodlot near pond

County Seneca State OH Time Up 8:50 Time Down 2:00

Lat/Lon; UTM: N/E 41.167111 W/N -82.884334 Zone ____ Datum NAD83 Observers Ram Storm, Brandon Smith

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type____	Freq. _____
1													
2		NO BATS											
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase 100 % **Wax / Wane**

	Rise	Set
Sun	6:25am	8:51pm
Moon	9:23 pm	9:10 am

Time	Temp (F)	Sky	Wind	No. Bats
9:00	68	1	0	0
10:51	63.5	1	0	0
2:00	58.1	1	0	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 2 Project No./Name 112.01 / Emerson Creek Date 7/27/2015

Site Location N County Rd. 29, Schriner Rd., Woodlot near pond

County Seneca State OH Time Up 9:05 Time Down 2:05

Lat/Lon ; UTM: (N)/E 41.167111 W/N -82.884234 Zone — Datum NAD83 Observers Rain Storm, Brandon Sw

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type ODNR	Freq. —
1	11:25	MYSE	A	M	NR	7	36	D	2.6	0	0	17172	—
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase 97 % (Wax) / Wane

	Rise	Set
Sun	6:22 am	8:55 pm
Moon	5:51 pm	3:11 am

Time	Temp (F)	Sky	Wind	No. Bats
9:30	68	1	0	0
11:13	66	1	0	1
2:05	62	1	0	1

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

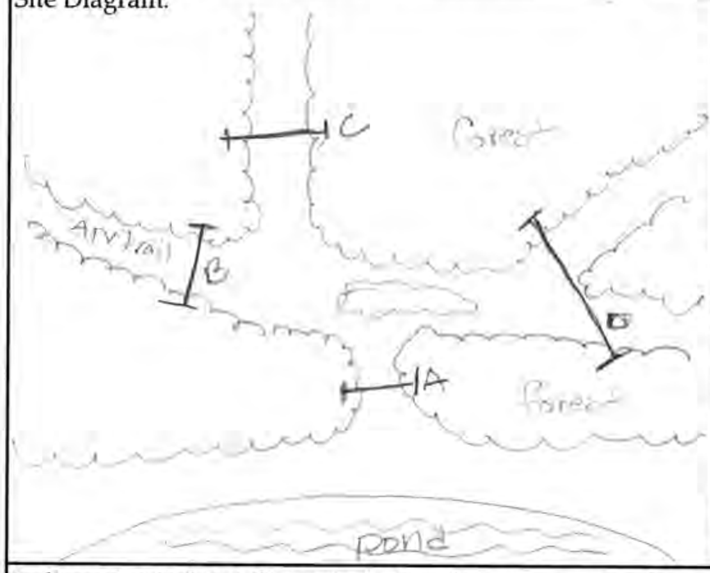
Property owner- Harold Daniels

Mist Net Site Habitat Sheet Site No. 1 Project No./Name 412.01 / Emerson Creek Date 7/27/2015

Lat/Lon ; UTM: N/E 41.16711 W/N -82.884334 Zone ____ Observers Ram Ston, Brandon Smith

Datum: NAD83 County Seneca State OH Quad Fireside

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	20ft	6m	7/27/2015
B	20ft	6m	7/27/2015
C	20ft	6m	7/27/2015
D	30ft	9m	7/27/2015
E			
F			

Site Photographs
Camera: Ram's
Photo Log: 1A, 1B, 1C, 1D

Dominant Vegetation

1. Red Maple
2. SB Hickory
3. Cottonwood
4. green ash
5. Sugar maple
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond						
Corridor	X	X	X	X		
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

3 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

11 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD

Mist Netting Data Form

Sheet____ of _____

Site No. 2 Project No./Name 412 / Apex Energy Emerson Cr. Wind Date 26 July 2015

Site Location Stream corridor southeast of Township Rd 9 and Trail 0197

County Seneca State OH Time Up 2050 Time Down ~~0150~~ 0155

Lat/Lon; UTM: (N)/E 41.11582 (W)/N -82.84374 Zone / Datum NAD83 Observers K. Pearman, A. Trousdale

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type____	Freq. ____
1	2340	EPFU	A	M	NR	17.0	45	A	0.5	0	—	—	—
2	0015	EPFU	A	M	NR	16.75	45	C	0.5	0	—	—	—
3	0110	LABO	J	F	NR	10.5	40	C	3.5	0	—	—	—
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase 60% (Wax) / Wane

	Rise	Set
Sun	0620	2055
Moon	1628	0202

Time	Temp (F)	Sky	Wind	No. Bats
2100	68.9	2	0	0
2209	65.1	3	1	2
2307	66.4	2	1	1
0007	64.6	3	0	1
0140	62.8	2	1	—

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 2 Project No./Name 412 / APEX Emerson Creek Wind Date 31 July 2015

Site Location Stream Corridor SE of CR9 & Trail 0197

County Seneca State OH Time Up 2048 Time Down 0148

Lat/Lon ; UTM: N/E 41.11582 W/N -82.84374 Zone ____ Datum NAD83 Observers K. Pearman, Alex Padover

COPPERHEAD ENVIRONMENTAL CONSULTANTS

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	2135	EPFU	J	F	NR	12.25	46	B	5	0	—	—	—
2	2218	EPFU	A	F	PL	20.0	50	B	6	0	—	—	—
3	2245	EPFU	A	F	PL	21.0	49	B	6	0	—	—	—
4	0155	LABO	J	F	NR	10.75	41	B	6	0	—	—	—
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase 97 % Wax / Wane

	Rise	Set
Sun	0625	2050
Moon	2050	0642

Time	Temp (F)	Sky	Wind	No. Bats
2100	74.1	0	1	—
2200	69.6	0	1	1
2300	65.4	1	1	2
0000	63.7	2	1	0
0100	60.6	1	0	0
0200	59.2	1	0	0
0230				

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

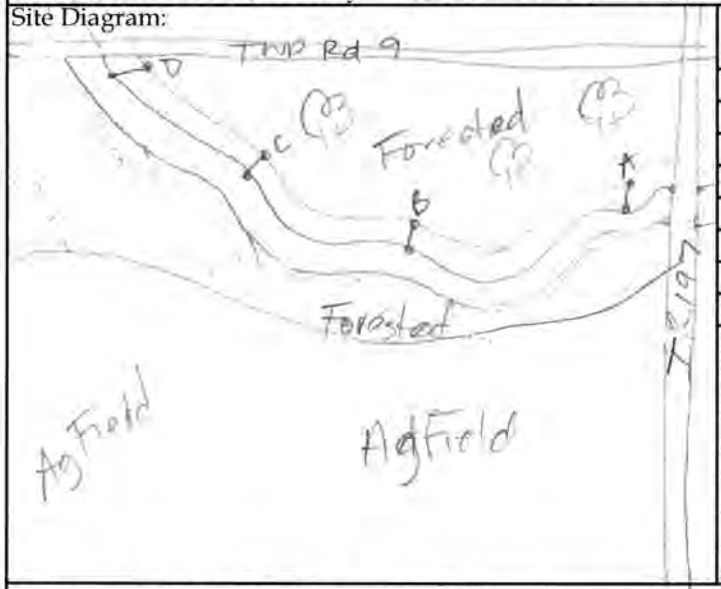
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 2 Project No./Name 412 / APEX / Emerson Creek Date 31 July 2015

Lat/Lon ; UTM: N/E 41.11582 W/N -82.841374 Zone — Observers K Perkman, Alex Padock

Datum: NAD83 County Seneca State OH Quad Centerton

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	5.2	9	31 July
B	5.2	9	31 July
C	7.8	12	31 July
D	5.2	9	31 July
E			
F			

Site Photographs
Camera: KRP
Photo Log:

Dominant Vegetation

1. Populus deltoides 4. Acer saccharum
2. Celtis tenuifolia 5.
3. Quercus palustris 6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond						
Corridor	✓	✓	✓	✓		
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

1 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

2 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

7 **Total Habitat Score** (Should be between 4 & 12)

Comments:

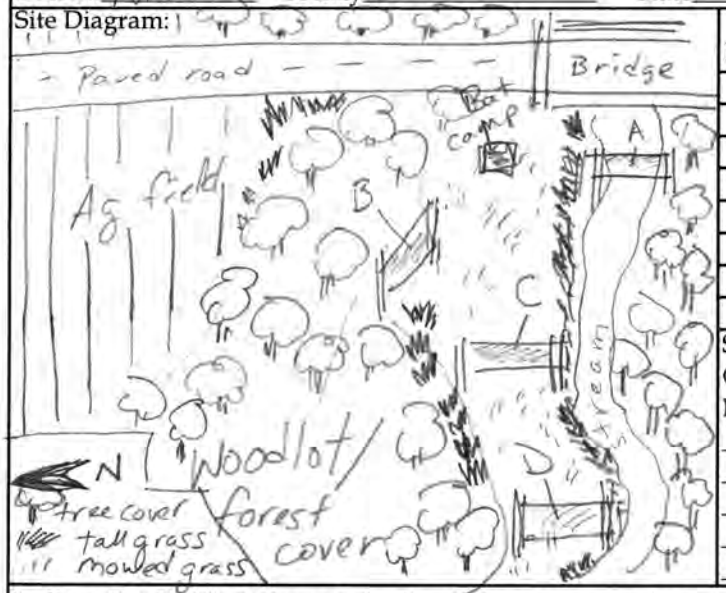
Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD ENVIRONMENTAL CONSULTING

Mist Net Site Habitat Sheet Site No. 2 Project No./Name 412 / Apex Clean Energy Emerson Creek Wind Farm Date 26 July 2015

Lat/Lon; UTM: N/E 41.11582 (W/N -82.84374 Zone — Observers K. Pearman, A. Trousdale

Datum: NAD83 County Seneca State OH Quad Centerton

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	5.2	4	26 July
B	7.8	12	
C	5.3	7	
D	5.2	9	
E			
F			

Site Photographs
Camera: Kelsey's
Photo Log: Kot

Dominant Vegetation

1. Populus deltoides 4. Acer saccharum
2. Gleditsia triacanthos 5.
3. Quercus palustris 6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream	✓					
Pond						
Corridor			✓	✓		
Cave						
Mine						
Forest Gap		✓				
Other						

=11 Net

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

1 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

2 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

7 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD ENVIRONMENTAL CONSULTING

Mist Netting Data Form

Sheet____ of _____

Site No. 4 Project No./Name 412 / EMERSON CREEK Date 7-25-14

Site Location WOODLOT off REDTOWN RD

County SCIOTO State OH Time Up 2055 Time Down 0155

Lat/Lon ; UTM: N/E 41.155 W/N -82.855 Zone _____ Datum NAD83 Observers MTM, TAB

COPPERHEAD

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type____	Freq. _____
1	10:00	EPFU	J	F	NR	17	45	D	4	0	—	—	—
2	10:30	EPFU	A	M	S	17.5	46	C	2	0	—	—	—
3	10:30	EPFU	J	F	NR	17	45	A	5	1	—	—	—
4	12:15	EPFU	A	F	PL	20	47	A	2	0	—	—	—
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase 60 % (Wax) / Wane

	Rise	Set
Sun		2055
Moon		

Time	Temp (F)	Sky	Wind	No. Bats
9:00	82	1	0	0
10:00	79	0	0	3
11:00	76	0	0	0
12:00	75	0	0	1
1:00	75	3	1	0
2:00	73	2	1	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 4 Project No./Name 412 / EMERSON CREEK Date 7-30-15

Site Location WOODLOT OFF REEDTOWN RD

County SENECA State OH Time Up 8:50 Time Down 2:00

Lat/Lon ; UTM: N/E 41.155 W/N -82.8559 Zone — Datum NAD83 Observers MTM, TAB

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	10:45	LABO	A	F	PL	14.5	40	E	1	0	—	—	—
2	10:45	EPFU	A	M	S	17	47	B	2	0	—	—	—
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase 100 % **Wax / Wane**

	Rise	Set
Sun		8:50
Moon		

Time	Temp (F)	Sky	Wind	No. Bats
9:00	78	0	1	0
10:00	75	0	1	2
11:00	73	0	1	0
12:00	70	0	1	0
1:00	66	0	1	0
2:00	64	0	1	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

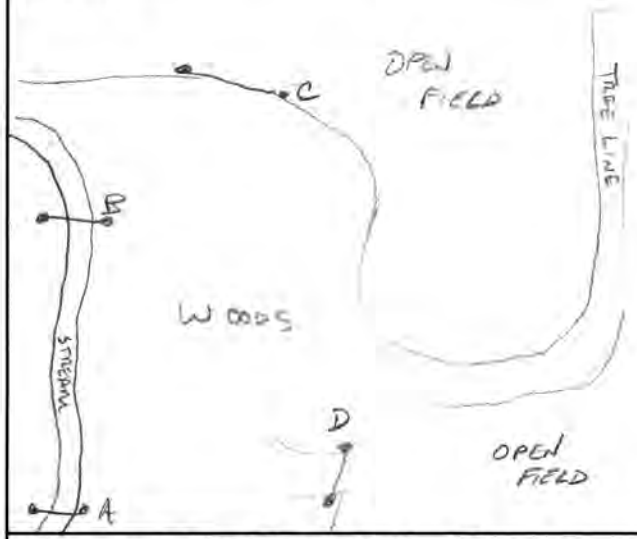
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 4 Project No./Name 421 / EMERSON CREEK Date 7-25-15

Lat/Lon ; UTM: N/E 41.155 W/N -82.8559 Zone ____ Observers MTM, TAB

Datum: NAD83 County SENECA State OH Quad Flat Rock

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	6	6	7-25
B	6	6	7-25
C	9	12	7-25
D	6	9	7-25
E			
F			

Site Photographs
Camera: ____
Photo Log: ____

Dominant Vegetation

1. RED OAK 4. ELM
2. WILLOW 5. ____
3. CATALPA 6. ____

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream	✓	✓				
Pond						
Corridor						
Cave						
Mine						
Forest Gap			✓	✓		
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

2 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

1 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

7 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD

Mist Netting Data Form

Sheet____ of _____

Site No. 5 Project No./Name 4R / Emerson Creek Date 7-25-15

Site Location Woodlot west of 4 w/intermittent streams

County Seneca State OH Time Up 8:50 Time Down 2:00

Lat/Lon ; UTM: N/E 41.167295 W/N 82.848025 Zone ____ Datum NAD83 Observers ES, RR

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type____	Freq. ____
1	9:00	LABO ESC											
2	11:00	MYSE	J	F	NR	6	36	A	2	0		escaped before banding	
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase %		Wax / Wane
	Rise	Set
Sun		8:55
Moon		

Time	Temp (F)	Sky	Wind	No. Bats
9:00	83	1	2	1
10:00	78	8	2	0
11:00	77	8	2	1
12:00	75	1	1	8
1:00	74	1	2	8
2:00	74	0	2	8

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 5 Project No./Name 412 / Emerson Creek Date 7-30-15

Site Location Woodlot west of 4 w/ intermittent stream

County Seneca State OH Time Up 20:30 Time Down 0159

Lat/Lon ; UTM: (N)/E 41.167295 (W)/N 82.848025 Zone — Datum NAD83 Observers ES, RR

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	1:30	LABO	J	F	NR	12	39	D	2	0	—	—	—
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase	%	Wax / Wane
	Rise	Set
Sun		8:59
Moon		

Time	Temp (F)	Sky	Wind	No. Bats
9:00	80	0	2	0
10:00	77	0	2	0
11:00	73	0	2	0
12:00	69	0	2	0
1:00	68	0	1	

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

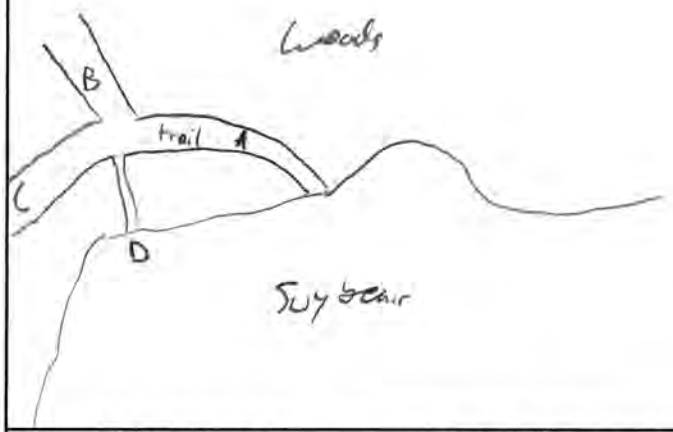
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 5 Project No./Name 412 / Emerson Creek Date 7-25-15

Lat/Lon; UTM: N/E 41.167295 W/N 82.848025 Zone — Observers ES, RR

Datum: NAD83 County Seneca State OH Quad Flat Rock

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	9	6	7
B	6	9	
C	6	6	
D	6	12	
E			
F			

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. Red Maple
2. Red oak
3. Shagbark Hickory
4.
5.
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond						
Corridor	X	X	X			
Cave						
Mine						
Forest Gap				X		
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

1 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

9 **Total Habitat Score** (Should be between 4 & 12)

Comments:

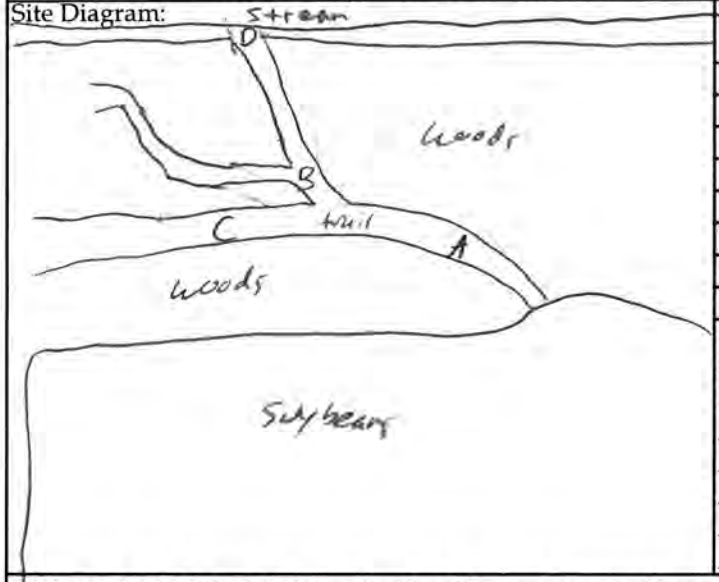
Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD

Mist Net Site Habitat Sheet Site No. 5 Project No./Name 412 / Emerson Creek Date 7-30-15

Lat/Lon ; UTM: (N)/E 41.167295 (W)/N 82.848025 Zone — Observers ES, RR

Datum: NAD83 County Seneca State OH Quad Flat Rock

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	9	6	
B	6	12	
C	6	6	
D	6	9	
E			
F			

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. Red Maple
2. Red oak
3. Shagbark Hickory
4.
5.
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond						
Corridor	x	x	x	x		
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

1 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

9 **Total Habitat Score** (Should be between 4 & 12)

Comments: narrow stream between woodlot and field

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD

Mist Netting Data Form

Sheet____ of _____

Site No. 5 Project No./Name 417 / Emerson Creek Date 7-29-15

Site Location Woodlot South of CR 410

County Seneca State OH Time Up 9:00 Time Down 2:00

Lat/Lon ; UTM: (N)/E 41.18653 (W)/N 82.84462 Zone — Datum NAD83 Observers Eric Smith, Rebekah Radcliff

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type____	Freq. ____
1	9:10	EPFU	A	M	S	17	44	B	2	0	—	—	—
2	11:30	LABO	J	F	NR	11	41	C	2	0	—	—	—
3	1:00	LABO	J	F	NR	11	40	C	1	0	—	—	—
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase	%	Wax / Wane
	Rise	Set
Sun	0622	8:51
Moon	1916	0431

Time	Temp (F)	Sky	Wind	No. Bats
9:00	80	1	1	1
10:00	78	1	1	0
11:00	78	2	3	1
12:00	78	1	2	0
1:00	76	0	2	0
2:00	74	0	2	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 6 Project No./Name 412 / Emerson Creek Date 7/31/15

Site Location Woodlot South of CR 410

County Seneca State OH Time Up 8:30 Time Down 1:55

Lat/Lon ; UTM: (N)/E 41.18693 (W)/N 82.84962 Zone — Datum NAD83 Observers Eric Smith

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ____
1	9:05	EPFU	A	M	S	17	44	B	2				
2	10:00	LABO	J	M	NR	9	37	C	4				
3	12:30	LABO	J	F	NR	11	40	B	4				
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase	%	Wax / Wane
	Rise	Set
Sun		8:44
Moon		

Time	Temp (F)	Sky	Wind	No. Bats
9:00	78	1	2	1
10:00	75	0	2	1
11:00	71	0	2	0
12:00	71	1	2	1
1:00	71	1	2	0
2:00	68	1	2	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

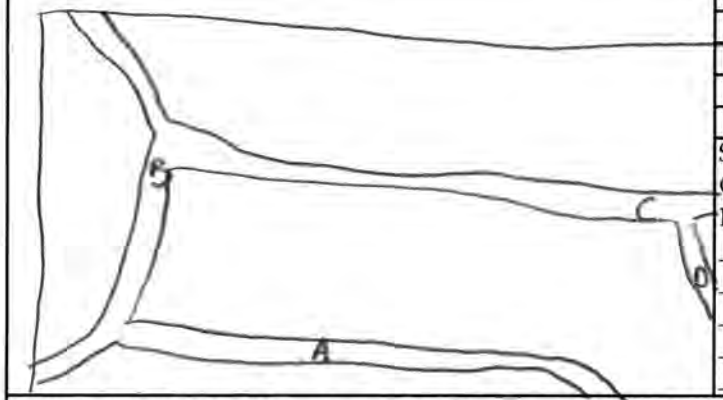
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 6 Project No./Name 417 / Emerson Creek Date 7-29-15

Lat/Lon ; UTM: (N) E 41.18653 (W) N 82.84962 Zone — Observers Eric Smith

Datum: NAD83 County Seneca State OH Quad Flat Rock

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	6	6	7/29, 7/31
B	9	9	7/29, 7/31
C	6	6	7/29, 7/31
D	6	6	7/29, 7/31
E			
F			

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. Red Maple
2. Shagbark
3. Elm
4.
5.
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond						
Corridor	X	X	X	X		
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

1 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

2 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

8 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD

Mist Netting Data Form

Sheet 1 of _____

Site No. 8 Project No./Name 412 / EMERSON CREEK Date 7/26/15

Site Location STREAM OFF of 136

County SENECA State OH Time Up 8:55 Time Down 2:00

Lat/Lon ; UTM: N/E 41.17072 W/N -82.89307 Zone — Datum NAD83 Observers MTM, RRR

COPPERHEAD ENVIRONMENTAL CONSULTANTS INC

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	9:10	LABO	A	F	PL	14	41	C	3	0	—	—	—
2	9:45	EPFU	A	F	PL	17	47	D	2	0	—	—	—
3	10:30	EPFU	A	F	PL	20	49	B	2	0	—	—	—
4	11:30	EPFU	A	F	PL	20	50	C	9	0	—	—	—
5	11:45	EPFU	A	F	PL	21	47	B	1	0	—	—	—
6	1:40	EPFU	A	F	PL	17	48	C	8	0	—	—	—
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myctis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase 50 % (Wax) / Wane

	Rise	Set
Sun	0621	9:00
Moon	1632	0246

Time	Temp (F)	Sky	Wind	No. Bats
9:00	73	3	1	2
10:00	71	3	1	1
11:00	70	3	1	2
12:00	69	2	1	0
1:00	66	2	1	1
2:00	66	2	1	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 8 Project No./Name 412 / EMERSON CREEK Date 7-29-15

Site Location STREAM OF 136

County SENECA State OHIO Time Up 8:50 Time Down 2:00

Lat/Lon ; UTM: N/E 41.17072 W/N -82.89307 Zone — Datum NAD83 Observers MTM, TAB

COPPERHEAD ENVIRONMENTAL CONSULTING INC.

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	10:50	EPFU	A	M	S	20	46	C	1.5	0	—	—	—
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase % **Wax / Wane**

	Rise	Set
Sun	0622	2052
Moon	1916	0431

Time	Temp (F)	Sky	Wind	No. Bats
9:00	81	2	0	0
10:00	79	2	1	1
11:00	77	1	1	0
12:00	77	0	2	0
1:00	76	0	2	3

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

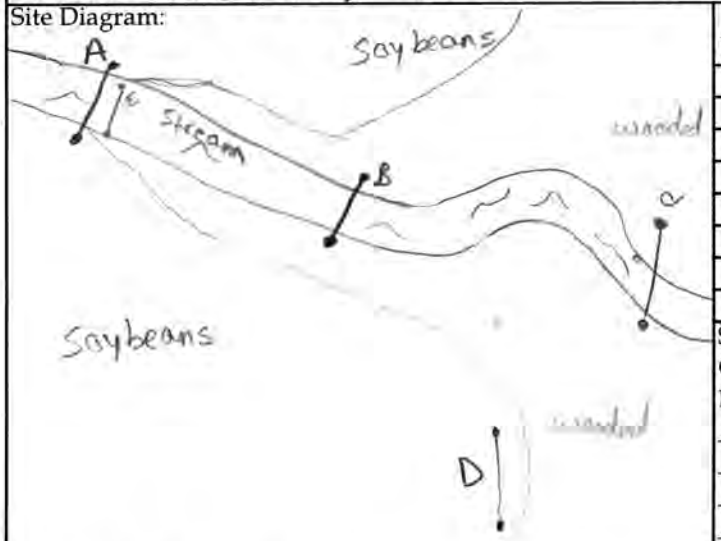
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 8 Project No./Name 412 / EMERSON CREEK Date 7/26/15

Lat/Lon ; UTM: N/E 41.17072 W/N -82.89307 Zone — Observers MTM, RRR

Datum: NAD83 County Seneca State OH Quad Fireside

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	6	6	7-26
B	6	6	7-26 7-29
C	9	9	7-26 7-29
D	6	6	7-26 7-29
E	6	4m	7-29
F			

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. RED OAK
2. RED MAPLE
3. COTTON WOOD
4. BEECH
5. ELM
6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream	✓	✓	✓			
Pond						
Corridor						
Cave						
Mine						
Forest Gap				✓		
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

3 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

11 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD

Mist Netting Data Form

Sheet____ of _____

Site No. 9 Project No./Name 413 / Emerson Creek Date 7-25-15

Site Location Woodlot south of E township road 124

County Seneca State OH Time Up 9:00 Time Down 2:00

Lat/Lon ; UTM: (N) E 41.14356 (W) N 82.92948 Zone — Datum NAD83 Observers ES, TAB

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ____
1	9:20	EPFU	A	M	TD	15.5	44	D	5	0	—	—	—
2	11:00	EPFU	J	F	NR	15	45	D	5	0	—	—	—
3	12:30	LABO	A	F	PL	13	41	D	3	0	—	—	—
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase ____ % **Wax / Wane**

	Rise	Set
Sun	0621	2058
Moon	1638	0346

Time	Temp (F)	Sky	Wind	No. Bats
9:00	75	3	1	1
10:00	72	3	1	0
11:00	70	3	0	1
12:00	67	3	0	1
1:00	66	2	0	2
2:00	64	2	0	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. #9 Project No./Name 417 / Emerson Creek Date 7/28/2015

Site Location Woodlot south of E Township Road 124

County Seneca State OH Time Up 9:00pm Time Down 2:00 AM

Lat/Lon ; UTM: (N)/E 41.14756 (W)/N 82.92948 Zone — Datum NAD83 Observers ES, TAB

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	9:00	LABO	Escape					A	4		—	—	—
2	9:10	LABO	A	F	PL	13	40	A	3	0	—	—	—
3	9:20	LABO	J	F	NR	9	38	A	3	0	—	—	—
4	9:50	EPFU	A	M	TD	17.5	48	D	2	0	—	—	—
5	10:00	EPFU	A	F	PL	20.5	49	D	5.5	0	—	—	—
6	10:00	EPFU	A	M	TD	15	46	D	3.5	0	—	—	—
7	10:45	EPFU	A	F	PL	20	48	D	5	0	—	—	—
8	11:30	EPFU	J	F	NR	14	45	D	4	0	—	—	—
9	11:30	EPFU	J	M	NR	13	44	D	1.5	0	—	—	—
10	12:50	EPFU	Escaped					D	4		—	—	—
11	12:50	LABO	J	F	NR	9.5	39	D	3	0	—	—	—
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase ___% Wax / Wane

	Rise	Set
Sun	0623	8:54
Moon	1827	0356

Time	Temp (F)	Sky	Wind	No. Bats
9:00	79	1	1	4
10:00	77	1	1	3
11:00	75	2	1	2
12:00	73	1	1	2
1:00	72	1	1	0
2:00	70	1	1	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

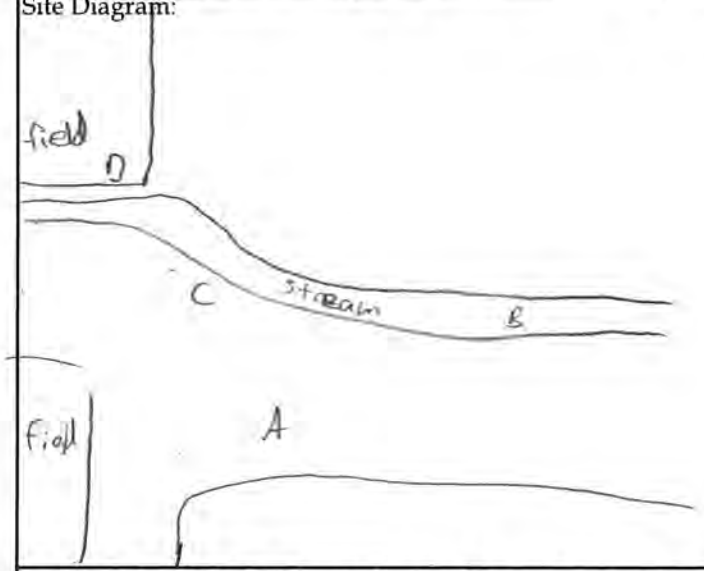
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 9 Project No./Name 412 / Emerson Creek Date 7/26/15 7/28/15

Lat/Lon, UTM: N/E 41.14356 W/N 82.92948 Zone — Observers ESmith

Datum: NAD83 County Seneca State OH Quad Fire Side

Site Diagram:



Net	Height (m)	Length (m)	Dates
A		9	
B		6	
C		6	
D		12	
E			
F			

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. Red maple	4. Red oak
2. Shagbark	5.
3. Elm	6.

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream		X				
Pond						
Corridor			X	X		
Cave						
Mine						
Forest Gap	X					
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

2 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

1 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

1 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

6 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD

Mist Netting Data Form

Sheet 1 of 2

Site No. 10 Project No./Name 412.01 / Emerson Creek Date 7/25/15

Site Location Forest gap; logging road; pond in forest

County Seneca State OH Time Up 9:00 Time Down 2:00 am

Lat/Lon ; UTM: (N)/E 41.15312 (W)/N 82.92621 Zone — Datum NAD83 Observers J. Storm, J. Klinger

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	9:20	EPFU	JV	M	NR	11	46	A	3.0	0	na	na	na
2	9:26	EPFU	JV	m	NR	11.25	45	A	5.0	0	na	na	na
3	10:00	LABO	JV	m	NR	6.5	39	D	0.5	0	na	na	na
4	10:00	EPFU	JV	M	NR	8.75	41	A	3.0	0	na	na	na
5	10:00	EPFU	JV	M	NR	13.00	44	A	3.0	0	na	na	-
6	10:00	EPFU	A	F	PL	17.75	47	A	3.0	01	na	na	-
7	10:00	EPFU	A	F	PL	20.5	49	A	5.0	0	na	-	-
8	10:00	EPFU	JV	M	NR	14.5	46	A	6.0	0	na	-	-
9	10:00	EPFU	A	F	PL	16.75	48	A	5.0	0	na	-	-
10	10:40	LABO	JV	F	NR	8.0	41	A	2.0	0	-	-	-
11	10:40	EPFU	A	M	S	16.0	44	A	7.0	0	-	-	-
12	10:40	EPFU	A	M	S	16.5	45	A	6.0	0	-	-	-
13	10:40	EPFU	A	F	PL	20.0	47	A	4.0	0	-	-	-
14	11:15	EPFU	JV	F	NR	13.0	46	A	3.0	0	-	-	-
15	11:50	EPFU	A	M	S	19.5	45	A	3.0	0	-	-	-
16	11:50	EPFU	JV	M	NR	14.0	49	A	3.0	0	-	-	-
17	11:50	EPFU	A	F	PL	20.75	48	A	5.5	0	-	-	-
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase % 68.1 (Wax) / Wane

	Rise	Set
Sun	6:20 am	8:57 pm
Moon	3:34 pm	1:26 am

Time	Temp (F)	Sky	Wind	No. Bats
9:00	73.0	1	2	2
10:00	70.5	0	1	11
11:00	69.8	1	1	4
12:00	69.4	1	1	0
1:00	70.3	1	0	0
2:00	70.1	1	3	—

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 10 Project No./Name 412.01 / Emerson Creek Date 7/30/15

Site Location Forest gap; logging road; pond in forest

County Seneca State OH Time Up 8:50 Time Down 1:50

Lat/Lon ; UTM: (N)/E 41.15312 (W)/N -82.92621 Zone — Datum NAD83 Observers J. Storm, M. Newton

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	9:05	LABO	Escaped from Net						A				
2	9:30	EPFU	JV	M	NR	11.75	47mm	A	6	0	—	—	—
3	9:30	EPFU	JV	F	NR	11	46mm	A	6	1	—	—	—
4	9:30	EPFU	A	F	PL	16	49mm	A	4	0	—	—	—
5	9:30	EPFU	A	M	TD	14.5	47mm	A	2	0	—	—	—
6	9:30	EPFU	JV	M	NR	10.25	44mm	A	2	0	—	—	—
7	9:50	EPFU	A	FM	L	17	47mm	D	1.5	0	—	—	—
8	10:30	LABO	JV	F	NR	9	38mm	A	3.5	0	—	—	—
9	10:20	LACI	JV	M	NR	11.25	49mm	A	3	0	—	—	—
10	10:20	EPFU	JV	F	NR	16.5	48mm	A	4	0	—	—	—
11	10:30	EPFU	A	M	TD	16.25	45mm	A	2	0	—	—	—
12	10:40	LABO	JV	F	NR	9.25	39mm	C	2	0	—	—	—
13	10:40	EPFU	A	F	L	21	48mm	C	4.5	1	—	—	—
14	10:40	EPFU	JV	M	NR	8.25	39mm	A	3	0	—	—	—
15	11:15	EPFU	JV	F	NR	13.5	45mm	A	1	0	—	—	—
16	1:50	LABO	JV	F	NR	9.75	42mm	A	2	0	—	—	—
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase % 97.6 Wax / Wane

	Rise	Set
Sun	6:25 am	8:51 pm
Moon	8:10 pm	5:35 am

Time	Temp (F)	Sky	Wind	No. Bats
~~9:00 PM~~	~~74.1~~	~~0~~	~~3~~	~~14~~
~~11:00 PM~~	~~68.5~~	~~0~~	~~2~~	~~—~~
9:00	—	0	3	7
10:00	74.1	0	3	8
11:00	68.5	0	2	1
12:00	64.9	0	1	0
1:00	63.1	0	2	1
2:00	62.8	0	1	—

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

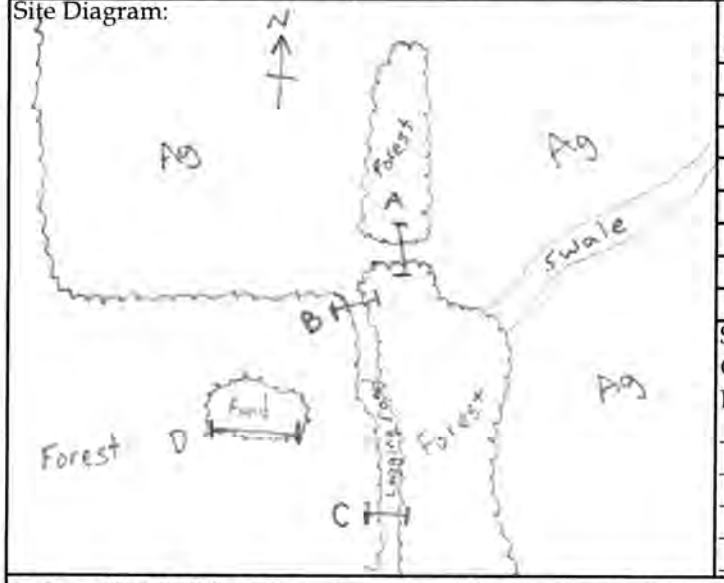
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 10 Project No./Name 412, Emerson Creek Date 7/25/15

Lat/Lon ; UTM: N/E 41.15312 W/N -82.92621 Zone ___ Observers J. Sloan, T. Kinser

Datum: NAD83 County Seneca State OH Quad ___

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	7.8	9	7/25 & 7/30
B	5.2	6	7/25 & 7/30
C	5.2	6	7/25 & 7/30
D	5.2	6	7/25 & 7/30
E			
F			

Site Photographs
Camera: ___
Photo Log: ___

Dominant Vegetation

1. Red Maple
2. ~~Red oak sp~~ Pin oak
3. Shagbark hickory
4. Slippery elm
5. ~~Red bud~~ Swamp White oak
6. Silver Maple

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond				X		
Corridor	X	X	X			
Cave						
Mine						
Forest Gap	X					
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

2 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

9 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD

Mist Netting Data Form

Sheet____ of _____

Site No. 11 Project No./Name 4/12 / EMERSON CREEK Date 7-23-15

Site Location CR 122

County Seneca State OH Time Up 8:50 Time Down 2:20

Lat/Lon ; UTM: N/E 41.13920 W/N 82.99223 Zone ~ Datum NAD83 Observers MTM , RRR

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ____
1	10:20	EPFU	A	F	L	18	46	2	7	0	—	—	—
2	1:10	EPFU	A	M	S	16.5	43	2	5	0	—	—	—
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase 50 % (Wax) / Wane

	Rise	Set
Sun	0612	2052
Moon	1328	0045

Time	Temp (F)	Sky	Wind	No. Bats
9:00	75	0	0	0
10:00	73	0	0	1
11:00	70	0	0	0
12:00	68	0	1	0
1:00	66	0	2	1
2:00	65	0	2	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 11 Project No./Name 412 / EMERSON CREEK Date 7/27/15

Site Location CR 122

County Seneca State OH Time Up 8:45 Time Down _____

Lat/Lon ; UTM: N/E _____ W/N _____ Zone _____ Datum _____ Observers MTM, RRR

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type___	Freq. ___
1	9:40	LABO	A	M	S	14	37	B	2	0	—	—	—
2	9:40	EPFU	J	F	NR	19	46	B	4	1	—	—	—
3	10:20	EPFU	A	M	S	22	51	B	4	0	—	—	—
4	11:30	EPFU	A	M	S	22.5	49	B	5	0	—	—	—
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type _____ Unit # _____ Date _____ Start time _____ Stop time _____

Date _____ Start time _____ Stop time _____

Date _____ Start time _____ Stop time _____

Weatherproofing _____ Coordinates _____

Comments:

Moon Phase 50 % (Wax) / Wane

	Rise	Set
Sun	0622	8:55
Moon	1731	0246

Time	Temp (F)	Sky	Wind	No. Bats
9:00	76	1	1	2
10:00	75	1	1	1
11:00	73	1	1	1
12:00	72	1	1	0
1:00	71	0	1	0
2:00	68	0	1	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

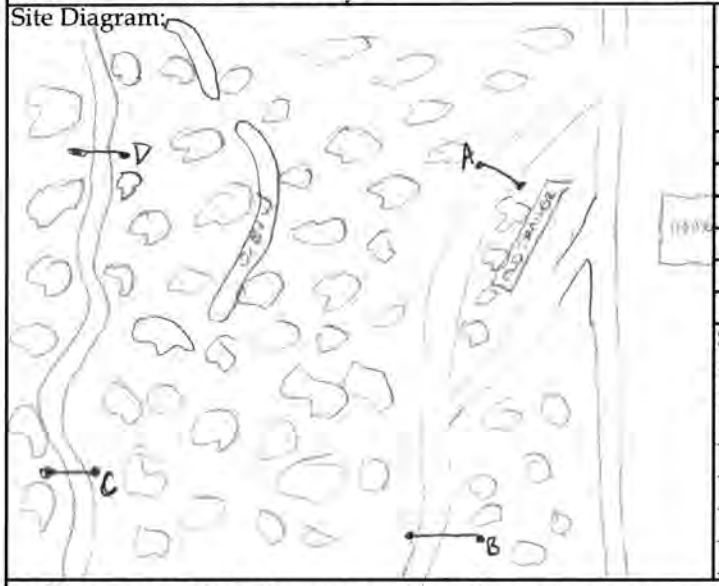
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 11 Project No./Name 412 / EMERSON CREEK Date 7-23-15

Lat/Lon ; UTM: N/E 41.13920 W/N 82.99223 Zone — Observers MTM, RRR

Datum: _____ County SENECA State OH Quad Fireside

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	6	6	7/23/15 7:27
B	9	9	7/23/15 7:27
C	6	6	7/23/15 7:27
D	6	6	7/23/15 7:27
E			
F			

Site Photographs
Camera: _____
Photo Log: _____

Dominant Vegetation

1. COTTONWOOD 4. ELM
2. RED MAPLE 5. WALNUT
3. RED OAK 6. _____

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream				✓		
Pond						
Corridor	✓	✓	✓			
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

2 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

10 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012
COPPERHEAD

Mist Netting Data Form

Sheet 1 of 2

Site No. 13 Project No./Name 412.01 / Emerson Creek Date 7/26/15

Site Location Woodlot logging road & Stream

County Seneca State OH Time Up 8:55 Time Down 1:55

Lat/Lon ; UTM: N/E 41.17809 W/N 82.89062 Zone — Datum NAD83 Observers J. Storm, J. Klinger

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type ODNR	Freq.
1	130	MYSE	A	F	L	7.0	35	B	2	0	N B	ODNR *1	17179
2	130	MYSE	A	F	L	7.5	36	B	3.5	0	B	17178	172.205
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

*ODNR 17179

Moon Phase	% 77.5	Wax / Wane
	Rise	Set
Sun	6:21	8:56
Moon	4:32 pm	2:46 am

Time	Temp (F)	Sky	Wind	No. Bats
9.00	71.2	2	1	0
10.00	68.3	2	1	0
11:00	67.2	3	1	0
12.00	65.3	2	1	0
1.00	63.8	2	1	2
2.00	62.2	2	1	—

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 13 Project No./Name 412 / Emerson Creek Date 7/28/15

Site Location Woodlot logging road & stream

County Seneca State OH Time Up 8:55 Time Down 1:55

Lat/Lon ; UTM: N/E 41.17809 W/N 82.89062 Zone — Datum NAD83 Observers J. Sherm, J. Klinger

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1													
2													
3													
4													
5													
6								BATS					
7													
8					NO								
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase %92.8 Wax / Wane

	Rise	Set
Sun	6:23	8:54
Moon	6:27 pm	3:56 am

Time	Temp (F)	Sky	Wind	No. Bats
9:00	68.5	0	1	0
10:00	67.5	0	2	0
11:00	69.7	1	2	0
12:00	65.4	0	1	0
1:00	65.3	0	1	0
2:00	64.5	0	1	—

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

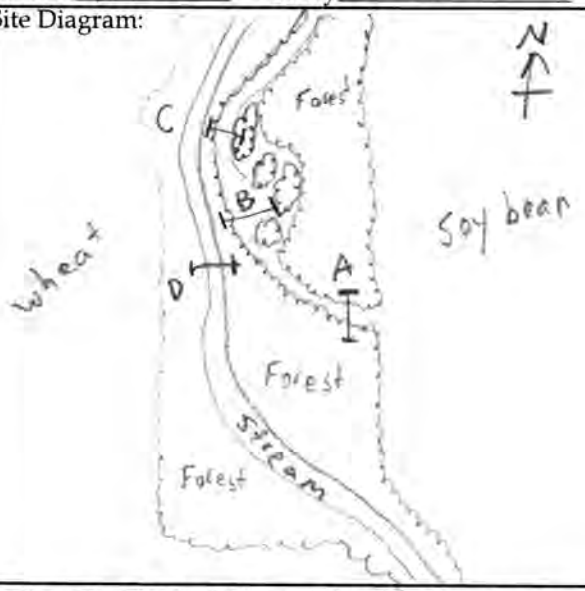
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 13 Project No./Name 412 / Emerson Creek Date 7/26/15

Lat/Lon ; UTM: N/E 41.17809 W/N 82.89062 Zone — Observers J. Storm; J. Klinger

Datum: NAD83 County Seneca State OH Quad Fireside

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	6.2	10	7/26-7/28
B	7.8	9	7/26-7/28
C	5.2	6	7/26-7/28
D	5.2	10	7/26-7/28
E			
F			

Site Photographs
Camera:
Photo Log:

Dominant Vegetation

1. Slippery elm
2. American elm
3. Hackberry
4. Green ash
5.
6.

Net Set by Habitat

Habitat	A	B 3	C	D	E	F
River						
Stream				X		
Pond						
Corridor	X	X	X			
Cave						
Mine						
Forest Gap		X				
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

3 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

11 **Total Habitat Score** (Should be between 4 & 12)

Comments:

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD

Mist Netting Data Form

Sheet 1 of 2

Site No. 16 Project No./Name 412.01 / Emerson Creek Date 7-23-15

Site Location Pond in wood lot West of CR 18 and South of East County Rd 24

County Seneca State OH Time Up 0900am Time Down 0200am

Lat/Lon; UTM: (N)/E 41.157652 (W)/N -82.989259 Zone ____ Datum ____ Observers B. Remley / R. McGregor

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type____	Freq. ____
1	9:30	EPFU	Escaped	while	lowering net			B	3	—	—	—	—
2	9:40	EPFU	A	F	PL	17.5	44	A	2	0	N/A	N/A	N/A
3	9:50	EPFU	A	F	PL	19.75	47	D	2	0	N/A	N/A	N/A
4	10:20	EPFU	J	M	NR	9.75	43	A	5	0	N/A	N/A	N/A
5	10:40	EPFU	A	F	PL	19.0	47	A	6	1	N/A	N/A	N/A
6	11:00	EPFU	J	F	NR	15.0	46	A	7	0	N/A	N/A	N/A
7	11:20	EPFU	A	F	PL	22.0	49	A	6	0	N/A	N/A	N/A
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase 49 % (Wax) / Wane

	Rise	Set
Sun	6:12	20:52
Moon	13:28	00:45

Time	Temp (F)	Sky	Wind	No. Bats
0900	74	1	0	N/A
1000	68	0	0	3
1100	63	0	0	3
1200	60	0	0	1
0100	61	0	0	0
0200	61	0	0	0

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Netting Data Form

Site No. 16 Project No./Name 412.01 / Emerson Creek Date 7-27-15

Site Location Pond in Wood lot West of CR18 + South of East County Rd 24

County Seneca State OH Time Up 8:55 Time Down 01:55

Lat/Lon ; UTM: (N)/E 41.157652 (W)/N -82.989259 Zone — Datum NAD83 Observers B. Renley / R McGregor

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	10:00	EPFU	A	F	PL	16.5	46	A	3	0	N/A	N/A	N/A
2	10:00	EPFU	A	M	NR	16.0	45	A	3	0	N/A	N/A	N/A
3	10:00	EPFU	A	F	PL	18.5	48	A	4	0	N/A	N/A	N/A
4	10:30	EPFU	J	M	NR	13.5	46	A	2.5	0	N/A	N/A	N/A
5	11:00	EPFU	J	M	NR	15.0	45	C	1.5	0	N/A	N/A	N/A
6	11:50	EPFU	A	M	NR	14.0	46	A	2	0	N/A	N/A	N/A
7	12:40	LABO	J	F	NR	9.0	41	C	1.5	0	N/A	N/A	N/A
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Acoustic Survey: Unit type_____ Unit #_____ Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Date_____ Start time_____ Stop time_____

Weatherproofing_____ Coordinates_____

Comments:

Moon Phase % 86 (Wax) / Wane

	Rise	Set
Sun	6:22 AM	8:55 PM
Moon	5:31 PM	2:46 AM

Time	Temp (F)	Sky	Wind	No. Bats
900	77	0	0	N/A
1000	74	1	0	0
1100	73	1	0	4
1200	71	0	0	2
100	70	0	0	1
200	69	0	0	

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

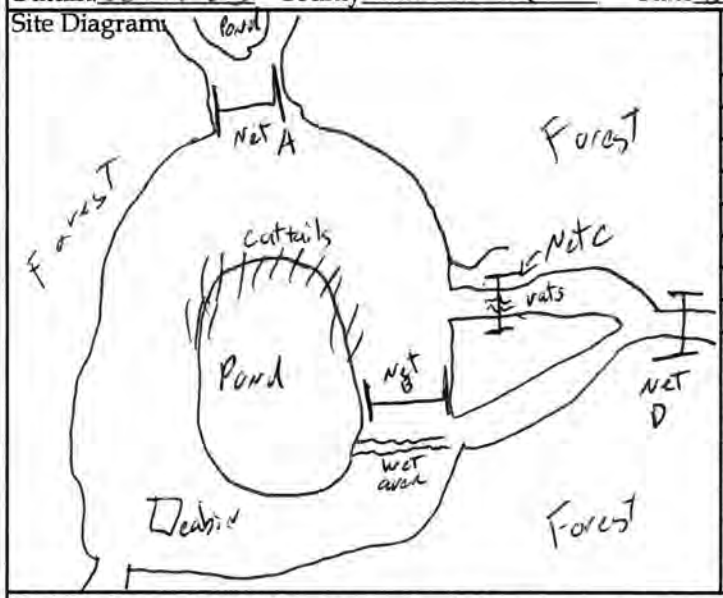
Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

Mist Net Site Habitat Sheet Site No. 16 Project No./Name 4120/ Emerson Creek Date 7-23-15

Lat/Lon; UTM: (N) E 41.157652 (W) N -82.989259 Zone ____ Observers B. Remley / R. McGregor

Datum: NAD83 County Seneca State OH Quad Fireside

Site Diagram:



Net	Height (m)	Length (m)	Dates
A	7.8	9	7/23/15 + 7/27
B	5.2	12	7/23/15 + 7/27
C	5.2	6	7/23/15 + 7/27
D	5.2	6	7/23/15 + 7/27
E			
F			

Site Photographs
Camera: ____
Photo Log: Downloaded to google drive site 16

Dominant Vegetation

1. Sugar maple
2. Shagbark Hickory
3. Oak - white
4. Red Oak
5. ____
6. ____

Net Set by Habitat

Habitat	A	B	C	D	E	F
River						
Stream						
Pond/Lake		✓				
Corridor	✓		✓	✓		
Cave						
Mine						
Forest Gap						
Other						

Indiana Bat Habitat Characterization (Choose appropriate score for each habitat characteristic)

3 **Roost habitat**: **1. Poor**: No or few snags >= 5" DBH with sloughing bark or other usable roost features (cracks, crevices, etc)
2. Moderate: Snags with sloughing bark or other roost features present 5-15 inch DBH within 1000 feet of forested areas.
3. Optimal: Snags with sloughing bark or other roost features present >15 inch DBH within 1000 feet of forested areas.

3 **Water Resources**: **1. Poor**: bat drinking resources not present at the site.
2. Moderate: Ephemeral or intermittent streams or ponded areas present but too cluttered to allow many bats to drink easily or simultaneously. No corridors, openings or canopy gaps allow bats easy access to the resource.
3. Optimal: Streams or ponds (including road ruts) present that appear to offer drinking resource throughout the majority of the summer. Flyways to resources are available.

3 **Forest Structure**: (if hardwoods are absent or nearly absent or if stand is monoculture, area automatically qualifies as a 1: poor).
1. Poor: Habitat even aged and young. Trees smaller than 5 inch DBH. Understory growth cluttered and restricts flying/foraging
2. Moderate: some diversity in age of trees in the stand. Trees 5 to 15 inches present. Understory clutter dominant but not ubiquitous. Trees greater than 15" DBH may be present but rare.
3. Optimal: Mature forest. Diverse age classes of trees present. Trees > 15 inch DBH frequent. Varying tree height and treefalls allow for frequent small openings and gaps that facilitate bat foraging.

2 **Land Cover**: **1. Poor**: Square kilometer surrounding site predominantly un-forested. Few mature trees present not connected to other areas of trees.
2. Marginal: Trees present in the form of small woodlots and wooded fence rows. Little connection to adjacent forested areas.
3. Optimal: Area is largely forested. Wooded stands are connected to other wooded stands via wooded stream, fence row, or other wooded corridor.

8/11 **Total Habitat Score** (Should be between 4 & 12)

Comments: Several shagbark hickories observed in woods surrounding Pond.

Please return to:
P.O. Box 73, Paint Lick, KY. 40461
859-925-9012

COPPERHEAD ENVIRONMENTAL CONSULTING

Mist Netting Data Form

Sheet 1 of 2

Site No. 24 Project No./Name 412 / Emerson Creek Date 7/29/15

Site Location logging road through woodlot; open water of emergent wetland

County Seneca State OH Time Up 8:55 Time Down 2:55

Lat/Lon ; UTM: N/E 41.17804 W/N -82.88361 Zone — Datum NAD83 Observers J. Storm; M. Newton

COPPERHEAD ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	10:30a	EPFU	JV	M	NR	10g	46mm	D	3	O	—	—	—
2	10:30a	EPFU	JV	F	NR	12.25	46mm	D	5	O	—	—	—
3	11:10a	EPFU	JV	M	NR	13.5	44mm	D	4	O	—	—	—
4	12:50p	EPFU	JV	M	NR	15	48mm	D	1	O	—	—	—
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Species Abbreviations: Corynorhinus rafinesquii (CORA); Corynorhinus t. virginianus (COVI); Eptesicus fuscus (EPFU); Lasiurus borealis (LABO); Lasiurus cinereus (LACI); Lasiurus seminolus (LASE); Lasionycteris noctivagans (LANO); Myotis austroriparius (MYAU); Myotis grisescens (MYGR); Myotis leibii (MYLE); Myotis lucifugus (MYLU); Myotis septentrionalis (MYSE); Myotis sodalis (MYSO); Nycticeius humeralis (NYHU); Perimyotis subflavus (PESU); Tadarida brasiliensis (TABR)

Other Abbreviations: Male: M; Female: F; Pregnant: P; Lactating: L; Post Lactating: PL; Scrotal: S; Non Repro: NR

Moon Phase % 99.5 (Wax) / Wane

	Rise	Set
Sun	6:24 am	8:53 pm
Moon	8:07 pm	6:42 am

Time	Temp (F)	Sky	Wind	No. Bats
9:00	78.0	3	1	0
10:00	75.9	2	1	2
11:00	74.1	1	2	1
12:00	73.2	0	3	1
2:00	69.7	1	2	—

Sky Code	
0	Clear
1	Few Clouds
2	Partly Cloudy
3	Cloudy or overcast
4	Fog or smoke
5	Drizzle or light rain
6	Heavy rain - thunder storm

Beaufort Wind Scale	
0	Calm: <1 mph
1	Light air: 1-3 mph
2	Light breeze: 4-6 mph
3	Gentle breeze: 7-10 mph
4	Moderate breeze: 11-16 mph

Please Return to:
P.O. Box 73, Paint Lick, KY, 40461.
(859) 925-9012

This foregoing document was electronically filed with the Public Utilities

Commission of Ohio Docketing Information System on

2/2/2018 2:00:46 PM

in

Case No(s). 17-2295-EL-BGN

Summary: Application Exhibit J Appendix E - Part 9 of 12 electronically filed by Teresa Orahood on behalf of Sally W. Bloomfield