



**Site 36 Net A**



**Site 36 Net B**



**Site 36 Net C**



**Site 36 Net D**



**Site 36 Net E**



**Site 36 Net F**



**Site 36 Net G**

## APPENDIX C

### **Bat Capture Photographs**



## T&E bats

MYSE 172.188\_ODNR23551\_Site26\_24July



MYSE 172.587\_ODNR23552\_Site26\_26July



MYSO 172.779\_ODNR23553\_Site26\_26July



MYSE 172.030\_ODNR23361\_Site18\_26July



MYSE 172.137\_ODNR23360\_Site18\_26July



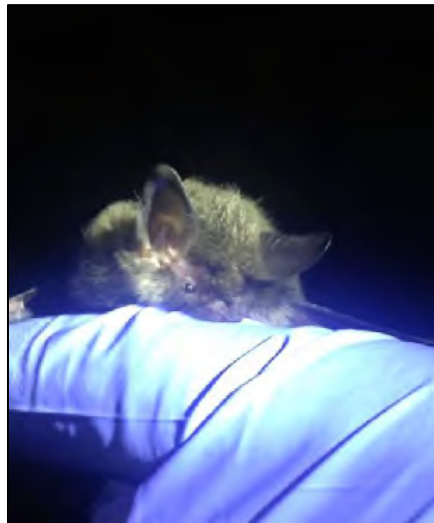
MYSE 172.205\_ODNR17178\_Site13\_26July



MYSE ODNR17179\_Site13\_26July



MYSE\_ODNR17344\_Site12\_28July



MYSE\_ODNR23362\_Site18\_28July



MYSE\_ODNR17168\_Site20\_28July

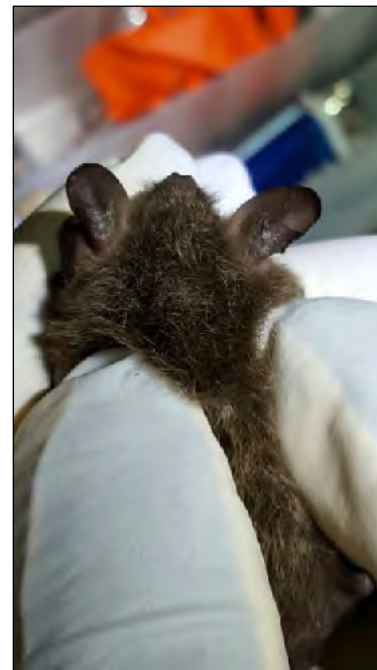




MYSE\_ODNR17345\_Site15\_31July



MYSE 172.450\_ODNR17166\_Site33\_31July



## Non T&E bats



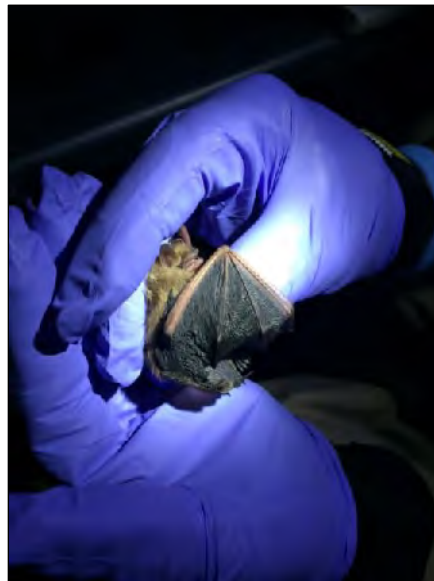
*Lasiurus cinereus*



*Eptesicus fuscus*



*Lasiurus borealis*



*Perimyotis subflavus*



## APPENDIX D

### Roost Tree Data Sheets

Roost Tree # 983

Project No./Project Name

412.01 / Emerson Creek

Date First Found

25 July 2015

Location

East of mist net site 26

County

Seneca

State

OH

Quad

Fireside

Lat-Long/UTM

N/E 41.21880

W/N

82.97015

Zone

Datum:

NAD83

Observers:

T. Wetzel

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	983	F. pennsylvanica	27	9	3	S	H	H	S	bark
2		A. saccharum	41.5	20	-	L	L	H	C	none
3		A. saccharum	55.5	17	-	L	L	H	C	none
4		F. grandifolia	82.6	22	-	S	L	H	C	bark
5		F. grandifolia	82	19	-	L	L	H	C	none
6		A. saccharum	67.5	18	-	L	L	H	C	none
7		A. saccharum	71	18	-	L	L	H	C	none
8		A. saccharum	62.1	19	-	L	L	H	C	none
9		A. saccharum	72.5	19	-	L	L	H	C	none
10		A. saccharum	78.4	19	-	L	L	H	C	none
11		F. grandifolia	72.8	18	-	L	L	H	C	cavity
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
90	20	0

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10- < 25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Roost Tree # 983Bat Species/Sex/Frequency: MYSE/F/188Band # ODNR 23551

Roost Tree Diagram:



Location Diagram:



Bat Days					
No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7/25	188	ODNR 23551	F	can see transmitter
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/25			1		2129	2129	2129	1	
2	7/31			1		2035	2035	—	—	Camera 1
3										
4										

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

Roost is on a fallen limb off of tree # 4 and leaning between tree # 2 + 3

Roost Tree # 395 Project No./Project Name 412 / Apex Emerson Creek Date First Found 7/26/15Location In plot 26County SenecaState OHQuad Fire sideLat-Long/UTM: N/E 41.21851W/N 82.96867Zone — Datum: NAD83Observers: A. Ashmore, K. Ferraro

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1	396	Prunus serotina	37.2	85'	35	snag	L	H	C	roost in bark of possible crevice
2		Acer saccharum	20.3	60'	—	live	L	H	C	
3		Carya sp.	39.4	75'	—	live	L	H	C	
4		Unknown	47.8	70'	—	live	L	H	C	possibly bark crevice
5		Fraxinus americana	56.9	80'	—	snag	M	H	C	
6		Acer saccharum	28.9	65'	—	live	L	H	C	
7		Fraxinus americana	46.3	80'		snag	H	H	C	
8		Fraxinus americana	40	10'		snag	L	L	UC	
9		Acer saccharum	19.2	65'		live	L	H	C	
10		Fraxinus americana	45.3	7'		snag	L	H	U	
11		Acer saccharum	32	45'		live	L	H	C	
12		Acer saccharum	59.5	20		snag	L	H	U	
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

Habitat		
<input checked="" type="radio"/> Interior	<input type="radio"/> Edge	<input type="radio"/> Open

Canopy Cover at Roost		
<input type="radio"/> Open	<input checked="" type="radio"/> Intermediate	<input type="radio"/> Closed

Basal Area		
Live Trees	Snags	All Trees
60	60	120

Roost Location		
<input checked="" type="radio"/> Bark	<input type="radio"/> Cavity	<input type="radio"/> Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

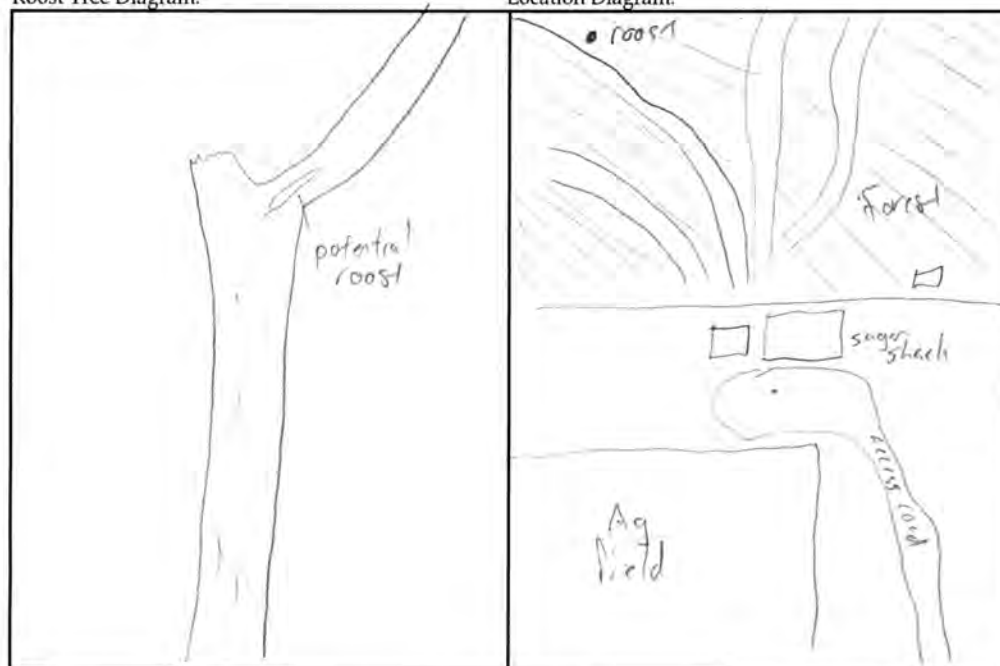


Roost Tree # 395Bat Species/Sex/Frequency: MYSE/F/188Band # ODNR 23551

107

Roost Tree Diagram:

Location Diagram:



## Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/26			1						transmitter still in tree
2	7/29	78	clear	0	2054					Emerson I
3	7/30	75°	clear	0	2054					Emerson I
4										

## Bat Days

No.	Date	Bat Freq.	Bat Band	Sex of Bat	Observations
1	7/26	188	ODNR 23551	F	
2	7/27	188	23551 23552	F	188 shed transmitter
3	7/28	188	23551	F	shed transmitter
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

## Comments:

Flying squirrels observed in potential roost site 7/28

Roost Tree #

985

Project No./Project Name

412.02 / Emerson Creek

Date First Found

7/27/2015

Location

NW of site 18

County

Caneva

State OH

Quad

Fireside

Lat-Long/UTM: N/E

41.18069

W/N 82.93027

Zone

Datum: NAD83

Observers:

T. W. J. A. Housdale

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	985	F. pennsylvanica	28.5	12	8	S	M	H	C	bark
2		U. americana	21	9	—	S	L	H	S	none
3		U. americana	38	10	—	S	M	H	S	bark
4		U. americana	18.7	10	—	S	L	H	S	bark
5		F. pennsylvanica	26.5	14	—	S	L	H	C	none
6		A. saccharum	21.2	12	—	L	L	H	S	none
7		A. saccharum	19.0	12	—	L	L	H	S	none
8		P. serotina	19.5	10	—	S	L	H	S	none
9		J. nigra	35.0	15	—	L	L	H	C	none
10		A. saccharum	12.6	6	—	S	L	H	U	crevice
11		Q. alba	107.5	17	—	L	L	H	C	bark/crevice
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.



Signal no longer found w/ attenuator @ 21:50

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
40	70	110

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

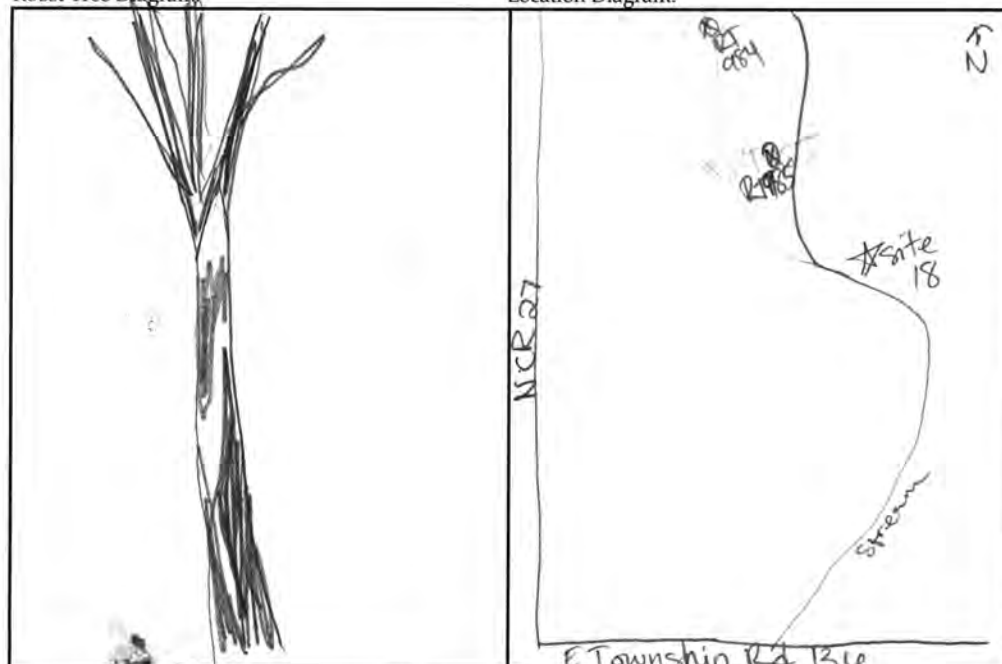
**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

Roost Tree # 985Bat Species/Sex/Frequency: mySE/F/137Band # ODNR 23361

Roost Tree Diagram:

Location Diagram:



## Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/ Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	27 July	72	calm clear	2	2054	2100	2150	2150	2nd	—
2	7-28	81	Clear	1	2055	2112	2112	N/A		A. McGary
3										
4										

## Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	5-1/2	137	ODNR 23361	F	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

## Comments:

\* Bat was not tracked to this tree on 7/28/15

Roost Tree # 986 Project No./Project Name 412.01 / Emerson Creek Date First Found 7-28-15

Location SE of site 18

County Saracen

State OH

Quad Fireside

Lat-Long/UTM: N/E 41.17857

W/N -82.92802

Zone Datum: NAD83

Observers: B. Ranley / R. McGregor

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	986	A. saccharinum	16.6	15	13	S	M	M	S	Bark/Cavity/crevice
2	-	A. saccharinum	13.4	25	-	L	L	H	S	Bark
3	-	A. saccharinum	19.1	35	-	L	L	H	S	NONE
4	-	A. saccharinum	62.7	50	-	LD	M	H	C	Bark/crevice
5	-	A. saccharinum	35.3	45	-	S	M	H	C	Bark
6	-	A. saccharinum	36.9	55	-	L	L	H	C	NONE
7	-	A. saccharinum	27.7	65	-	L	L	H	C	NONE
8	-	A. saccharinum	35.7	17	-	LD	L	M	S	crevice
9	-	P. deltooides	88.2	60	-	L	L	H	C	crevice
10	-	P. deltooides	85.9	65	-	L	L	H	C	NONE
11	-	A. saccharinum	28.6	50	-	L	L	H	C	NONE
12	-	A. saccharinum	29.3	45	-	L	L	H	C	NONE
13	986	A. saccharinum	36.3	50	-	LD	L	H	C	crevice/Bark
14	-	A. saccharinum	40.4	14	-	S	L	M	U	crevice
15	-	A. saccharinum	29.3	50	-	L	L	H	C	NONE
16	-	A. saccharinum	37.6	60	-	LD	M	H	C	BARK
17	-	A. saccharinum	29.6	45	-	L	M	H	C	BARK
18	-	A. saccharinum	34.7	20	-	S	L	M	S	crevice
19	-	A. saccharinum	34.4	45	-	L	L	H	C	NONE
20	-	A. saccharinum	26.1	35	-	L	L	H	S	NONE
21	-	A. saccharinum	31.8	50	-	L	L	H	C	NONE
22	-	A. saccharinum	43.9	55	-	L	L	H	C	NONE

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

-	986	A. saccharinum	44.6	65	L	L	H	C	NONE
-	-	A. saccharinum	62.1	30	LD	M	H	S	Bark/crevice

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
200	40	240

Roost Location		
Bark	Cavity	Crevice

QUICK REFERENCE / CIRCLE

*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

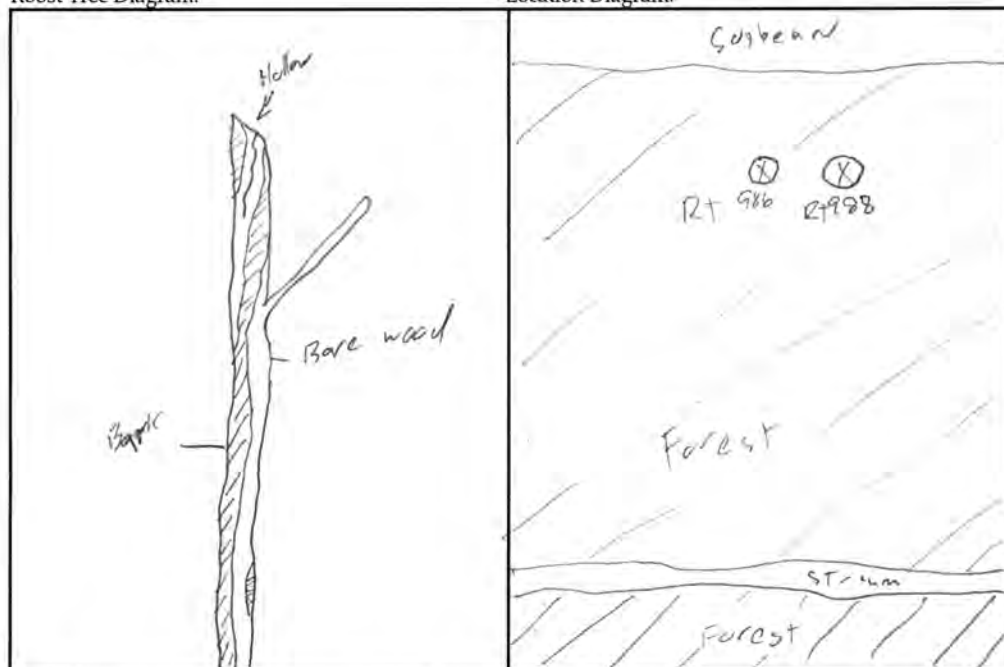
***Tree Ranking		
Canopy	Sub-Canopy	Understory



Roost Tree # 986Bat Species/Sex/Frequency: MYSE/F/137Band # ODNR 233101

Roost Tree Diagram:

Location Diagram:



## Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7-28	81	Clear	1	2053	2110	2110	2110	1	
* 2	7-31	76	Clear	0	20:49	N/A	N/A	N/A	N/A	C. 1364d
3										
4										

Bat Days					
No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7-28	137	ODNR 233101	F	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

\* tree observed 8:45 - 9:25

Roost Tree #

988

Project No./Project Name

412.01

1 EMERSON CREEK

Date First Found

7.29.15

Location

30 of 988

County

Sevier

State

OH

Quad

F.v. side

Lat-Long/UTM: (N)/E

41.17866

(W)/N

- 82.92805

Zone

Datum:

NAD83

Observers:

B. Renley / R. McGregg

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	988	A. saccharinum	36.3	50	20	LD	L	H	C	Bark/Crevice
2		A. saccharinum	22.6	20	-	LD	L	H	S	Crevice
3		A. saccharinum	42.3	40	-	LD	L	H	C	Crevice
4		A. saccharinum	43.0	55	-	L	L	H	C	NONE
5		A. saccharinum	61.4	30	-	LD	M	M	S	Bark/Crevice
6	986	A. saccharinum	16.6	15	13	S	M	M	S	Bark/Cavity Crevice
7		A. saccharinum	27.7	60	-	L	L	H	C	NONE
8		A. saccharinum	62.1	40	-	LD	M	H	C	Bark/Crevice
9		A. saccharinum	36.9	35	-	L	L	H	C	NONE
10		A. saccharinum	35.7	15	-	LD	L	M	S	Crevice
11		A. saccharinum	28.6	50	-	L	L	H	C	NONE
12		A. saccharinum	29.0	30	-	LD	L	H	S	Crevice
13		A. saccharinum	40.4	10	-	S	L	M	U	Crevice
14		A. saccharinum	37.2	60	-	L	L	H	C	NONE
15		A. saccharinum	29.6	40	-	L	L	H	C	NONE
16		A. saccharinum	37.6	50	-	L	L	H	C	Bark
17		A. saccharinum	26.7	45	-	LD	L	H	C	Crevice
18		A. saccharinum	30.2	30	-	L	L	H	S	Bark
19		A. saccharinum	33.1	15	-	LD	M	M	S	Bark/Crevice
20		A. saccharinum	34.7	30	-	L	L	H	S	NONE
21		A. rubrum	25.8	40	-	L	L	H	C	NONE
22		A. saccharinum	30.6	40	-	L	L	H	C	NONE

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

COPPERHEAD  
ENVIRONMENTAL CONSULTING

A. saccharinum 47.7 50 - L L H C NONE

P. latoides 88.2 60 - L L H C Crevice

P. latoides 85.9 65 - L L H C NONE

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
230	20	250

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE
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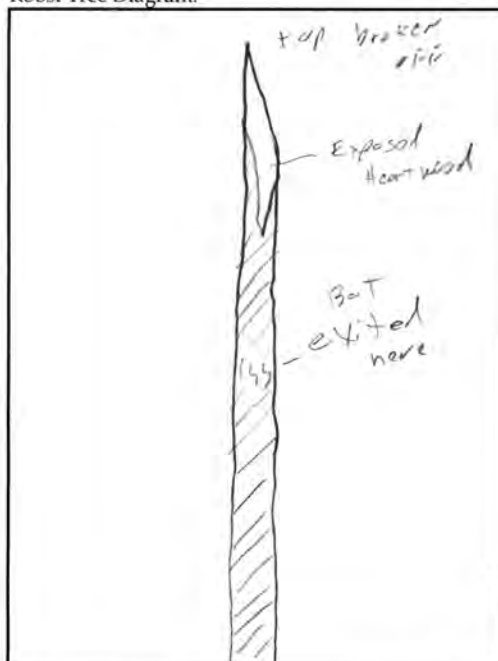
*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

Roost Tree # 986Bat Species/Sex/Frequency: MYSE/F/137Band # ODNR 23361

Roost Tree Diagram:



Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7-29	81	cloudy light rain	2	8:53	8:56	8:58	-	-	Heid.
2	7-30	80	clear	0	8:50	N/A	N/A	N/A	N/A	C. Boyd
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7/29	137	ODNR 23361	F	
2	7/30				
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

\* Transmitter fell off bat day of 7/30, tree observed that night for emergence.

MYSE/F/030

ODNR  
23360

Roost Tree # 984

Project No./Project Name

412.03 / Emerson Creek

Date First Found 27 July 2015

Location NW of RT 985

County Seneca

State OH

Quad Fireside

Lat-Long/UTM: N/E 41.18175

W/N 82.93174

Zone — Datum: NAD83

Observers: J. Wetzel, A. Trousdale

#	Tree Tag #	Species	DBH (cm)	Height ft on m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	984	F. pennsylvanica	34.3	12	7	S	H	H	C	bark
2		A. saccharum	54	13	—	S	M	H	C	crevice bark
3		A. saccharum	58	15	—	LD	L	H	C	crevice
4		A. saccharum	54.8	15	—	LD	L	H	C	bark
5		C. ovata	54.0	16	—	L	L	H	C	bark
6		A. saccharum	81.6	13	—	LD	M	H	S	bark crevice
7		V. americana	11.3	9	—	L	L	H	V	none
8		V. americana	8.5	6	—	L	L	H	V	none
9		V. americana	13.4	9	—	L	L	H	V	none
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
70	20	90

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10- < 25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory



Roost Tree #

984

Bat Species/Sex/Frequency:

MYSE/F/030

Band #

ODNR 23360

Roost Tree Diagram:

Location Diagram:



## Emergence Count

No.	July Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	27	72	Sunny/Cloudy warm/humid	1	2054	2123	2123	2123	513	AT
2	28	81	Cloudy	1	2055	2105	2105			RJR
3										
4										

## Bat Days

No.	Date	Bat Freq.	Bat Band #ODNR	Sex of Bat	Observations
1	7/27	030	23360	F	only bat seen emerge
2	7/28	030	23360	F	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

HC # 0416, JW Olympus

Roost Tree # 987 Project No./Project Name 412.03 / Emerson Creek Date First Found 7-29-15  
Location

County Seneca

State OH

Quad Fireside

Lat-Long/UTM: N/E 41.18179

W/N -82.92933

Zone Datum:

Observers: B. Remy / R. McGregor

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	987	A. saccharinum	56.3	40	25	S	M	M	C	Bark
2		A. saccharinum	54.1	15	-	S	L	M	U	Crevice
3		A. saccharinum	38.2	45	-	LD	L	H	C	Bark
4		A. saccharinum	53.5	50	-	L	L	H	C	None
5		A. saccharinum	37.9	30	-	LD	L	H	C	Crevice
6		A. saccharinum	37.6	45	-	L	L	H	C	None
7		A. saccharinum	31.8	30	-	L	L	H	C	None
8		A. saccharinum	52.5	50	-	L	L	M	C	None
9		A. saccharinum	42.7	20	-	S	M	M	S	Bark
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.



Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
60	30	90

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

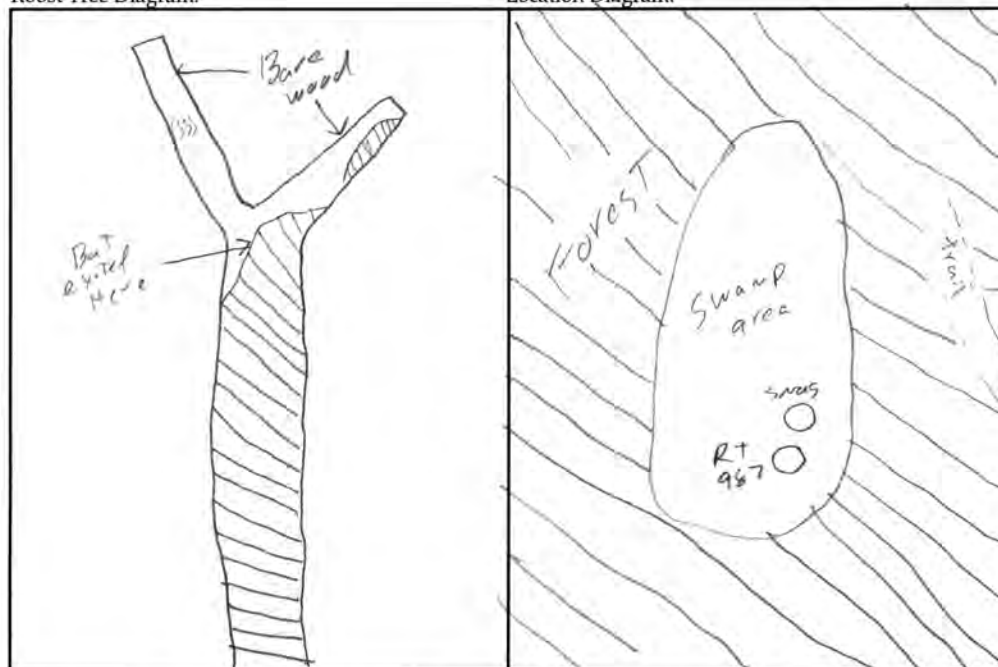
**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10- < 25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

Roost Tree # 987Bat Species/Sex/Frequency: MYSE/F/030Band # ODNR 23360

Roost Tree Diagram:

Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7-29	80	Partly cldy	3	20:51	20:59	21:21	21:21	3	R. McGregor
2	7-30	80	Clear	3	20:50	21:01	21:14	21:14	3	R. McGregor
3	7-31	76	Clear	5	20:49	21:02	21:12	21:12	5	R. McGregor
4	8-1	75	Clear	1	20:48	21:17	21:17	21:17	1	C. Boyd
	8-2	77	Clear	1	20:47	21:06	21:06	21:06	1	C. Boyd

Comments:

Battery signal weak on 8/2

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7-29	030	23360	F	
2	7-30	030	23360	F	
3	7-31	030	23360	F	
4	8-1	030	23360	F	
5	8-2	030	23360	F	
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Roost Tree # 369 Project No./Project Name 412 / Emerson Creek Date First Found 7/28/15Location Site 26County SenecaState OHQuad FiresideLat-Long/UTM: N/E 41.21838W/N 82.96845Zone — Datum: NAD83 Observers: J. Storm

Rain Storm

#	Tree Tag #	Species	DBH (cm)	Height (m)		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	369	Fraxinus pennsylvanica	40.0	12	9	S	M	L	U	cracks & crevices
2		Fraxinus pennsylvanica	45.1	50	—	S	L	L	C	cracks & crevices
3		Fraxinus pennsylvanica	35.7	50	—	S	M	H	C	Bark
4		Fraxinus pennsylvanica	48.0	60	—	S	H	H	C	Bark
5		Pine sp.	37.3	40	—	S	L	H	C	Bark
6		oak sp.	60.2	20	—	S	L	H	U	cracks & crevices
7	395	cherry	37.8	80	Yes	S	H	H	C	Roost tree
8		Sugar maple	19.8	85	—	L	H	H	C	
9		Sugar maple	34.4	100	—	L	L	H	C	
10		Sugar maple	8.2	20	—	L	L	H	C	
11		Sugar maple	23.3	80	✓	L	L	H	C	
12		Sugar maple	13.2	60	—	L	L	H	C	
13		Sugar maple	32.3	100	—	L	L	H	C	
14		Sugar maple	15.5	80	✓	L	L	H	SC	
15		Sugar maple	6.2	40	✓	L	L	H	U	
16		Sugar maple	4.2	12	—	L	L	H	U	
17		Sugar maple	9.0	25	—	L	L	H	SC	
18										
19										
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.



Habitat		
<input checked="" type="radio"/> Interior	<input type="radio"/> Edge	<input type="radio"/> Open

Canopy Cover at Roost		
<input type="radio"/> Open	<input checked="" type="radio"/> Intermediate	<input type="radio"/> Closed

Basal Area		
Live Trees	Snags	All Trees
100	170	170

Roost Location		
<input checked="" type="radio"/> Bark	<input type="radio"/> Cavity	<input type="radio"/> Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

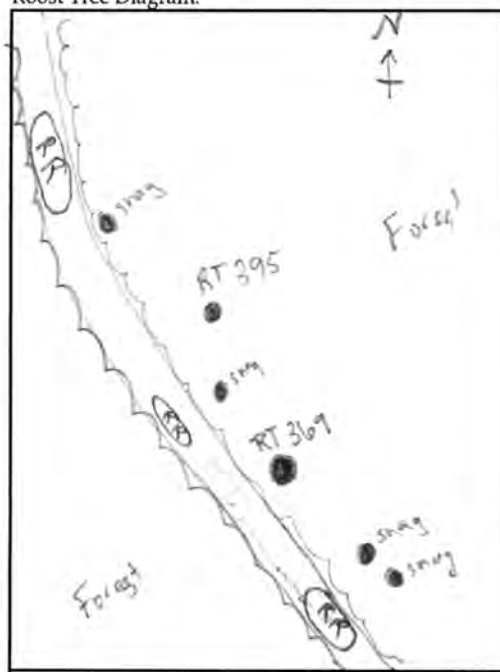
*Condition		
<input type="radio"/> Snag	<input type="radio"/> Live	<input type="radio"/> Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

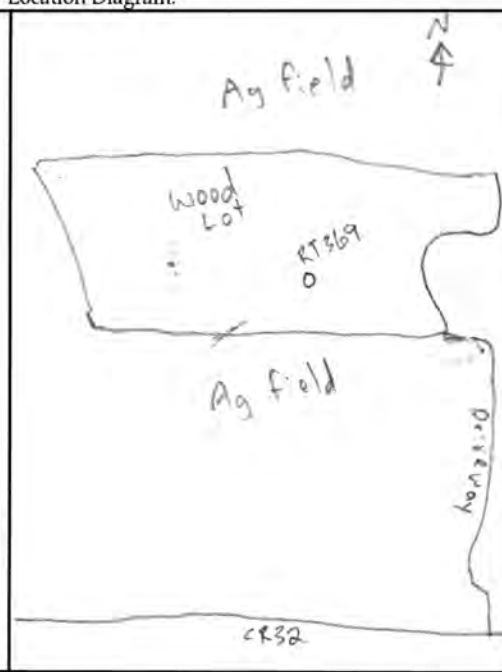
***Tree Ranking		
Canopy	Sub-Canopy	Understory

Roost Tree # 369Bat Species/Sex/Frequency: MYSE/F/587Band # ODNR 23552

Roost Tree Diagram:



Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/28	78	clear	0	2054	—	—	—	—	Caution
2				0						
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7/28	587	23552	F	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

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Roost Tree # 371

Project No./Project Name 412.02 / Emerald Cuck

Date First Found 7/29/15

Location In woodlot site 2 is in.

County Seneca

State OH

Quad Fireside

Lat-Long/UTM: N/E 41.21921

W/N 82.96834

Zone

Datum: NAD83

Observers: J. Storm, B. Smith

#	Tree Tag #	Species	DBH (cm)	Height (ft or m)		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	371	fraxinus pennsylvanica	42.4	60	30	S	L	H	C	Bark
2		fraxinus pennsylvanica	36.1	65	-	S	H	H	C	Bark
3		fraxinus pennsylvanica	28	50	?	S	M	H	C	Poss. live roost tree cracks / crevices
4		oak sp	74.3	20	-	S	L	H	SC	none
5		sugar maple	15.5	30	-	Live	L	H	SC	none
6		sugar maple	20.5	60	-	LNE	L	H	C	no
7		sugar maple	41	100	-	L	L	H	C	no
8		sugar maple	24	75	-	L	L	H	C	none
9		Boxwood	34	75	-	L	L	H	C	none
10		Black cherry	49.5	100	-	L	L	H	C	none
11		sugar maple	35	75	-	L	L	H	C	none
12		sugar maple	70	60	-	L	L	H	C	none
13		Beech	59	100	-	L	L	H	C	none
14		sugar maple	19	50	-	L	L	H	SC	none
15		Slippery elm	4	15	-	L	L	H	U	none
16		sugar maple	23	60	-	L	L	H	SC	none
17		Slippery elm	50	100	-	L	L	H	C	none
18		sugar maple	36.5	50	-	L	L	H	SC	none
19		Black walnut	43.5	100	-	L	L	H	C	none
20		sugar maple	12	40	-	L	L	H	SC	none
21		sugar maple	81	120	-	L	L	H	C	none
22		Slippery elm	4	20	-	L	L	H	U	none

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.



Tree # 3 is leaning against the tree marked as RT 371. RT 371 is believed to be the roost.

Slippery elm 20 150 - L H SC none  
sugar maple 23 110 - L H SC none

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
210	40	250

Roost Location		
Bark?	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE
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*Condition		
Snag	Live	Live-Damaged

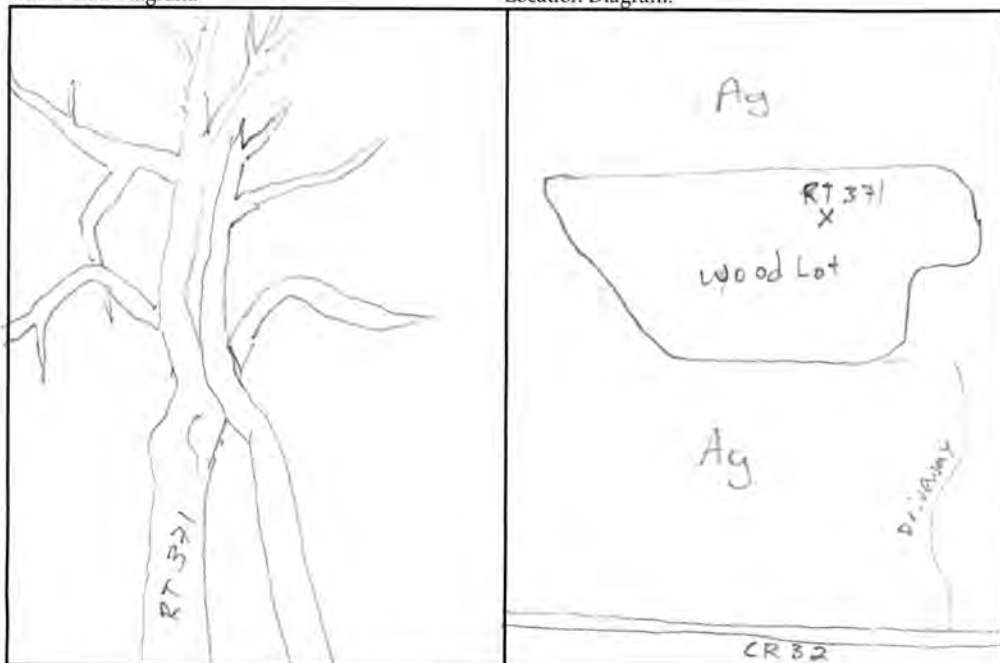
**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

Roost Tree # 371Bat Species/Sex/Frequency: SB7Band # ODNR  
23552

Roost Tree Diagram:

Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/ Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/29	79°	partly cloudy	3	2051	2058	2115	2058	1	K. DP
2	7/30			5	2050	2049	2102	2100	1	J. Barne
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	29 July	SB7	23552	F	
2	30 July	SB7	23552	F	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

Bats emerged from where the two trees touch

Roost Tree # 372

Project No./Project Name 412.02

/ Emerson

Date First Found 7/31/15

Location Same woodlot 371, 369

County Seneca

State NY

Quad Fireside

Lat-Long/UTM: N/E 41.21920

W/N -82.97147

Zone — Datum: NAD83

Observers: Rain Storm, Tony Wyle

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	372	snag bark	34	75ft	50ft	Live	100	100	Canopy	typical snag
2		Sugar maple	9	50	—	Live	0	100	sub-c	none
3		Sugar map.	14.5	50	—	Live	0	100	sub	none
4		Sugar map.	15	50	—	Live	0	100	sub	none
5		Ash snag	48.5	100	100	snag	50%	100	canopy	limited
6		Sugar maple	9.5	50	—	Live	0	100	sub	none
7		Sugar map	9.5	40	—	Live	0	100	sub	none
8		Ash snag	42.5	110	—	snag	50%	100	canopy	limited
9		Sug. maple	17.0	75	—	Live	0	100	subcan	none
10		Sug. maple	6.5	30	—	Live	0	100	subcan	none
11		Ash snag	50	120	50	snag	0	0	canopy	crevice
12		Sugar maple	14	60	—	Live	0	100	sub	none
13		basswood?	25.5	75	—	Live	0	100	canopy	none
14		Sug. maple	14	50	—	Live	0	100	sub	none
15		Sug. maple	20	60	—	Live	0	100	sub	none
16		Sug.	10.5	45	—	Live	0	100	sub	none
17		snag bark	49	90	all	Live	100	100	can	none
18		hickory	45.5	80	60	Live	5	100	canopy	broken
19		Sugar maple	15	50	—	Live	0	100	sub	none
20		Ash snag	44	90	all	snag	30	30	sub	none
21		Am. Beech	35	100	—	Live	0	100	canopy	none
22		Am. Beech	25.5	60	—	Live	0	100	sub	none

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

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Ash snag	39	75	45	snag	40	80	can	100
Ash	50	100	50	snag	30	30	sub	none
Sugar maple	10.5	40	—	Live	0	100	sub	none
Sugar maple	82.0	100	50	Live	10	100	can	100

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
200	50	250

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE
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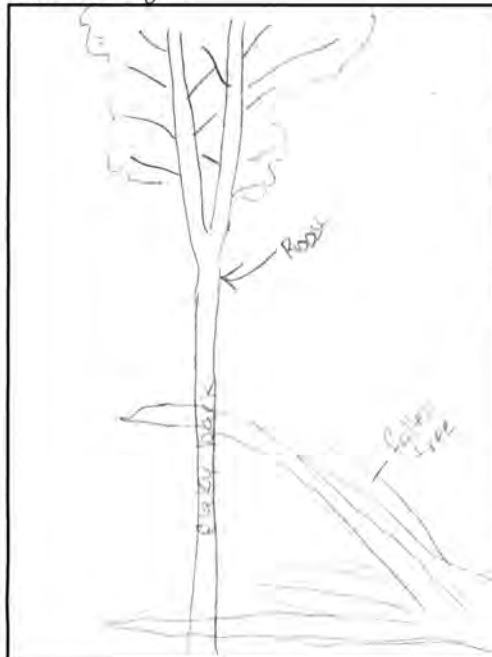
*Condition		
Snag	Live	Live-Damaged

***Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

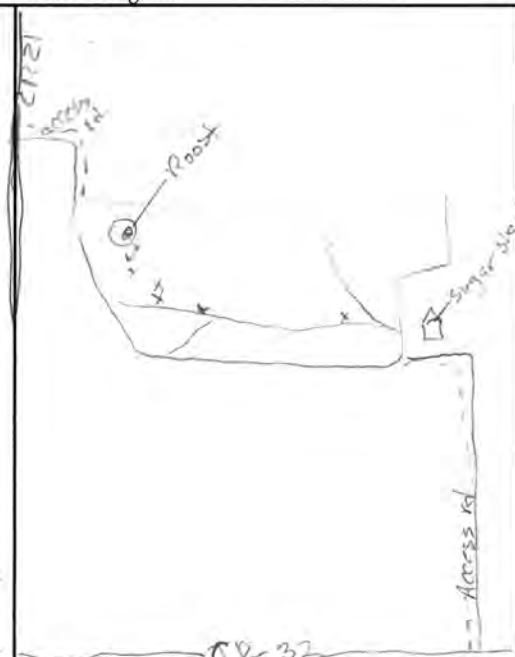
***Tree Ranking		
Canopy	Sub-Canopy	Understory

Roost Tree # 372Bat Species/Sex/Frequency: MYSE/F/.587Band # ODNR23552

Roost Tree Diagram:



Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/ Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/31	70	clear	1	20:00	21:04	21:04	21:04	21	
2										
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7/31	.587	ODNR 23552	F	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

Recent tree fall creates forest gap @ roost tree and promotes solar exposure from the northwest. Roost believed to be hollowed out by woodpecker.

- picked up bat on 5/6 for emergence

Roost Tree # 373 Project No./Project Name 412.01 / Emerson Creek Date First Found Aug. 1, 2015

Location Same woodlot as 369, 371, 372

County Somerset

State OH

Quad Fireside

Lat-Long/UTM: N/E 41.21954

W/N -82.96838

Zone ~~EMO~~ Datum: NAD83

Observers: Rain Storm

W. Anderson Smith

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1	373	Ash snag	47.2	80	40	S	H	L	C	Yes
2		Boxwood	56.2	110	-	L	L	H	C	
3		Sugarmaple	33	80	-	L	L	H	C	
4		Sugarmaple	14.5	50	-	L	L	H	SC	
5		Sugarmaple	3.6	15	-	L	L	H	U	
6		Beech	5.1	12	-	L	L	H	U	
7		Sugarmaple	16.4	75	-	L	L	H	SC	
8		Sugarmaple	5.2	12	-	L	L	H	U	
9		Sugarmaple	28.1	75	-	L	L	H	C	
10		Sugarmaple	5.3	15	-	L	L	H	U	
11		Sugarmaple	5.0	10	-	L	L	H	U	
12		Sugarmaple	21.4	60	-	L	L	H	SC	
13		Sugarmaple	5.1	15	-	L	L	H	U	
14		Sugarmaple	8.1	25	-	L	L	H	U	
15		Beech	80.1	90	-	L	L	H	C	
16		Sugarmaple	6.5	30	-	L	L	H	U	
17		Beech	23.8	60	-	L	L	H	C	
18										
19										
20										
21										
22										

Habitat		
<input checked="" type="radio"/> Interior	<input type="radio"/> Edge	<input type="radio"/> Open

Canopy Cover at Roost		
<input type="radio"/> Open	<input checked="" type="radio"/> Intermediate	<input type="radio"/> Closed

Basal Area		
Live Trees	Snags	All Trees
160	10	170

Roost Location		
<input checked="" type="radio"/> Bark	<input type="radio"/> Cavity	<input type="radio"/> Crevice

↓ QUICK REFERENCE /	↑ CIRCLE
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*Condition		
<input type="radio"/> Snag	<input type="radio"/> Live	<input type="radio"/> Live-Damaged

***Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
<input type="radio"/> Canopy	<input type="radio"/> Sub-Canopy	<input type="radio"/> Understory

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

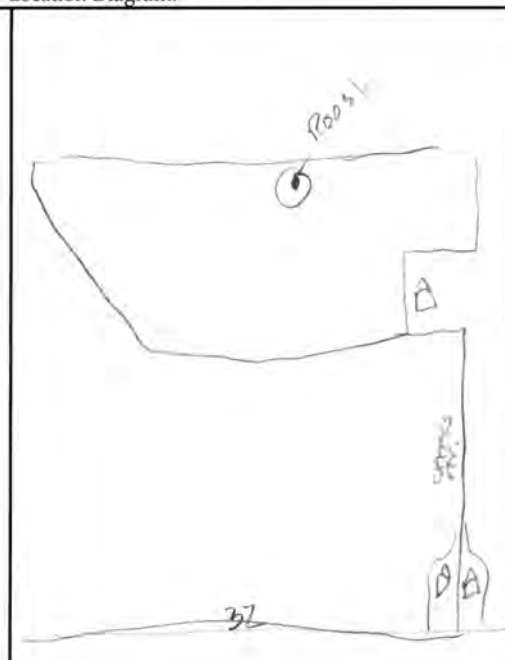


Roost Tree # 373Bat Species/Sex/Frequency: MYSE/F/587Band # ODNR 23552

Roost Tree Diagram:



Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/ Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	8/1	21°C	clear	1	8:58	9:10	9:10	1	1	Rain
2	8/2	22°C	clear	1	8:58	9:02	9:02	1	1	Rain
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	8/1	587	23552	F	Rain + Brandon
2	8/2	587	23552	F	Rain + Brandon
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

Ash snag near edge of woodland and large road cut. Little bark remaining. Bat emerged from smaller openings above canopy corner of 2 trees.

Roost Tree #

Project No./Project Name

Date First Found

Location

County

State

Quad

Lat-Long/UTM: N/E

W/N

Zone

Datum:

Observers:

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1		OFF	Parcel							
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

***% Bark Cover		
High = $\geq 25\%$	Moderate = $\geq 10-25\%$	Low = $< 10\%$

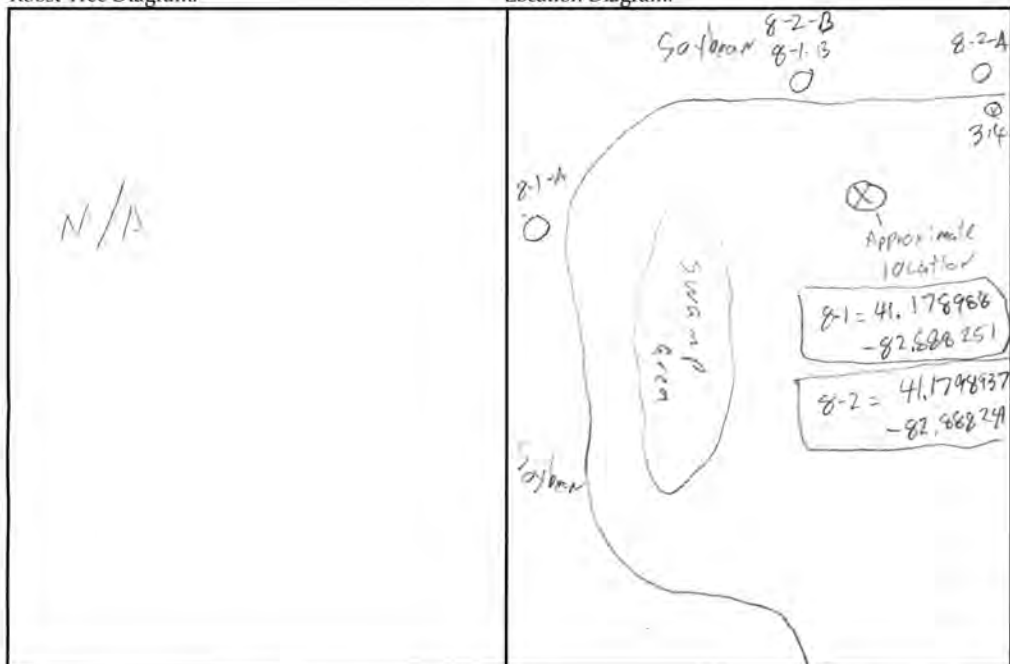
***Tree Ranking		
Canopy	Sub-Canopy	Understory

COPPERHEAD  
ENVIRONMENTAL CONSULTINGCopperhead Environmental Consulting Inc.  
P.O. Box 73, 11641 Richmond Rd.  
Paint Lick, KY 40461 (859) 925-9012

Roost Tree # N/ABat Species/Sex/Frequency: MYSE/F/205Band # ODNR 17178

Roost Tree Diagram:

Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1										
2										
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	8-1	205	17178	F	
2	8-2	205	17178	F	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

GPS coordinates 8-1-A = 41.17860/-82.88918, 242° Back, 8-1-B 41.17904/-82.88830, 332° Back  
 8-2-A = 41.17906/-82.88768, 66° Back, 8-2-B = 41.17907/-82.88832, 340° Back

MYSE/F/172.205

00NR  
17178

Roost Tree #

140

Project No./Project Name

412-021 Emerson C1

Date First Found

27 July 15

Location

near wood lot w/ creek bordered by agriculture

County

Spencer

State

OH

Quad

Fireside

Lat-Long/UTM: N/E

41.17892

W/N

82.89089

Zone

—

Datum: NAD83

Observers:

C. Lettich

#	Tree Tag #	Species	DBH (cm)	Height ft of m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1	140	Fraxinus sp.	48.5	25	20	Snag	10	90	Canopy	Bark
2		U. americana	6.7	3	—	Live	0	100	Sub	—
3		Fraxinus sp.	45.8	23	—	Snag	30	70	Canopy	Bark
4		Fraxinus sp.	54	20	—	Snag	30	50	Canopy	Bark
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
10	30	40

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

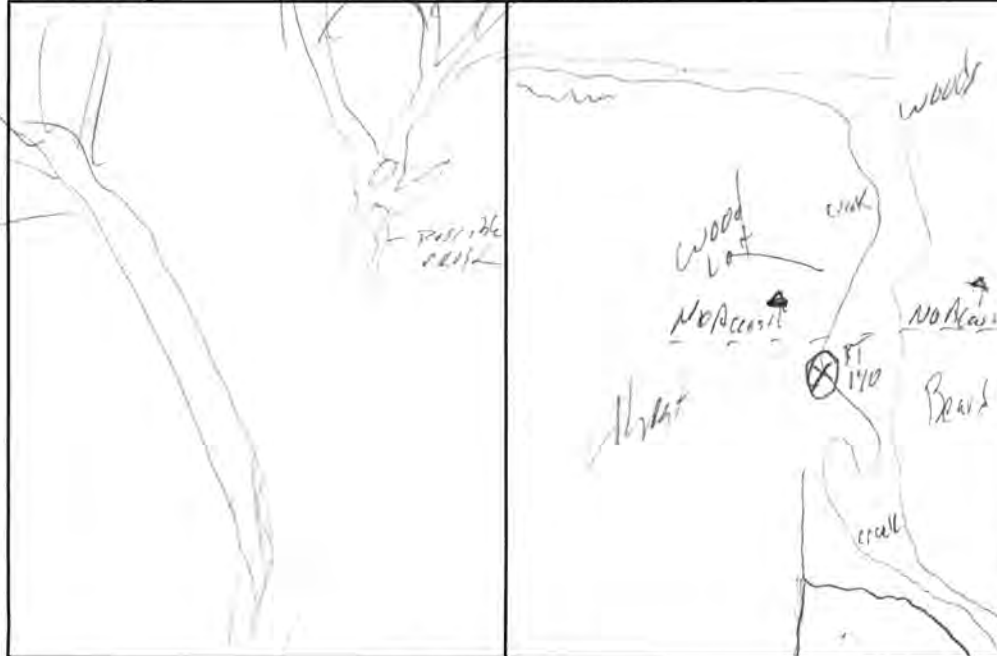
***Tree Ranking		
Canopy	Sub-Canopy	Understory

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Roost Tree # 140Bat Species/Sex/Frequency: MYSE/F/172.205Band # ODNR 17178

Roost Tree Diagram:

Location Diagram:



## Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	27	20°C	clear	2	20:55	21:09	21:13	21:13	2	
2	28	68.5	clear	2	20:53	21:11	21:20	21:20	2	
3										
4										

## Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	27 July	172.205	ODNR 17178	F	
2	28 July	172.206	17178	F	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

## Comments:

walk wheel field/woodlot edge to 41.17889; -82.89136 then turn due East to tree  
 across creek  
 - Double Red Flagging marks good emergence spot

Per 16 = 41.175375  
 -82.889903



Roost Tree # 314

Project No./Project Name 412.01 / EMERSON CREEK

Date First Found 7-30-15

Location Easton RT140

County SEVILLA

State OH

Quad Fireside

Lat-Long/UTM: N/E 41.17900

W/N - 82.88789

Zone — Datum: NAD83 Observers: MTM, ELS

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1	314	Quercus sp.	91	60'		SNAG	Low	High	C	
2		Ulmus sp.	10"	12'		LIVE	Low	High	Sub-C	
3		Ulmus sp.	7"	10'		LIVE	Low	High	Under	
4		Ulmus sp.	23"	40'		LIVE	Low	High	Sub-C	
5		Acer rubrum	19.5"	35'		LIVE	Low	High	C	
6		Carya ovata	36"	55'		LIVE	High	High	C	
7		Carya ovata	31"	55'		LIVE	High	High	C	
8		Carya ovata	9"	12'		LIVE	Low	High	Under	
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
70	10	80

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE /	↑ CIRCLE
---------------------	----------

*Condition		
Snag	Live	Live-Damaged

***% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

Plus / Emergent

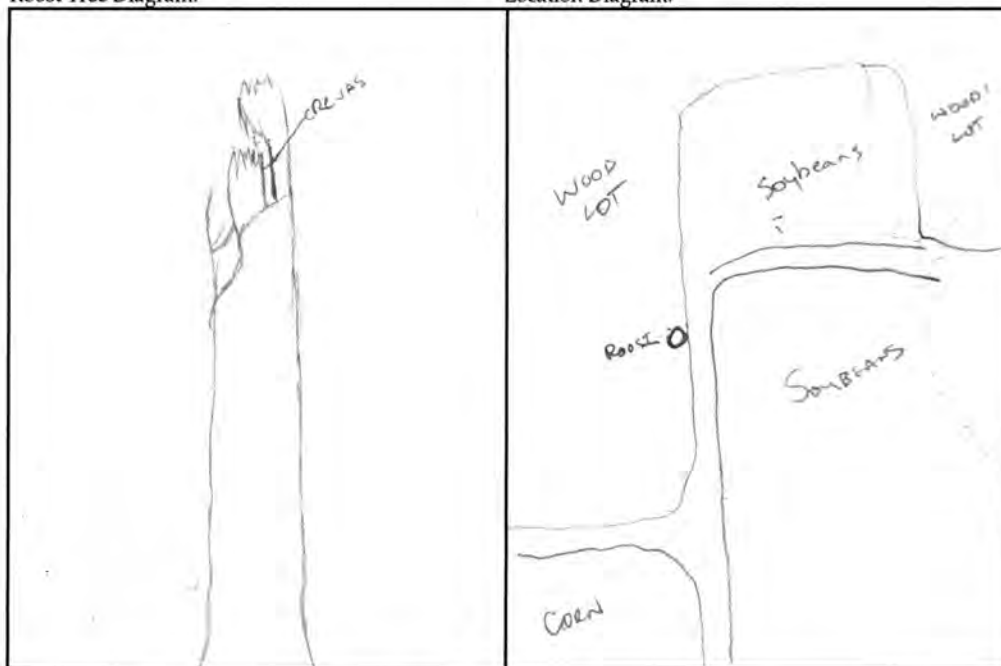
Roost Tree # 314

Bat Species/Sex/Frequency: MYSE / F / 205

Band # ODNR  
17178

Roost Tree Diagram:

Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/30/15	81	Clear	3	8:49	8:47	9:44	9:44		TAB
2										
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band # ODNR	Sex of Bat	Observations
1	7-30	205	17178	F	1
2	7-31	205	17178	F	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

81° - Start time : 8:35 pm ; Frequency 206  
 75° - End Time : 10:14 pm

First bat tree to the right, not Northern  
 Second - left Big Brown



847

9:10 &gt; possibly same bat

9:12

9:44 - Northern Emerged - no ping on Receiver

8-1-15 off parcel  
 8-2-15

N 41.17860 W 82.88918 - 242  
 N 41.17904 W 82.88830 - 332'

Copperhead Environmental Consulting Inc.  
 P.O. Box 73, 11641 Richmond Rd.  
 Paint Lick, KY 40461 (859) 925-9012

Likely tree location

N 41.178988  
 W 82.888251

MYSE/F/450

DNR  
17160

Roost Tree #

396

Project No./Project Name

412.01

Emerson Creek

Date First Found

8-1-15

Location

Wood lot next to soybean field + Coyote Grove campground

County

Seneca

State

OH

Quad

Fireside

Lat-Long/UTM:

(N)E 41.18123

(W)N

82.93402

Zone

Datum: NAD83

Observers:

B. Realey/C. Blayd

#	Tree Tag #	Species	DBH (cm)	Height ft or m		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1	396	Fraxinus sp.	31	35	20	S	L	L	C	Bark
2	-	Fraxinus sp.	30	40	-	S	L	H	C	Bark
3	-	Fraxinus sp.	26.5	40	-	S	M	H	C	Bark
4	-	Fraxinus sp.	21.5	35	-	S	L	H	C	Bark
5	-	Juglans nigra	62.5	60	-	L	L	H	C	NONE
6	-	Juglans nigra	91	75	-	L	L	H	C	NONE
7	-	Fraxinus sp.	39	55	-	S	M	M	C	Bark
8	-	Fraxinus sp.	16	17	-	S	L	H	S	NONE
9	-	Ulmus rubra	17	20	-	L	L	H	S	NONE
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

Habitat		
Interior	Edge	Open

Canopy Cover at Roost		
Open	Intermediate	Closed

Basal Area		
Live Trees	Snags	All Trees
30	100	90

Roost Location		
Bark	Cavity	Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

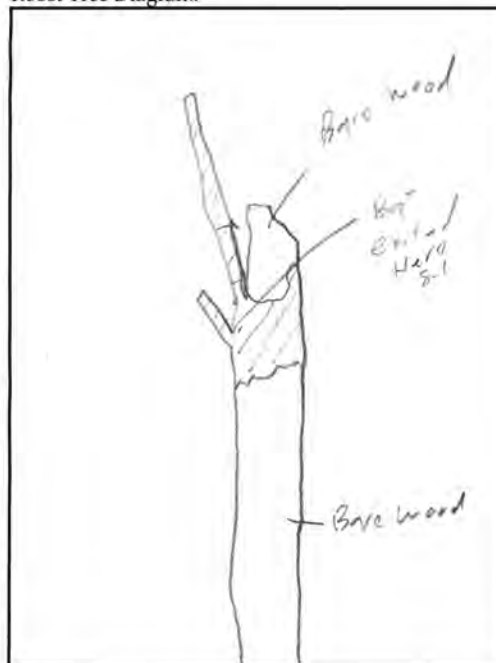
**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

***Tree Ranking		
Canopy	Sub-Canopy	Understory

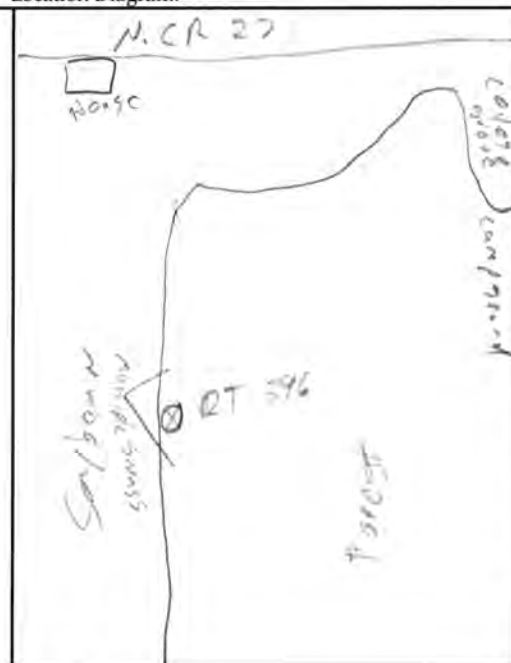
A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Roost Tree # 396Bat Species/Sex/Frequency: MYSE/F/450Band # DDNR 17166

Roost Tree Diagram:



Location Diagram:



Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	8-1	75	Clear	1	2046	21:27	21:27	21:27	1	B. Remick
2	8-2	77	Clear	2	2047	21:05	21:34	21:34	2	B. Remick
3										
4										

Bat Days

No.	Date	Bat Freq.	Bat Band	Sex of Bat	Observations
1	8-1	450	DDNR 17166	F	
2	8-2	450	DDNR 17166	F	
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

Snags are dead ash trees, evidence of Emerald Ash borer  
 \* Windy, 1st bat to exit was large (maybe red bat or big brown)

Roost Tree # 370 Project No./Project Name 412 / Emerson Creek Date First Found 7/20/15Location Site 26County SenecaState OHQuad FiresideLat-Long/UTM: N/E 41.20894W/N 82.9628Zone - Datum: NAD83 Observers: J. Storm

#	Tree Tag #	Species	DBH (cm)	Height (ft or m)		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/ Observation
				Tree	Roost		Usable	Total		
1	370	Fraxinus pennsylvanica	58.7	60	710	S	M	L	C	
2		Fraxinus pennsylvanica	46.2	20	-	S	L	H	SC	cracks & crevices
3		Beech	42.3	18	-	S	L	H	SC	Bark
4		oak sp	70	30	-	S	L	H	C	Bark & cracks
5		unknown	44	40	-	S	L	L	C	cracks & crevices
6		Fraxinus pennsylvanica	42.3	25	-	S	L	H	SC	cracks & crevices
7		Sugar maple	17.1	50	-	L	L	H	SC	
8		Sugar maple	18.4	50	-	L	L	H	SC	
9		Sugar maple	4.3	15	-	L	L	H	U	
10		Sugar maple	12.9	40	-	L	L	H	SC	
11		Sugar maple	6.9	30	-	L	L	H	SC	
12		Sugar maple	11.6	40	-	L	L	H	SC	
13		Sugar maple	14.4	40	-	L	L	H	SC	
14		Sugar maple	11.8	30	-	L	L	H	SC	
15		elm	58.3	100	-	L	L	H	C	
16		Sugar maple	16.9	75	-	L	L	H	SC	
17		Sugar maple	10.2	60	-	L	L	H	SC	
18		Sugar maple	11.6	60	-	L	L	H	SC	
19		Sugar maple	14.9	75	-	L	L	H	SC	
20										
21										
22										

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.

Habitat		
<input checked="" type="checkbox"/> Interior	<input type="checkbox"/> Edge	<input type="checkbox"/> Open

Canopy Cover at Roost		
<input type="checkbox"/> Open	<input checked="" type="checkbox"/> Intermediate	<input type="checkbox"/> Closed

Basal Area		
Live Trees	Snags	All Trees
130	60	190

Roost Location		
<input checked="" type="checkbox"/> Bark	<input type="checkbox"/> Cavity	<input type="checkbox"/> Crevices

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
Snag	Live	Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

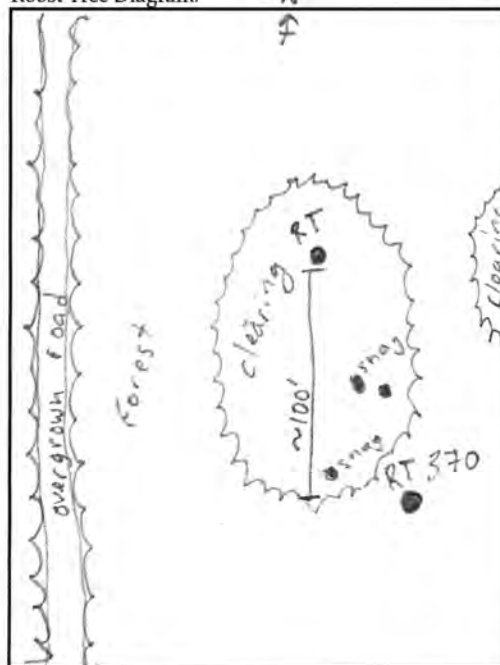
***Tree Ranking		
Canopy	Sub-Canopy	Understory

PLOT REDD

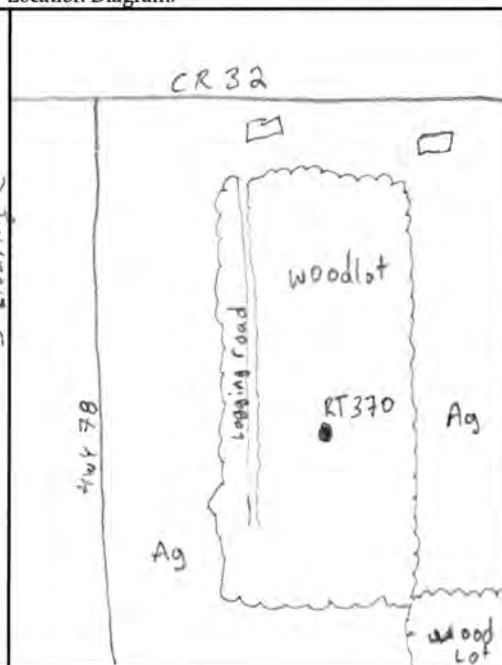


Roost Tree # 370Bat Species/Sex/Frequency: M/SO/P 1778Band # ODNR 23553

Roost Tree Diagram:



Location Diagram:



## Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/28	79°	Clear/Hot	1	2054	2100	2100	2100	1	
2	7/30	80°	Clear	0		—	—	—	—	
3										
4										

Video →

## Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7/28	779	23553	F	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

Comments:

RT 370 is approximately 100ft south of RT 368

MYSO/F/779

ODNR 23553

1 of 1

Roost Tree #

368

Project No./Project Name

412

APEX

Date First Found

27 July 2015

Location

In same woodlot as must net site 21

County

Seneca

State

OH

Quad

Tireside

Lat-Long/UTM:

N/E 41.20927

W/N

82.96308

Zone

Datum:

NAD83 Observers: K. Pearman, A. A. Shm

#	Tree Tag #	Species	DBH (cm)	Height (ft or m)		Condition*	% Bark Cover**		Tree Ranking***	Available Roost/Observation
				Tree	Roost		Usable	Total		
1	368	unk.	52.7	70	25	snag	L/O	L/O	C	squeaking
2		acer seedling	60.3	50	-	snag	L	H	SC	
3		acer seedling	29.7	50	-	snag	L	H	SC	
4		acer seedling	66.9	20	-	snag	L	L	US	sp. hole in trunk
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

Habitat		
<input checked="" type="radio"/> Interior	<input type="radio"/> Edge	<input type="radio"/> Open

Canopy Cover at Roost		
<input checked="" type="radio"/> Open	<input type="radio"/> Intermediate	<input type="radio"/> Closed

Basal Area		
Live Trees	Snags	All Trees
0	40	40

Roost Location		
<input type="radio"/> Bark	<input type="radio"/> Cavity	<input checked="" type="radio"/> Crevice

↓ QUICK REFERENCE / ↑ CIRCLE

*Condition		
<input type="radio"/> Snag	<input type="radio"/> Live	<input type="radio"/> Live-Damaged

**% Bark Cover		
High = ≥ 25%	Moderate = ≥ 10-25%	Low = < 10%

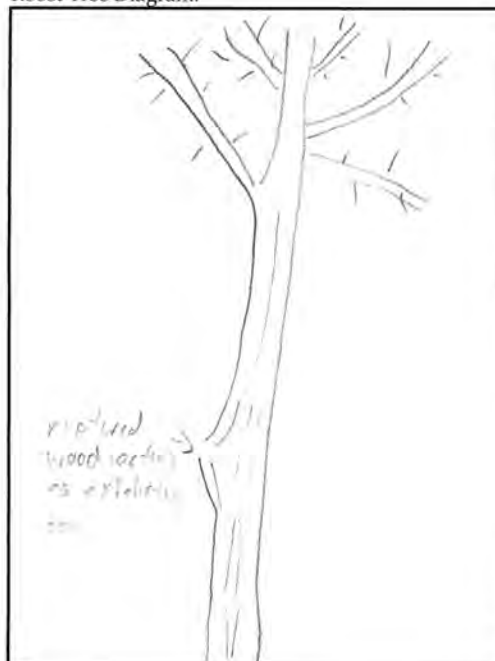
***Tree Ranking		
<input type="radio"/> Canopy	<input type="radio"/> Sub-Canopy	<input type="radio"/> Understory

A 10 factor English prism is used to identify trees within the plot, centered on the roost tree.



Roost Tree # 368Bat Species/Sex/Frequency: MYSO/F/779Band # ODNR-23553

Roost Tree Diagram:



Location Diagram:



## Emergence Count

No.	Date	Temp °F	Weather	# of Bats	Time				Focal Bat exit #	Personnel/Comments
					Sunset	Bats Start	Bats End	Tagged Bat		
1	7/27	75	clear	4	2054	2109	2221	2109	1	
2	7/28	78	clear	1	2054	2104	2104	—		
3	7/29	82	partly cloudy	2	2053	2053	2110	2053	1	
4	7/31	70°	clear	5	20	20:56	21:31	20:56	1	

8/1  
 Comments: 230C clear 2 20:56 20:58 20:58 2  
 Mouse/Bat cave out of house early on 10/20/2017  
 Squirrels and other animals are still in the yard since 2204  
 10/20/2017 - more about the same

## Bat Days

No.	Date	Bat Freq.	Bat Band #	Sex of Bat	Observations
1	7/27	779	23553	F	
2	7/29	779	23553	F	
3	7/31	779	23553	F	
4	8/1	779	23553	F	Rain + Brandon
5	8/2	779	23553	F	Rain + Brandon
6					
7					
8					
9					
10					
11					
12					
13					
14					

## Cavity or Crevice Characteristics

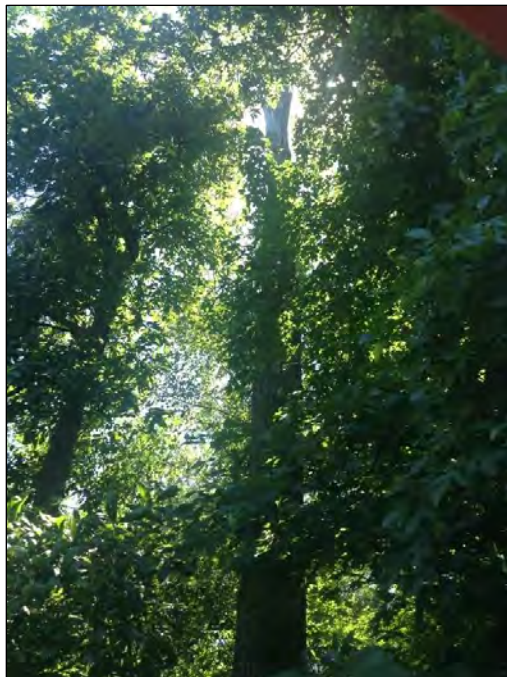
No.	Nature	Aspect	Opening Measurements			
			Width	Height	Ground	H <sub>2</sub> O Level
1						
2						
3						

## APPENDIX E

### Roost Tree Photographs



**RT 140**



**RT 314**





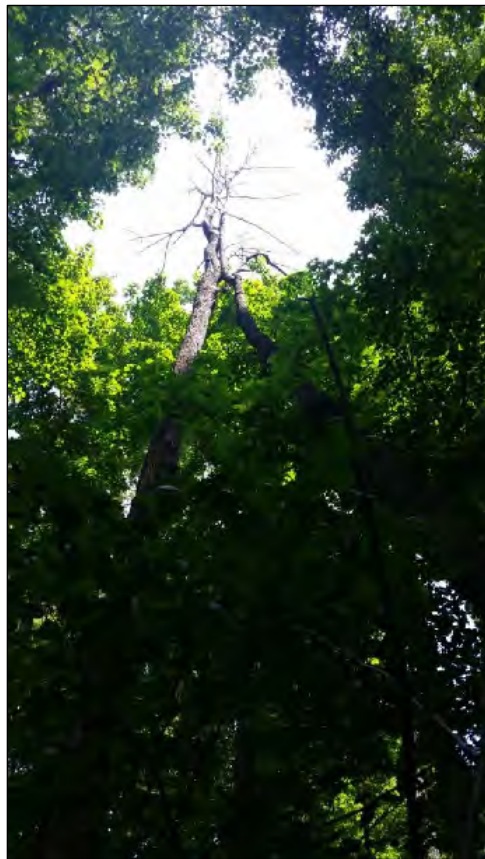
**RT 368**



**RT 369**



**RT 370**



**RT 371**

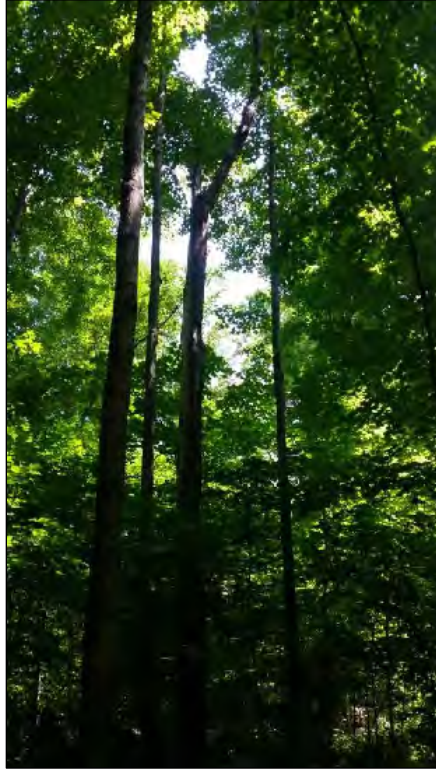


**RT 372**



**RT 373**





**RT 395**



**RT 396**



**RT 983**



**RT 984**

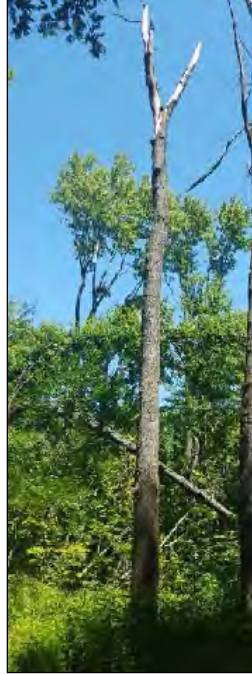




**RT 985**



**RT 986**



**RT 987**



**RT 988**



## Summer 2016 Bat Survey for the Proposed Republic Wind Project, Seneca and Sandusky Counties, Ohio

USFWS #16-037

Completed by:

Theresa Wetzel, Christopher McNees, and Chris Leftwich

1 November 2016

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## APPENDICES

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- Appendix A: Mist-Net Data Sheets
- Appendix B: Mist-Net Site Photographs
- Appendix C: Bat Capture Photographs

## PROJECT BACKGROUND

In 2015, Copperhead Environmental Consulting, Inc. (Copperhead) completed a bat mist-net and telemetry survey for the Republic Wind Project (Project) in Seneca and Sandusky counties, Ohio. Since completion of the 2015 survey, the Project boundary changed to include an additional area (~7,882 acres) along the northern and western edges of the original Project. Therefore, Copperhead completed a mist-net survey of the expansion area, referred to as the 2016 assessment area (Figure 1). The goals of this survey were to document bat species diversity and abundance within the assessment area, 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 leibei*), if captured.

## METHODOLOGY

### *Level of Effort/Site Selection*

Mist-net surveys were implemented in accordance with guidelines outlined in the 2016 *Range-wide Indiana Bat Summer Survey Guidelines* (USFWS 2016), 2009 *Ohio Department of Natural Resources 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). A study plan was submitted to the USFWS and the ODNR on 6 July 2016 and concurrence was received on 6 July (USFWS) and 17 July (ODNR).

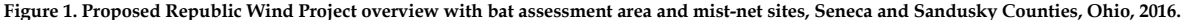
The level of effort outlined in the study plan was based on the estimated amount of forested habitat within the 2016 assessment area (~540 acres) resulting in 5 mist-net sites surveyed from 19 July through 22 July 2016.

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.

### *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).





Nine net nights of effort were completed at each site over two non-consecutive nights, with at least one mist-net set being a high net (three mist-nets stacked to create one set that was ~7.5 m tall) each night. Low visibility, high-quality, nylon nets, 4 to 12 meters 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. 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. For each individual captured, the following biological and morphometric data were recorded: species, sex, age class, reproductive condition, mass, and forearm length. In addition, the height and the specific net set of capture were recorded for each bat. Processing of bats was completed within 30 minutes from the time the bat was removed from the net.

#### ***Radio-Telemetry & Emergence Counts***

If captured, Indiana, northern long-eared, Rafinesque's big-eared, and eastern small-footed bats were to be radio-tagged in order to locate day roosts, conduct emergence counts, and to estimate foraging range. Radio-telemetry and emergence counts were not conducted because no target species were captured during this survey.

#### ***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 "*National White-Nose Syndrome Decontamination Protocol - Version 04.12.2016*", established by USFWS. All netting equipment was sanitized in > 55°C (>131°F) water for 20 minutes prior to arrival and after each survey night. Individual bats were kept in unused paper bags while awaiting processing. 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 were sanitized immediately with isopropyl alcohol disinfecting wipes following the handling of each bat. Bats were evaluated for potential WNS infection through wing scoring following Reichard and Kunz (2009).



## RESULTS AND DISCUSSION

### *Mist-Net Survey*

Mist-net surveys were conducted at five sites from 19 – 22 July 2016 (Table 1, Figure 1). A total of 78 bats of three species were captured over 45 net nights. No Indiana or northern long-eared bats were captured (Table 2). Big brown bats (*Eptesicus fuscus*) comprised 85 percent of total captures (n=66), and eastern red bats (*Lasiurus borealis*) comprised 13 percent of total captures (n=10). 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.

Weather conditions during the surveys were within the parameters outlined in the USFWS survey guidance, including no rain or heavy winds and temperatures above 10°C (50°F) during the entire five-hour survey period. No deviations from the survey methodology occurred during the course of the field survey. Captured bats were examined for any sign of WNS by using the Reichard Wing-Damage Index (WDI). No major traumas (i.e., WDI > 1) were observed on captured bats.

Table 1. Mist-net site locations, Republic Wind Project, Ohio, 2016.

Site No.	Latitude	Longitude	Site Location
1	41.25035	-83.02975	trail through woodlot and ephemeral wetland
2	41.23370	-83.03558	wood lot and stream of 180
3	41.22830	-83.04389	large riparian forest along beaver creek
4	41.22067	-83.10469	wood lot off TR0164
5	41.20766	-83.05096	wide corridors leading to ag fields

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

Species	Adult Male		Adult Female				Juvenile		Escaped	Total
	NR*	S	P	L	PL	NR	Female	Male		
<i>Eptesicus fuscus</i>	5	11	0	2	13	0	12	21	2	<b>66</b>
<i>Lasiurus borealis</i>	1	4	0	0	2	1	1	1	0	<b>10</b>
<i>Lasiurus cinereus</i>	0	0	0	0	1	0	0	0	1	<b>2</b>

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

## CONCLUSIONS

No federally or state listed species were captured during this survey. The lack of Indiana and northern long-eared bat captures suggests that these species are not using this portion of the project area during the summer maternity season, or the species are present in such low densities that current survey techniques failed to detect them.

## LITERATURE CITED

- 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 (ODNR-DOW). 2015. Ohio Division of Wildlife and USFWS (OH Field Office) Guidance for Bat Permitted Biologist.
- 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). 2016. Range-wide Indiana Bat Summer Survey Guidelines.



## APPENDIX A

### **Mist-Net Data Sheets**

## Mist Netting Data Form

Sheet 1 of 1

Site No. 1 Project No./Name 513 1 Republic Date 20 July 16  
 Site Location trail through woodlot and ephemeral wetland  
 County Seneca State OH Time Up 0655 Time Down 0800  
 Lat/Lon ; UTM: N 41.25035 N 83.02975 Zone 1 Datum NAD83 Observers C. Leftwich  
A. Ashmore

COPPERHEAD  
MENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	2215	EPFU	J	M	NR	14.0	44	A	7	0-P			
2	2300	EPFU	A	M	NR	17.0	84	A	7	0			
3	0021	EPFU	J	M	NR	16.75	45	A	1.5	0			
4													
5													
6													
7													
8													
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29													
30													

Moon Phase % FULL Wax / Wane

Rise Set

Sun 0617 2100Moon 2203 0806

Time	Temp (F)	Sky	Wind	No. Bats
2100	77	unk	1	—
2200	73	unk	0	1
2300	71	unk	0	1
0000	70	unk	0	1
0100	70	unk	0	0
0200	70	unk	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

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p. 1


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

## Mist Netting Data Form

Site No. Site 1 Project No./Name \_\_\_\_\_ / \_\_\_\_\_ Date 7-22-16

Site Location \_\_\_\_\_

County \_\_\_\_\_ State \_\_\_\_\_ Time Up 2100 Time Down 0200Lat/Lon; UTM: N/E \_\_\_\_\_ W/N \_\_\_\_\_ Zone \_\_\_\_\_ Datum \_\_\_\_\_ Observers E. SmithA. Ashmore B. Lowe  **COPPERHEAD**  
ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	22:40	<i>E. fuscus</i>	J	M	N	14	45	E	.5	0			
2	23:40	<i>E. fuscus</i>	A	M	N	18	46	A	7	0			
3	00:50	<i>E. fuscus</i>	A	M	N	17	48	A	6	0			
4	00:50	<i>E. fuscus</i>	J	M	N	14	46	A	6	0			
5	02:00	<i>E. fuscus</i>	A	M	S	17	46	A	4.5	0			
6													
7													
8													
9													
10													
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12													
13													
14													
15													
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26													
27													
28													
29													
30													

Moon Phase \_\_\_\_\_ % \_\_\_\_\_ Wax / Wane

	Rise	Set
Sun	06:17	20:58
Moon	22:40	09:10

Time	Temp (F)	Sky	Wind	No. Bats
2100	87	0	1	-
2200	84	0	1	0
2300	81	0	1	1
0000	80	0	1	1
0100	79	1	2	2
0200	78	1	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

Acoustic Survey: Unit type \_\_\_\_\_ Unit # \_\_\_\_\_ Date \_\_\_\_\_ Start time \_\_\_\_\_ Stop time \_\_\_\_\_

Date \_\_\_\_\_ Start time \_\_\_\_\_ Stop time \_\_\_\_\_

Date \_\_\_\_\_ Start time \_\_\_\_\_ Stop time \_\_\_\_\_

Weatherproofing \_\_\_\_\_ Coordinates \_\_\_\_\_

Comments: \_\_\_\_\_

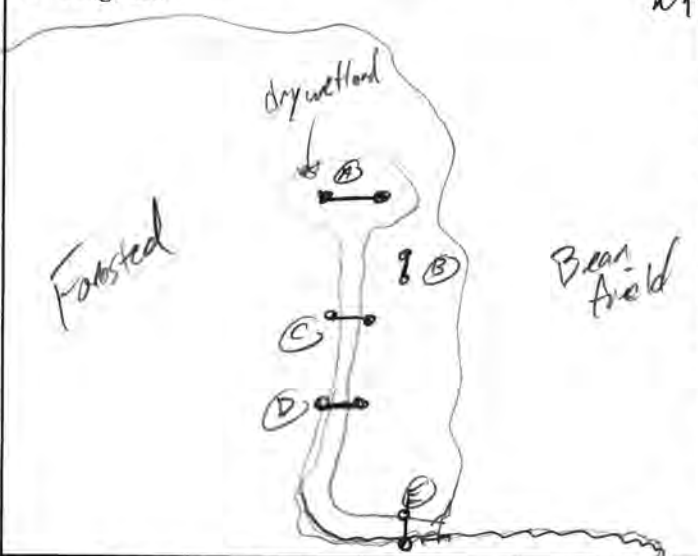
Please Return to:  
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Mist Net Site Habitat Sheet Site No. 1 Project No./Name 513, Republic Date 20 July 16

Lat/Lon; UTM: N 41.25035 W 83.02975 Zone 18 Observers C. Goffswich, A. Ashmore

Datum: NAD83 County Sevier State OH Quad Fremont East B. L. 26

Site Diagram:



Net	Height (m)	Length (m)	J- Dates
A	7.48	12	20;
B	5.2	6	20;
C	5.2	6	20;
D	5.2	6	20;
E	5.2	9	20;
F			

Site Photographs  
Camera: *EL*  
Photo Log: *[Signature]*

Dominant Vegetation						
1. <i>A. saccharum</i>	4. <i>C. alba</i>					
2. <i>C. urtica</i>	5. <i>F. griseaefolia</i>					
3. <i>A. rubrum</i>	6. <i>C. polystachya</i>					

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

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

- Roost habitat:** 1. **Poor:** No or few snags  $\geq 5"$  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.
- 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.
- 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.
- 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:**

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859-925-9012



**COPPERHEAD**  
ENGINEERING CONSULTANTS

## Mist Netting Data Form

Sheet \_\_\_\_\_ of \_\_\_\_\_

Site No. 2 Project No./Name 513 / REPUBLIC Date 7-20-16  
 Site Location WOOD LOT AND CRSEIC off 1800  
 County GENECA State OH Time Up 9:00 Time Down 2:00  
 Lat/Lon; UTM: N/E 41.2337 W/N -83.03558 Zone — Datum NAD83 Observers MTM, MJG

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	LABO	A	F	PL	11.5	42	D	4	0	—	—	✓
2	9:40	EPFU	A	F	PL	16	44	E	2	1	—	—	—
3	9:40	EPFU	J	M	NR	14	42	E	5	0	—	—	—
4	9:40	EPFU	A	M	S	16	46	E	5	0	—	—	—
5	9:45	EPFU	A	M	S	16	47	D	5.5	0	—	—	—
6	10:30	EPFU	J	F	NR	16.5	43	D	1	0	—	—	—
7	10:30	EPFU	A	F	PL	20	48	D	3	0	—	—	—
8	10:40	EPFU	J	M	NR	14	45	D	7	0	—	—	—
9	11:05	EPFU	A	M	S	16.5	42	D	1	0	—	—	—
10	11:15	EPFU	A	F	PL	18.5	45	E	5.5	0	—	—	—
11	11:08	EPFU	A	F	PL	20	49	D	6	0	—	—	—
12	11:40	LACI						E	5.5		ESCAPE		✓
13	12:05	LABO	A	F	PL	12	43	D	0.5	0	—	—	—
14	12:50	EPFU	A	M	S	17.5	48	D	7	1	—	—	—
15													
16													
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**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	6:16		2:00
Moon	0924		0700

Time	Temp (F)	Sky	Wind	No. Bats
9:00	82°	0	0	5
10:00	75	0	0	3
11:00	73	0	0	3
12:00	72	0	0	2
1:00	72	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

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## Mist Netting Data Form

Site No. 2 Project No./Name 513 / REPUBLIC Date 7-22-16  
 Site Location WOOD LOT AND CREEK OFF 180  
 County SENECA State OH Time Up 8:55 Time Down 6:58  
 Lat/Lon; UTM: N/E 41.2337 W/N -83.03558 Zone — Datum NAD83 Observers MTM, MJG

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	EPFU	A	F	PL	17.5	44	E	1	1	—	—	—
2	9:40	EPFU	A	M	S	16	45	E	2	0	—	—	—
3	9:40	EPFU	A	M	S	15.5	45	D	4	0	—	—	—
4	10:00	EPFU	J	F	NR	16	47	E	1	0	—	—	—
5	10:00	LABO	A	M	S	11	40	D	.5	0	—	—	—
6	10:50	EPFU	J	M	NR	13.5	46	D	5	0	—	—	—
7	12:20	EPFU	J	M	NR	15	44	D	.5	0	—	—	—
8	12:30	EPFU	J	M	NR	15	44	D	6	0	—	—	—
9	1:50	EPFU	J	F	NR	14	45	D	1	0	—	—	—
10	1:50	LABO	J	F	NR	10	40	D	6	0	—	—	—
11													
12													
13													
14													
15													
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21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Moon Phase % Wax / Wane

	Rise	Set
Sun	6:17	7:58
Moon	2240	0910

Time	Temp (F)	Sky	Wind	No. Bats
9:00	88	0	0	3
10:00	82	0	0	3
11:00	82	0	0	0
12:00	81	0	0	2
1:00	79	0	0	2
2:00	78	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

Acoustic Survey: Unit type \_\_\_\_\_ Unit # \_\_\_\_\_ Date \_\_\_\_\_ Start time \_\_\_\_\_ Stop time \_\_\_\_\_

Date \_\_\_\_\_ Start time \_\_\_\_\_ Stop time \_\_\_\_\_

Date \_\_\_\_\_ Start time \_\_\_\_\_ Stop time \_\_\_\_\_

Weatherproofing \_\_\_\_\_ Coordinates \_\_\_\_\_

Comments:

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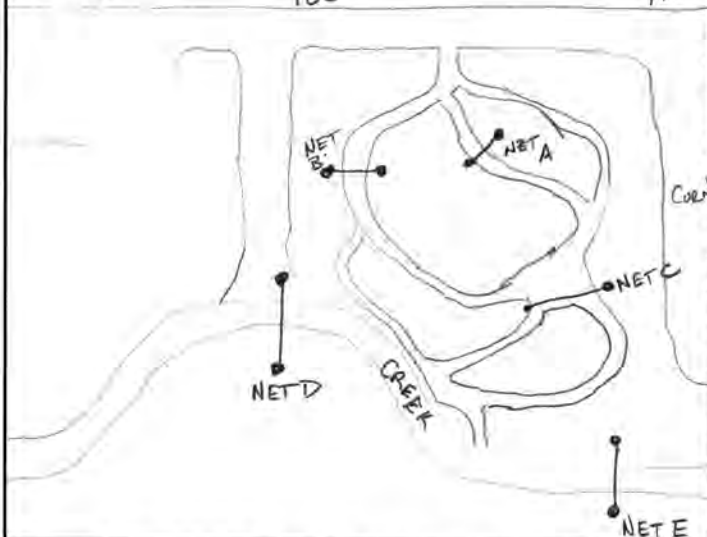
## Mist Net Site Habitat Sheet

Site No. 2Project No./Name 513 / REPUBLICDate 7/20/16Lat/Lon; UTM: N/E 41.2337W/N -83.03552Zone Observers MTM, MJGDatum: NAD83County SENECAState OH Quad WATSON

Site Diagram:

180

1N



Net	Height (m)	Length (m)	Dates
A	6	6	7/20 7/22
B	6	6	7/20 7/22
C	6	6	7/20
D	7.8	9	7/20 7/22
E	6	9	7/20 7/22
F			

Site Photographs  
 Camera: \_\_\_\_\_  
 Photo Log: \_\_\_\_\_

## Dominant Vegetation

1. <u>MAPLE</u>	4. _____
2. <u>Sycamore</u>	5. _____
3. <u>Cottonwood</u>	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  $\geq 5"$  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.

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.

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

Comments:

Please return to:

P.O. Box 73, Paint Lick, KY. 40461

859-925-9012



## Mist Netting Data Form

Sheet 1 of 1

Site No. 3 Project No./Name 513 / Republic Date 19 July 16  
 Site Location large riparian forest along Beaver Creek  
 County Sevier State OH Time Up 2050 Time Down 0201  
 Lat/Lon ; UTM: N/E 41.22830 W/N 83.04389 Zone 1 Datum NAD83 Observers C. Lottwisch  
A. Ashmore

COPPERHEAD  
ENVIRONMENTAL CONSULTING

#	Time	Species	Age	Sex	Repr.	Mass (g)	FA (mm)	Net	Height (m)	WDI	G/H/B/T	Band# Type	Freq.
1	2145	EPFU	A	F	PL	18.75	46	E	2.5	0			
2	2150	EPFU	A	M	NR	15.0	46	C	2.0	0			
3	2201	EPFU	A	M	NR	14.5	45	E	2.0	0			
4	2215	EPFU	JV	M	NR	14.95	45	E	3.5	0			
5	2215	EPFU	JV	F	NR	15.5	44	E	4.0	0			
6	2215	EPFU			ESCAPED			E					
7	2235	EPFU			ESCAPED			D	6.0				
8	2320	LABO	A	M	NR	11.75	44	E	0.5	0			
9	2340	EPFU	A	F	L	20.0	48	D	7.5	0			
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Moon Phase	%	Wax / Wane
	100	
	Rise	Set
Sun	0616	2100
Moon	2124	0703

Time	Temp (F)	Sky	Wind	No. Bats
2100	72	unk	0	1
2200	72	unk	0	2
2300	70	unk	1	5
0000	68	unk	1	2
0100	66	unk	1	0
0200	66	unk	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

**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

Please Return to:  
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## Mist Netting Data Form

Site No. Site 3 Project No./Name 513 / \_\_\_\_\_ Date 7-21-16

Site Location \_\_\_\_\_

County \_\_\_\_\_ State \_\_\_\_\_ Time Up 2100 Time Down 0200Lat/Lon ; UTM: N/E \_\_\_\_\_ W/N \_\_\_\_\_ Zone \_\_\_\_\_ Datum \_\_\_\_\_ Observers E. SmithB. LoweCOPPERHEAD  
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	EPFU	JUV	M	A	12	43	E	3	0	—	—	—
2	10:50	EPFU	A	M	S	16.5	44	A	2.5	0	—	—	—
3													
4													
5													
6													
7													
8													
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21													
22													
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25													
26													
27													
28													
29													
30													

Moon Phase 100 % Wax / Wane

	Rise	Set
Sun	<u>06:15</u>	<u>200</u>
Moon	<u>2203</u>	<u>0804</u>

Time	Temp (F)	Sky	Wind	No. Bats
<u>21:00</u>	<u>78</u>	<u>0</u>	<u>1</u>	<u>—</u>
<u>22:00</u>	<u>77</u>	<u>0</u>	<u>1</u>	<u>1</u>
<u>23:00</u>	<u>75</u>	<u>0</u>	<u>2</u>	<u>1</u>
<u>00:00</u>	<u>74</u>	<u>0</u>	<u>3</u>	<u>0</u>
<u>01:00</u>	<u>74</u>	<u>1</u>	<u>2</u>	<u>0</u>
<u>02:00</u>	<u>74</u>	<u>3</u>	<u>3</u>	<u>0</u>

## 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: \_\_\_\_\_

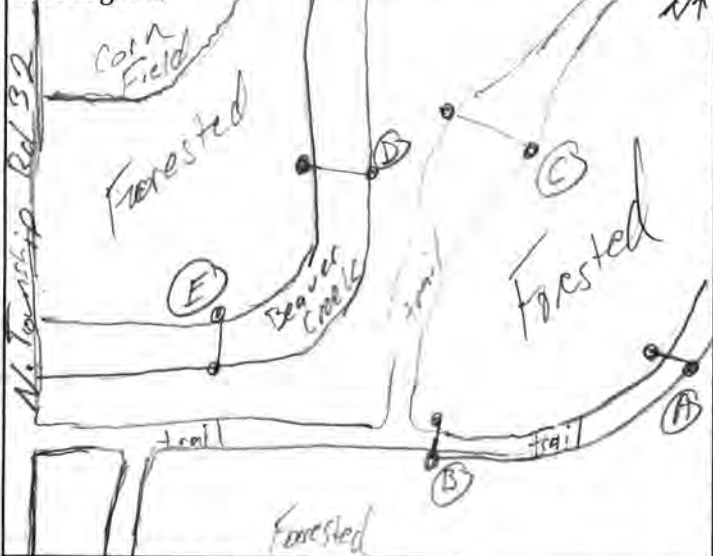
Please Return to:  
P.O. Box 73, Paint Lick, KY, 40461.  
(859) 925-9012



## Mist Net Site Habitat Sheet

Site No. 3Project No./Name 513RepublicDate 19 July 16Lat/Lon; UTM: N 41.22830W 83.04389Zone 1Observers C. LeftwichDatum NAD83County SenecaState OHQuad WatsonA. Ashmore

Site Diagram:



Net	Height (m)	Length (m)	5-4 Dates
A	5.2	6	19
B	5.2	6	19
C	5.2	12	19
D	7.8	9	19
E	5.2	9	19
F			

Dominant Vegetation						
1. <u>A. rubra</u>						
2. <u>A. saccharum</u>						
3. <u>Carya sp.</u>						
4. <u>Q. rubra</u>						
5.						
6.						

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

Site Photographs  
 Camera: CL  
 Photo Log: ↗

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

- 2 **Roost habitat:** 1. Poor: No or few snags  $\geq 5"$  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.
- 3 **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:

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859-925-9012





## Mist Netting Data Form

Sheet 1 of   

Site No. 4 Project No./Name 513 / REPUBLIC Date 7-19-16  
 Site Location WOOD LOT OF TR 0164  
 County SENECA State OH Time Up 8:50 Time Down 2:00  
 Lat/Lon; UTM: N/E 41.22067 W/N -83.10469 Zone    Datum NAD83 Observers MTM, MJG



#	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													
7													
8													
9													
10													
11													
12													
13													
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24													
25													
26													
27													
28													
29													
30													

NO Bat  
Captures

Moon Phase 100 % Wax / Wane

	Rise	Set
Sun	<u>06:15</u>	<u>21:00</u>
Moon	<u>20:41</u>	<u>06:00</u>

Time	Temp (F)	Sky	Wind	No. Bats
9:00	75	1	1	0
10:00	73	0	1	0
11:00	72	0	1	0
12:00	70	0	0	0
1:00	68	0	0	0
2:00	67	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

**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

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

## 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, MSK



**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	12:30	EPFU	A	M	S	17	44	A	6.5	0	—	—	—
3													
4													
5													
6													
7													
8													
9													
10													
11													
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26													
27													
28													
29													
30													

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

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

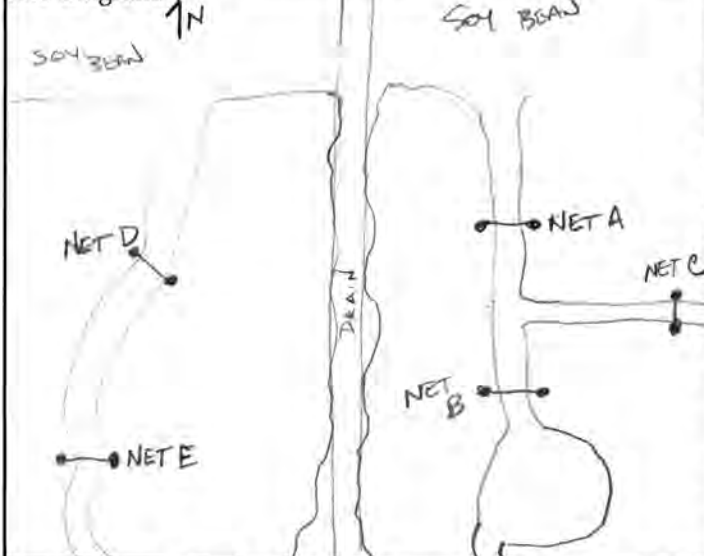
## Mist Net Site Habitat Sheet

Site No. 4Project No./Name 513 / REPUBLICDate 7-19-16Lat/Lon; UTM: N/E 41.22067 W/N -83.10469Zone       Observers TODD MEDANEC, MARK GAVULADatum:        County SENecaState 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	4. RED OAK					
2. AMERICAN ELM	5.					
3. SHAGBARK HICKORY	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  $\geq 5$ " 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:

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859-925-9012



## 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 NAD83 Observers G. Janos & 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	4.1	0	—	—	—
2	2145	LABO	A	M	S	3.0	42.0	F	6.5	0	—	—	—
3	2145	EPFU	J	M	NR	11.25	43.0	A	4.0	0	—	—	—
4	2130	EPFU	J	F	NR	13.5	50.0	C	4.0	0	—	—	—
5	2130	EPFU	J	M	NR	9.25	44.0	C	4.0	0-P	—	—	—
6	2200	EPFU	A	F	PL	17.5	47.0	B	3.0	0-P	—	—	—
7	2225	EPFU	J	M	NR	17.0	49.0	A	5.0	0	—	—	—
8	2240	EPFU	J	M	NR	13.25	44.0	B	1.5	0	—	—	—
9	2225	EPFU	J	M	NR	13.25	45.0	A	5.0	0	—	—	—
10	2225	EPFU	J	M	NR	15.0	46.0	A	5.0	0	—	—	—
11	2305	EPFU	J	M	NR	17.0	47.0	A	5.0	0	—	—	—
12	2315	EPFU	J	F	NR	16.25	49.0	B	1.0	0	—	—	—
13	2345	LABO	J	M	NR	8.5	39.0	A	4.0	0-P	—	—	—
14	2345	EPFU	A	F	PL	21.75	46.0	A	5.0	0	—	—	—
15	2345	EPFU	A	F	PL	22.25	47.0	D	3.0	0	—	—	—
16	2350	EPFU	A	F	PL	20.5	47.0	D	4.0	0	—	—	—
17	0030	EPFU	J	F	NR	16.25	47.0	C	5.0	0	—	—	—
18	0045	LABO	A	M	S	11.25	39.0	C	1.0	0	—	—	—
19	0125	EPFU	A	F	L	17.5	45.0	B	2.5	0	—	—	—
20	0240	EPFU	A	F	PL	19.25	47.0	E	1.0	0	—	—	—
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

Moon Phase 100% Wax / Wane

	Rise	Set
Sun	<u>0615</u>	<u>2101</u>
Moon	<u>2041</u>	<u>0603</u>

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

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

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(859) 925-9012

p. 1

\* Possible broken ulna before capture.



## Mist Netting Data Form

Site No. 5 Project No./Name 513.01 / Republic Date 21 July 2016  
 Site Location Wide corridors 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. Gooden



#	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	0P	—	—	—
11	2320	EPFU	J	M	NR	15.25	46.0	C	3.0	0	—	—	—
12	2340	LABO	A	M	S	9.5	38.0	C	3.0	0	—	—	—
13	0050	LALI	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	<u>0617</u>	<u>2100</u>
Moon	<u>2204</u>	<u>0806</u>

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

## 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.

Project No./Name

1. Economic

Date 19 July 2016

Lat/Lon ; UTM: N/E 46.20760

W/N-83.05096

Zone

Observers: S. Innes, K. DeBeek

Datum: NA 083

County Seneca

State (

Quad

Watson

Site Diagram:

Net	Height (m)	Length (m)	Dates	Dominant Vegetation							
A	5.2	17	7/19, 7/21	1. <i>Prunus serotina</i>			4. <i>Ligustrum nigra</i>				
B	5.2	12	7/19, 7/21	2. <i>Populus nigra</i>			5. _____				
C	5.2	6	7/19, 7/21	3. <i>Acer saccharinum</i>			6. _____				
D	7.8	9	7/19	Net Set by Habitat							
E	2.5	4	7/19, 7/21								
F				Habitat	A	B	C	D	E	F	
				River							
				Stream					✓		
				Pond							
Site Photographs Camera: <i>Fujifilm</i> Photo Log:       				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  $\geq 5"$  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)

**Please return to:**

P.O. Box 73, Paint Lick, KY. 40461

859-925-9012

**Comments:**



**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 cinereus*



*Eptesicus fuscus*



*Lasiurus borealis*





## 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

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## APPENDICES

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Appendix B: Mist-Net Photographs
Appendix C: Bat Capture Photographs
Appendix D: Roost Tree Data Sheets
Appendix E: Roost Tree Photographs

## 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.

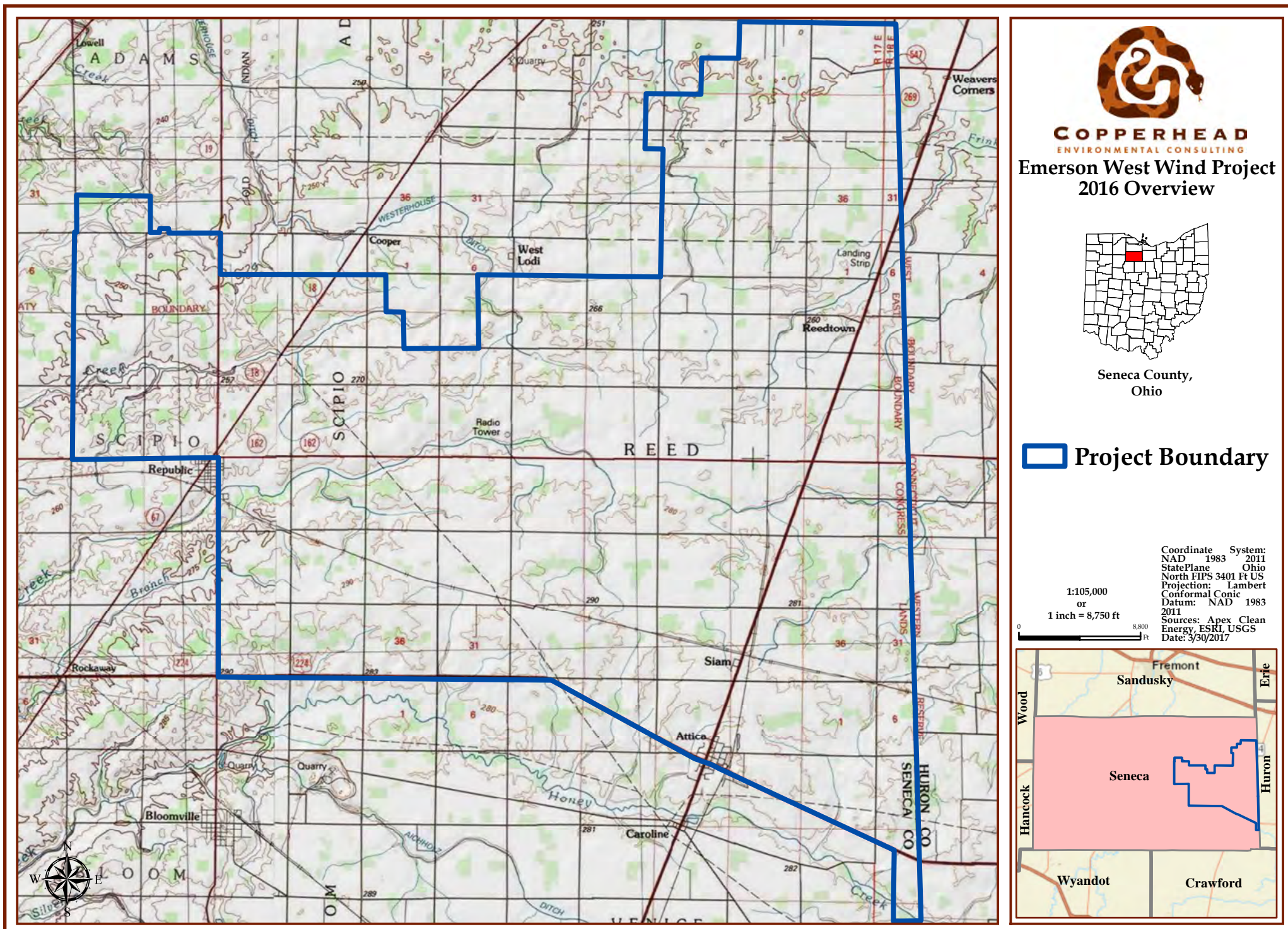
## METHODOLOGY

### *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 USFWS 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.











### *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.

### *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  $151.7 \pm 44.4$  (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

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