



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 31-Jul-11 Biologists: S. Captain

Project Name: Republic State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-2

Latitude: 41° 13' 06.1" N Longitude: 82° 56' 44.6" W

Roost Name/#: 218-2

Radio-tagged bat present in tree: Yes \_\_\_ No X

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 24-Jul-11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2040 Departure time: 2140 Total Bats: 0

Emergence Time	Number of Bats	Emergence Aspect
	<u>no bats</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

---

---

---



## ROOST TREE DATA

Project #: 340 Date: 27-Jul-11 Biologists: S. Caplar, M. Farmer  
Project Name: Tetrahedron State: OH County: Seneca  
GPS Unit #: A7 Waypoint: 218-3 Camera #: 4634 Picture #: 104-3835, 3836  
Latitude: 41° 13' 12.0"N Longitude: 82° 56' 33.5"W  
Bat Species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL  
Capture Date: 24-Jul-11 Capture Site: 16  
Frequency: 172.218 Roost Name/#: 218-3

### ROOST TREE DATA

Roost tree species: Carya ovata dbh: 25 cm  
Estimated height from ground to roost: 20 (meters) Tree height 40 (meters)  
Exfoliating bark (%): 30 Distance from capture site: 1 m or (km) (circle one)  
Tree health: ☒ Live ☐ Dead ☐ Partial  
Observed roost potential: ☒ Exfoliating Bark ☐ Cracks/crevasses ☐ Hollow ☐ Unknown  
Bat vocalizations: ☐ Yes ☒ No  
Guano on ground/foliage: ☐ Yes ☒ No  
Is guano fresh (if present)?: ☐ Yes ☒ No  
Guano volume (if present): \_\_\_\_\_

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Subdominant Canopy Species (< 40 cm/16" dbh)

Carya ovata  
Acer saccharum  
\_\_\_\_\_  
\_\_\_\_\_

Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_

Estimated dbh range (cm): Lg: 25 Sm: 10

Estimated canopy closure at roost: \_\_\_\_\_ %

Slope: ☐ Steep ☐ Moderate ☐ Slight ☒ None Slope aspect: \_\_\_\_\_

Subcanopy Clutter: ☐ Closed ☒ Moderate ☐ Open

Distance to nearest water source: 750 m or km (circle one) Distance to nearest flight corridor: \_\_\_\_\_ meters

Habitat Description: Mainly Carya ovata, few large trees, very dense vegetation

#### Check all that apply:

<input type="checkbox"/> Mature Upland Forest	<input type="checkbox"/> Recently Logged Forest	<input type="checkbox"/> Crop/Pasture Land	<input type="checkbox"/> Shrub/scrub Swamp
<input type="checkbox"/> Young Upland Forest	<input type="checkbox"/> Pine Plantation	<input type="checkbox"/> Stream/River	<input type="checkbox"/> Vernal Pool
<input type="checkbox"/> Mature Lowland Forest	<input checked="" type="checkbox"/> Woodlot/Forest Edge	<input type="checkbox"/> Emergent Wetland	<input type="checkbox"/> Deepwater Lake/Pond
<input type="checkbox"/> Young Lowland Forest	<input type="checkbox"/> Old Field	<input type="checkbox"/> Forested Swamp	<input type="checkbox"/> Other _____

Comments:



## ROOST TREE DATA (continued)

Page 2 of 2

State/County: OH / Seneca

Project Name/ #: 340

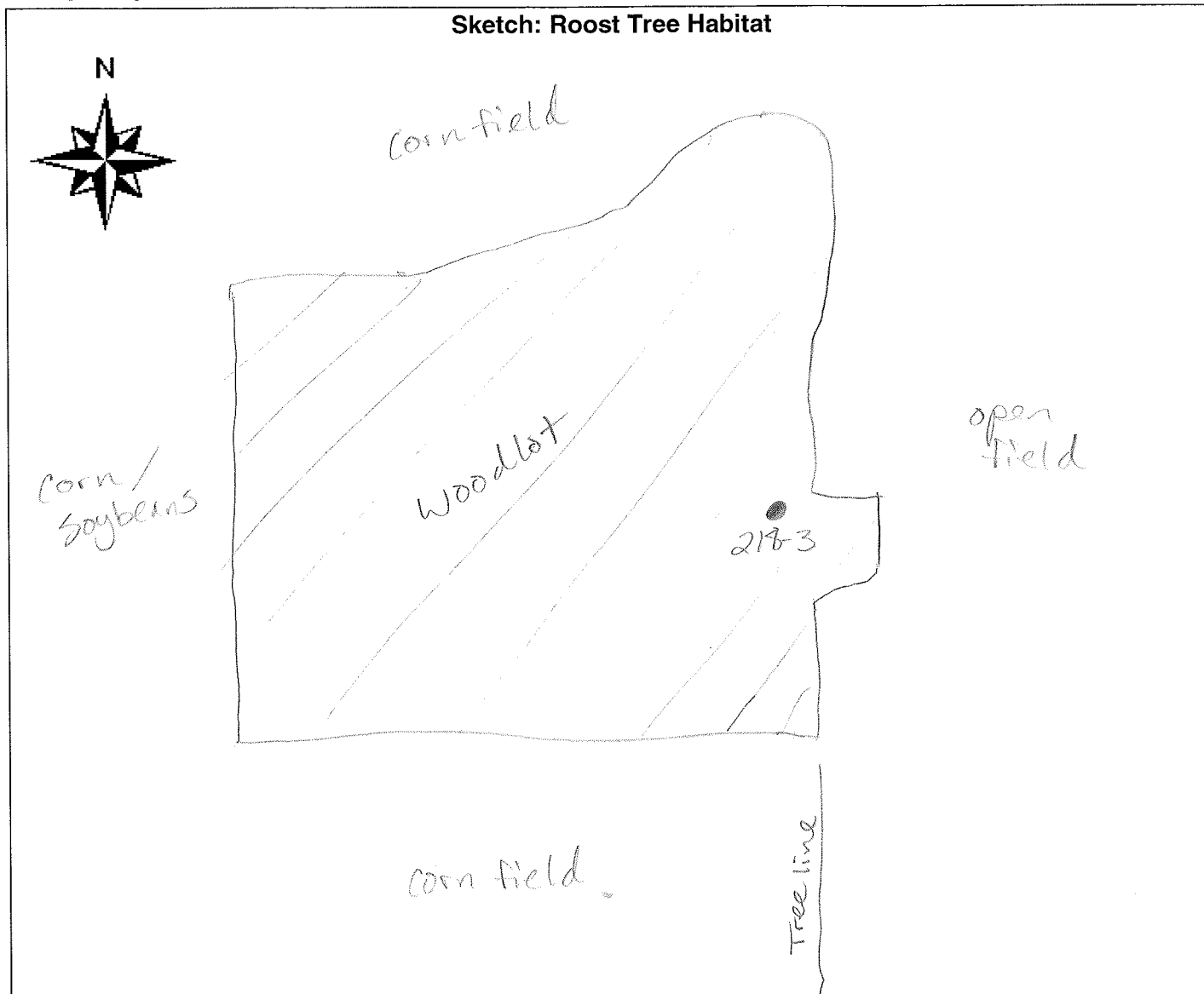
Date: 27-Jul-11

Frequency: 170, 218

Roost Name/ #: 218-3

Initials: SC

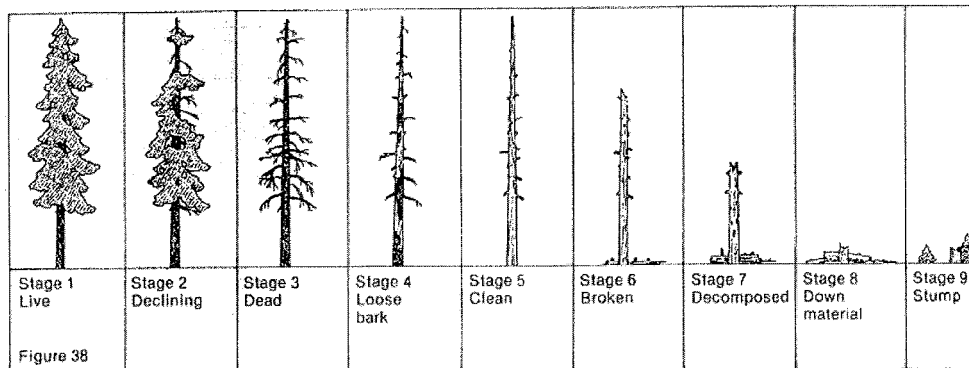
### Sketch: Roost Tree Habitat



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

### Sketch: Roost Tree

#### Stages of Decay:



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 27-Jul-11 Biologists: S. Coats

Project Name: Tetratech State: OH County: Seneca

GPS Unit #: A7      Waypoint: 2143

**Latitude:** 41 ° 13 ' 12.0 "N **Longitude:** 82 ° 56 ' 33.5 "W

Roost Name/#: 210-3

Radio-tagged bat present in tree: Yes X No     

Complete the following information only if a radio-tagged bat is present in the roost.

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 29-Jul-11 Capture site: 16 Frequency: 170.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2045      Departure time: 2145      Total Bats: 0

[illegible]

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Bat not seen



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 29 Jul 2011 Biologists: M Forman

Project Name: Republic State: OH County: Seneca

GPS Unit #: A5 Waypoint: \_\_\_\_\_

Latitude: 41° 13' 12.0" N Longitude: 82° 56' 33.6" W

Roost Name/#: R3

Radio-tagged bat present in tree: Yes \_\_\_\_\_ No X

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Lasiurus borealis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 24 Jul 11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2010 Departure time: 2130 Total Bats: 2

Emergence Time	Number of Bats	Emergence Aspect
<u>2110</u>	<u>1</u>	
<u>2114</u>	<u>1</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

Bats emerged from roost and flew  
100 ft.



## ROOST TREE EMERGENCE DATA

Project #: 350 Date: 30-Jul-11 Biologists: Doornik

Project Name: 7641000 State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-3

UTM Zone: 18Q Easting: 412131 Northing: 7054133

Roost Name/#: 218-3

Transmitted bat present in tree: Yes ☐ No ☒

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. s. l. s. Sex(M/F): F Age(Ad/Jv): 1 Repro.: 1

Capture date: 24-Jul-11 Capture site: 16 Frequency: 42.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (i.e., do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2054 Departure time: 2118

Emergence Time	Number of Bats	Emergence Aspect
2054	1	
2056	0	
2058	1	
2100	2	
2102	1	
2104	0	
2106	0	
2108	0	
2110	0	
2112	1	
2114	1	
2116	0	
2118	0	



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 30-July-11 Biologists: Doonan

Project Name: 1644444 State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-3

UTM Zone: 18Q Easting: 412 121 00 Northing: 42564306

Roost Name/#: 218-3

Transmitted bat present in tree: Yes ☐ No ☒

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. grisescens Sex(M/F): F Age(Ad/Jv): 1 Repro.: 2

Capture date: 24-July-11 Capture site: 164 Frequency: 112.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (i.e., do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2054 Departure time: 2118

Emergence Time	Number of Bats	Emergence Aspect
2054	1	
2056	0	
2058	1	
2100	2	
2102	1	
2104	0	
2106	0	
2108	0	
2110	0	
2112	1	
2114	1	
2116	0	
2118	0	



## ROOST TREE DATA

Project #: 340 Date: 26-Jul-11 Biologists: S. Caplain & M. Farmer  
Project Name: Tetatech State: OH County: Seneca  
GPS Unit #: A7 Waypoint: 218-4 Camera #: 4834 Picture #: 104-3837, 3838  
Latitude: 41° 13' 08.6"N Longitude: 82° 56' 37.7"W  
Bat Species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL  
Capture Date: 24-Jul-11 Capture Site: 16  
Frequency: 172.218 Roost Name/#: 218-4

### ROOST TREE DATA

Roost tree species: Carya ovata dbh: 30 cm  
Estimated height from ground to roost: 20 (meters) Tree height 40 (meters)  
Exfoliating bark (%): 30 Distance from capture site: 1 m or km (circle one)  
Tree health: ☒ Live ☐ Dead ☐ Partial  
Observed roost potential: ☒ Exfoliating Bark ☐ Cracks/crevasses ☐ Hollow ☐ Unknown  
Bat vocalizations: ☐ Yes ☒ No  
Guano on ground/foliage: ☐ Yes ☒ No  
Is guano fresh (if present)?: ☐ Yes ☒ No  
Guano volume (if present): \_\_\_\_\_

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh) \_\_\_\_\_  
Subdominant Canopy Species (< 40 cm/16" dbh) Carya ovata

Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_ Estimated dbh range (cm): Lg: 30 Sm: 10  
Estimated canopy closure at roost: \_\_\_\_\_ %  
Slope: ☐ Steep ☐ Moderate ☐ Slight ☒ None Slope aspect: \_\_\_\_\_  
Subcanopy Clutter: ☐ Closed ☐ Moderate ☐ Open  
Distance to nearest water source: 300 m or km (circle one) Distance to nearest flight corridor: 2 meters

Habitat Description: \_\_\_\_\_

### Check all that apply:

<input type="checkbox"/> Mature Upland Forest	<input type="checkbox"/> Recently Logged Forest	<input checked="" type="checkbox"/> Crop/Pasture Land	<input type="checkbox"/> Shrub/scrub Swamp
<input type="checkbox"/> Young Upland Forest	<input type="checkbox"/> Pine Plantation	<input type="checkbox"/> Stream/River	<input type="checkbox"/> Vernal Pool
<input type="checkbox"/> Mature Lowland Forest	<input checked="" type="checkbox"/> Woodlot/Forest Edge	<input type="checkbox"/> Emergent Wetland	<input type="checkbox"/> Deepwater Lake/Pond
<input type="checkbox"/> Young Lowland Forest	<input type="checkbox"/> Old Field	<input type="checkbox"/> Forested Swamp	<input type="checkbox"/> Other _____

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





## ROOST TREE DATA (continued)

Page \_\_\_\_ of \_\_\_\_

State/County: OH / Seneca

Project Name/#: 340

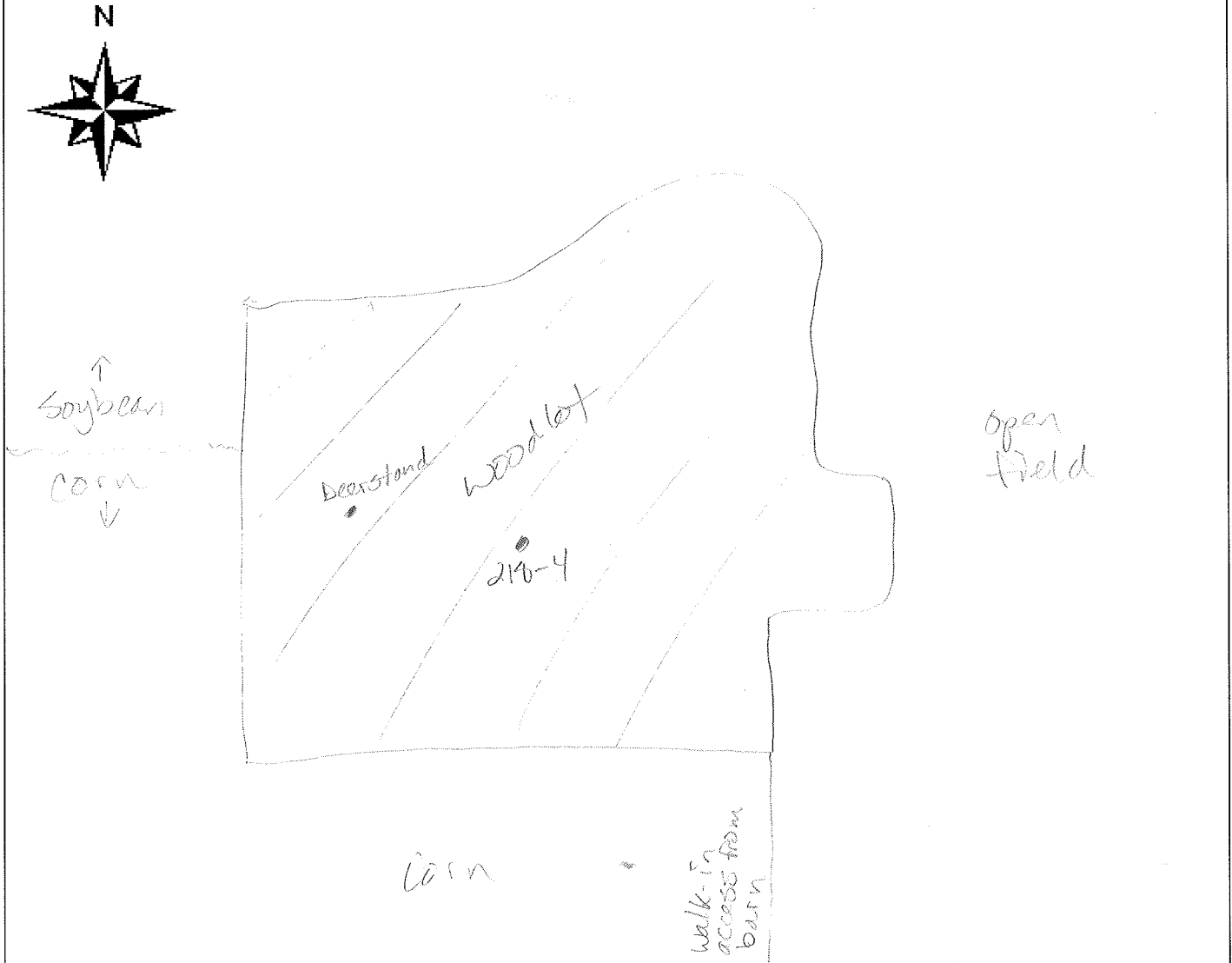
Date: 24 Jul 11

Frequency: 172.218

Roost Name/#: 210-4

Initials: JS

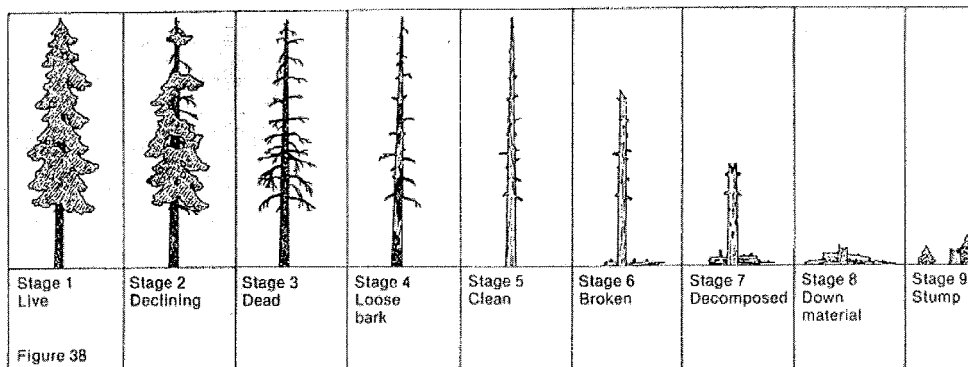
### Sketch: Roost Tree Habitat



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

### Sketch: Roost Tree

#### Stages of Decay:





## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 28 Jul-11 Biologists: M. F. Miller

Project Name: Republic State: OH County: Seneca

GPS Unit #: A5 Waypoint: \_\_\_\_\_

Latitude: 41° 13' 08.6" N Longitude: 82° 56' 37.7" W

Roost Name/#: 4

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Myotis grisescens Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: \_\_\_\_\_ Capture site: \_\_\_\_\_ Frequency: 2/8

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2115 Departure time: 2145 Total Bats: 4

Emergence Time	Number of Bats	Emergence Aspect
<u>2212</u>	<u>2</u>	
<u>2215</u>	<u>1</u>	
<u>2218</u>	<u>1</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Bats loitered and perched for some time  
near and around the roost.



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 29-Jul-11 Biologists: M. Flynn

Project Name: Republic State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-4

Latitude: 41° 13' 09.6" N Longitude: 82° 56' 33.7" W

Roost Name/#: 218-4

Radio-tagged bat present in tree: Yes ☐ No ☒

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 24-Jul-11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2030 Departure time: 2125 Total Bats: 1

Emergence Time	Number of Bats	Emergence Aspect
<u>2110</u>	<u>1</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

---

---

---



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 30-July-2011 Biologists: M. Farmer

Project Name: Republic State: OH County: Seneca

GPS Unit #: A5 Waypoint: 214-4

Latitude: 41° 13' 08.6" N Longitude: 82° 56' 33.7" W

Roost Name/#: 4

Radio-tagged bat present in tree: Yes \_\_\_\_ No X

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 24-Jul-11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2055 Departure time: 2140 Total Bats: 0

Emergence Time	Number of Bats	Emergence Aspect
<u>0</u>		

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

No bats leaving roost, although previously (previous night)  
several bats foraged circling the roost area for approx. 15  
minutes



## ROOST TREE DATA

Project #: 340 Date: 29-Jul-11 Biologists: S. Captain & M. Farmer

Project Name: Tetratich Republic State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-5 Camera #: 4834 Picture #: 104-3842, 3844

Latitude: 41° 12' 38.6"N Longitude: 82° 57' 03.8"W

Bat Species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture Date: 24-Jul-11 Capture Site: 16

Frequency: 172, 218 Roost Name/#: 218-5

### ROOST TREE DATA

Roost tree species: Carya ovata dbh: 40 cm

Estimated height from ground to roost: 35 (meters) Tree height 40 (meters)

Exfoliating bark (%): 40 Distance from capture site: 100 m or km (circle one)

Tree health: ☒ Live ☐ Dead ☐ Partial

Observed roost potential: ☒ Exfoliating Bark ☐ Cracks/crevasses ☐ Hollow ☐ Unknown

Bat vocalizations: ☐ Yes ☒ No

Guano on ground/foliage: ☐ Yes ☒ No

Is guano fresh (if present)?: ☐ Yes ☒ No

Guano volume (if present): \_\_\_\_\_

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

Carya ovata

Subdominant Canopy Species (< 40 cm/16" dbh)

Carya ovata

Acer saccharum

Populus deltoides

Estimated dbh range (cm): Lg: 40 Sm: 40

Estimated dbh range (cm): Lg: 35 Sm: 10

Estimated canopy closure at roost: 25 %

Slope: ☐ Steep ☐ Moderate ☐ Slight ☒ None Slope aspect: \_\_\_\_\_

Subcanopy Clutter: ☐ Closed ☒ Moderate ☐ Open

Distance to nearest water source: 25 m or km (circle one) Distance to nearest flight corridor: 2 meters

Habitat Description: Deciduous woodlot between two houses. Near edge of lawn w/ a pond.

### Check all that apply:

☐ Mature Upland Forest ☐ Recently Logged Forest ☐ Crop/Pasture Land ☐ Shrub/scrub Swamp  
☐ Young Upland Forest ☐ Pine Plantation ☐ Stream/River ☐ Vernal Pool  
☐ Mature Lowland Forest ☒ Woodlot/Forest Edge ☐ Emergent Wetland ☐ Deepwater Lake/Pond  
☐ Young Lowland Forest ☐ Old Field ☐ Forested Swamp ☒ Other decorative pond w/ fountain

Comments:



## ROOST TREE DATA (continued)

Page 2 of 2

State/County: OH / Seneca

Project Name/#: Totat-tech

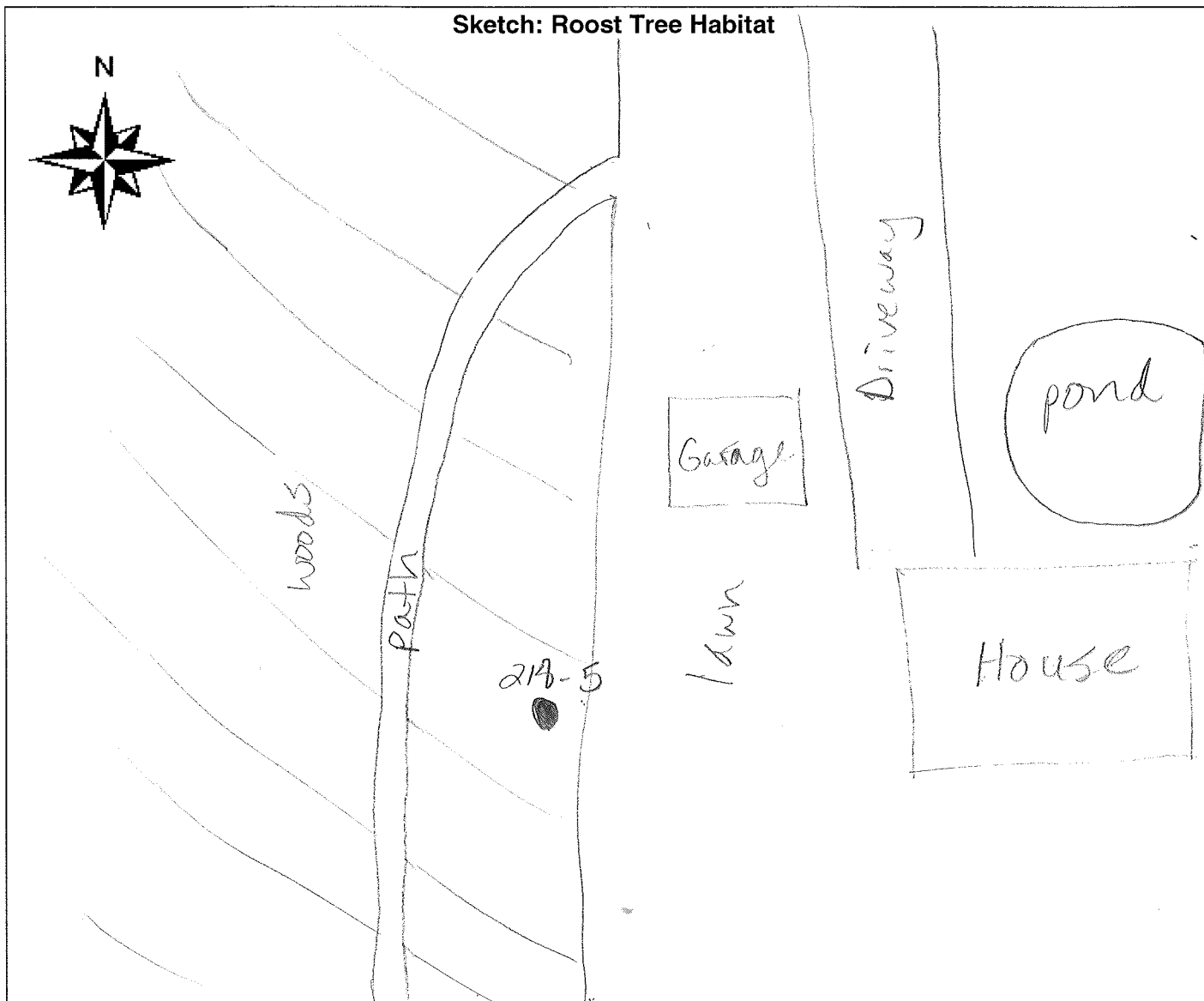
Date: 29-Jul-11

Frequency: 172, 214

Roost Name/#: 218-5

Initials: SC

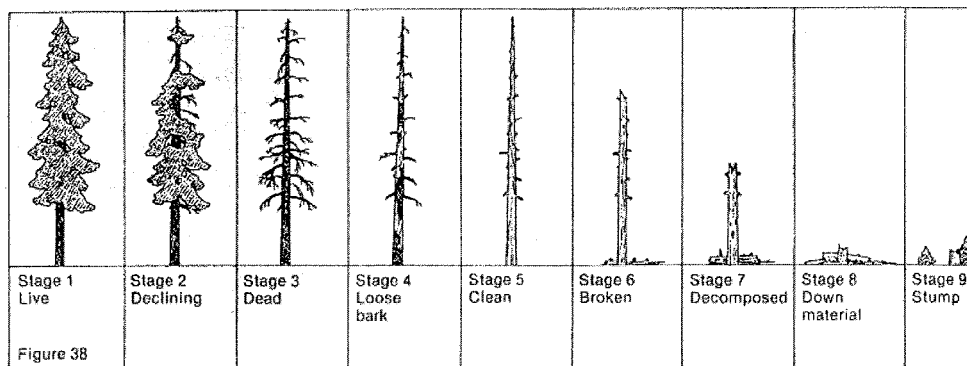
Sketch: Roost Tree Habitat



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

Sketch: Roost Tree

### Stages of Decay:





## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 29-Jul-11 Biologists: S. Captain

Project Name: Tetatech Republic State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-5

Latitude: 41° 12' 38.6" N Longitude: 82° 57' 53.8" W

Roost Name/#: 218-5

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 21-Jul-11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2025 Departure time: 2100 Total Bats: 1

Emergence Time	Number of Bats	Emergence Aspect
<u>2053</u>	<u>1</u>	<u>NW</u>

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

Did not see exact spot on tree where she emerged.



## ROOST TREE DATA

Project #: 340 Date: 30-Jul-11 Biologists: S. Captain

Project Name: Tetatech Republic State: OH County: Seneca

GPS Unit #: A7 Waypoint: 218-6 Camera #: 4834 Picture #: 104-3846, 3847

Latitude: 41° 13' 17.9"N Longitude: 82° 56' 33.6"W

Bat Species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture Date: 24-Jul-11 Capture Site: 16

Frequency: 172.218 Roost Name/#: 218-6

### ROOST TREE DATA

Roost tree species: Carya ovata dbh: 20 cm

Estimated height from ground to roost: 15 (meters) Tree height 30 (meters)

Exfoliating bark (%): 30 Distance from capture site: 1 m or km (circle one)

Tree health: ☒ Live ☐ Dead ☐ Partial

Observed roost potential: ☒ Exfoliating Bark ☐ Cracks/crevasses ☐ Hollow ☐ Unknown

Bat vocalizations: ☐ Yes ☒ No

Guano on ground/foliage: ☐ Yes ☒ No

Is guano fresh (if present)?: ☐ Yes ☒ No

Guano volume (if present): \_\_\_\_\_

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

Quercus rubra

\_\_\_\_\_

\_\_\_\_\_

Subdominant Canopy Species (< 40 cm/16" dbh)

Carya ovata Prunus virginiana

Quercus alba

\_\_\_\_\_

Populus grandidentata

Estimated dbh range (cm): Lg: 40 Sm: 40

Estimated dbh range (cm): Lg: 35 Sm: 10

Estimated canopy closure at roost: 75 %

Slope: ☐ Steep ☐ Moderate ☐ Slight ☒ None Slope aspect: \_\_\_\_\_

Subcanopy Clutter: ☒ Closed ☐ Moderate ☐ Open

Distance to nearest water source: 200 m or km (circle one) Distance to nearest flight corridor: 1 meters

Habitat Description: Deciduous forest w/ a trav-trail, slightly less disturbed than rest of woodlot

### Check all that apply:

☐ Mature Upland Forest ☐ Recently Logged Forest ☐ Crop/Pasture Land ☐ Shrub/scrub Swamp

☐ Young Upland Forest ☐ Pine Plantation ☐ Stream/River ☐ Vernal Pool

☐ Mature Lowland Forest ☒ Woodlot/Forest Edge ☐ Emergent Wetland ☐ Deepwater Lake/Pond

☐ Young Lowland Forest ☒ Old Field ☐ Forested Swamp ☐ Other \_\_\_\_\_

Comments:





## ROOST TREE DATA (continued)

Page 2 of 2

State/County: OH / Seneca

Project Name/ #: Tetatech

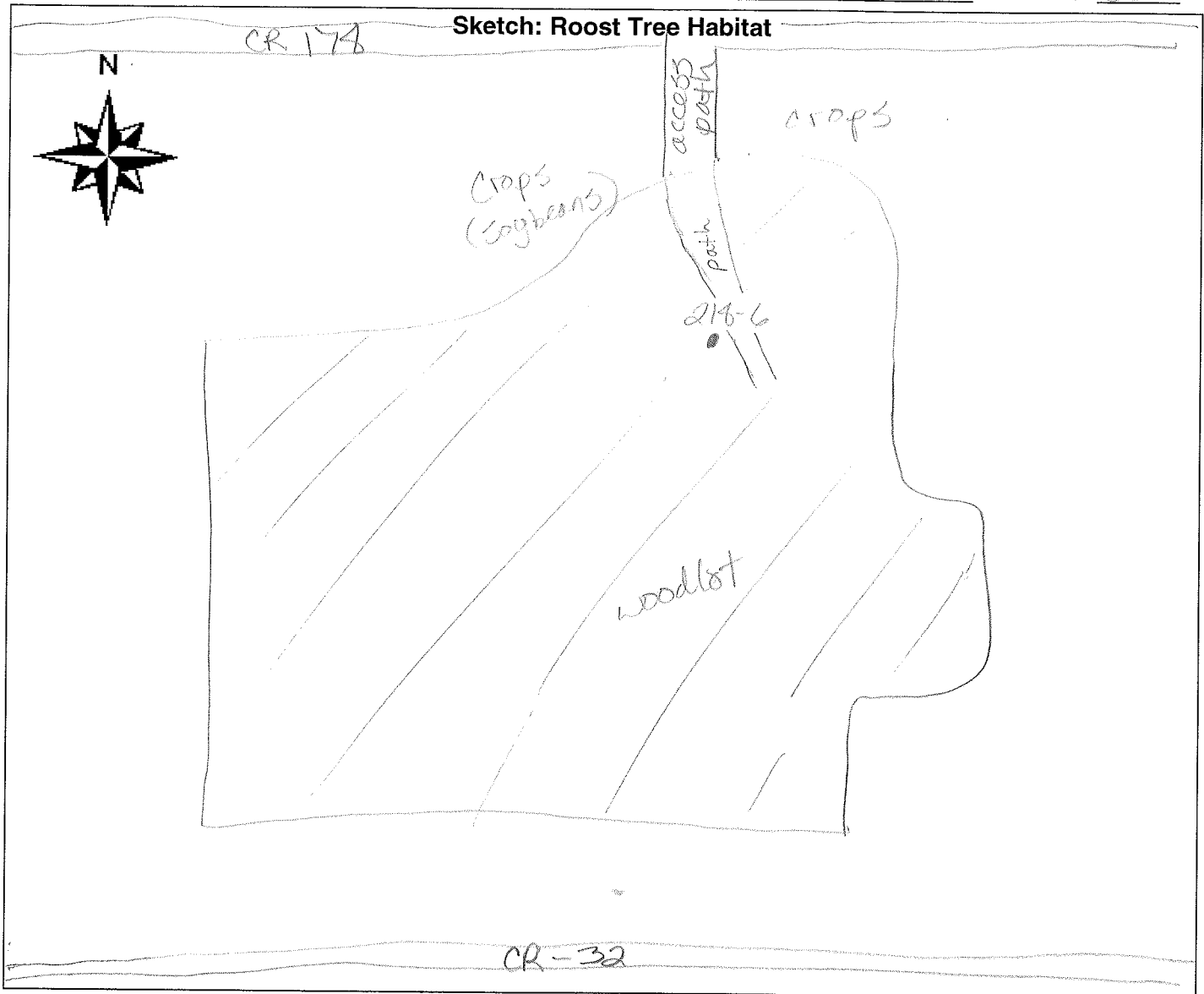
Date: 30 Jul-11

Frequency: 72.219

Roost Name/ #: 218-6

Initials: SC

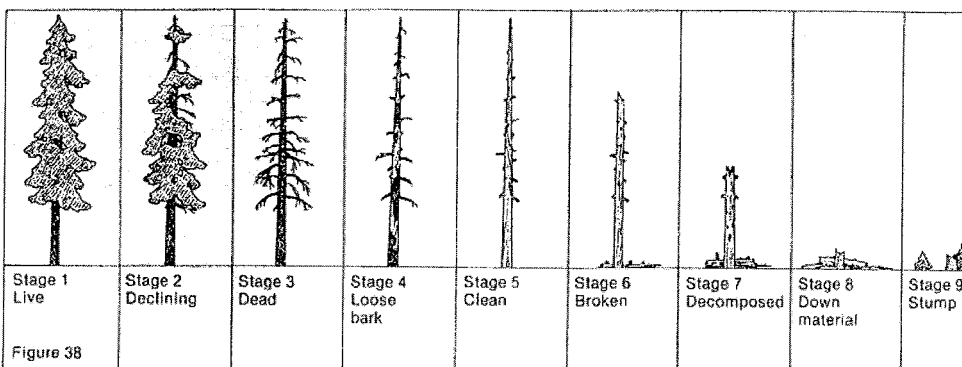
### Sketch: Roost Tree Habitat



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

### Sketch: Roost Tree

#### Stages of Decay:





## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 30 Jul 11 Biologists: S. Captain

Project Name: Republic State: OH County: Seneca

GPS Unit #: A7 Waypoint: 219-6

Latitude: 41° 13' 17.9" N Longitude: 82° 56' 33.6" W

Roost Name/#: 219-6

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 24 Jul 11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2030 Departure time: 2220 Total Bats: 3

Emergence Time	Number of Bats	Emergence Aspect
<u>2059</u>	<u>3</u>	<u>unknown</u>

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Bats circled tree overhead, not seen coming out of  
tree directly





## ROOST TREE EMERGENCE DATA

Project #: 340.0 Date: 2 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Seneca

GPS Unit #: \_\_\_\_\_ Waypoint: \_\_\_\_\_

Latitude: 41 ° 13 ' 17.9 "N Longitude: 82 ° 56 ' 33.6 "W

Roost Name/#: 218-6

Radio-tagged bat present in tree: Yes \_\_\_\_\_ No \_\_\_\_\_ UNK ✓

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: M. sodalis Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 24 Jul 11 Capture site: 16 Frequency: 172.218

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2030 Departure time: 2130 Total Bats: 7

Emergence Time	Number of Bats	Emergence Aspect
<u>2104</u>	<u>1</u>	<u>E</u>
<u>2111</u>	<u>1</u>	<u>E</u>
<u>2113</u>	<u>1</u>	<u>E</u>
<u>2115</u>	<u>1</u>	
<u>2117</u>	<u>2</u>	<u>1 circle</u>
<u>2119</u>	<u>0</u>	
<u>2121</u>	<u>0</u>	
<u>2123</u>	<u>1</u>	
<u>2125</u>	<u>1</u>	<u>N</u>
<u>2127</u>		
<u>2129</u>		
<u>2131</u>		
<u>2133</u>		

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Bats flew at 15, 21, 25, mostly flew East  
Tx bat no longer tagged - emergence unknown





## FIXED TELEMETRY DATA

Project #: 340.01 Date: 25 Jul 11 Biologists: M Flynn

Project Name: Republic State: OH County: Seneca

USGS Quad: \_\_\_\_\_ GPS Unit #: 465570 Waypoint: 019

Bat Species: Myotis sodalis

Transmitter Frequency: 172.218

Comments:

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
Firehouse	41° 12' 46.0"	82° 58' 31.1"	172.218	9:30	—	no signal
				9:35	—	
				9:40	—	
				9:45	—	
				9:50	—	
				9:55	—	
				10:00	—	
				10:05	—	
				10:10	—	
				10:15	—	
				10:20	—	
				10:25	—	
				10:30	—	
				10:35	—	travel
				10:40	—	travel
				10:45	—	travel
SC	41 11 17.2	82 58 31.6	172.218	10:50	91°	new location
				10:55	112°	
				11:00	126°	
				11:05	—	no more!
				11:10	—	" "
				11:15	—	" "
				11:20	120°	
				11:25	118°	
				11:30	120°	
				11:35	—	no signal
				11:40	—	
				11:45	104°	
				11:50	104°	



## FIXED TELEMETRY DATA (continued)

Project #: 340.61 Date: 25JUL State: OH County: Seneca Initials: ME

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
				12:55	1190	1150
				12:55	—	no signal
				12:55	—	"
				12:50	1170	1040
				12:15	—	no signal
				12:20	—	"
				2:25	1080	1020
				12:30	800	900
				12:35	1130	1180
				12:40	—	no signal
				12:45	—	"
				12:50	1280	
				12:55	1280	
				1:00	1260	
				1:05	—	no signal
				1:10	—	"
				1:15	—	"
				1:20	1340	
				1:25	1290	
				1:30	—	no signal
				1:35	—	"
				1:40	—	"
				1:45	—	"
				1:50	—	"
				1:55	—	"
				2:00	—	"
				2:05	1340	
				2:10	—	no signal
				2:15	—	"
				2:20	—	"
				2:25	—	"
				2:30	—	"

## FIXED TELEMETRY DATA

Project #: 340 Date: 25-Jul-11 Biologists: M. Farmer

Project Name: Tetratex State: OH County: Sevier

USGS Quad: \_\_\_\_\_ GPS Unit #: A7 Waypoint: MSF

**Bat Species:** *M. sodalis*

**Transmitter Frequency:** 172.218

**Comments:**

Continued  
1 from flip side

[illegible]





## FIXED TELEMETRY DATA (continued)

Project #: 340 Date: 25 Jul State: OH County: Seneca Initials: MF

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
	41°13'36.9"	82°56'10.9"		2130		
				2135	79	
				2140	42	
				2145	91.5	
				2150	60.0	
				2155	26	
				2200	90.0	
				2205	81°	
				2210	45	
				2215	60	
				2220	62	
				2225	30	
				2230	61	
				2235	40	
				2240		
				2245	44°	
				2250	25°	
				2255	52	
				2300	62	
				2305	66	
				2310	80	
			*	2315	270	
				2320	240.5°	
				2325	233	
				2330		
				2335	249	
				2340	222	
				2345	220	
				2350	260	
				2355	252	
				0000	238	(Rain signal)
				0005	305	(Very faint)
				0010	279	signal
				0015	161.5°	
				0020		20 ft high overhead
				0025	Due South	
				0030	200°	
				0035		
				0040	274°	



## FIXED TELEMETRY DATA

Project #: 340.82 Date: 28 July 2011 Biologists: S Reeves  
Project Name: Tetrahedral Republic State: OH County: Seneca  
USGS Quad: FireSide GPS Unit #: E9528 Waypoint: 017  
Bat Species: Myotis sodalis

Transmitter Frequency: 172.2181

Comments: Interference - from machinery possibly at J Miller Barn

Station #	Latitude N	Longitude W	Frequency	Time (0000h)	Azimuth	Comments
J Miller Barn	41° 11' 55.0" N	82° 56' 53.9"	172.2181	2100	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	2140	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	2345	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	2350	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0000	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0005	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0010	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0015	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0020	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0025	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0030	—	No signal
J Miller Barn	41° 11' 55.0"	82° 56' 53.9"	172.2181	0035	—	No signal
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0055	350°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0100	24°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0105	352°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0110	—	No signal
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0115	—	No signal
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0120	318°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0125	343°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0130	359°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0135	340°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0140	0°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0145	—	No signal
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0150	3°	—
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0155	—	No signal
32/79	41° 12' 43.5"	82° 56' 14.2"	172.2181	0200	25°	—

## FIXED TELEMETRY DATA

Project #: 340.01 Date: 26 Jul 11 Biologists: M Flynn

**Project Name:** Republic **State:** OH **County:** Seneca

USGS Quad: \_\_\_\_\_ GPS Unit #: \_\_\_\_\_ Waypoint: ME

**Bat Species:** Myotis sodalis

**Transmitter Frequency:** 172.218

**Comments:**

[illegible]



## FIXED TELEMETRY DATA

Page 1 of 2

Project #: 340 Date: 26-Jul-11 Biologists: S. Captain

Project Name: Tetratech State: OH County: Seneca

USGS Quad: \_\_\_\_\_ GPS Unit #: A5 Waypoint: \_\_\_\_\_

Bat Species: M. sodalis

Transmitter Frequency: 172.218

Comments: 40 ft Emerson Creek bridge, near 1A

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
<u>503</u>	<u>41°13'15.1</u>	<u>82°55'04.4</u>	<u>218</u>	<u>2225</u>	<u>292</u>	
				<u>2230</u>	<u>—</u>	
				<u>2235</u>	<u>262</u>	
				<u>2240</u>	<u>338</u>	
				<u>2245</u>	<u>310</u>	
				<u>2250</u>	<u>—</u>	
				<u>2255</u>	<u>—</u>	
				<u>2300</u>	<u>319</u>	
				<u>2305</u>	<u>284</u>	
				<u>2310</u>	<u>265</u>	
				<u>2315</u>	<u>261</u>	
				<u>2320</u>	<u>266</u>	
				<u>2325</u>	<u>91</u>	<u>faint</u>
				<u>2330</u>	<u>299</u>	
				<u>2335</u>	<u>295</u>	
				<u>2340</u>	<u>261</u>	
				<u>2345</u>	<u>282</u>	<u>faint</u>
				<u>2350</u>	<u>—</u>	
				<u>2355</u>	<u>—</u>	
				<u>0000</u>	<u>320</u>	
				<u>0005</u>	<u>291</u>	
				<u>0010</u>	<u>279</u>	
				<u>0015</u>	<u>—</u>	
				<u>0020</u>	<u>271</u>	<u>faint</u>
				<u>0025</u>	<u>309</u>	
				<u>0030</u>	<u>300</u>	
				<u>0035</u>	<u>271</u>	
				<u>0040</u>	<u>280</u>	
				<u>0045</u>	<u>275</u>	



## FIXED TELEMETRY DATA

Page 1 of 2

Project #: 3410.02 Date: 26 July 2011 Biologists: S. Reeves  
Project Name: Tatech Republic State: OH County: Seneca  
USGS Quad: F10846 GPS Unit #: F10846 Waypoint: 32-79  
Bat Species: Myotis sodalis

Transmitter Frequency: 172.2181

Comments: N/A

Station #	Latitude N	Longitude W	Frequency	Time (0000h)	Azimuth	Comments
32-79	41° 12' 43.5"	82° 58' 14.2"	172.2181	2200	32.7°	Moving to New Location
				2205		Moving to New Location
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2210		
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2215	92°	
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2220	48°	
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2225	93°	
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2230	118°	
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2235		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2240	91°	
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2245	53°	
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2250		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2255		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2300		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2305		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2310		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2315		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2320		No signal
Unavail	41° 12' 45"	82° 58' 14"	172.2181	2325		No signal
				2330		Moving to New Location
				2335		Moving to New Location
				2340		Moving to New Location
				2345		Moving to New Location
				2350		Moving to New Location
				2355		Moving to New Location
				0000		Moving to New Location
				0005		Moving to New Location
				0010		Moving to New Location
				0015		Moving to New Location
				0020		Moving to New Location



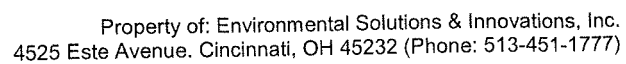


## FIXED TELEMETRY DATA

Page \_\_\_ of \_\_\_

Project #: 340.01 Date: 26 Jul 2011 Biologists: J Basiger, M. Farmer  
Project Name: Tetratech State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: \_\_\_\_\_ Waypoint: 20  
Bat Species: Myotis sodalis (on GPS # 465670)  
Transmitter Frequency: 172.218  
Comments: \_\_\_\_\_

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
			<u>172.218</u>	2205	243°	
				2210	199°	
				2215	224°	
				2220	225°	
				2225	211°	
				2230	250°	
				2235	220°	
				2240	235°	
				2245	235°	
				2250	235°	
				2255	180°	
				2300	122°	
				2305	—	
				2310	—	
				2315	—	
				2320	—	
				2325	89°	
				2330	131°	
				2335	—	
				2340	170°	
				2345	153°	
				2350	141°	
				2355	147°	
				0000	211°	
				0005	200°	
				0010	242°	
				0015	—	
				0020	140°	
				0025	158°	



### FIXED TELEMETRY DATA (continued)

**Project #:**\_\_\_\_\_ **Date:**\_\_\_\_\_ **State:**\_\_\_\_\_ **County:**\_\_\_\_\_ **Initials:**\_\_\_\_\_

[illegible]





## FIXED TELEMETRY DATA

Project #: 340 Date: 27 Jul Biologists: J Basiger, M Farmer  
Project Name: 761 atech State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: A7 Waypoint: \_\_\_\_\_  
Bat Species: M. sodalis

Transmitter Frequency: 172.218

Comments: 76 + 178 in Garage driveway

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
			172.2180	2250	161°	
			↓	2255	156°	
			↓	2300	220°	
			↓	2305	220°	
				2310	—	
				2315	191°	
				2320	160°	
				2325	211°	
				2330	210°	
				2335	210°	
				2340	—	
				2345	210°	checked with the others to see if she was moving at all. They said she was
				2350	210°	
				2355	180°	
				0000	160°	
				0005	210°	
				0010	180°	
				0015	160°	
				0020	180°	
				0025	208°	
				0030	200°	
				0035	160°	
				0040	197°	
				0045	—	
				0050	176°	
				0055	168°	
				0100	170°	
				0105	215°	
				0110	—	

Project #: \_\_\_\_\_ Date: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_ Initials: \_\_\_\_\_

[illegible]



## FIXED TELEMETRY DATA

Project #: 340 Date: 27 July '11 Biologists: E. Basiger; A. Kleinhenz  
Project Name: Republic Wind State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: Erin Waypoint: N/A  
Bat Species: M. sodalis  
Transmitter Frequency: 172.219  
Comments: \_\_\_\_\_

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
1	41° 12' 44.2"	82° 56' 28.8"	172.219	2225	22	Good signal strength
	⊥	⊥		2230	10	
				2235	341	
2	41 12' 44.0	82° 56' 29.5		2240	1	
				2245	25	
				2250	29	
				2255	14	
				2300	2	
				2305	18	
				2310	<del>18</del>	missed due to visitor/land owner
				2315	359	
				2320	40	
				2325	354	
				2330	14	
				2335	19	
				2340	11	
				2345	2	
				2350	18	
				2355	18	
				2400	18	
				2405	28	
				2410	35	
				2415	30	
				2420	32	
				2425	46	
				2430	50	
				2435	55	
				2440	23	
				2445	55	





## FIXED TELEMETRY DATA

Page \_\_\_ of \_\_\_

Project #: 345.01 Date: 27 Jul 11 Biologists: PI Flynn

Project Name: Republic State: OH County: Seneca

USGS Quad: \_\_\_\_\_ GPS Unit #: \_\_\_\_\_ Waypoint: MMF

Bat Species: Myotis sodalis

Transmitter Frequency: 172.218

Comments:

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
MMF			172.217	22:30	58°	
				22:35	56°	
				22:40	56°	
				22:50	56°	
				22:55	56°	
				23:05	45°	
				23:26	45°	
				23:25	80°	
				23:30	80°	
				23:33	66°	
				23:40	56°	
MMF2	41°13'17.7"	82°55'04.4"		0045	260°	
				0050	260°	
				0055	270°	
				0100	265°	
				0105	268°	
				0115	268°	
				0115	284°	
				0120	260°	
				0125	300°	
				0130	272°	
				0135	272°	
				02:05	260°	
				02:15	290°	
				02:20	252°	
				02:30	280°	



## FIXED TELEMETRY DATA

Page 1 of 2

Project #: 340 Date: 27-Jul-11 Biologists: S. Captain

Project Name: Tetratich State: OH County: Seneca

USGS Quad: \_\_\_\_\_ GPS Unit #: A7 Waypoint: \_\_\_\_\_

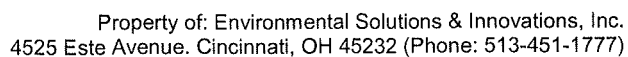
Bat Species: M. sodalis

Transmitter Frequency: 172.218

Comments: 7A near Emerson Creek bridge (SC4)

SC5: 172.218

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
SC4	41°14'02.8	82°57'23	218	2300	99	
				2305	—	
				2310	—	
				2315	—	
				2320	—	
				2325	—	
SC5	41°13'36.0	82°57'23.3	218	2340	139	
				2345	—	
				2350	120	Faint
				2355	116	
				0000	152	
				0005	105	
				0010	132	
				0015	123	
				0020	129	
				0025	126	
				0030	—	
				0035	—	
				0040	126	
				0045	121	
				0050	116	
				0055	130	
				0100	119	
				0105	117	
				0110	—	
				0115	—	
				0120	—	
				0125	—	
				0130	—	



### FIXED TELEMETRY DATA (continued)

Project #: 340 Date: 27-Jul-11 State: OH County: Seneca Initials: SC

[illegible]



## FIXED TELEMETRY DATA

Page \_\_\_ of \_\_\_

Project #: 340.01 Date: 28 Jul 11 Biologists: M. Flynn

Project Name: Republic State: OH County: Seneca

USGS Quad: \_\_\_\_\_ GPS Unit #: \_\_\_\_\_ Waypoint: \_\_\_\_\_

Bat Species: Myotis sodalis

Transmitter Frequency: 172.218

Comments:

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
			172.218	2230	20°	
				2235	36°	
				2240	350	
				2245	3480	
				2250	3460	
				2255	0°	
				2300	354°	
				2305	3550	
				2310	320°	
				2320	18°	
				2325	20°	
				2330	20°	
				2335	32°	
				2340	8°	
				2345	30°	
				2350	6°	
				2355	6°	
				0000	20°	
				0005	12°	
				0010	12°	
				0015	20°	
				0025	354°	
				0030	18°	
				0035	25°	
				0040	0°	
				0045	12°	
				0050	12°	
				0055	12°	
				0100	3480	







## FIXED TELEMETRY DATA

Project #: 340 Date: 26 Oct-11 Biologists: S. Captain  
Project Name: Tetradleech State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: A7 Waypoint: 5C6  
Bat Species: M. sodalis

Transmitter Frequency: 172.218

Comments: 178 d 78

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
5C6	41°13'36.9	82°57'20.7	218	2245	159	
				2250	151	
				2255	162	Faint
				2300	165	
				2305	150	
				2310	164	
				2315	133	
				2320	129	
				2322	138	
				30	---	
				35	-	
				2340	101	
				2345	---	
				2350	124	
				2355	---	
				0000	---	
				0005	131	
				0010	140	
				0015	126	
				0020	122	
				0025	137	
				0030	131	
				0035	131	
				0040	131	Faint
				0045	139	
				0050	125	
				0055	128	
				0100	132	
				0105	---	





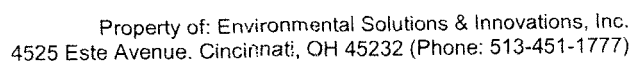
## FIXED TELEMETRY DATA

Project #: 340.01 Date: 28 Jul 11 Biologists: J. Basiger  
Project Name: Republic State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: ISI 119210 Waypoint: \_\_\_\_\_  
Bat Species: M. sodalis

Transmitter Frequency: 218

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

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
	<u>41° 13' 19.2"</u>	<u>82° 55' 26.6"</u>	<u>218</u>	<u>2300</u>	<u>100°</u>	
			<u>218</u>	<u>2305</u>	<u>72°</u>	
			<u>218</u>	<u>2310</u>	<u>24°</u>	
			<u>218</u>	<u>2315</u>	<u>24°</u>	
			<u>218</u>	<u>2320</u>	<u>19°</u>	
			<u>218</u>	<u>2325</u>	<u>41°</u>	
			<u>218</u>	<u>2330</u>	<u>38°</u>	
			<u>218</u>	<u>2335</u>	<u>72°</u>	
			<u>218</u>	<u>2340</u>	<u>27°</u>	
			<u>218</u>	<u>2345</u>	<u>72°</u>	
			<u>218</u>	<u>2350</u>	<u>59°</u>	
			<u>218</u>	<u>2355</u>	<u>41°</u>	
			<u>218</u>	<u>0000</u>	<u>39°</u>	
			<u>218</u>	<u>0005</u>	<u>36°</u>	
			<u>218</u>	<u>0010</u>	<u>24°</u>	
			<u>218</u>	<u>0015</u>	<u>17°</u>	
			<u>218</u>	<u>0020</u>	<u>20°</u>	
			<u>218</u>	<u>0025</u>	<u>38°</u>	
			<u>218</u>	<u>0030</u>	<u>43°</u>	
			<u>218</u>	<u>0035</u>	<u>23°</u>	
			<u>218</u>	<u>0040</u>	<u>119°</u>	
			<u>218</u>	<u>0045</u>	<u>80°</u>	
			<u>218</u>	<u>0050</u>	<u>358°</u>	
			<u>218</u>	<u>0055</u>	<u>138°</u>	
			<u>218</u>	<u>0100</u>	<u>138°</u>	
			<u>218</u>	<u>0105</u>	<u>89°</u>	
			<u>218</u>	<u>0110</u>	<u>120°</u>	
			<u>218</u>	<u>0115</u>	<u>—</u>	<u>No Signal</u>
			<u>218</u>	<u>0120</u>	<u>—</u>	<u>No Signal</u>



Project #: \_\_\_\_\_ Date: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_ Initials: \_\_\_\_\_

[illegible]



## FIXED TELEMETRY DATA

Project #: 7110 Date: 28 Jul 2011 Biologists: M. Forman  
Project Name: Tetratich State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: AS Waypoint: 20  
Bat Species: M. Sodalis on GPS # 465670

Transmitter Frequency: 172.218

Comments:

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
			7.812	2240	260°	
				2245	229°	
				2250	210°	2250 LMW
				2255	210°	2255 LMW
				2250	210°	2300 LMW
				2255	225°	2305 LMW
				2220	230°	2310 LMW
				2315	210°	
				2320	245°	
				2325	218°	
				2330	190°	
				2335	210°	
				2340	220°	
				2345	215°	
				2350	215°	
				2355	200°	
				0000	218°	
				0005	220°	
				0010	210°	
				0015	213°	
				0020	210°	
				0025	—	
				0030	210°	
				0035	210°	
				0040	210°	
				0045	190°	
				0050	200°	
				0055	—	
				0100	209°	

### FIXED TELEMETRY DATA (continued)

Project #: \_\_\_\_\_ Date: \_\_\_\_\_ State: \_\_\_\_\_ County: \_\_\_\_\_ Initials: \_\_\_\_\_

[illegible]



## FIXED TELEMETRY DATA

Project #: 312.51 Date: 12/20/07 Biologists: M. Fum  
Project Name: Republie State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: \_\_\_\_\_ Waypoint: \_\_\_\_\_  
Bat Species: H. sodalis

Transmitter Frequency: 172.218

Comments:

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
1?	41°12'43.16"	82°56'29.85"	172.218	20:00	250°	
				20:05	340°	
				20:10	90°	
				20:15	40°	
				20:20	30°	
				20:25	25°	
				20:30	20°	
				20:35	15°	
				20:40	10°	
				20:45	5°	
				20:50	0°	
				20:55	350°	
				21:00	300°	
				21:05	250°	
				21:10	200°	
				21:15	150°	
				21:20	100°	
				21:25	50°	
				21:30	0°	
				21:35	350°	
				21:40	300°	
				21:45	250°	
				21:50	200°	
				21:55	150°	
				22:00	100°	
				22:05	50°	
				22:10	0°	
				22:15	350°	
				22:20	300°	
				22:25	250°	
				22:30	200°	
				22:35	150°	
				22:40	100°	
				22:45	50°	
				22:50	0°	
				22:55	350°	
				23:00	300°	
				23:05	250°	
				23:10	200°	
				23:15	150°	
				23:20	100°	
				23:25	50°	
				23:30	0°	



01:40	50°
01:45	20°
01:50	60°
02:00	20°
02:10	20°
02:20	20°
02:30	20°
02:40	40°
02:50	10°



## FIXED TELEMETRY DATA

Project #: 340 Date: 29-Jul-11 Biologists: S. Captain  
Project Name: Tetratich State: OH County: Seneca  
USGS Quad: \_\_\_\_\_ GPS Unit #: A7 Waypoint: \_\_\_\_\_  
Bat Species: M. sodalis

Transmitter Frequency: 172.219

Comments: 18 at white barn, near 32

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
5C6				2245	—	
				2250	—	
				2255	—	
				2300	—	
5C7	41°12'51.0	82°55'36.3	216	2330	320	
				2335	314	
				2340	308	
				2345	307	
				2350	314	
				2355	320	
				0000	—	
				0005	—	
				0010	—	
				0015	301	
				0020	314	
				0025	—	
				0030	49	
				0035	18	
				0040	—	
				0045	50	
				0050	12	
				0055	32	
				0100	358	
				0105	348	
				0110	334	
				0115	335	
				0120	332	
				0125	324	
				0130	352	



Property of: Environmental Solutions & Innovations, Inc.  
4525 Este Avenue, Cincinnati, OH 45232 (Phone: 513-451-1777)

Page 2 of 2

### FIXED TELEMETRY DATA (continued)

Project #: 340 Date: 29-Jul-11 State: OH County: Seneca Initials: SC

[illegible]



## FIXED TELEMETRY DATA

Project #: 340.1 Date: 29 Jul Biologists: W. Farmer

Project Name: Tetrahatch State: OH County: Scheneca

USGS Quad:  GPS Unit #: AS Waypoint: 20

Bat Species: Myotis sodalis (on GPS# 465670)

Transmitter Frequency: 172.218

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

Station #	Latitude	Longitude	Frequency	Time (0000h)	Azimuth	Comments
MFI				2205	180	
				2200	180	
				2305	180	
				2310	170	
				2315	150	
				2320	270	
				2325	242	
				2330	242	
				2335	228	
				2340	230	
				2345	238	
				2350	205	
				2355	208	
				0000	220	
				0005	225	
				0010	230	
				0015		
				0020		
				0025	90°	
				0030		
				0035	10°	
				0040	125	
				0045	110	
				0050	109	
				0055	125	
				0100	185	
				0105	141	
				0110	120	
				0115	120	

## FIXED TELEMETRY DATA (continued)

[illegible]



## BAT TRANSMITTER DATA

Project #: 340.02 Date: 27 July 2011 Biologists: Akaiowski, Kleinhenz  
Project Name: Republic - Wind Site Name/#: 4  
State: OH County: Seneca Camera #: Can 671 (Jack)  
Picture #: 0918 - 0921  
Bat Species: E. fuscus Capture Time: 0140

Age Ad or Ju	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
Ju	M	NR	14.9	46

Transmitter weight = 0.35 grams

Frequency number: 172.122 (Best @ 172.121)

Transmitter + bat total weight = 15.0 grams

Band/color number: N/A

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Yes
- 2) Signal receiving (frequency): Yes
- 3) Band attachment (Y/N): No
- 4) Condition of animal: Healthy & active
- 5) Description of release: \_\_\_\_\_

RELEASE TIME: 0300 TOTAL HOLD TIME: 80 minutes

RELEASE LOCATION: Capture site

### COMMENTS:

ATS = 172.120  
Com Spec = 172.1206



Property of: Environmental Solutions & Innovations, Inc.  
781 Neeb Road, Cincinnati, OH 45233 (Phone: 513-451-1777)

## BAT TRANSMITTER DATA

Project #: 340 Date: 20 July 2011 Biologists: J. Basiger  
Project Name: Republic Site Name/#: 9  
State: OH County: Seneca Camera #: Cam 671  
Picture #: 879-881 Way pt. #016  
Bat Species: Eptesicus fuscus Capture Time: 2145

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
<u>Jv</u>	<u>F</u>	<u>NR</u>	<u>13.5</u>	<u>45</u>

Transmitter weight = 0.25 grams Frequency number: 172.239  
Transmitter + bat total weight = 13.75 grams Band/color number: \_\_\_\_\_

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Y
- 2) Signal receiving (frequency): 172.239
- 3) Band attachment (Y/N): N
- 4) Condition of animal: Good
- 5) Description of release: Normal

RELEASE TIME: 2230 TOTAL HOLD TIME: 41 minutes

RELEASE LOCATION: \_\_\_\_\_

### COMMENTS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Roost Pic 890-91



## BAT TRANSMITTER DATA

Project #: 340, 01 Date: July 30, 11 Biologists: Jack Basiger  
Project Name: Republic Site Name/#: 12  
State: Ohio County: Seneca Camera #: can671  
Picture #: 965-969  
Bat Species: fuscus Capture Time: 22:00

Age  
Ad or Jv

Ad

Sex  
M or F

F

Reproductive Condition  
F=(NR/PG/L/PL; M=↑/↓

PL

Wt  
(g)

18.5

RFA  
(mm)

47

Transmitter weight = 30 grams

Frequency number: 172.2250

Transmitter + bat total weight = 19 grams

Band/color number: —

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Yes  
2) Signal receiving (frequency): 172.2250  
3) Band attachment (Y/N): Yes  
4) Condition of animal: Great  
5) Description of release: fine

RELEASE TIME: 2250 TOTAL HOLD TIME: 50 minutes

RELEASE LOCATION: capture site

COMMENTS:





## BAT TRANSMITTER DATA

Project #: 340 Date: 24-Jul-11 Biologists: A. Kniewski  
Project Name: Republic Site Name/#: 14  
State: OH County: Sevier Camera #: \_\_\_\_\_  
Picture #: \_\_\_\_\_  
Bat Species: E. fuscus Capture Time: \_\_\_\_\_

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
Jv	F	NR	19.3	16

Transmitter weight = 35 grams Frequency number: 172.580  
Transmitter + bat total weight = \_\_\_\_\_ grams Band/color number: n/a

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): ✓
- 2) Signal receiving (frequency): ✓
- 3) Band attachment (Y/N): ✓
- 4) Condition of animal: good
- 5) Description of release: good

RELEASE TIME: 0100 TOTAL HOLD TIME: 30 minutes

RELEASE LOCATION: site 14

COMMENTS:



## BAT TRANSMITTER DATA

Project #: 340.02 Date: 22 July 2011 Biologists: D. Wofford, S. Reeves  
Project Name: Tetrotech Republic Site Name/#: Site 16  
State: OH County: Seneca Camera #: C4834  
Picture #: 3736 - 3737  
Bat Species: Eptesicus fuscus Capture Time: 2200

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
<u>Ad</u>	<u>F</u>	<u>L</u>	<u>19.1</u>	<u>45.2</u>

Transmitter weight = 0.2 grams Frequency number: 172.118  
Transmitter + bat total weight = 19.2 grams Band/color number: N/A

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Y
- 2) Signal receiving (frequency): 172.1172
- 3) Band attachment (Y/N): N
- 4) Condition of animal: healthy, excellent
- 5) Description of release: normal release

RELEASE TIME: 2300 TOTAL HOLD TIME: 60 minutes

RELEASE LOCATION: at capture location

### COMMENTS:

N/A



Property of: Environmental Solutions & Innovations, Inc.  
781 Neeb Road, Cincinnati, OH 45233 (Phone: 513-451-1777)

## BAT TRANSMITTER DATA

Project #: 340 Date: 19-Jul-11 Biologists: E. Basiger  
Project Name: Republic Site Name/#: 24  
State: OH County: Seneca Camera #: Can 671  
Picture #: \_\_\_\_\_  
Bat Species: E. fuscus Capture Time: 2150

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
<u>Jv</u>	<u>F</u>	<u>NR</u>	<u>15.7</u>	<u>48</u>

Transmitter weight = .35 grams Frequency number: 172.780  
Transmitter + bat total weight = 16.15 grams Band/color number: n/a

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): ✓
- 2) Signal receiving (frequency): ✓
- 3) Band attachment (Y/N): n
- 4) Condition of animal: good
- 5) Description of release: good

RELEASE TIME: 2200 TOTAL HOLD TIME: 30 minutes

RELEASE LOCATION: Site 24

### COMMENTS:

---

---

---

---

---



## BAT TRANSMITTER DATA

Project #: 340.01 Date: 15 Jul 2011 Biologists: J. Basiger + M. Flynn  
Project Name: Republic Site Name/#: 26  
State: OH County: Seneca Camera #: can 671  
Picture #: 832 - 835  
Bat Species: Eptesicus fuscus Capture Time: 2300

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
<u>Ad</u>	<u>F</u>	<u>PL</u>	<u>24.25</u>	<u>47</u>

Transmitter weight = 0.35 grams Frequency number: 172740  
Transmitter + bat total weight = 24.5 grams Band/color number: N/A

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Y
- 2) Signal receiving (frequency): Y com 172.7398
- 3) Band attachment (Y/N): N/A
- 4) Condition of animal: good
- 5) Description of release: normal

RELEASE TIME: 0600 TOTAL HOLD TIME: 60 minutes

RELEASE LOCATION: capture site

### COMMENTS:

---

---

---

---

---



## BAT TRANSMITTER DATA

Project #: 340.01 Date: 24 Jun 11 Biologists: J. Basiger  
Project Name: Republic Site Name/#: 30  
State: OH County: Seneca Camera #: Can 671

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

Bat Species: Eptesicus fuscus Capture Time: 2200

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
<u>Jv</u>	<u>F</u>	<u>NA</u>	<u>15.75</u>	<u>49</u>

Transmitter weight = 35 grams

Frequency number: 172.500

Transmitter + bat total weight = 16.10 grams

Band/color number:       

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Yes
- 2) Signal receiving (frequency): 172.4997
- 3) Band attachment (Y/N): N
- 4) Condition of animal: Good
- 5) Description of release: Normal

RELEASE TIME: 2230 TOTAL HOLD TIME: 30 minutes

RELEASE LOCATION: Capture site

COMMENTS:



## BAT TRANSMITTER DATA

Project #: 340.01 Date: 7/30/11 Biologists: A. Kniewski  
Project Name: popo611c Site Name/#: 32  
State: OH County: Seneca Camera #: 11  
Picture #: 0676 - 0682  
Bat Species: E. fuscus Capture Time: 2235

Age Ad or Jv	Sex M or F	Reproductive Condition F=(NR/PG/L/PL; M=↑/↓	Wt (g)	RFA (mm)
<u>Jv</u>	<u>F</u>	<u>NR</u>	<u>6.5</u>	<u>45</u>

Transmitter weight = 0.35 grams Frequency number: 172.950  
Transmitter + bat total weight = 16.7 grams Band/color number: —

### FINAL CHECK:

- 1) Transmitter attachment (Y/N): Y
- 2) Signal receiving (frequency): 172.950
- 3) Band attachment (Y/N): Y
- 4) Condition of animal: AK
- 5) Description of release: \_\_\_\_\_

RELEASE TIME: 2350 TOTAL HOLD TIME: 75 minutes

RELEASE LOCATION: cap location

### COMMENTS:

---

---

---

---

---



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 27 July 2011 Biologists: E. Boesiger; A. Kleinhenz

Project Name: Republic - Wild State: OH County: Serena

GPS Unit #: E9528 Waypoint: 617

Latitude: 41° 11' 55.0"N Longitude: 82° 56' 53.9"W

Roost Name/#: 118-1

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Ep. fuscus Sex(M/F): F Age(Ad/Jv): Ad Repro.: L

Capture date: 22 July '11 Capture site: 116 Frequency: 172.118

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2055 Departure time: 2138 Total Bats: 117

Emergence Time	Number of Bats	Emergence Aspect
2100	<u>0</u>	
2102	<u>0</u>	
2104	<u>0</u>	
2106	<u>2</u>	<u>W-NW</u>
2110	<u>0</u>	
2112	<u>7</u>	<u>N; S; W; E - All diff directions</u>
2114	<u>18</u>	<u>"</u>
2116	<u>19</u>	<u>"</u>
2118	<u>17</u>	<u>"</u>
2120	<u>27</u>	<u>"</u>
2122	<u>14</u>	<u>"</u>
2124	<u>9</u>	<u>N, E, S</u>
2126	<u>3</u>	<u>N, E</u>

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Transmitted Bat emerged @ 2116



## ROOST TREE EMERGENCE DATA

Project #: 3400.01 Date: 12 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Sonoma

GPS Unit #: E-9526 Waypoint: 017

Latitude: 41 ° 11 ' 55.0 "N Longitude: 82 ° 26 ' 53.1 "W

Roost Name/#: 118-1

Radio-tagged bat present in tree: Yes ☐ No ☒ Ty not heard

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): Ad Repro.: L

Capture date: 22 July 2011 Capture site: 16 Frequency: 172.1172

NOTE: Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2035 Departure time: 2125 Total Bats: 62

Emergence Time	Number of Bats	Emergence Aspect
<u>2045</u>	<u>1</u>	<u>W side of</u>
<u>2047</u>	<u>3</u>	<u>bank + South</u>
<u>2049</u>	<u>18</u>	<u>side</u>
<u>2051</u>	<u>3</u>	
<u>2053</u>	<u>6</u>	
<u>2055</u>	<u>4</u>	
<u>2057</u>	<u>12</u>	
<u>2059</u>	<u>5</u>	
<u>2101</u>	<u>6</u>	
<u>2103</u>	<u>2</u>	
<u>2105</u>	<u>1</u>	
<u>2107</u>	<u>1</u>	
<u>2109</u>	<u>0</u>	<u>2111-2119 = 0</u>

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

Most flew out, circled a few times  
then flew South. Tagged bat not heard





## ROOST TREE DATA

Project #: 340 Date: 31 Jul 11 Biologists: J. Basiger  
Project Name: Republic State: OH County: Seneca  
GPS Unit #: E51.7 Waypoint: N/A Camera #: 671 Picture #: 982-983  
Latitude: 41° 13' 39.0"N Longitude: 82° 57' 0.6"W  
Bat Species: E. Auscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NA  
Capture Date: 30 Jul 11 Capture Site: 12  
Frequency: 112.025 Roost Name/#: 205-1

### ROOST TREE DATA

Roost tree species: Bass dbh: \_\_\_\_\_ cm  
Estimated height from ground to roost: 7 (meters) Tree height \_\_\_\_\_ (meters)  
Exfoliating bark (%): \_\_\_\_\_ Distance from capture site: \_\_\_\_\_ m or km (circle one)  
Tree health: \_\_\_\_\_ Live \_\_\_\_\_ Dead \_\_\_\_\_ Partial  
Observed roost potential: \_\_\_\_\_ Exfoliating Bark \_\_\_\_\_ Cracks/crevasses \_\_\_\_\_ Hollow \_\_\_\_\_ Unknown  
Bat vocalizations: \_\_\_\_\_ Yes ✓ No  
Guano on ground/foliage: ✓ Yes \_\_\_\_\_ No  
Is guano fresh (if present)?: ✓ Yes \_\_\_\_\_ No  
Guano volume (if present): light

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Subdominant Canopy Species (< 40 cm/16" dbh)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_

Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_

Estimated canopy closure at roost: 0 %

Slope: \_\_\_\_\_ Steep \_\_\_\_\_ Moderate \_\_\_\_\_ Slight ✓ None Slope aspect: \_\_\_\_\_

Subcanopy Clutter: \_\_\_\_\_ Closed \_\_\_\_\_ Moderate ✓ Open

Distance to nearest water source: 300 m or km (circle one)

Distance to nearest flight corridor: 0 meters

Habitat Description: Large area of crop land

#### Check all that apply:

☐ Mature Upland Forest ☐ Recently Logged Forest ✓ Crop/Pasture Land ☐ Shrub/scrub Swamp  
☐ Young Upland Forest ☐ Pine Plantation ☐ Stream/River ☐ Vernal Pool  
☐ Mature Lowland Forest ☐ Woodlot/Forest Edge ☐ Emergent Wetland ☐ Deepwater Lake/Pond  
☐ Young Lowland Forest ☐ Old Field ☐ Forested Swamp ☐ Other \_\_\_\_\_

Comments:



## ROOST TREE EMERGENCE DATA

Project #: 346.01 Date: 31 Jul 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Summa

GPS Unit #: \_\_\_\_\_ Waypoint: \_\_\_\_\_

Latitude: 41 ° 13 ' 39.0 "N Longitude: 82 ° 57 ' 00.8 "W

Roost Name/#: 225-1

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 30 Sep 14 2011 Capture site: 12 Frequency: 172.225

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2030 Departure time: 2140 Total Bats: 36

Emergence Time	Number of Bats	Emergence Aspect
<u>2117</u>	<u>First emerge data</u>	<u>Peruse</u>
	<u>36 Total -</u>	
	<u>First day -</u>	
	<u>all tallied may</u>	
	<u>have missed some</u>	
<u>2125</u>	<u>Last bat emerged</u>	
<u>2135</u>	<u>Survey done</u>	
<u>I didn't know what I was doing.</u>		
<u>Way miscounted in</u>		

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Tx bat emerge 2125



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 3 Aug 11 Biologists: \_\_\_\_\_

Project Name: Republic State: OH County: Seneca

GPS Unit #: ESI-7 Waypoint: N/A

Latitude: 41° 3' 16" N Longitude: 82° 5' 16" W

Roost Name/#: 225-1

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: C. v. b. f. Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 30 July 2011 Capture site: 12 Frequency: 172.225

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2049 Departure time: 2100 Total Bats: 117

Emergence Time	Number of Bats	Emergence Aspect
2103	4	E
2107	14	E
2111	14	E
2114	22	E
2117	23	E
2118	16	E
2119	7	E
2119	12	E
2121	0	
2123	0	
2125	1	
2125	6	
2125	0	
2129 - 2235	0	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Transmitted bat emerged at 2125, flew E.  
Most of the bats emerged at 2125, 5-6, before flying off.



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 6/20/11 Biologists: Courtney L. Brown

Project Name: Republic State: OH County: Seneca

GPS Unit #: E91-7 Waypoint: N/A

Latitude: 41° 13' 31.0" N Longitude: 82° 33' 11" W

Roost Name/#: 225

Radio-tagged bat present in tree: Yes X No     

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): Ad Repro.: PC

Capture date: 30 July 2011 Capture site: 12 Frequency: 140.225

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2044 Departure time: 2145 Total Bats: 173

Emergence Time	Number of Bats	Emergence Aspect
21:02	2	NE / N
21:04	3	
21:06	4	
21:08	18	
21:10	20	
21:12	31	
21:13	34	S, SE
21:15	13	
21:16	14	NE
21:19	22	
21:21	11	
21:23	4	
21:25	3	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

21:13 - 1 bat emerged, flew off to the SE

Project #: 340.01  
Frequency: 7223

Project name: Republic  
Roost #: 225-1

[illegible]



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 5/24/2011 Biologists: W. J. Miller

Project Name: Republic State: OH County: Seneca

GPS Unit #: 670 Waypoint: N/A

Latitude: 41° 13' 39.0" N Longitude: 82° 57' 00.8" W

Roost Name/#: ZZS-1

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: E. fuscus Sex(M/F): F Age(Ad/Jv): Ad Repro.: PC

Capture date: 30 July 2011 Capture site: 12 Frequency: 172.215

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2045 Departure time: 2130 Total Bats: 169

Emergence Time	Number of Bats	Emergence Aspect
2056	3	
2058	1	
2100	7	
2102	24	
2104	24	
2106	30	
2108	29	
2110	16	
2112	17	
2114	7	
2116	7	
2118	0	2118-8
2120	1	2122-0-2124-0

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

2109 Tx bat emerged and flew NE  
majority flew out of E, total flew SE



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 1 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Shelby

GPS Unit #: ES7-7 Waypoint: N7A

Latitude: 41° 13' 39.0" N Longitude: 82° 57' 00.8" W

Roost Name/#: 225

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Myotis grisescens Sex(M/F): F Age(Ad/Jv): Ad Repro.: PL

Capture date: 30 July 2011 Capture site: 12 Frequency: 172.225

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2030 Departure time: 2140 Total Bats: 121

Emergence Time	Number of Bats	Emergence Aspect
2102	1	NE
2104	7	NE
2106	13	
2108	11	
2110	12	
2112	7	
2114	21	
2116	18	
2118	14	
2120	12	
2122	2	
2124	2	
2126	1	2127-2131: Overcast

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

2109 Tx bat left,



## ROOST TREE DATA

Project #: 340 Date: 7/25/11 Biologists: A. Knierstein, M. Farmer  
Project Name: Republic State: OH County: Sandusky  
GPS Unit #: 7 Waypoint: 340R14 Camera #: 11 Picture #: 0667  
Latitude: 41° 16' 19.6" N Longitude: 82° 54' 17.5" W  
Bat Species: E. fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NR  
Capture Date: 7/24/11 Capture Site: 14  
Frequency: 172.580 Roost Name/#: 580-1

### ROOST TREE DATA

Roost tree species: Barn dbh: \_\_\_\_ cm  
Estimated height from ground to roost: 20 (meters) Tree height \_\_\_\_ (meters)  
Exfoliating bark (%): \_\_\_\_ Distance from capture site: 6 m or km (circle one)  
Tree health: \_\_\_\_ Live \_\_\_\_ Dead \_\_\_\_ Partial  
Observed roost potential: \_\_\_\_ Exfoliating Bark \_\_\_\_ Cracks/crevasses \_\_\_\_ Hollow \_\_\_\_ Unknown  
Bat vocalizations: \_\_\_\_ Yes \_\_\_\_ No  
Guano on ground/foliage: \_\_\_\_ Yes \_\_\_\_ No  
Is guano fresh (if present)?: \_\_\_\_ Yes \_\_\_\_ No  
Guano volume (if present): UK

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)

Not in forest.

Subdominant Canopy Species (< 40 cm/16" dbh)

not in forest

Estimated dbh range (cm): Lg: \_\_\_\_ Sm: \_\_\_\_

Estimated dbh range (cm): Lg: \_\_\_\_ Sm: \_\_\_\_

Estimated canopy closure at roost: \_\_\_\_ %

Slope: \_\_\_\_ Steep \_\_\_\_ Moderate \_\_\_\_ Slight \_\_\_\_ None Slope aspect: \_\_\_\_

Subcanopy Clutter: \_\_\_\_ Closed \_\_\_\_ Moderate \_\_\_\_ Open

Distance to nearest water source: \_\_\_\_ m or km (circle one) Distance to nearest flight corridor: \_\_\_\_ meters

Habitat Description: Old farm - deserted minimal upkeep

#### Check all that apply:

<input type="checkbox"/> Mature Upland Forest	<input type="checkbox"/> Recently Logged Forest	<input checked="" type="checkbox"/> Crop/Pasture Land	<input type="checkbox"/> Shrub/scrub Swamp
<input type="checkbox"/> Young Upland Forest	<input type="checkbox"/> Pine Plantation	<input type="checkbox"/> Stream/River	<input type="checkbox"/> Vernal Pool
<input type="checkbox"/> Mature Lowland Forest	<input checked="" type="checkbox"/> Woodlot/Forest Edge	<input type="checkbox"/> Emergent Wetland	<input type="checkbox"/> Deepwater Lake/Pond
<input type="checkbox"/> Young Lowland Forest	<input checked="" type="checkbox"/> Old Field	<input type="checkbox"/> Forested Swamp	<input type="checkbox"/> Other ____

Comments:





## ROOST TREE EMERGENCE DATA

Project #: 3460-1 Date: 17 Aug Biologists: Laura Tyson

Project Name: Bobolink State: OH County: Sandusky

GPS Unit #: 7 Waypoint: 3460 R14

Latitude: 41° 16' 19.6" N Longitude: 82° 54' 17.5" W

Roost Name/#: 580-1

Radio-tagged bat present in tree: Yes ☐ No ☒ UNK-Tx 101, 102, 103

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: E. v. g. g. Sex(M/F): F Age(Ad/Jv): ADJ Repro.: NR

Capture date: 24 July 2011 Capture site: 14 Frequency: 10.580

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2028 Departure time: 2106 Total Bats: 23

Emergence Time	Number of Bats	Emergence Aspect
2036	12	Mostly North
38	6	silhouettes in sky
40	11 (6)	see above
42	11 (6)	
46	11 (3)	see above
48		
50		
52	11 (2)	
54	0	
56	0	
58	0	
2100	0	
2102	0	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Most emerged simultaneously, flew off in the same direction, loitered, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 18 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Sandusky

GPS Unit #: 7 Waypoint: 340 R 14

Latitude: 41° 16' 19.6"N Longitude: 82° 54' 17.5"W

Roost Name/#: 580-1

Radio-tagged bat present in tree: Yes      No      UNK - Tx not heard

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Myotis lucifugus Sex(M/F): F Age(Ad/Jv): JV Repro.: NR

Capture date: 24 July 2011 Capture site: 14 Frequency: 112.580

NOTE: Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2032 Departure time: 2102 Total Bats: 23

Emergence Time	Number of Bats	Emergence Aspect
<u>2036</u>	<u>/// (3)</u>	<u>1 emerged then went back into barn.</u>
	<u>/// 3</u>	
	<u>/// 3</u>	
	<u>/// 1 6</u>	<u>S. side of barn</u>
	<u>/// 4</u>	<u>slit above door.</u>
<u>2048</u>	<u>/// 2</u>	
<u>50</u>	<u>0</u>	
<u>52</u>	<u>0</u>	
<u>54</u>	<u>0</u>	
<u>56</u>	<u>0</u>	
<u>58</u>	<u>0</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Most circled a few times after emerging then flew North over top of barn.



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 22 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Franklin

GPS Unit #: 7 Waypoint: 340 R 14

Latitude: 41° 16' 19.6" N Longitude: 82° 54' 17.5" W

Roost Name/#: 580-1

Radio-tagged bat present in tree: Yes      No      UNK Tx not heard

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): JV Repro.: NK

Capture date: 29 July 2011 Capture site: 14 Frequency: 172.580

NOTE: Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2011 Departure time: 2057 Total Bats: 23

Emergence Time	Number of Bats	Emergence Aspect
<u>2034</u>	<u>    </u> <u>4</u>	<u>flaw out of</u>
<u>36</u>	<u>    </u> <u>4</u>	<u>both side</u>
<u>38</u>	<u>    </u> <u>4</u>	<u>of bank</u>
<u>40</u>	<u>    </u> <u>4</u>	
<u>42</u>	<u>    </u> <u>5</u>	
<u>44</u>	<u>  </u> <u>2</u>	
<u>46</u>	<u>0</u>	
<u>48</u>	<u>0</u>	
<u>50</u>	<u>0</u>	
<u>52</u>	<u>0</u>	
<u>54</u>	<u>0</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

circled several times before flying off, unsure of direction,



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 24 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Sandusky

GPS Unit #: 7 Waypoint: 340 R14

Latitude: 41° 16' 19.6" N Longitude: 82° 54' 17.5" W

Roost Name/ #: 580-1

Radio-tagged bat present in tree: Yes      No      UNK - Tx not heard

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: L. cinerea fusces Sex(M/F): F Age(Ad/Jv): SU Repro.: NR

Capture date: 29 Sep 2011 Capture site: 14 Frequency: 172.540

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2014 Departure time: 2054 Total Bats: 16

Emergence Time	Number of Bats	Emergence Aspect
2022	1	
	11	
2032	11	
2034	11	
36	11	
2040	0	
42	0	
44	0	
46	0	
48	0	
50	0	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 26 Aug Biologists: Laura Tyson

Project Name: Republic State: OH County: Sandusky

GPS Unit #: 7 Waypoint: 340 R 14

Latitude: 41° 16' 19.6" N Longitude: 82° 54' 17.5" W

Roost Name/#: 580-1

Radio-tagged bat present in tree: Yes ☐ No ☒ Unk - Tx not heard

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: E. fuscus Sex(M/F): F Age(Ad/Jv): JV Repro.: NR

Capture date: 24 Sep 2011 Capture site: 14 Frequency: 172.580

NOTE: Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2001 Departure time: 2059 Total Bats: 22

Emergence Time	Number of Bats	Emergence Aspect
<u>2025</u>	<u>1</u>	<u>1 came out then back in</u>
<u>2027</u>	<u>1</u>	
<u>2029</u>	<u>1</u>	<u>Most emerged, circle</u>
<u>2032</u>	<u>1</u>	<u>in front of tree</u>
<u>2036</u>	<u>1</u>	<u>before leaving</u>
<u>2038</u>	<u>1</u>	
<u>2040</u>	<u>0</u>	
<u>2042</u>	<u>0</u>	
<u>2044</u>	<u>0</u>	
<u>2046</u>	<u>0</u>	
<u>2048</u>	<u>0</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?



## ROOST TREE DATA

Project #: 340.02 Date: 19 July 2011 Biologists: E. Basiger; M. Flynn; A. Garitt  
Project Name: Republic - Wind State: OH County: Seneca  
GPS Unit #: \_\_\_\_\_ Waypoint: 14 Camera #: \_\_\_\_\_ Picture #: 866-868  
Latitude: 41° 09' 53.7" N Longitude: 82° 56' 17.4" W  
Bat Species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): JV Repro.: NR  
Capture Date: 18 July 2011 Capture Site: 24  
Frequency: 172.780 Roost Name/#: 780-1

### ROOST TREE DATA

Roost tree species: dilapidated <sup>brick</sup> garage dbh: N/A cm  
Estimated height from ground to roost: 6 (meters) Tree height N/A (meters)  
Exfoliating bark (%): N/A Distance from capture site: \_\_\_\_\_ m or km (circle one)  
Tree health: \_\_\_\_\_ Live \_\_\_\_\_ Dead \_\_\_\_\_ Partial \_\_\_\_\_  
Observed roost potential: \_\_\_\_\_ Exfoliating Bark ☒ Cracks/crevasses ☒ Hollow \_\_\_\_\_ Unknown  
Bat vocalizations: \_\_\_\_\_ Yes ☒ No ☒  
Guano on ground/foliage: ☒ Yes massive amounts! \_\_\_\_\_ No  
Is guano fresh (if present)?: ☒ Yes \_\_\_\_\_ No  
Guano volume (if present): lots!!

inside brick building

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh)  
Acer saccharum

Subdominant Canopy Species (< 40 cm/16" dbh)

Estimated dbh range (cm): Lg: 40 Sm: 40

Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_

Estimated canopy closure at roost: 0 %

Slope: \_\_\_\_\_ Steep \_\_\_\_\_ Moderate \_\_\_\_\_ Slight ☒ None Slope aspect: N/A

Subcanopy Clutter: \_\_\_\_\_ Closed \_\_\_\_\_ Moderate ☒ Open

Distance to nearest water source: \_\_\_\_\_ m or km (circle one) Distance to nearest flight corridor: 0 meters

Habitat Description: small town main street. No forest cover; building surrounded by other buildings and fields

#### Check all that apply:

<input type="checkbox"/> Mature Upland Forest	<input type="checkbox"/> Recently Logged Forest	<input checked="" type="checkbox"/> Crop/Pasture Land	<input type="checkbox"/> Shrub/scrub Swamp
<input type="checkbox"/> Young Upland Forest	<input type="checkbox"/> Pine Plantation	<input type="checkbox"/> Stream/River	<input type="checkbox"/> Vernal Pool
<input type="checkbox"/> Mature Lowland Forest	<input type="checkbox"/> Woodlot/Forest Edge	<input type="checkbox"/> Emergent Wetland	<input type="checkbox"/> Deepwater Lake/Pond
<input type="checkbox"/> Young Lowland Forest	<input type="checkbox"/> Old Field	<input type="checkbox"/> Forested Swamp	<input checked="" type="checkbox"/> Other <u>small town building</u>

Comments:



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 19 July 2011 Biologists: Alexa Gantz

Project Name: Republic State: OH County: Seneca

GPS Unit #: ESI 465670 Waypoint: N/A

Latitude: 41° 09' 53.7" N Longitude: 82° 56' 17.4" W

Roost Name/#: 172.780-1

Radio-tagged bat present in <sup>Building</sup> tree: Yes X No     

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NR

Capture date: 16-Jul-11 Capture site: 24 Frequency: 172.780

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2130 Departure time: 2200 Total Bats: 73

Emergence Time	Number of Bats	Emergence Aspect
<u>2130</u>	<u>11</u>	
<u>2132</u>	<u>22</u>	
<u>2134</u>	<u>30</u>	
<u>2136</u>	<u>37</u>	
<u>2138</u>	<u>48</u>	
<u>2140</u>	<u>67</u>	
<u>2142</u>	<u>72</u>	
<u>2144</u>	<u>73</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Bats dispersed

transmitted bat left at 2140 hours heading South



## ROOST TREE EMERGENCE DATA

Project #: 340 Date: 20 July 2011 Biologists: Alexa Gaurin

Project Name: Republic State: OH County: Seneca

GPS Unit #: ESI 4105670 Waypoint: NA

Latitude: 41° 09' 53.7" N Longitude: 82° 56' 17.4" W

Roost Name/#: 740-1

Radio-tagged bat present in tree: Garage Yes X No     

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): JV Repro.: NR

Capture date: 18-Jul-11 Capture site: 24 Frequency: 172.780

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2100 Departure time: 2200 Total Bats: 93

Emergence Time	Number of Bats	Emergence Aspect
2110	2	
2112	2	
2114	1	
2116	2	
2118	2	
2120	3	
2122	11	
2124	13	
2126	27	
2128	41	
2130	63	
2132	84	
2134	91	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

transmitted bat left - 2130, headed East

bats mostly dispersed in an Eastern direction







## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 22 Jul 2011 Biologists: M Flynn

Project Name: Republic State: OH County: Seneca

GPS Unit #: ESI 465670 Waypoint: #016

Latitude: 41° 09' 53.7" N Longitude: 82° 56' 17.4" W

Roost Name/#: 172.780

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: E. fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NR

Capture date: 18 Jul 11 Capture site: 24 Frequency: 172.780

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2100 Departure time: 2200 Total Bats: 218

Emergence Time	Number of Bats	Emergence Aspect
9:14	III (3)	east
9:16	IIII I (6)	
9:18	IIII II II II I (16)	
9:20	IIII II II II II II II II II (37)	
9:22	IIII II II II II II II II II (35)	
9:24	IIII II II II II II II II II (32)	
9:26	IIII II II II II II II II I (21)	
9:28	IIII II II II III (18)	
9:30	IIII II II II III (18)	
9:32	II (2)	
9:34	IIII II (7)	
9:36	III (3)	
9:38	IIII (4)	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

---

---

---



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 24 Jul 11 Biologists: M. Flynn

Project Name: Republic State: OH County: Seneca

GPS Unit #: ESI 465670 Waypoint: 016

Latitude: 41° 09' 53.7" N Longitude: 82° 56' 17.4" W

Roost Name/#: 172.780

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: E. AUSCUS Sex(M/F): F Age(Ad/Jv): JV Repro.: NR

Capture date: 14 Jul 11 Capture site: 24 Frequency: 172.780

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2100 Departure time: 2200 Total Bats: 156

Emergence Time	Number of Bats	Emergence Aspect
2100	(8)	
2102	I (1)	
2104	-----	
2106	(3)	
2109	(4)	
2110	(11)	
2112	(11)	
2114	(23)	
2116	(16)	
2118	(14)	
2120	(9)	
2122	(13)	
2124	(21)	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitter bat(s) emerge? What direction did the transmitter bat fly?

Transmitter bat did not emerge. Emerging bats scattered  
and dispersed. Flight - mostly up



## ROOST TREE DATA

Project #: 340 Date: 25 Jul 11 Biologists: J. Basiga  
Project Name: Republic State: OH County: Seneca  
GPS Unit #: ES17 Waypoint: \_\_\_\_\_ Camera #: Cam 671 Picture #: 899-901  
Latitude: 41° 09' 40.3"N Longitude: 76° 57' 56.8"W  
Bat Species: E. fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NR  
Capture Date: 24 Jul 11 Capture Site: 30  
Frequency: 172,500 Roost Name/#: 500-1

### ROOST TREE DATA

Roost tree species: Barn dbh: \_\_\_\_\_ cm  
Estimated height from ground to roost: \_\_\_\_\_ (meters) Tree height \_\_\_\_\_ (meters)  
Exfoliating bark (%): \_\_\_\_\_ Distance from capture site: 7 m or (circle one) km (circle one)  
Tree health: \_\_\_\_\_ Live \_\_\_\_\_ Dead \_\_\_\_\_ Partial  
Observed roost potential: \_\_\_\_\_ Exfoliating Bark \_\_\_\_\_ Cracks/crevasses \_\_\_\_\_ Hollow \_\_\_\_\_ Unknown  
Bat vocalizations: \_\_\_\_\_ Yes ✓ No  
Guano on ground/foilage: ✓ Yes \_\_\_\_\_ No  
Is guano fresh (if present)?: ✓ Yes \_\_\_\_\_ No  
Guano volume (if present): light

### DESCRIPTION OF SURROUNDING HABITAT

Dominant Canopy Species (> 40 cm/16" dbh) \_\_\_\_\_ Subdominant Canopy Species (< 40 cm/16" dbh) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_ Estimated dbh range (cm): Lg: \_\_\_\_\_ Sm: \_\_\_\_\_  
Estimated canopy closure at roost: 0 %  
Slope: \_\_\_\_\_ Steep \_\_\_\_\_ Moderate \_\_\_\_\_ Slight ✓ None Slope aspect: \_\_\_\_\_  
Subcanopy Clutter: \_\_\_\_\_ Closed \_\_\_\_\_ Moderate ✓ Open  
Distance to nearest water source: 500 m or km (circle one) Distance to nearest flight corridor: 0 meters

Habitat Description: \_\_\_\_\_

### Check all that apply:

\_\_\_\_ Mature Upland Forest \_\_\_\_\_ Recently Logged Forest ✓ Crop/Pasture Land \_\_\_\_\_ Shrub/scrub Swamp  
\_\_\_\_ Young Upland Forest \_\_\_\_\_ Pine Plantation \_\_\_\_\_ Stream/River \_\_\_\_\_ Vernal Pool  
\_\_\_\_ Mature Lowland Forest \_\_\_\_\_ Woodlot/Forest Edge \_\_\_\_\_ Emergent Wetland \_\_\_\_\_ Deepwater Lake/Pond  
\_\_\_\_ Young Lowland Forest \_\_\_\_\_ Old Field \_\_\_\_\_ Forested Swamp \_\_\_\_\_ Other \_\_\_\_\_  
Comments:



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 29 July 11 Biologists: J. Basiger

Project Name: Republic State: OH County: Seneca

GPS Unit #: ESF 7 Waypoint: N/A

Latitude: 41° 09' 40.3" N Longitude: 82° 57' 51.8" W

Roost Name/#: 500-1

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NA

Capture date: 29 July 2011 Capture site: 30 Frequency: 172.500

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2045 Departure time: 2200 Total Bats: 14

Emergence Time	Number of Bats	Emergence Aspect
<u>2110</u>	<u>11</u>	
<u>2112</u>	<u>0</u>	
<u>2114</u>	<u>111</u>	
<u>2116</u>	<u>0</u>	
<u>2122</u>	<u>111</u>	
<u>2124</u>	<u>11</u>	
<u>2126</u>	<u>11</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Bat 500 emerged 2122. Flew SE



## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 8 Aug Biologists: Laurel & Ben

Project Name: Republic State: OH County: Seneca

GPS Unit #: 7 Waypoint: 11/A

Latitude: 41° 09' 38.3" N Longitude: 82° 57' 52.6" W

Roost Name/#: 500-1

Radio-tagged bat present in tree: Yes ☒ No ☐

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: 11/11

Capture date: 24 Feb 2009 Capture site: 30 Frequency: 172.300

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2042 Departure time: 2119 Total Bats: 14

Emergence Time	Number of Bats	Emergence Aspect
<u>2055</u>	<u>2</u>	<u>Southern</u>
<u>2057</u>	<u>3</u>	<u>East-south-east (W)</u>
<u>2059</u>	<u>4</u>	<u>on W side</u>
<u>2101</u>	<u>1</u>	
<u>2103</u>	<u>3</u>	
<u>2105</u>	<u>1</u>	
<u>2107</u>	<u>0</u>	
<u>2109</u>	<u>0</u>	
<u>2111</u>	<u>0</u>	
<u>2113</u>	<u>0</u>	
<u>2115</u>	<u>0</u>	

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

All Bats emerged, headed East  
by 10:00 AM - 10:00 AM



## ROOST TREE EMERGENCE DATA

Project #: 340201 Date: 9 Aug 11 Biologists: Lawrence Tyson

Project Name: Republic State: OH County: Seneca

GPS Unit #: 7 Waypoint: \_\_\_\_\_

Latitude: 41° 09' 40.3" N Longitude: 82° 57' 51.8" W

Roost Name/ #: 500-1

Radio-tagged bat present in tree: Yes X No \_\_\_\_\_ Ty heard, still heard after US empty

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: Eptesicus fuscus Sex (M/F): F Age (Ad/Jv): JV Repro.: NA

Capture date: 14 July 2011 Capture site: 30 Frequency: 172,500

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2039 Departure time: 2128 Total Bats: 12

Emergence Time	Number of Bats	Emergence Aspect
<u>2051</u>	<u>1</u>	<u>W. facing</u>
<u>2053</u>	<u>0</u>	<u>back view</u>
<u>2055</u>	<u>0</u>	
<u>2057</u>	<u>2</u>	
<u>2059</u>	<u>2</u>	
<u>2101</u>	<u>1</u>	
<u>2103</u>	<u>2</u>	
<u>2105</u>	<u>0</u>	
<u>21</u>	<u>1</u>	
<u>21</u>	<u>0</u>	
<u>11</u>	<u>1</u>	
<u>13</u>	<u>2</u>	
<u>15</u>	<u>0</u>	<u>215-2125: 10</u>

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

All emerged flew East over corn field  
Ty never left







## ROOST TREE EMERGENCE DATA

Project #: 340.01 Date: 11 Aug 11 Biologists: Laura Tyson

Project Name: Republic State: OH County: Seneca

GPS Unit #: \_\_\_\_\_ Waypoint: \_\_\_\_\_

Latitude: 41° 09' 40.3" N Longitude: 82° 57' 51.8" W

Roost Name/#: 500-1

Radio-tagged bat present in tree: Yes \_\_\_\_\_ No \_\_\_\_\_ Tx not heard today

Complete the following information only if a radio-tagged bat is present in the roost

Bat species: E. fuscus Sex(M/F): F Age(Ad/Jv): Jv Repro.: NR

Capture date: 24 July 11 Capture site: 30 Frequency: 72.500

**NOTE:** Tallies of bat exits should be made at 2-minute intervals. Use the back lighting of the setting sun to help distinguish bats as silhouettes against the sky as they exit the roost. Please ensure that you are close enough to the roost to observe all exiting bats, but not close enough to influence emergence (do not stand directly beneath the roost and do not make unnecessary noise and/or conversation, and minimize use of lights).

Arrival time: 2032 Departure time: 2118 Total Bats: 11

Emergence Time	Number of Bats	Emergence Aspect
<u>2050</u>	<u>1</u>	<u>W. facing door</u>
<u>2052</u>	<u>2</u>	<u>all from front</u>
<u>2054</u>	<u>3</u>	
<u>2056</u>	<u>2</u>	
<u>2058</u>	<u>2</u>	
<u>2100</u>	<u>1</u>	
<u>02</u>	<u>0</u>	
<u>04</u>	<u>0</u>	
<u>06</u>	<u>0</u>	
<u>08</u>	<u>0</u>	
<u>10</u>	<u>0</u>	
<u>12</u>	<u>0</u>	
<u>14</u>		

Describe emergence: Did bats emerge simultaneously, fly off in the same direction, loiter, circle, disperse, etc. What time did the transmitted bat(s) emerge? What direction did the transmitted bat fly?

Tx not heard today (batteries dead?), all bats flew out +  
headed straight east

**APPENDIX D  
PHOTOGRAPHS**



Site 2



Site 3



Site 4



Site 10





Site 12



Site 14



Site 23



Site 26





Site 30



Site 31



Big brown bat (*Eptesicus fuscus*)



Northern bat (*Myotis septentrionalis*)





Eastern red bat (*Lasirus borealis*)



Little brown bat (*Myotis lucifugus*)



Hoary bat (*Lasiurus cinereus*)



Tri-colored bat (*Perimyotis subflavus*)



Evening bat (*Nycticeius humeralis*)



Indiana bat (*Myotis sodalis*)





Indiana bat roost 218-1



Indiana bat roost 218-2



Indiana bat roost 218-3



Indiana bat roost 218-4





Indiana bat roost 218-5



Indiana bat roost 218-6



Big brown bat roost 740-1



Big brown bat roost 780-1





Big brown bat roost 239-1



Big brown bat roost 118-1





Big brown bat roost 500-1



Big brown bat roost 285-1



Big brown bat roost 580-1



Bat 950



Bat 740



Bat 122



Bat 118





Bat 225



Bat 239



Bat 218



## **Bat Acoustic Monitoring Survey Report - 2011**

### **Republic Wind Farm, Seneca County, Ohio**



*Prepared for:*

**Republic Wind, LLC  
300 South Wacker Drive, Suite 1500  
Chicago, Illinois 60606**

*Prepared by:*

**Tetra Tech, Inc.  
451 Presumpscot St.  
Portland, Maine 04103**

**December 2011**

## Table of Contents

1.0	INTRODUCTION .....	1
1.1	PROJECT OVERVIEW .....	1
1.2	GOALS AND OBJECTIVES .....	1
2.0	METHODS.....	3
2.1	DATA COLLECTION .....	3
2.2	DATA ANALYSIS.....	4
3.0	RESULTS .....	5
4.0	DISCUSSION.....	12
5.0	REFERENCES.....	14

## List of Figures

<b>Figure 1.1.</b>	Republic Wind Farm Bat Acoustic Monitoring Sites – 2011. ....	2
<b>Figure 2.1.</b>	Photograph of the High detector suspended from a specialized met tower pulley system – Republic Wind Farm, 2011. ....	4
<b>Figure 2.2.</b>	Photograph of the Low detector suspended from the met tower guy wire array – Republic Wind Farm, 2011. ....	4
<b>Figure 3.1.</b>	Index of Activity of migratory bat species by detector site group – Republic Wind Farm, 2011. ....	9
<b>Figure 3.2.</b>	Total number of call sequences recorded per night for all detector pooled – Republic Wind Farm, 2011.....	10
<b>Figure 3.3.</b>	Total number of migratory species and non-migratory species call sequences – Republic Wind Farm, 2011.....	11

## List of Tables

<b>Table 3.1.</b>	Summary results of acoustic monitoring survey effort by detector – Republic Wind Farm, 2011. ....	6
<b>Table 3.2.</b>	Summary of total number of call sequences recorded per species – Republic Wind Farm, 2011. ....	8



## **1.0 INTRODUCTION**

### **1.1 Project Overview**

Republic Wind, LLC proposes to develop the Republic Wind Farm (Project) near Belleview, Ohio (Figure 1-1). The Project site is located in Seneca and Sandusky County in north central Ohio. Land use in the proposed Project area comprises agricultural fields interspersed with forested riparian habitat that follows streams and storm water drainage. This report presents baseline (pre-construction) bat acoustic monitoring data collected during the spring, summer, and fall 2011 migration season at the Project's meteorological tower (met tower) (Figure 1.1).

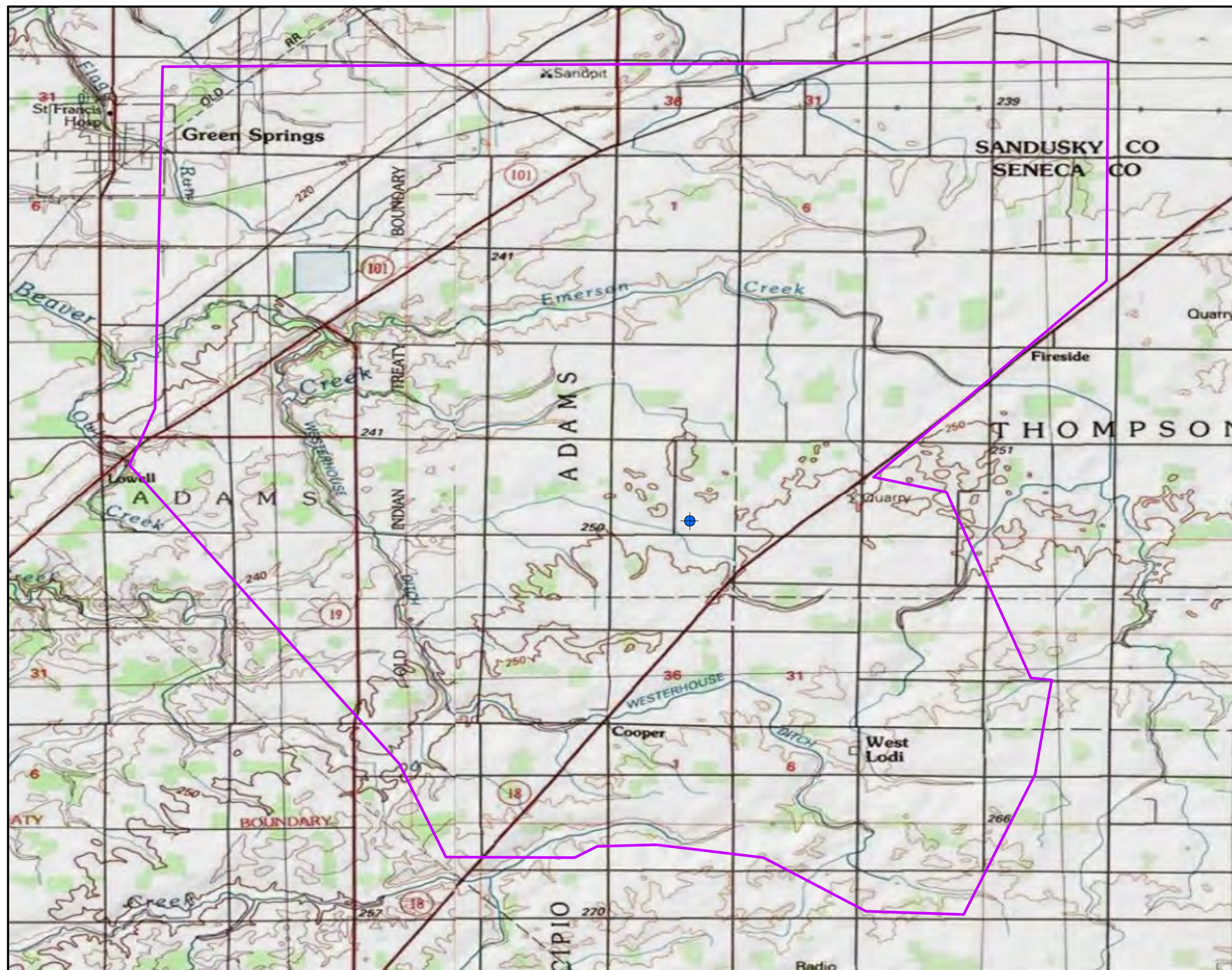
### **1.2 Goals and Objectives**

The goal of the bat acoustic monitoring survey was to assess bat phenology within the Project area, for an extended period, between March 16 and November 16, 2011. The objectives of the bat survey were to:

- 1) identify the peak activity periods for bats;
- 2) determine the bat species composition in the Project area (near the bat detectors); and,
- 3) determine an index of bat activity at different heights above ground level.

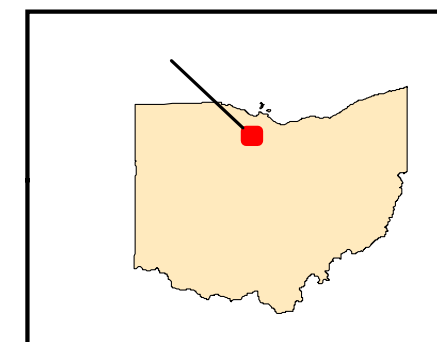
**Figure 1.1.** Republic Bat Acoustic Monitoring Sites – 2011.





# Legend

- Bat Acoustic Detectors
- Project Area



0 0.5 1 2 Miles

**Figure 1.1. 2011 Met Tower and Bat Detector Location.**

Prepared For:  
**Republic Wind, LLC**

Prepared By: <b>TETRA TECH</b>	Date: <b>12/2011</b>
-----------------------------------	-------------------------

Source: NGS\_Topo\_US\_2D, Detector location data provided by Tetra Tech.

Coordinate System: WGS84.



## 2.0 METHODS

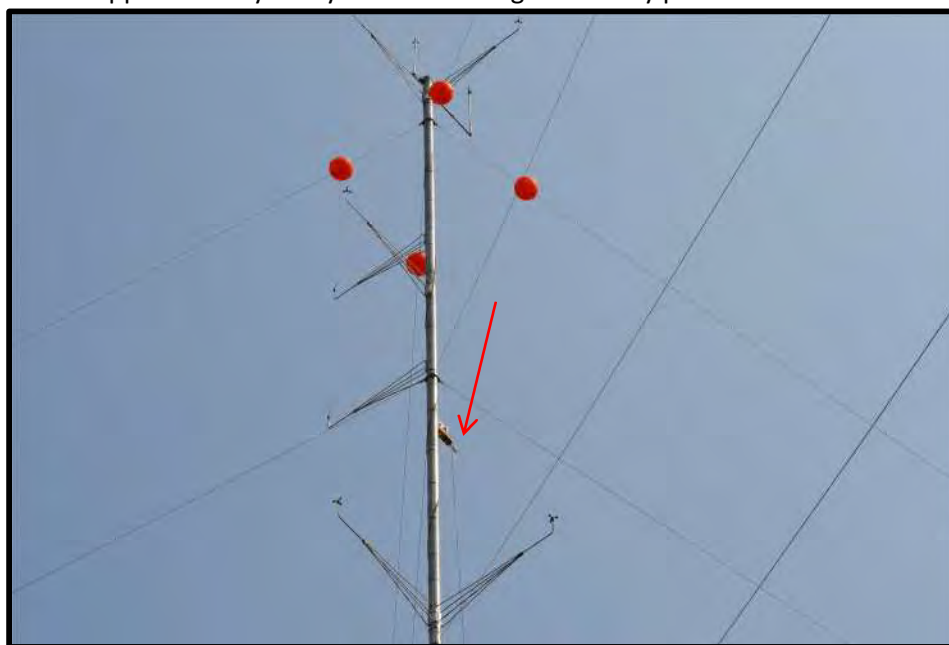
### 2.1 Data Collection

Tetra Tech conducted bat acoustic surveys at the Project area in the spring, summer, and fall of 2011. The surveys conformed to the ODNR-On-shore Bird and Bat Pre-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio (May 2004).

Bat activity was monitored using ultrasonic acoustic recorders (Anabat SD-2, Titley Scientific, Inc.) at the Project's met tower. The area around the met tower was an agricultural field, that was used to grow corn. The nearest forested area was approximately 670 meters northeast of the met tower. This section presents the cumulative results of 245 nights of bat activity monitoring during the spring migration, summer residency period, and fall migration in 2011.

Two bat acoustic detectors were deployed at the met tower. The two detectors were suspended from the tower on March 16, 2011, at heights of 45 meters (m) and 5 m above ground level; these detectors will be referred to as the 'High' and 'Low' detectors, respectively (Figure 2.1 and 2.2). Each of the two detectors remained in the same location throughout the survey period. To ensure that the greatest period of bat activity was surveyed each night, detectors were programmed to begin recording 30 minutes before sunset and stop recording 30 minutes after sunrise. Each detector was calibrated to detect a 40 kHz tone at a distance of 20 m using a Bat Chirp (Tony Messina, Nevada Bat Technology). Acoustic monitoring at the met tower was continuous throughout the survey period.

Each detector station consisted of an Anabat SD-2 bat acoustic detector powered by a 10-watt solar panel and a 12-volt battery encased in a waterproof housing (Figure 2.1 and 2.2). A pre-amplified microphone cable, pre-amplified microphone, and bracket were used to suspend the Anabat microphone from the tower. A plastic deflector shield angled at 45 degrees below the microphone facilitated recording of the airspace above and adjacent to the detector. Each detector was manually checked by trained technicians approximately every 2 weeks during the survey period.



**Figure 2.1.** Photograph of the High detector suspended from the met tower guy wire array – Republic Wind Farm, 2011. The red arrow indicates the detector location.



**Figure 2.2.** Photograph of the Low detector suspended from a specialized met tower pulley system – Republic Wind Farm, 2011. The red arrow indicates the detector location.

## 2.2 Data Analysis

Potential bat call files were extracted from data files using CFCread<sup>®</sup> software (Titley Electornics, Inc.). CFCread<sup>®</sup> software screens all data recorded by the bat detector and extracts call files using a filter. The default settings for the CFCread<sup>®</sup> software were used during the file extraction process to ensure comparability among datasets. These settings include a maximum time between calls (TBC) of 5 seconds, a minimum pulse fragment line length of 5 milliseconds, and a smoothing factor of 50. The smoothing factor refers to the degree that adjacent data points are averaged. The higher the smoothing factor, the less restrictive the filter, resulting in more noise files and poor quality call sequences retained within the dataset. A call is defined as a single pulse of sound produced by a bat. A call sequence is defined as a combination of two or more pulses recorded in a single call file. Call sequences with less than 2 pulses were not analyzed.

A qualitative visual comparison was made between recorded bat call sequences and established reference libraries of calls. This technique allowed for relatively accurate identification of bat species (O'Farrell et al. 1999; O'Farrell and Gannon 1999). All call sequences were also run through a series of conservative filters based on call sequence characteristics outlined in Szewczak et al. (2008) and from known species call sequences (hand released and zip-line individuals) from a regional call library. A call sequence was considered of suitable quality and duration to be included in data analysis if the individual

call pulse(s) exhibited the full spectrum of frequency modulation produced by a bat (i.e., consisting of sharp, distinct lines) with a minimum of two pulses.

In addition to the qualitative visual analysis, all bat calls recorded during the monitoring period were processed using an Indiana bat specific call filter. Call sequences can be difficult to definitively classify due to overlap in call pulse characteristics across species. Species such as hoary bat (*Lasiurus cinereus*) emit calls that are distinct in slope, duration, characteristic frequency, and frequency range (i.e., parameterizations). However, for other species, particularly those of the *Myotis* genus, it is difficult to accurately differentiate among species based on call sequence characteristics due to the similarities in call parameters. Nevertheless, it is often possible to make accurate classification inferences based on good quality calls of species including Indiana bat, little brown bat (*Myotis lucifugus*), and northern long-eared bat (*Myotis septentrionalis*). Call sequences of eastern red bat (*Lasiurus borealis*) and tri-colored bat (*Perimyotis subflavus*) are typically unique but occasionally appear similar to each other or *Myotis* species, especially if the recording is of poor quality. Classification is often complicated by the presence of static or incomplete call pulses within a recording. Fragments and poor quality calls are prevalent in recordings from passive detectors monitoring for a long duration.

Relative abundance, or the magnitude of each species' contribution to spatial and temporal use, was determined by calculating an Index of Activity (IA) modified from Miller (2001). The method is based on the presence/absence of a species call sequence within one-minute time increments. Thus, IA was the sum of minute-increments with a species presence divided by the unit effort ( $IA = \# \text{ minutes} / \text{detector-nights} * 100$ ). The IA calculations allows for samples with different levels of effort (i.e., different total number of detector-nights) to be accurately compared, thereby reducing the potential bias associated with differences in study effort. IA calculations follow those employed by Miller (2001) and O'Farrell and Shanahan (2006).

### **3.0 RESULTS**

The 2011 bat acoustic monitoring survey started on March 16 and ended on November 16, 2011 (Table 2.1). During the 245-night survey period detectors operated for 490 detector-nights (number of detectors multiplied by the number of nights that detectors were operational). A total of 534 bat call sequences were recorded within 531 one-minute intervals of bat activity (number of minutes with bat call sequences present) yielding an overall IA of 108.4 (Table 3.1).

The highest IA rate ( $\# \text{ of one minute intervals of bat activity} / \text{detector-nights} * 100$ ) was recorded by the Low detector (IA = 197.1). The smallest IA rate (19.6) was recorded by the High Detector, which detected 50 call sequences within 48 minutes of activity (Table 3.1).

**Table 3.1.** Summary results of acoustic monitoring survey effort by detector – Republic Wind Farm, 2011.

Detector	Period of Operation	Detector-Nights	Number of Minutes with Bat Activity	Total Number of Call Sequences Recorded	Overall Index of Activity
High (45 m)	Mar. 16 - Nov. 16	245	48	50	19.6
Low (10 m)	Mar. 16 - Nov. 16	245	483	484	197.1
<b>Total</b>		<b>490</b>	<b>531</b>	<b>534</b>	<b>108.4</b>

Bat call sequences were identified to the lowest possible taxonomic level (Table 3.2). Sixty-six (66) percent of recorded calls were classified to species ( $n = 354$ ). Calls were then combined into five categories based on similarities in call sequence structure: Low Frequency Species, Middle Frequency Species, High Frequency Non-Myotis Species, High Frequency Myotis Species, and Unknown (Table 3.2). Some call sequences did not meet the parameters required for species level identification ( $n = 132$ ) and were classified based on the frequency modulation exhibited in the call sequence. Some of these calls ( $n = 4$ ) were classified as Unknown because they consisted of feeding buzzes that could not be accurately attributed to any single species or guild, and therefore could not be labeled as either a middle or high frequency calls [it is likely that most of these were evening bat (*Nycticeius humeralis*) calls].

Seven species were identified from the call sequences recorded during the 2011 acoustic monitoring effort. A total of 248 calls (46.4 percent of all calls recorded), were attributed to migratory bats including the hoary bat, silver-haired bat, eastern red bat, and evening bat. The greatest number ( $n = 125$ ) of recorded call sequences attributable to a single species was from silver-haired bat. Silver-haired bat produce call sequences with relatively unique characteristics that can generally be accurately identified to species level, and tend to be lower in frequency than other species, and therefore do not attenuate as quickly in the atmosphere. A number of hoary bat ( $n = 54$ ), eastern red-bat ( $n = 48$ ), and evening bat ( $n = 21$ ) were also recorded.

IA values were calculated for each species by detector. The greatest IA was for silver-haired bat at the low detector (IA = 43.7). For each of the species recorded IA values were greatest at the Low detector (Figure 2.4). Hoary bat was the second most active species overall (as measured by IA), and was the most active species at the High detector (IA = 9.4) (Figure 3.1).

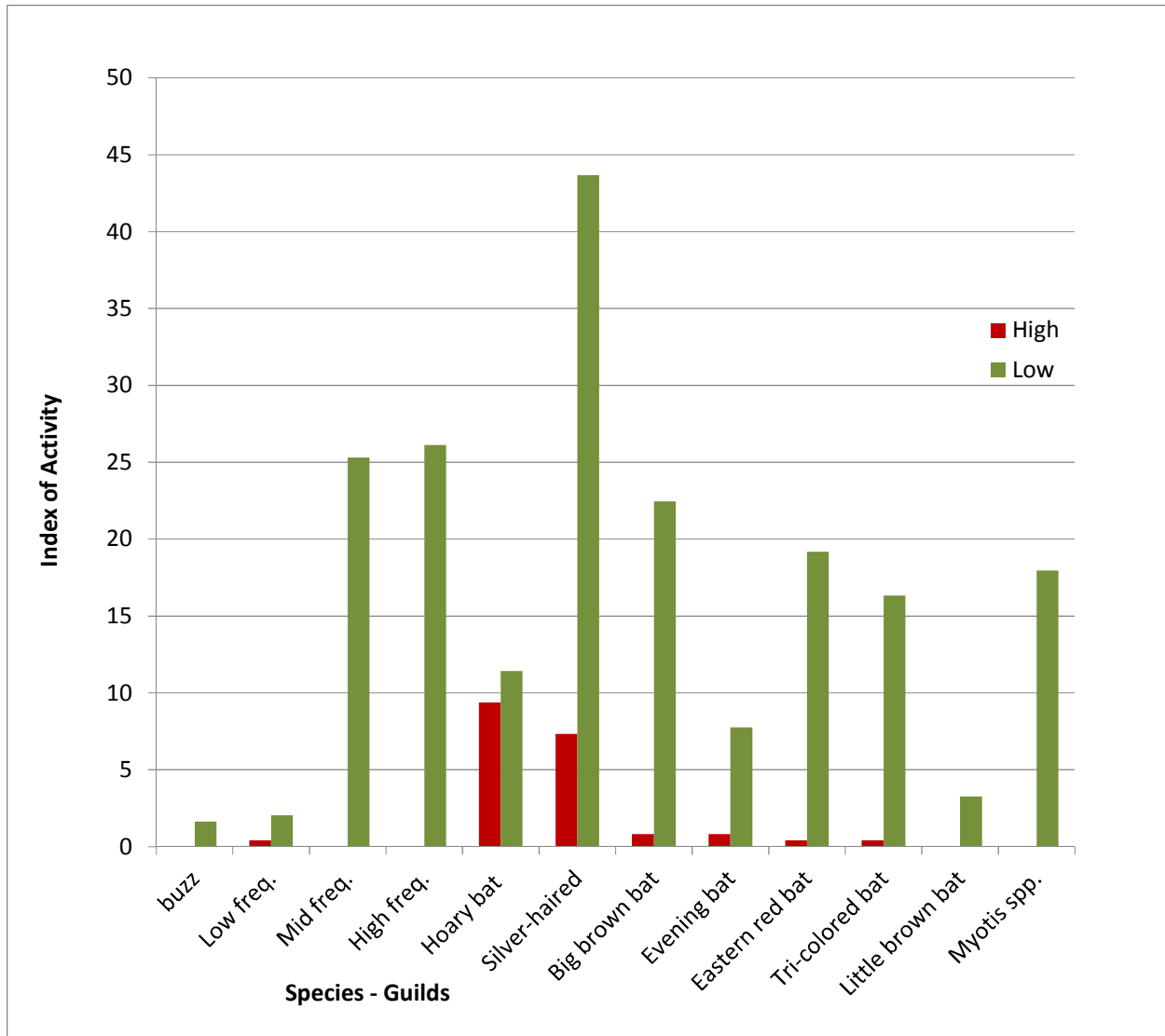
No calls of federally listed bat species were positively identified during the survey. Indiana bats are known to occur in the vicinity of the Project area, and species classifications for many *Myotis* calls recorded during the 2011 surveys ( $n = 44$ ) was not feasible; therefore it is possible that Indiana bats were recorded but not identified in the dataset. Although none of the 44 *Myotis* calls identified during the passive acoustic monitoring surveys at the met tower exhibited characteristics typical of Indiana bat calls. In addition, the overall low levels of *Myotis* species activity recorded may indicate that the type of habitat around the met tower is not frequented by *Myotis*. The distance from wooded areas (approximately 670 m) may make the likelihood of Indiana bat occurrence lower near the met tower. Avoidance of large open areas by Indiana bat, especially agricultural land with little forested habitat, has been documented (Murray and Kurta 2004).

Bat activity varied throughout the monitoring period (Figures 3.2). Overall, there was no bat activity recorded before April 10, 2011. Bat activity increased slightly around April 20 but declined again in mid-May. Activity began to increase in early August until peak activity was recorded on August 13. Activity declined after August, although bats were active throughout September, and until October 12, 2011.

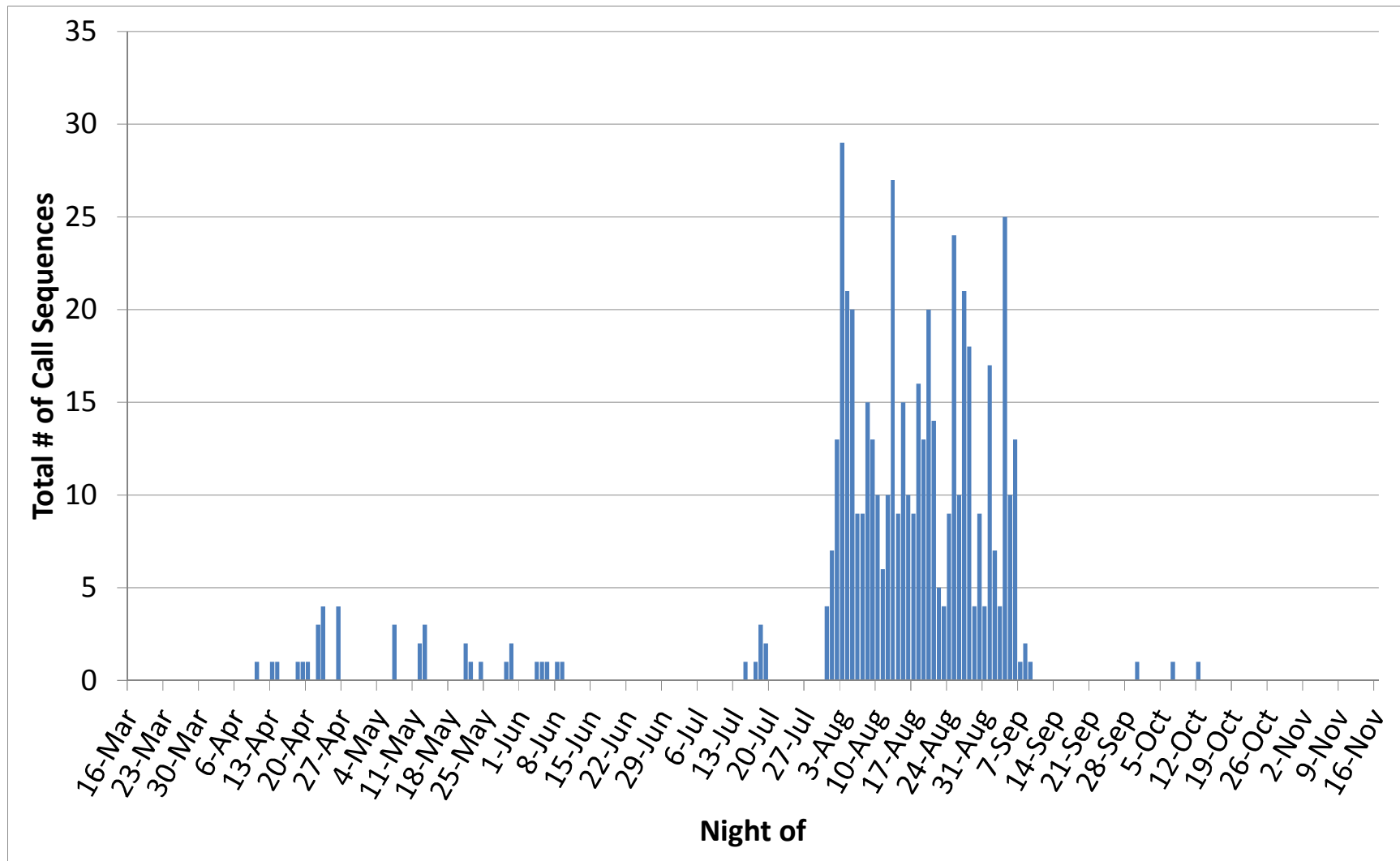


**Table 3.2.** Summary of total number of call sequences recorded per species – Republic Wind Farm, 2011.

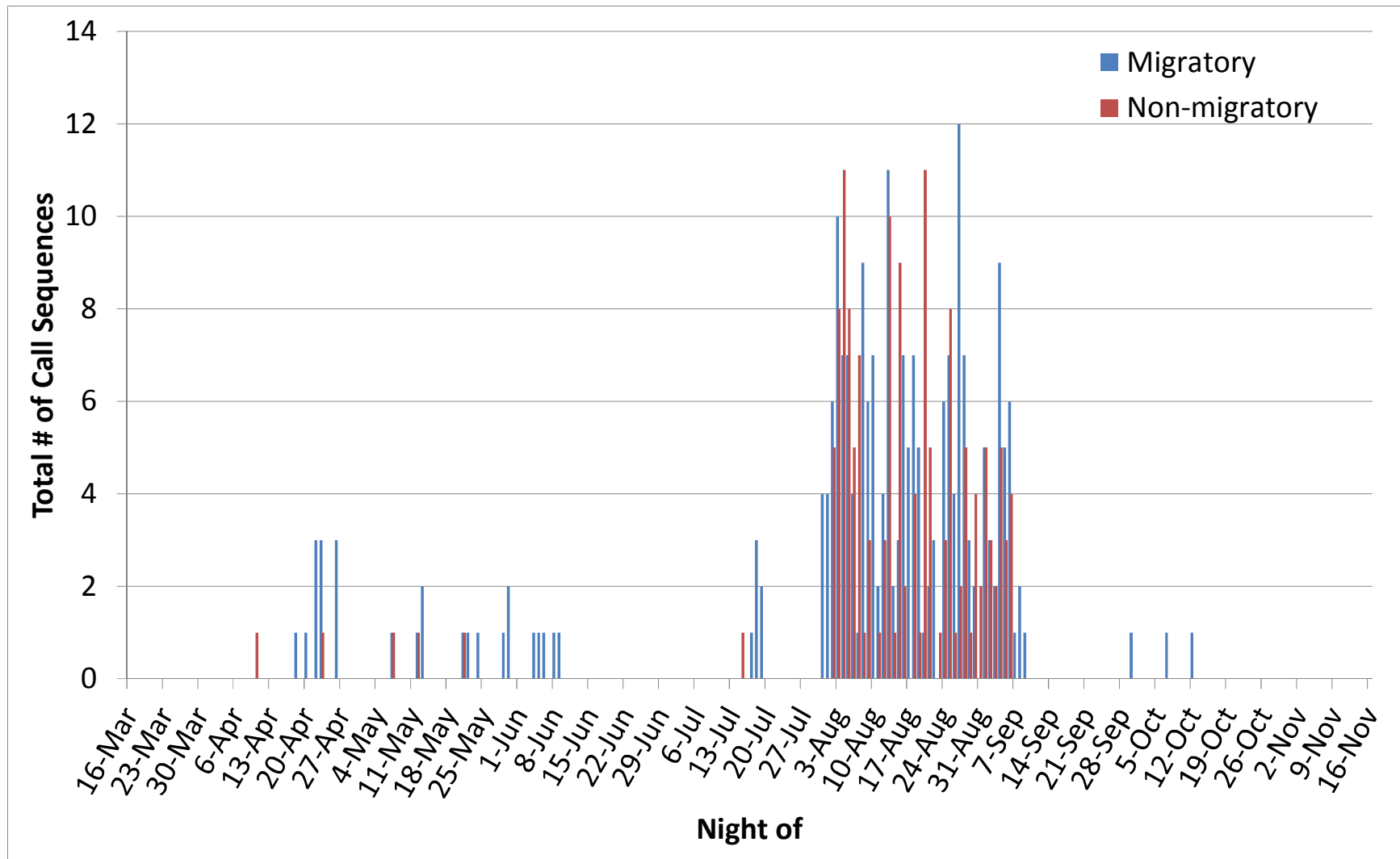
Group	Characteristic Frequencies*	Species	Total Call Sequences
Low Frequency	12 kHz–24 kHz	Hoary bat	54
		Unknown low frequency call seq.	6
Middle Frequency	24 kHz–38 kHz	Big brown bat	57
		Silver-haired bat	125
		Evening bat	21
		Unknown middle frequency call seq.	62
High Frequency (Non-myotis species)	44–45 kHz	Tri-colored bat	41
		Eastern red bat	48
High Frequency (Myotis species)	46–52 kHz	Little brown myotis	8
		Unknown <i>Myotis</i> species	44
		Unknown high frequency call seq.	64
Unknown		Buzz	4
* Characteristic frequency (Fc) is generally defined as the frequency of the call pulse at the lowest slope, or the lowest frequency of the consistent frequency modulation sweeps. Fc represents the single most useful parameter for species identification.			



**Figure 3.1.** Index of Activity of migratory bat species by detector – Republic Wind Farm, 2011.



**Figure 3.2.** Total number of call sequences recorded per night for all detector pooled – Republic Wind Farm, 2011.



**Figure 3.3.** Total number of migratory species and non-migratory species call sequences – Republic Wind Farm, 2011.

#### 4.0 DISCUSSION

The migratory species, hoary bat, silver-haired bat, eastern red bat, as well as evening bat, were positively identified from recordings made during the 2011 survey period. Overall, there was more migratory species activity than non-migratory species activity recorded in the Project area. These results are consistent with recent research demonstrating that tree and tree-crevasse roosting migratory bats are the predominant species found during post-construction mortality studies at operational wind farms in North America (Arnett et al. 2008). Results from these mortality studies show the three bat species most commonly encountered during ground searches were long-distance (Lasiurine) migratory bats: hoary bat, silver-haired bat, and eastern red bat (Kunz et. al 2007, Arnett et al. 2008).

Non-migratory species recorded during the 2011 surveys (big brown bat, tri-colored bat, and *Myotis* species) were only slightly more active during August and September than were migratory species recorded (hoary bat, silver-haired bat, eastern red bat, and evening bat). Migratory species were active in August and September, as well as in the spring and fall (Figure 3.3). Overall activity of non-migratory and migratory species was highest during August and September, which is considered the “swarming period”, when bats group together prior to hibernation and/or migration, and often mate (Parsons et al. 2003). The occurrence of migratory bat species during the summer demonstrates that there were likely some long-distance migratory tree and tree crevasse roosting bats spending the summer residency period at the Project area. There also appeared to be few long-distance migrants moving through the Project area during the spring and fall, as evidenced by the low number of calls recorded during those periods.

IA values for all bat species were lowest at the High detector. This indicates that bat activity nearest the rotor swept zone (RSZ) of typical modern wind energy turbines was low compared to bat activity levels below the RSZ and nearest ground level. Migratory species (hoary bat, silver-haired bat, eastern red bat, and evening bat) we recorded primarily just above ground level by the Low detectors. *Myotis* species exhibited low levels of activity, as measured by IA, and were not recorded at the High detector.

The ratio between the total number of call sequences recorded at each detector, and the total number of one-minute intervals with bat activity may be used as an indicator of the “concentration” of bat activity throughout time. For example, the High detector recorded 50 call sequences over the course of 48 minutes of activity. This near one to one ratio (0.96) is a function of low concentrations of bat activity at the High detector; activity events were spread out over time and rarely were two calls recorded in the same one-minute interval. Similarly the ratio between call sequences and minutes of activity at the Low detector was also slightly less than one to one (0.99). Based on these observations it seems that bat activity at the met tower was largely episodic in nature, and that extended periods of constant activity did not occur. Instead, it appears that periods of diffused and inconsistent activity occurred at both detectors. These patterns of activity are not consistent with what would be expected if the met tower location provided significant foraging habitat, or was located within a migration or transit corridor. If the area was important for foraging or migration we would expect to see high numbers of bat calls recorded during limited temporal periods. For example Racey and Swift (1985) demonstrated that foraging bats may trap-line areas where food resources are concentrated, returning to the same foraging areas nightly. High numbers of calls recorded over a short period of monitoring would be more indicative of high use by bats. Bat activity at an important migration corridor might also be more concentrated, with high numbers of passes occurring in rapid succession, as would expected if multiple individuals moved through the area during migration of transit between foraging sites.

Patterns of activity in the Project area do not suggest the presence of a large bat migration corridor in the vicinity of the met tower. If a substantial migration corridor did exist over the Project area, the data should show a higher ratio of minutes of bat activity to detector nights. The sporadic and diffused occurrence of long-distance migratory species in the recording indicates that few individuals use the open area near the met tower. There did not appear to be an episode of dramatic fluctuation in recorded activity that could be definitively attributed to large-scale migration, although an observable increase in activity during August and September was apparent; however this increase was minimal and was not indicative of a large number of bats moving through the Project area (Cryan and Veilleux 2007).

Weather conditions, including mean nightly temperature and wind speed, probably contributed to the patterns of activity recorded by the acoustic detector sets. The increase in bat call sequences recorded in August may have resulted from the following: (1) increased foraging activity near the detectors due to a rise in mean nightly temperatures (Racey and Swift 1985, O'Donnell 2000, Kusch et al. 2004); (2) increases in food resource concentrations near the detectors, (3) an episode of bats leaving a roost and transiting to an established area of concentrated food resource passing the detectors *en route*; or, (4) bat swarming near the met tower. The increase in activity of hoary bat, silver-haired bat, and eastern red bat at the met tower detectors during September was almost certainly attributable to migration and/or pre-migration staging (Cryan and Veilleux 2007).

There is inherent difficulty in attempting to interpret the number of recorded call sequences as an indication of activity levels; however, detection rates, recorded minutes of activity and IA values do provide a relative measure of bat activity near sampling locations. The limited maximum range of a single Anabat detector (approximately 30 m [100 ft]) makes the characterization of landscape-scale movements, such as migration, difficult to assess. However, a comparative assessment of the results from detectors arrayed within a tower at different elevations can facilitate the characterization of spatial distribution and phenology of bat activity.

The total number of bat call sequences and minutes of activity recorded each night by a given detector may or may not reflect the absolute level of bat activity present in the Project area, although some studies have suggested that there may be a relationship between the relative numbers of calls recorded and absolute bat activity levels (Gorresen et al. 2008). The bias in passive acoustic surveys of this type stems from the unknowns that are intrinsic to automated monitoring. For example, a single foraging individual may produce a large number of call sequences that are within the range of a given detector set. Conversely, a large number of individual bats may pass the detector set and produce an equally large number of call sequences. It is also important to note that the survey results are a sample of bat activity in the airspace surrounding the detectors and are not necessarily indicative of bat activity throughout the entire Project area.

## 5.0 REFERENCES

- Arnett, E. B., K. Brown, W. P. Erickson, J. Fiedler, T. H. Henry, G. D. Johnson, J. Kerns, R. R. Kolford, C. P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management* 72: 61–78.
- Brooks, R. T., and W. M. Ford. 2005. Bat activity in a forest landscape of central Massachusetts. *Northeastern Naturalist* 12: 447–462.
- Cryan, P. M., and J. P. Veilleux (2007). Migration and use of autumn, winter and spring roosts by tree bats. In *Bats in Forests: Conservation and Management*, eds. J. P. H. M.J. Lacki, and A. Kurta. Baltimore, MD, The Johns Hopkins University Press: 153–176.
- Copperhead Environmental Consulting and Tetra Tech, Inc. 2011. Summer 2011 Indiana bat mist net survey draft report. Green Hills Wind Energy Project, Sullivan County, Missouri. Prepared for Nordex USA, Inc. Chicago, Illinois.
- Gorresen, P.M., A. C. Miles, C. M. Todd, F. J. Bonaccorso and T. J. Weller. 2008. Assessing bat detectability and occupancy with multiple automated echolocation detectors. *Journal of Mammalogy* 89: 11–17.
- Kusch, J., C. Weber, S. Idelberger, and T. Koob. 2004. Foraging habitat preferences of bats in relation to food supply and spatial vegetation structures in a western European low mountain range forest. *Folia Zoologica* 53: 113–128.
- Kunz, T. H., E. B. Arnett, W. P. Erickson, A. R. Hoar, G. D. Johnson, R. P. Larkin, M. D. Strickland, R. W. Thresher, and M. D. Tuttle. 2007. Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses. *Frontiers in Ecology and the Environment* 5: 315–324.
- Kusch, J., C. Weber, S. Idelberger, and T. Koob. 2004. Foraging habitat preferences of bats in relation to food supply and spatial vegetation structures in a western European low mountain range forest. *Folia Zoologica* 53: 113–128.
- Miller, B. W. 2001. A method for determining relative activity of free flying bats using a new activity index for acoustic monitoring. *Acta Chiropterologica* 3: 93–105.
- Murray, S.W. and A. Kurta. 2004. Nocturnal activity of the endangered Indiana bat (*Myotis sodalis*). *Journal of Zoology* 262: 1–10.
- O'Donnell, L. C. F. J. 2000. Influence of season, habitat, temperature, and invertebrate availability on nocturnal activity of the New Zealand long-tailed bat (*Chalinolobus tuberculatus*). *New Zealand Journal of Zoology* 27: 207–221.
- O'Farrell, M. J., and W. L. Gannon. 1999. A comparison of acoustic versus capture techniques for the inventory of bats. *Journal of Mammalogy* 80: 24–30.
- O'Farrell, M. J., B. W. Miller, and W. L. Gannon. 1999. Qualitative identification of free-flying bats using the anabat detector. *Journal of Mammalogy* 80: 11–23.
- O'Farrell, M.J. and S. A. Shanahan. 2006. *Las Vegas Wash Bat Survey 2004–2005*. Prepared for Las Vegas Wash Coordination Committee. Las Vegas, Nevada.
- Parsons, K. N., G. Jones, and F. Greenaway. 2003. Swarming activity of temperate zone microchiropteran bats: effects of season, time of night and weather conditions. *Journal of Zoology* 261: 257 – 264.
- Racey, P. A., and S. M. Swift. 1985. Feeding ecology of *Pipistrellus pipistrellus* (Chiroptera: Vespertilionidae) during pregnancy and lactation. *Journal of Animal Ecology* 54: 205–215.
- Szewczak, J. M., A. Corcoran, J. P. Kennedy, T. J. Weller, P. C. Orsmbec. 2008. Echolocation call characteristics of Pacific northwest bats. Presented during the proceedings of the Bat Conservation International Acoustic Monitoring Workshop, Tulelake, California.



---

## Summer 2015 Bat Surveys for the Proposed Republic Wind Project, Seneca and Sandusky Counties, Ohio

USFWS No. 15-045

Completed by:

Theresa Wetzel, Piper Roby, Steve Samoray, Sean Burke, and Chris Leftwich

22 December 2015

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

Business Confidential – Not for Public Disclosure



## TABLE OF CONTENTS

PROJECT BACKGROUND.....	1
METHODOLOGY.....	1
Level of Effort/Site Selection.....	1
Mist-Net Surveys.....	1
White-Nose Syndrome Protocol .....	3
Radio Telemetry .....	3
RESULTS AND DISCUSSION .....	6
Mist-Net Survey .....	6
Diurnal Radio Telemetry .....	9
Emergence Counts .....	16
Foraging Telemetry.....	17
CONCLUSIONS.....	28
LITERATURE CITED .....	29

## LIST OF TABLES

Table 1. Mist-net site locations, Republic Wind Project, Ohio, 2015.....	6
Table 2. Total bat captures by species, age, sex, and reproductive status, Republic Wind Project, Ohio, 2015.....	7
Table 3. Indiana and northern long-eared bats captured and radio-tagged during the mist-net survey, Republic Wind Project, Ohio, 2015. ....	9
Table 4. Northern long-eared bat and Indiana bat roost trees located during radio telemetry efforts, Republic Wind Project, Ohio, 2015.....	10
Table 5. Roost tree (RT) use by radio-tagged northern long-eared and Indiana bats, Republic Wind Project, Ohio, 2015.....	15
Table 6. Emergence counts of northern long-eared and Indiana bat roost trees, Republic Wind Project, Ohio, 2015.....	16
Table 7. Data collected on foraging northern long-eared and Indiana bats, 27 July – 31 July, Republic Wind Project, Ohio, 2015. ....	17
Table 8. Foraging area sizes for northern long-eared and Indiana bats, Republic Wind Project, 27 July – 31 July, 2015. ....	18
Table 9. Comparison of foraging area size among individuals, Republic Wind Project, 27 July – 31 July, 2015. Italicized values are significant at level alpha = 0.05.....	19
Table 10. Mean foraging area size for three adult and one juvenile female northern long-eared bats, Republic Wind Project, 27 July – 31 July, 2015.....	19

## LIST OF FIGURES

Figure 1. Proposed Republic Wind Project and bat study area overview, Seneca and Sandusky Counties, Ohio, 2015. ....	2
Figure 2. Mist-net site locations, Republic Wind Project study area, Seneca and Sandusky Counties, Ohio, 2015. ....	8
Figure 3. Roost trees used by northern long-eared bats, Republic Wind Project, 2015. ....	11
Figure 4. Roost trees used by northern long-eared bats, Republic Wind Project, 2015. ....	12
Figure 5. Roost trees used by northern long-eared bats, Republic Wind Project, 2015. ....	13
Figure 6. Roost trees used by the Indiana bat, Republic Wind Project, 2015.....	14
Figure 7. Foraging points collected on five northern long-eared bats and one Indiana bat, Republic Wind Project, 2015. ....	18
Figure 8. Foraging areas utilized by all radio tagged bats, Republic Wind Project, 2015.....	21
Figure 9. Foraging area utilized by bat 030, Republic Wind Project, 2015.....	22
Figure 10. Foraging area utilized by bat 137, Republic Wind Project, 2015.....	23
Figure 11. Foraging area utilized by bat 205, Republic Wind Project, 2015.....	24
Figure 12. Foraging area utilized by bat 287, Republic Wind Project, 2015.....	25
Figure 13. Foraging area utilized by bat 587, Republic Wind Project, 2015.....	26
Figure 14. Foraging area utilized by bat 779, Republic Wind Project, 2015.....	27

## APPENDICES

Appendix A: Mist-Net Data Sheets
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) completed a bat mist-net and telemetry survey for the proposed Republic Wind Project (Project) in Seneca and Sandusky counties, Ohio. The Project is located approximately 11 kilometers northeast of Republic Ohio, and covers approximately 37,777 acres, the majority of which is non forested (~94%) based on estimates derived from National Land Cover Dataset (Figure 1). The goals of this survey were to document bat species diversity and abundance within the study area, and inform understanding of roosting habitat, foraging range, and spatial distribution of Indiana bats and northern long-eared bats, if captured.

## METHODOLOGY

### *Level of Effort/Site Selection*

Mist-net surveys were implemented in accordance with guidelines outlined in the 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2015), 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). Because the survey was not a presence/absence survey for listed bats, the total number of net nights per mist-net site and specific net set requirements followed ODNR (2009). A study plan was submitted to the USFWS and the ODNR on 7 July 2015 and concurrence was received on 13 July (USFWS) and 22 July (ODNR).

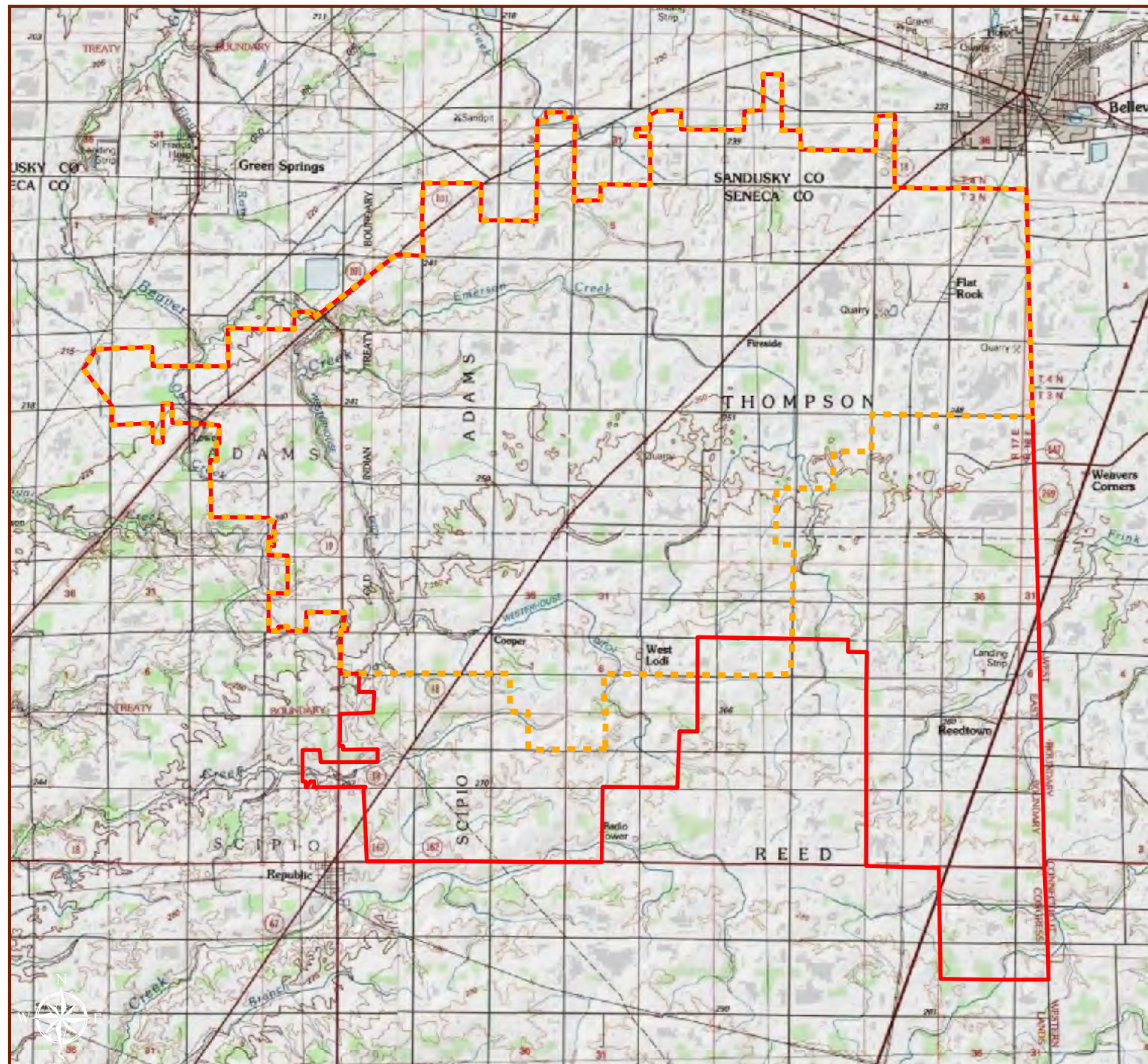
The level of effort outlined in the study plan was based on the estimated amount of forested habitat within the Study Area (~4,454 ac) resulting in 36 mist-net sites surveyed from 23 July through 31 July 2015. After field work was completed, the area of the Project was reduced and is denoted as Project Area – Reduced Fall 2015 in Figure 1. The level of effort completed exceeds the level of effort required for the Project Area.

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).





**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project Project Overview Map



Seneca County, Ohio

- Project Area - Reduced Fall 2015
- Study Area

1:120,000  
or  
1 inch = 10,000 ft

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex Clean  
Energy, ESRI, USGS  
Date: 10/5/2015

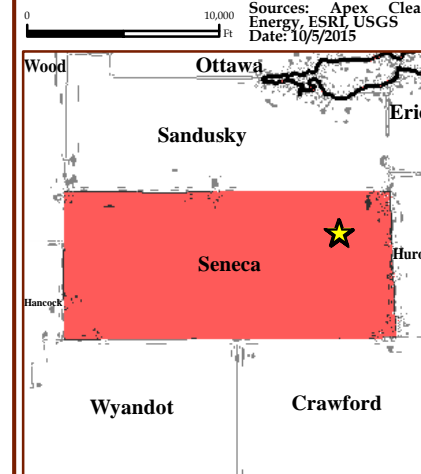


Figure 1. Proposed Republic Wind Project and bat study area overview, Seneca and Sandusky Counties, Ohio, 2015.



Each mist-net site consisted of four net sets with at least one set being a high net (three mist-nets stacked to create one set that was ~7.5 m tall). Mist-net sites were surveyed for two nonconsecutive nights (due to an access issue, site 3 was surveyed for only one night), totaling eight net nights per site. 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. 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 individual captured. 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. All captured northern long-eared bats and Indiana 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 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 Used for Characterizing Wing Condition of Bats Affected by White-nose Syndrome” (Reichard and Kunz 2009).

### *Radio Telemetry*

#### *Radio Transmitter Attachment*

Captured Indiana and northern long-eared bats were radio-tagged in order to locate diurnal roosts. 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 and locate 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 or recorded with a night vision video camera, which allowed 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 the back of the 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 the 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=6) and compared them to the actual locations of those roosts as documented via ground telemetry. The resulting telemetry error from the airplane was  $340.0 \pm 128.0$  (SE) m (range: 91.0 – 950.0 m).

Locations of foraging bats and capture locations were pooled and examined using the fixed kernel method and a least squares cross-validation smoothing parameter conducted with Biotas™ version 2.0a 3.8 (Ecological Software Solutions LLC, Hegymagas, Hungary) to determine utilization distributions (UD) for each individual. UD's were imported into ArcGIS to calculate the 50%, 75%, and 95% probability contour for each individual bat and for all bats combined. Foraging areas were defined based on the area of use within these probability contours. Most of the foraging area with outlier locations eliminated was defined by the 95% probability contours (majority foraging area), areas within the 75% probability contours were considered intermediate foraging usage areas, and 50% probability contours were considered core foraging areas. Probability contours were imported into ArcGIS for additional analysis using aerial photography, USGS spatial analysis, and GIS layers provided by Apex to characterize foraging areas.

One-sample Student's t-tests were used to determine differences in foraging area sizes (50%, 75%, 95% probability contours) among individual bats and among female northern long-eared bats. Average values were reported with plus or minus standard error ( $\pm$ SE). Pearson's correlation tests (r) were used to determine the relationship between the number of points collected for each foraging bat and the number of nights a bat was tracked. An analysis of variance (one-way ANOVA) was used to determine differences among individual bats in distances foraged from forested habitat.

## RESULTS AND DISCUSSION

### *Mist-Net Survey*

Mist-net surveys were conducted at 36 sites from 23 - 31 July 2015 (Table 1, Figure 2). A total of 429 bats of six species were captured, including one female Indiana bat and fourteen (12 female, 2 male) northern long-eared bats, over 284 net nights (Table 2). Big brown bats (*Eptesicus fuscus*) comprised 75 percent of total captures (n=320) and eastern red bats (*Lasiurus borealis*) comprised 21 percent of total captures (n=88). Completed bat capture data sheets are provided in Appendix A, photographs of mist-net sites are provided in Appendix B, and representative photographs of each bat species captured are provided in Appendix C.

Table 1. Mist-net site locations, Republic Wind Project, Ohio, 2015.

Site No.	Latitude	Longitude	Site Location
1	41.167111	-82.884334	N. County Rd. 29, Schriener Prop., Woodlot Near Pond
2	41.115820	-82.843740	Stream Corridor Southeast Of Township Rd And Trail 0197
3	41.181645	-82.932637	Wood Lot; Saturated Mud Flats
4	41.155000	-82.855900	Woodlot Off Reedtown Rd
5	41.167295	-82.848025	Woodlot West Of CR 4 With Intermittent Stream
6	41.186530	-82.849620	Woodlot South Of CR 46
7	41.252800	-82.865720	SW Of Site 28
8	41.170720	-82.893070	Stream Off Of CR 136
9	41.143560	-82.929480	Woodlot South Of E Township Road 124
10	41.153120	-82.926210	Forest Gap; Logging Road; Pond In Forest
11	41.139200	-82.992230	CR 122
12	41.184500	-82.935600	Wooded Area Of N. CR 27
13	41.178090	-82.890620	Woodlot Logging Road Off Stream
14	41.224734	-83.028039	Woodlot SE Of Portland Rd
15	41.200800	-83.015200	Creek Along Hwy 19
16	41.157652	-82.989259	Pond In Woodlot West Of CR 28 And S Of East CR 24
17	41.175850	-82.960330	Woodlot Next To Soybean Field Off N Township Rd 183
18	41.179190	-82.928270	Woodlot And Perennial Stream
19	41.176590	-83.003480	Forest/ Ag Edge, Stream, Corridor
20	41.186390	-82.931455	Wood Lot Off CR 15 S And East Of North CR 27
21	41.211200	-82.963580	Woodlot South Of Site 26



Site No.	Latitude	Longitude	Site Location
22	41.219650	-82.944167	5425 N SR 18, Woodlot, Ziegler Property
23	41.249950	-82.962020	Township Road 78 Meacham Prop, Interior Mudflats & Trails @ deer stand
24	41.178040	-82.888610	Logging Road Through Woodlot; Open Water Of Emergent Wetland
25	41.217306	-82.908250	Decker Property Of E CR 32
26	41.218160	-82.967180	Trails Through Woods Behind "Sugar Shack"
27	41.188540	-82.986353	Snavelly Property Off TR 138
28	41.253563	-82.868040	Woodlot South Of CR 62, West Of CR 68
29	41.247860	-82.937220	Woodlot Beside Lodi-Colby Road, Ag Field
30	41.182580	-83.024150	Woodlot East Of Township Road 138
31	41.155560	-82.949780	Woodlot Bordered By Bean And Corn, South Of E. County Road 24
32	41.175420	-82.922500	Woodlot South Of East Township Road
33	41.182330	-82.935820	Woodlot And Pond Near Coyote Grove Campground
34	41.153410	-82.961690	Woodlot South Of East County Rd 34 And West Of Township Rd 183
35	41.183680	-82.903440	Recently Logged Wood Lot
36	41.155480	-83.004700	Woodlot South Of County Rd. 24

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

Species	Adult Male		Adult Female			Juvenile			Escaped	Total
	NR*	S	P	L	PL	NR	Female	Male		
<i>Eptesicus fuscus</i>	42	52	1	10	73	8	51	71	12	320
<i>Lasiurus borealis</i>	2	3	0	4	16	3	37	10	13	88
<i>Lasiurus cinereus</i>	0	0	0	0	0	1	1	3	0	5
<i>Myotis septentrionalis</i>	1	0	0	2	3	2	5	1	0	14
<i>Myotis sodalis</i>	0	0	0	0	1	0	0	0	0	1
<i>Perimyotis subflavus</i>	0	0	0	0	0	0	1	0	0	1

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

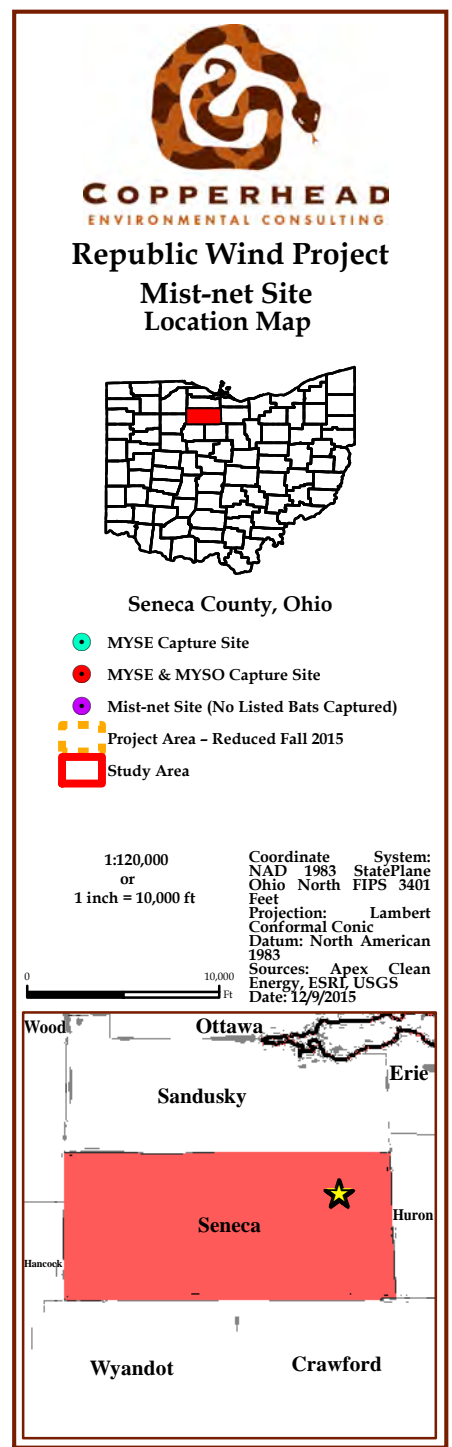
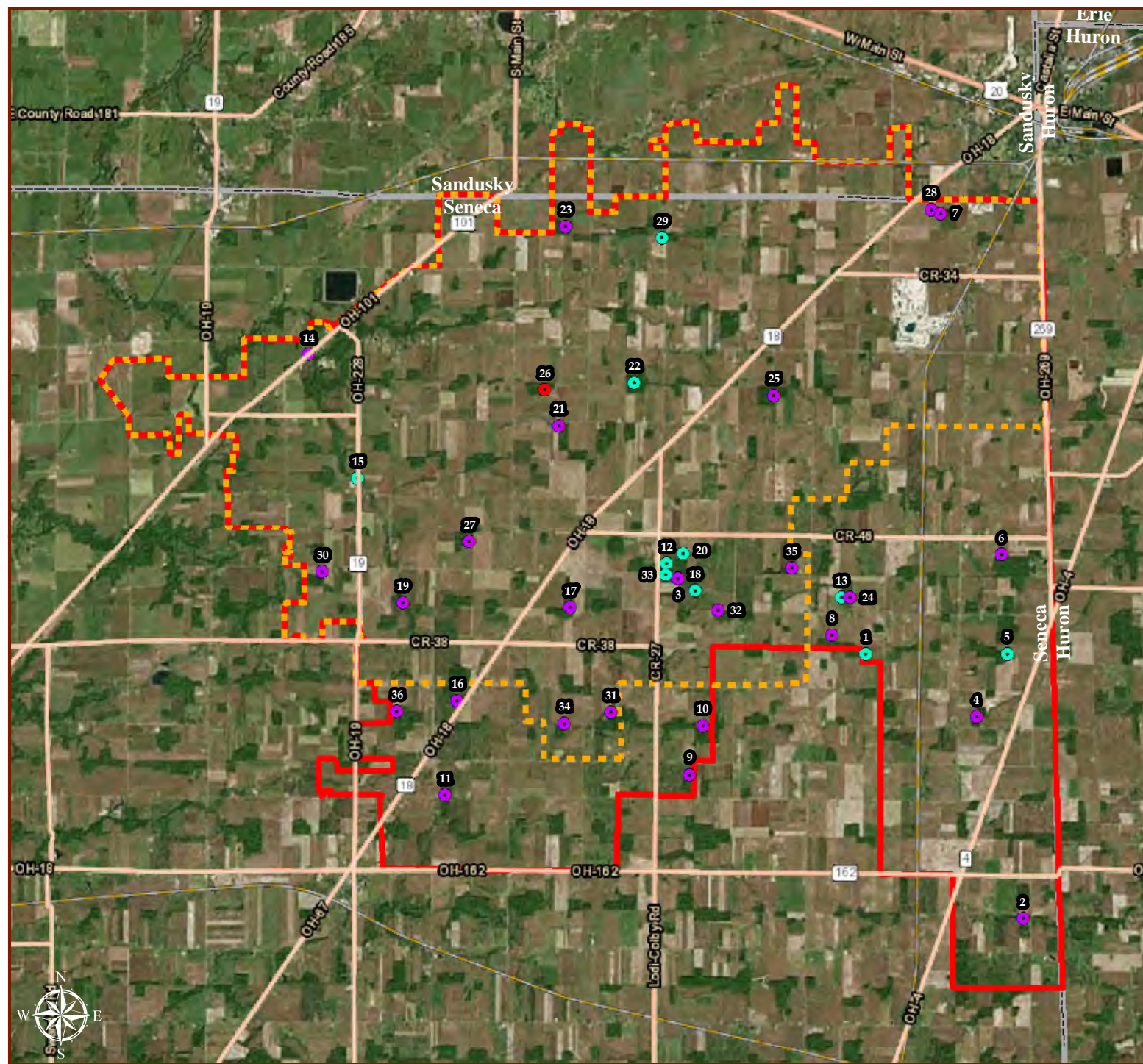


Figure 2. Mist-net site locations, Republic Wind Project study area, Seneca and Sandusky Counties, Ohio, 2015.



### *Diurnal Radio Telemetry*

In accordance with the ODNR/USFWS approved study plan, seven northern long-eared bats and the only Indiana bat captured were radio-tagged in order to locate diurnal roost trees (Table 3).

Table 3. Indiana and northern long-eared bats captured and radio-tagged during the mist-net survey, Republic Wind Project, Ohio, 2015.

Species <sup>1</sup>	Site No.	Band Number (ODNR)	Age <sup>2</sup>	Sex <sup>3</sup>	Reproductive Status <sup>4</sup>	Mass (g)	Transmitter Freq. (172.xxx) BAT ID
MYSE	26	23551	A	F	PL	6.5	188
MYSE	26	23552	A	F	PL	7.25	587
MYSE	18	23360	J	F	NR	6.75	030
MYSE	18	23361	A	F	NR	7.5	137
MYSE	13	17179	A	F	L	7.5	205
MYSE	22	17171	A	M	NR	8.0	287
MYSE	33	17166	A	F	NR	6.0	450
MYSE	18	23362	J	F	NR	6.0	-
MYSE	1	17172	A	M	NR	7.0	-
MYSE	5	- <sup>5</sup>	J	F	NR	6.0	-
MYSE	12	17344	J	F	NR	6.0	-
MYSE	13	17179	A	F	L	7.0	-
MYSE	15	17345	A	F	PL	7.5	-
MYSE	20	17168	J	F	NR	6.0	-
MYSO	26	23553	A	F	PL	8.5	779

<sup>1</sup> MYSE=northern long-eared bat, MYSO=Indiana bat

<sup>2</sup> A=adult, J=juvenile

<sup>3</sup> F=female, M=male

<sup>4</sup> PL=post-lactating, NR=non-reproductive, L=lactating

<sup>5</sup> Escaped before band could be fitted

Of the eight bats that were radio-tagged, three northern long-eared bats and one Indiana bat were tracked for seven days each. One northern long-eared bat (MYSE 188) was tracked for two days, and one (MYSE 137) was tracked for three days, both due to the transmitter falling off. One northern long eared bat (MYSE 450) was captured on the last night of the mist-net survey and was only tracked for two days because the maximum number of bats to be radio-tagged had already been met. The male northern long-eared bat was not tracked during diurnal telemetry because the target number of females were met. As a result of the diurnal radio telemetry effort, 14 northern long-eared bat roost trees and two Indiana bat roost trees were located (Table 4, Figures 3-6). Completed roost tree data sheets are in Appendix D and roost tree photographs are in Appendix E.

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

Roost Tree No.	Tree Species	DBH (cm)	Estimated Height (m)		Condition <sup>2</sup>	Tree Ranking <sup>3</sup>	Bat Species Use <sup>4</sup> _BAT ID	No. Calendar Days Used
			Tree	Roost				
983	<i>Fraxinus pennsylvanica</i>	27.0	9.0	3.0	S	S	MYSE_188	1
395	<i>Prunus serotina</i>	37.2	17.0	10.7	S	C	MYSE_188 MYSE_587	3
985	<i>Fraxinus pennsylvanica</i>	28.5	12.0	8.0	S	C	MYSE_137	1
988	<i>Acer saccharinum</i>	36.3	15.0	20.0	LD	C	MYSE_137	1
986	<i>Acer saccharinum</i>	16.6	5.0	4.0	S	S	MYSE_137	1
984	<i>Fraxinus pennsylvanica</i>	34.3	12.0	7.0	S	C	MYSE_030	2
987	<i>Acer saccharinum</i>	56.3	12.0	8.0	S	C	MYSE_030	5
369	<i>Fraxinus pennsylvanica</i>	40.0	4.0	3.0	S	U	MYSE_587	1
371	<i>Fraxinus pennsylvanica</i>	42.4	18.0	9.0	S	C	MYSE_587	2
372	<i>Carya ovata</i>	34.0	23.0	15.0	L	C	MYSE_587	1
373	<i>Fraxinus sp.</i>	47.2	24.5	12.0	S	C	MYSE_587	2
140	<i>Fraxinus sp.</i>	48.5	25.0	20.0	S	C	MYSE_205	2
314	<i>Quercus sp.</i>	91.0	18.5	-	S	C	MYSE_205	2
396	<i>Fraxinus sp.</i>	31.0	11.0	6.0	S	C	MYSE_450	2
368	Unk. <sup>1</sup>	52.7	21.5	7.5	S	C	MYSO_779	5
370	<i>Fraxinus. pennsylvanica</i>	58.7	18.5	3.0	S	C	MYSO_779	1

<sup>1</sup> unk = too decayed to determine species

<sup>2</sup> L = live, LD = live damaged, S = snag

<sup>3</sup> C= canopy, SC = sub canopy, U = understory

<sup>4</sup> MYSE = northern long-eared bat, MYSO = Indiana bat



**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project

### Roost Tree Location Map



Seneca County, Ohio

▲ MYSE Roost Tree

1:6,000  
or  
1 inch = 500 ft

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

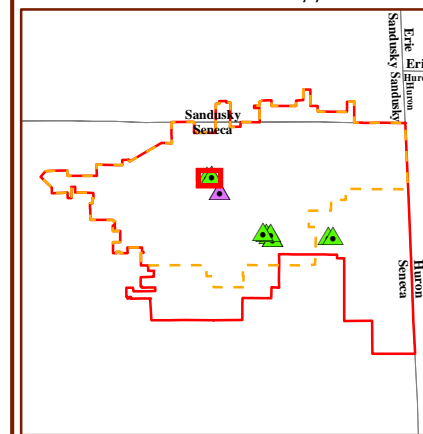


Figure 3. Roost trees used by northern long-eared bats, Republic Wind Project 2015.





## Republic Wind Project

### Roost Tree Location Map



Seneca County, Ohio

▲ MYSE Roost Tree

1:6,000  
or  
1 inch = 500 ft

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

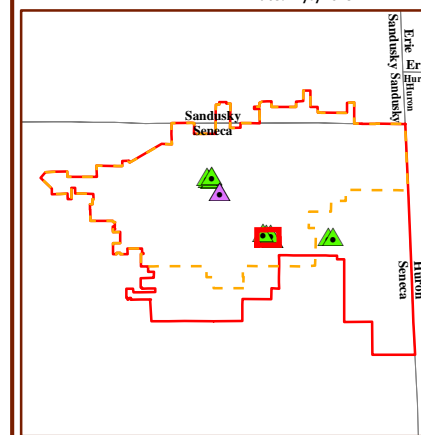
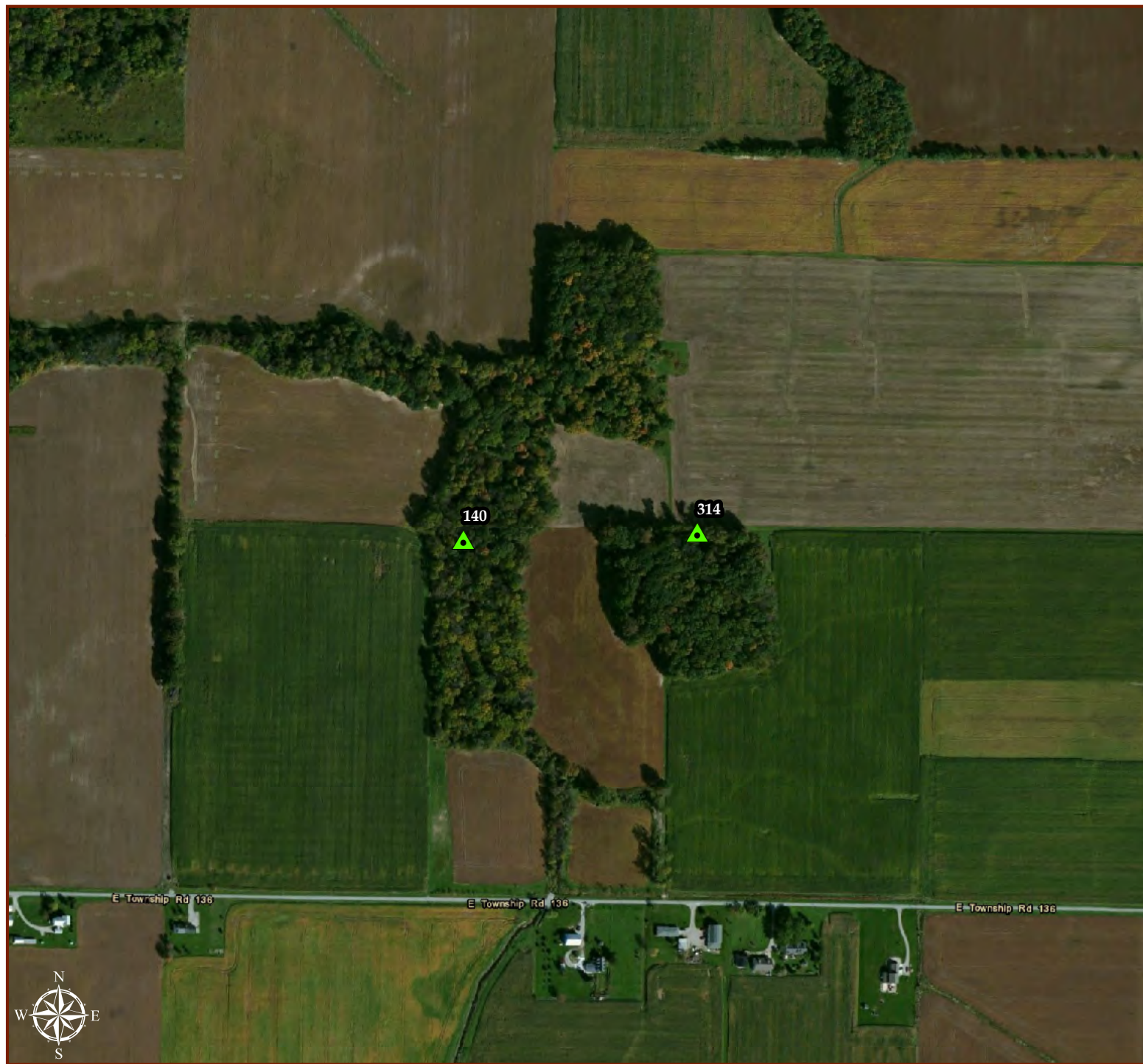


Figure 4. Roost trees used by northern long-eared bats, Republic Wind Project, 2015.





**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project

### Roost Tree Location Map



Seneca County, Ohio

▲ MYSE Roost Tree

1:6,000  
or  
1 inch = 500 ft

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

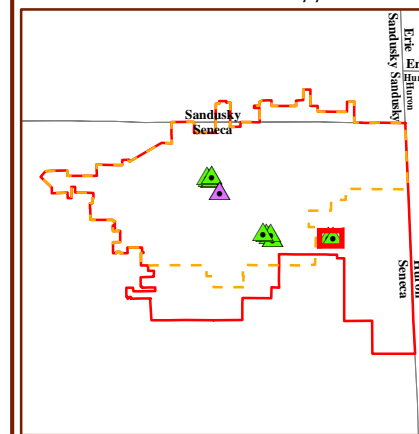


Figure 5. Roost trees used by northern long-eared bats, Republic Wind Project, 2015.





**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project

### Roost Tree Location Map



Seneca County, Ohio

▲ MYSO Roost Tree

1:6,000  
or  
1 inch = 500 ft

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

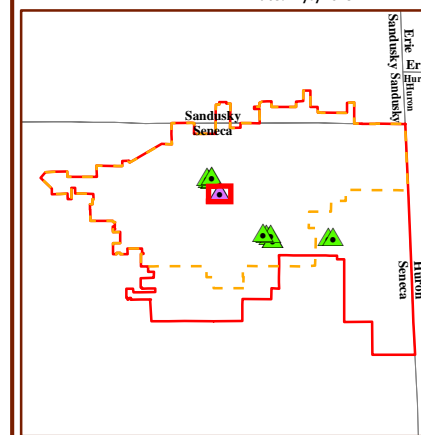


Figure 6. Roost trees used by the Indiana bat, Republic Wind Project, 2015.



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

The aerial crew was also used to confirm whether a transmitter had been shed by a bat. When a radio-tagged bat did not emerge from its roost tree during an emergence count and was not heard flying during foraging telemetry efforts that evening, it was considered to have been shed by the bat. This occurred with MYSE 188 on day three of tracking and MYSE 137 on day four of tracking (Table 5).

During seven days of tracking, the juvenile female northern long-eared bat switched roost trees the fewest times (n=2), using two roost trees. The greatest number of roost tree switches (n=4) was done by an adult female northern long-eared bat (MYSE 587) that used five roost trees over seven days. The adult female Indiana bat also switched roost trees four times, but only used two different roost trees over seven days (Table 5).

Table 5. Roost tree (RT) use by radio-tagged northern long-eared and Indiana bats, Republic Wind Project, Ohio, 2015.

Bat ID	Bat <sup>1</sup>	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug
188	AF-MYSE	RT983	RT395	shed	-	-	-	-	-	-
137	AF-MYSE	-	-	RT985	RT986	RT988	shed	-	-	-
030	JF-MYSE	-	-	RT984	RT984	RT987	RT987	RT987	RT987	RT987
587	AF-MYSE	-	-	RT395	RT369	RT371	RT371	RT372	RT373	RT373
205	AF-MYSE	-	-	RT140	RT140	no signal	RT314	RT314	off parcel	off parcel
450	AF-MYSE	-	-	-	-	-	-	-	RT396	RT396
779	AF-MYSO	-	-	RT368	RT370	RT368	off parcel	RT368	RT368	RT368

<sup>1</sup> AF = adult female, JF = juvenile female, MYSE=northern long-eared bat, MYSO=Indiana bat

### *Emergence Counts*

A total of 37 emergence counts were conducted from 25 July – 2 August 2015 (Table 6). The highest emergence count from a single roost tree was five bats, which occurred at two northern long-eared bat roost trees [RT987 (juvenile female), RT371 (adult female)], and one Indiana bat roost tree [RT368 (adult female)]. In several instances, despite knowing there was at least one radio-tagged bat in a roost tree, the bat(s) did not emerge before dark and those roost trees were given an emergence count of zero (Table 6).

Table 6. Emergence counts of northern long-eared and Indiana bat roost trees, Republic Wind Project, Ohio, 2015.

Roost No.	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug
MYSE <sup>1</sup>									
983	1						1		
395		1		0 <sup>2</sup>		0 <sup>2</sup>			
985			2	1					
984			1	1					
140			2	2					
986				1			0		
369				0 <sup>2</sup>					
987					3	3	5	3	1
988					2	0 <sup>2</sup>			
371					3	5			
314						3			
372							1		
396								1	2
373								1	1
Total Bats	1	1	5	5	8	11	7	5	4
MYSO <sup>1</sup>									
368			4	1	2		5	2	1
370				1		0			
Total Bats			4	2	2	0	5	2	1

<sup>1</sup> MYSE = northern long-eared bat, MYSO = Indiana bat

<sup>2</sup> radio-tagged bat was present in tree, but did not emerge before dark

### *Foraging Telemetry*

Foraging telemetry was conducted on one Indiana bat and five northern long-eared bats from 27 – 31 July 2015 as outlined in the USFWS/ODNR approved study plan (Table 7). Two northern long-eared bats, one adult male and one adult female, were tracked for less than five nights because telemetry effort focused on female bats and MYSE 137's transmitter shed after three days. All other radio-tagged bats were tracked for five nights each. The number of foraging points collected for each bat ranged from 10 – 87 with an average of  $54.5 \pm 11.6$  points per bat (Figure 7).

Table 7. Data collected on foraging northern long-eared and Indiana bats, 27 July – 31 July, Republic Wind Project, Ohio, 2015.

Bat ID	Age*	Sex*	Repro. Status*	Species*	No. Nights Tracked	No. Points Collected
030	J	F	NR	MYSE	5	87
137	A	F	NR	MYSE	3	38
205	A	F	L	MYSE	5	63
587	A	F	PL	MYSE	5	49
287	A	M	NR	MYSE	2	10
779	A	F	PL	MYSO	5	80

\* J = juvenile, A = adult, F = female, M = male, NR = non-reproductive, L = lactating, PL = post-lactating, MYSE = northern long-eared bat, MYSO = Indiana bat

Foraging area sizes were calculated for six radio-tagged bats (Table 8, Fig. 8). Sizes of the 50% and 75% probability contour foraging areas were not different among individuals; however, 95% probability contour foraging areas did vary in size among individuals (Table 9). Variation in total foraging area sizes is to be expected when comparing across multiple species, ages, and sexes; however, total foraging area sizes varied even among female northern long-eared bats (Table 9, 10). Foraging areas for individual bats are displayed in Figures 9 – 14.

Mean foraging distance from forested habitat did not differ among individual bats ( $F_{5,121} = 1.692$ ,  $P = 0.142$ ), therefore all bats were grouped together resulting in 39 percent of foraging points ( $n=127$ ) being located outside of forested habitat. The mean distance bats foraged from the forest edge was  $57.5 \pm 5.1$  meters (range: 0.2 – 379.3 m). However, 61 percent of foraging points ( $n = 202$ ) were within forested habitat.

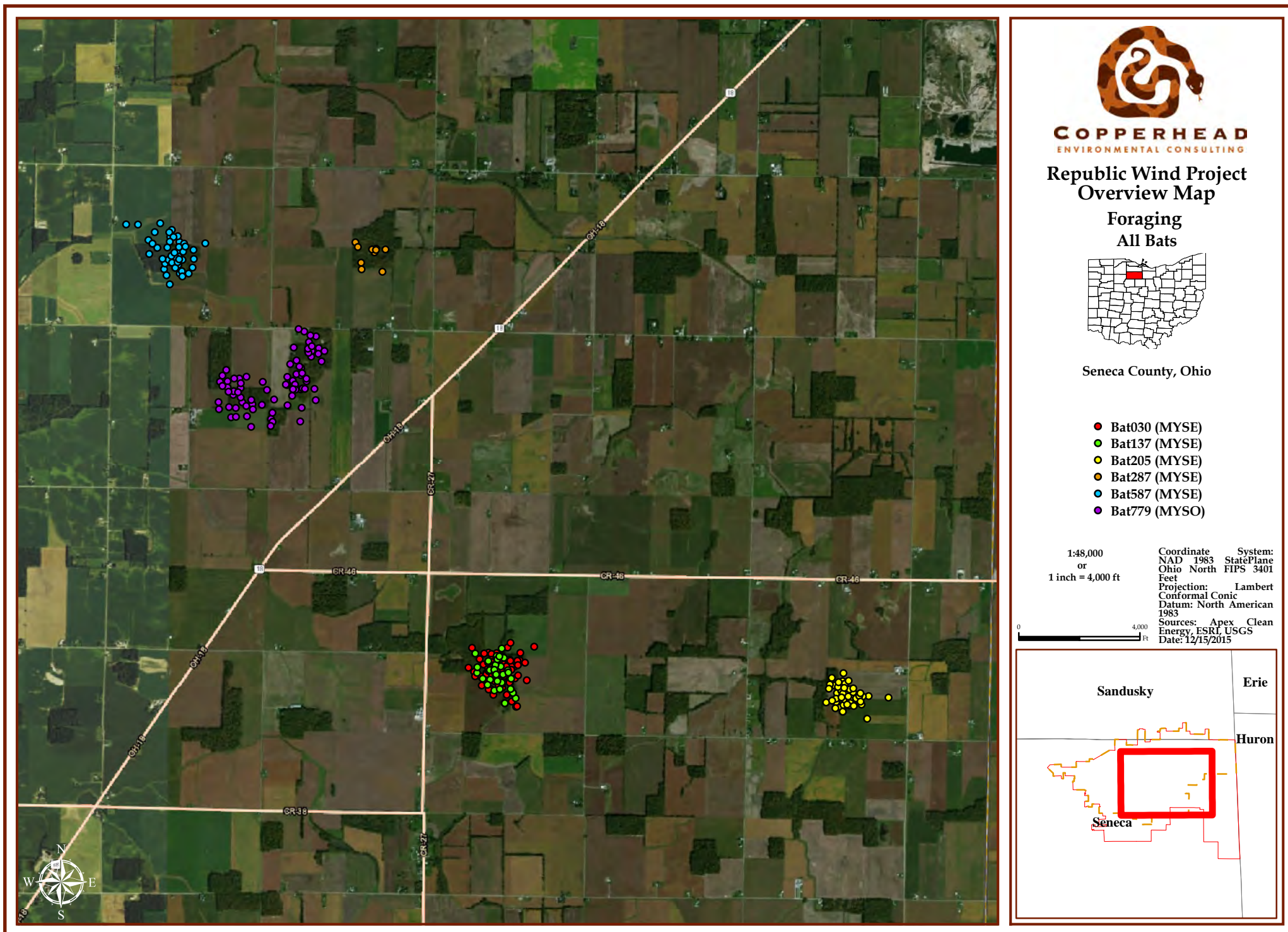


Figure 7. Foraging points collected on five northern long-eared bats and one Indiana bat, Republic Wind Project, 2015.



Table 8. Foraging area sizes for northern long-eared and Indiana bats, Republic Wind Project, 27 July – 31 July, 2015.

Bat ID	Age*	Sex*	Species*	Foraging Area (acres)		
				95% contour	75% contour	50% contour
multiple			Sum of All Bats	366.0	74.2	27.6
030	J	F	MYSE	100.6	41.5	20.4
137	A	F	MYSE	65.4	31.2	8.0
205	A	F	MYSE	52.6	22.7	10.6
587	A	F	MYSE	110.2	18.1	45.3
287	A	M	MYSE	15.1	3.2	1.1
779	A	F	MYSO	266.4	138.7	58.1
multiple			Mean of All Bats	101.7±35.8	47.1±3.2	19.4±8.3

\* J = juvenile, A = adult, F = female, M = male, MYSE = northern long-eared bat, MYSO = Indiana bat

Table 9. Comparison of foraging area size among individuals, Republic Wind Project, 27 July – 31 July, 2015. Italicized values are significant at level alpha = 0.05.

Bat Group	Foraging Area					
	mean 95% contour		mean 75% contour		mean 50% contour	
	t	p	t	p	t	p
All Bats (n = 6)	2.347	0.066	2.437	> 0.05	2.841	<i>0.036</i>
Female MYSE (n=4)	2.479	0.089	5.506	<i>0.012</i>	5.956	<i>0.009</i>

Table 10. Mean foraging area size for three adult and one juvenile female northern long-eared bats, Republic Wind Project, 27 July – 31 July, 2015.

Bat group	Foraging Area (acres)					
	mean 95%		mean 75%		mean 50%	
	contour	range	contour	range	contour	range
Female MYSE (n = 4)	82.2±13.8	52.6 – 110.2	35.2±5.1	22.7 – 45.3	14.3±2.9	8.0 – 20.4

The number of foraging points collected per bat was similar to the low end number of foraging points collected in other similar studies that were conducted for much longer periods of time (Menzel et al. 2005, Womack et al. 2013). In addition, the overall number of foraging points collected over five days was similar to the number collected from ground crews over several months in other studies (Menzel et al. 2005, Womack et al. 2013). Although the number of foraging points collected was strongly correlated with the number of nights a bat was tracked ( $r = 0.879$ ,  $p = 0.021$ ), the size of the core

foraging area (50% probability contour) was not correlated to the number of nights a bat was tracked ( $r = 0.664$ ,  $p = 0.150$ ) or the number of location points collected ( $r = 0.557$ ,  $p = 0.251$ ) for each bat.

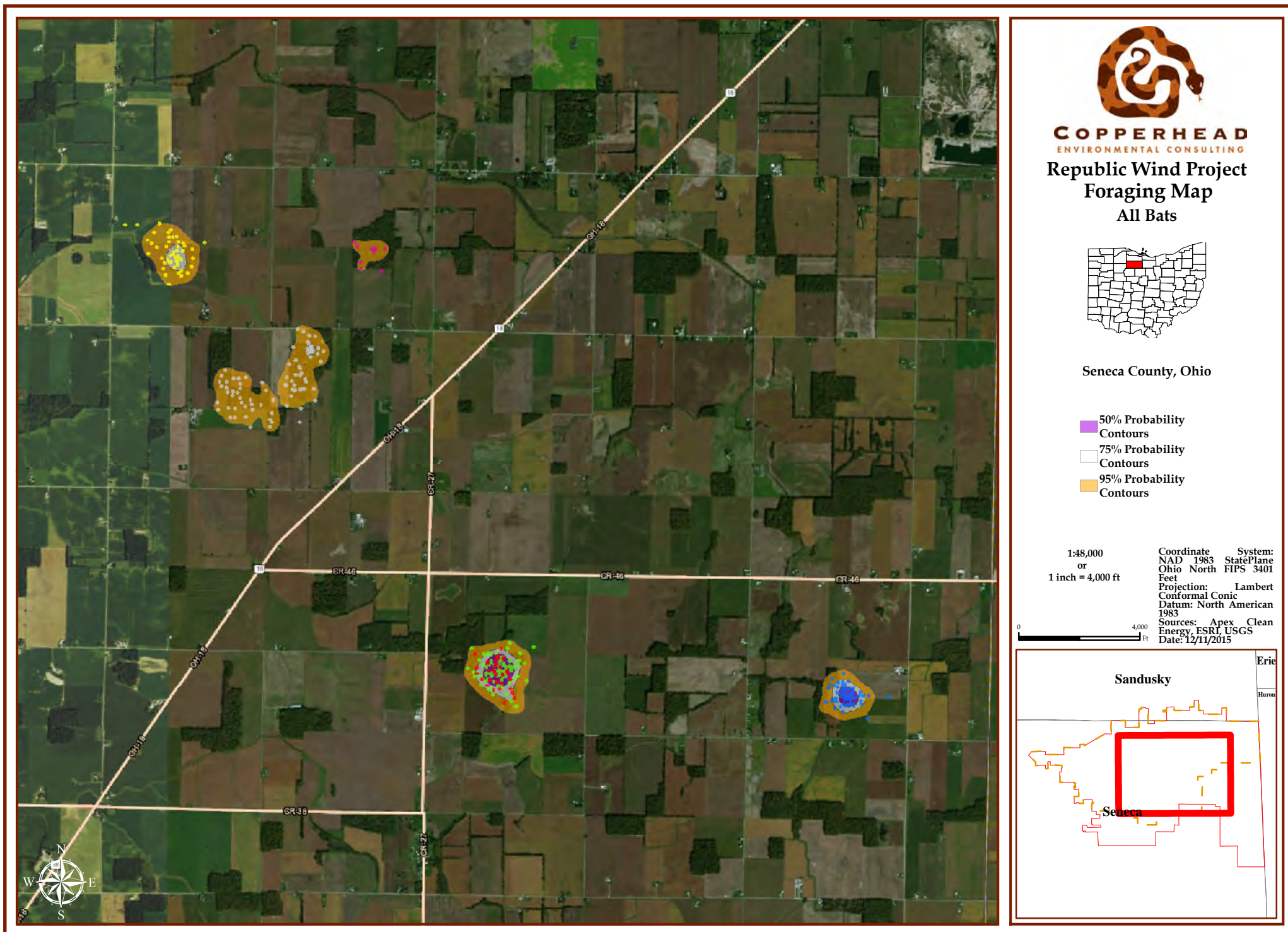


Figure 8. Foraging areas utilized by radio-tagged bats, Republic Wind Project, 2015.



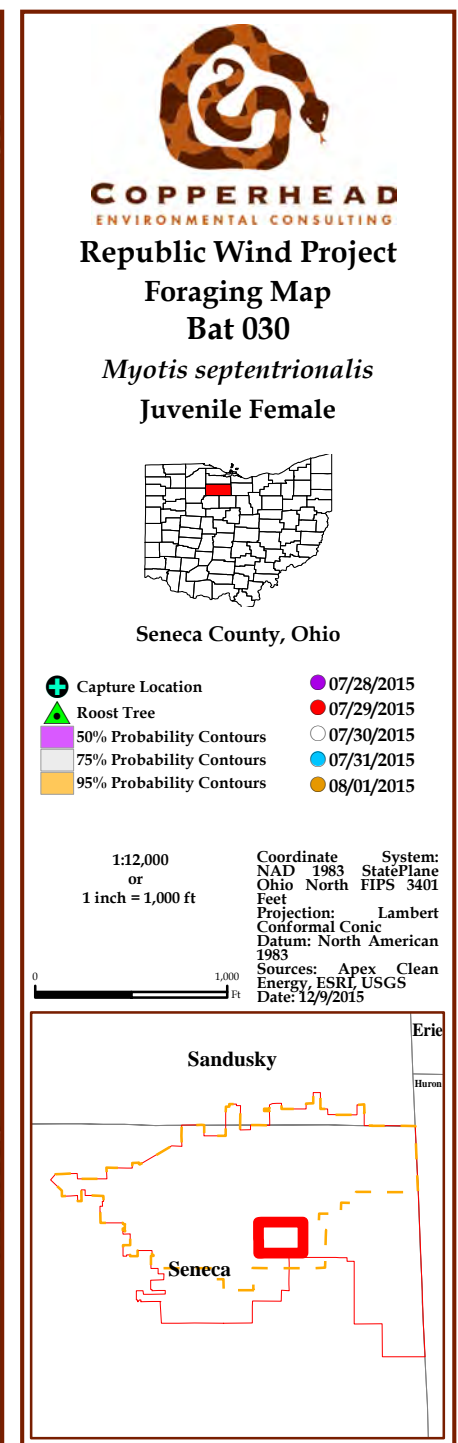
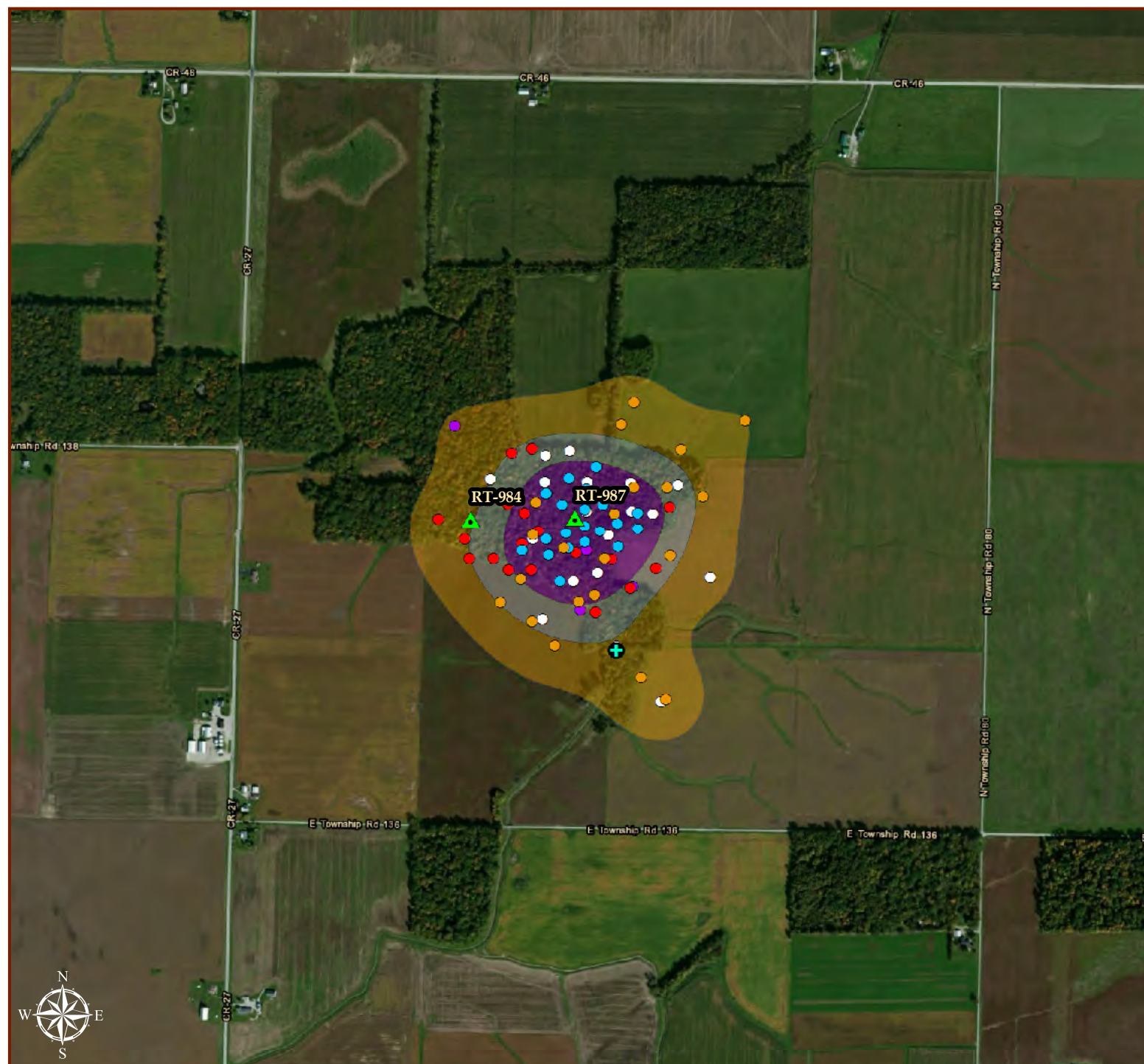
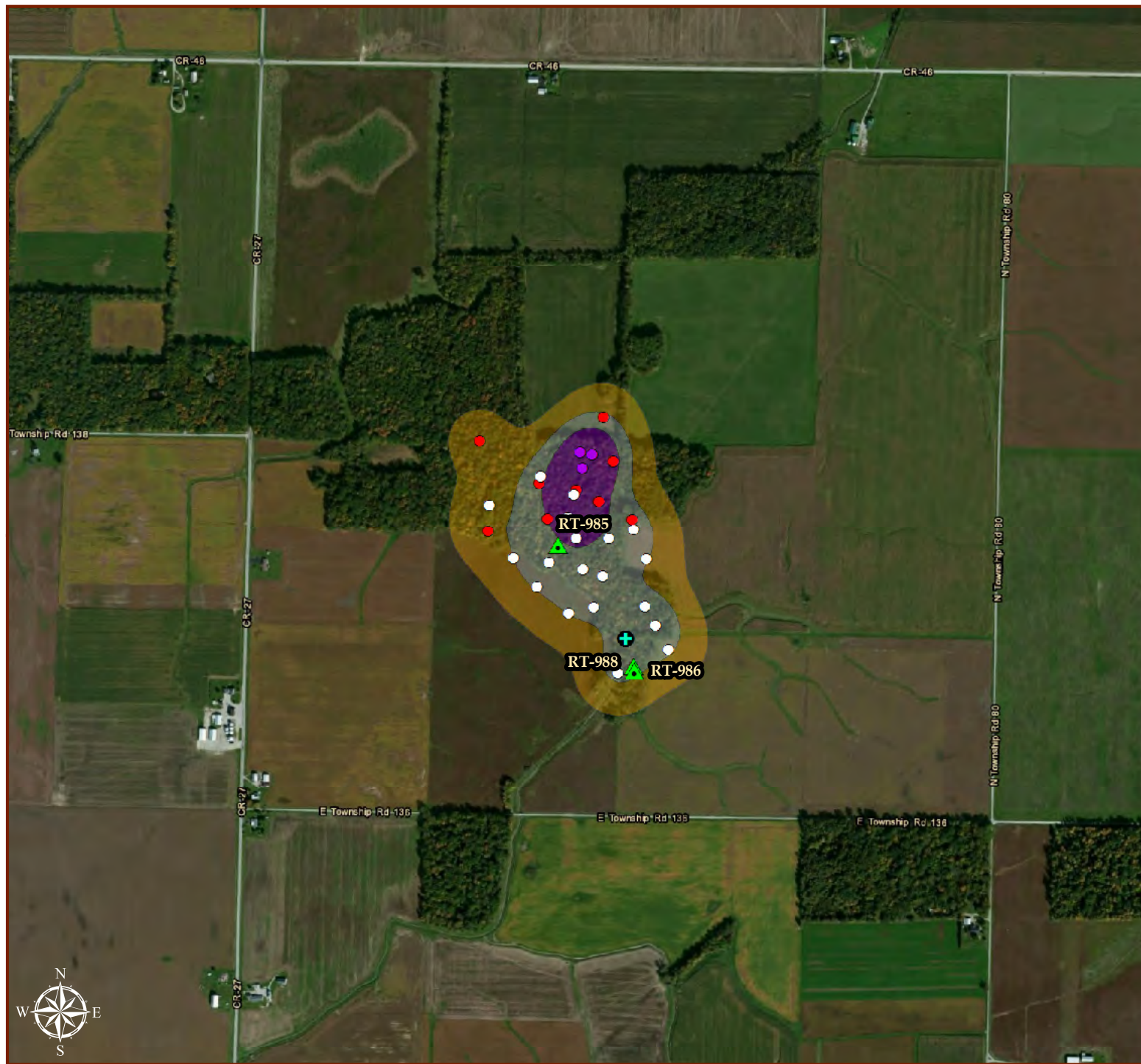


Figure 9. Foraging area utilized by bat 030, Republic Wind Project, 2015.





**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project

### Foraging Map

#### Bat 137

*Myotis septentrionalis*

Adult Female



Seneca County, Ohio

- + Capture Location
- ▲ Roost Tree
- 07/28/2015
- 07/29/2015
- 07/30/2015
- 50% Probability Contours
- 75% Probability Contours
- 95% Probability Contours

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

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

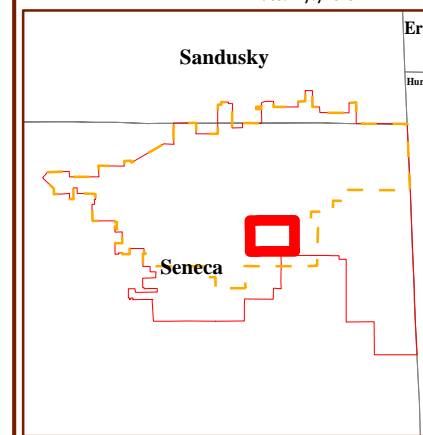


Figure 10. Foraging area utilized by bat 137, Republic Wind Project, 2015.



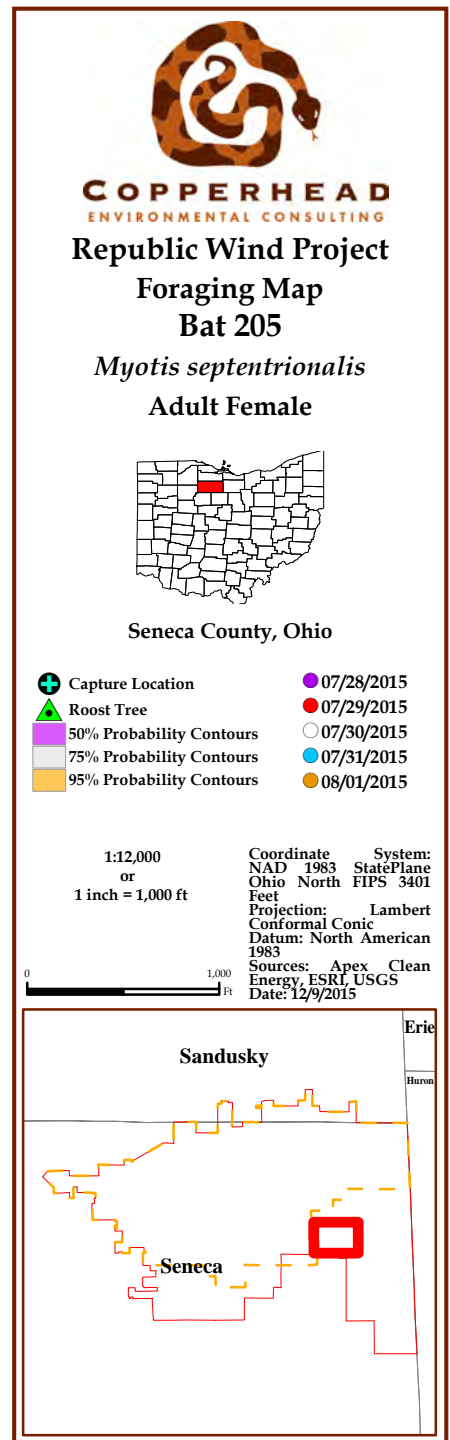


Figure 11. Foraging area utilized by bat 205, Republic Wind Project, 2015.



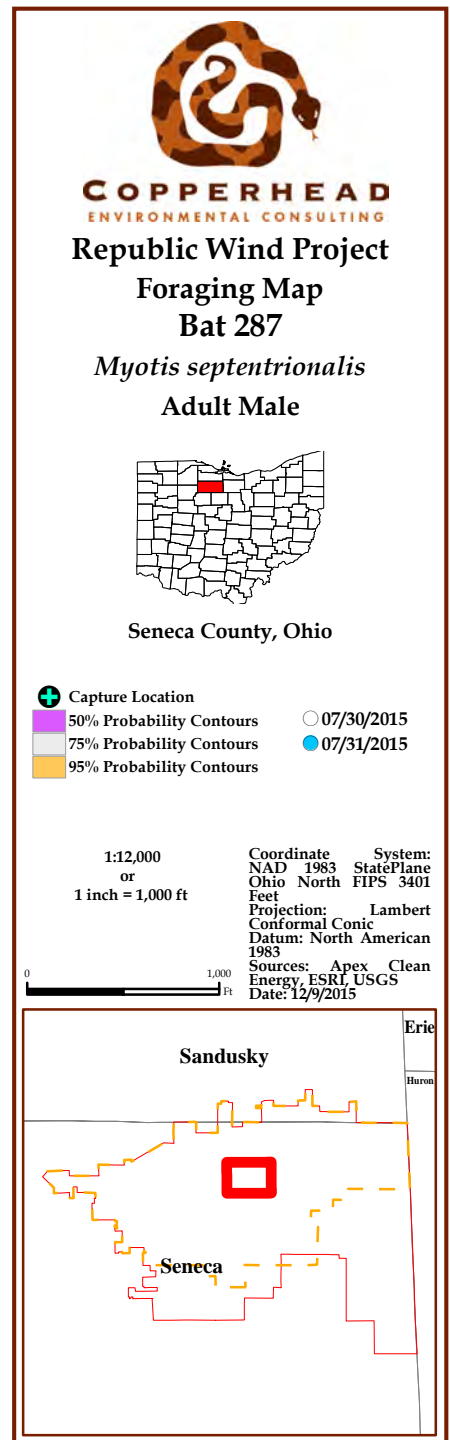
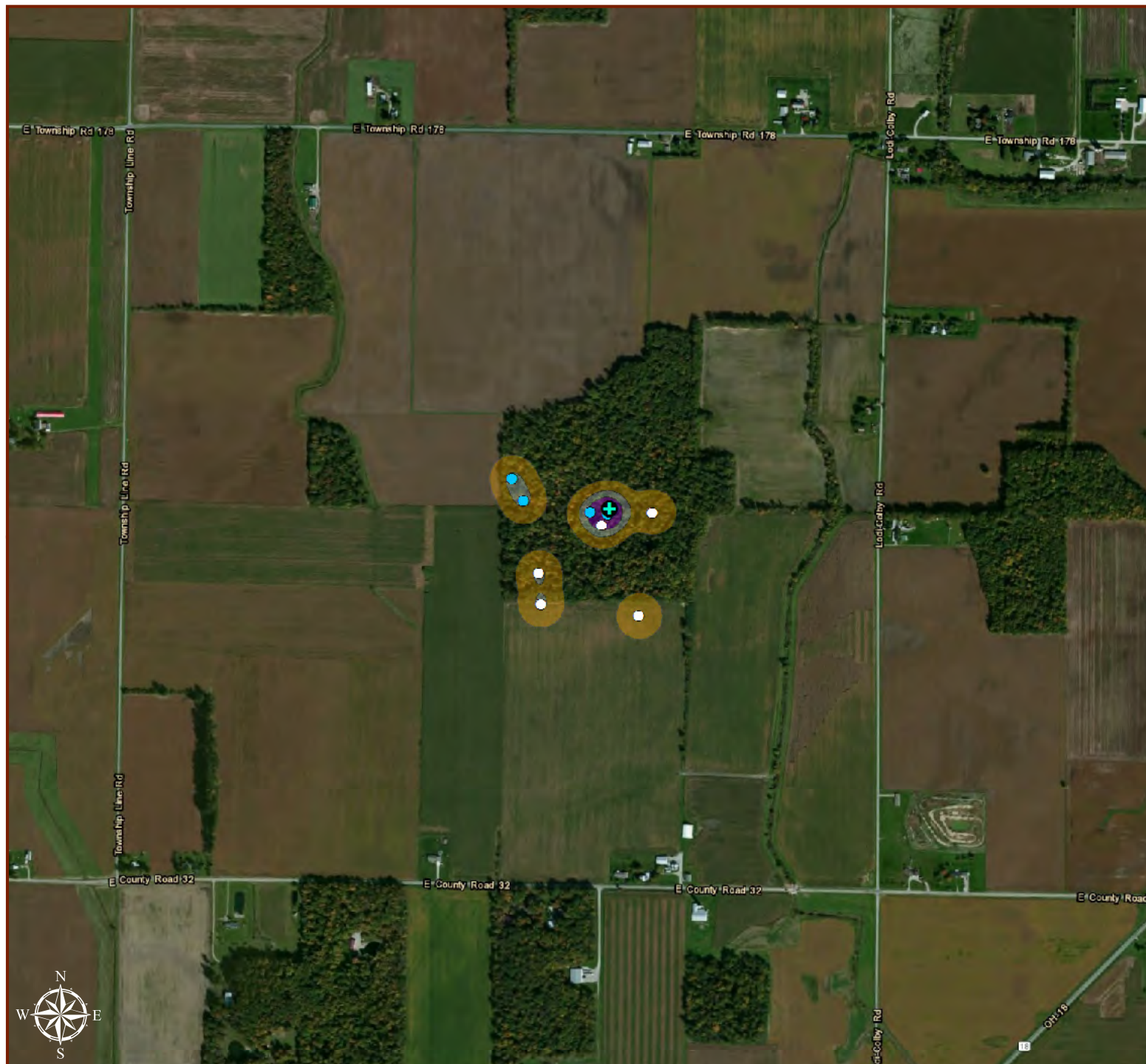
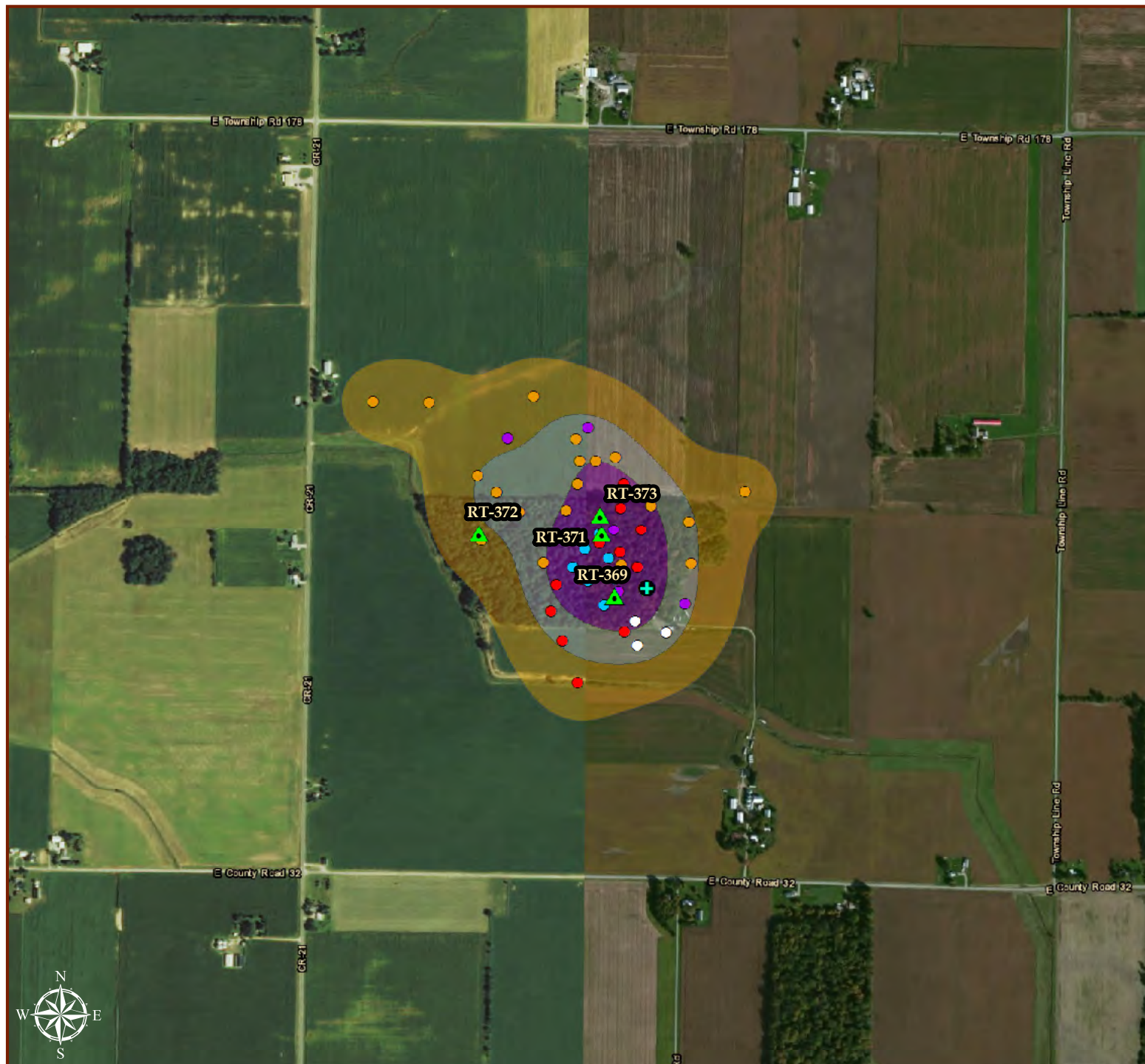


Figure 12. Foraging area utilized by bat 287, Republic Wind Project, 2015.



**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project

### Foraging Map

Bat 587

*Myotis septentrionalis*

Adult Female



Seneca County, Ohio

- + Capture Location
- ▲ Roost Tree
- 50% Probability Contours
- 75% Probability Contours
- 95% Probability Contours
- 07/28/2015
- 07/29/2015
- 07/30/2015
- 07/31/2015
- 08/01/2015

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

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex, Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

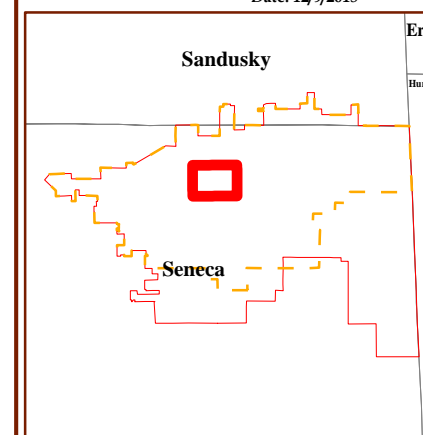


Figure 13. Foraging area utilized by bat 587, Republic Wind Project, 2015.





**COPPERHEAD**  
ENVIRONMENTAL CONSULTING

## Republic Wind Project

### Foraging Map

Bat 779

*Myotis sodalis*

Adult Female



Seneca County, Ohio

- Capture Location
- Roost Tree
- 50% Probability Contours
- 75% Probability Contours
- 95% Probability Contours
- 07/28/2015
- 07/29/2015
- 07/30/2015
- 07/31/2015
- 08/01/2015

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

Coordinate System:  
NAD 1983 StatePlane  
Ohio North FIPS 3401  
Feet  
Projection: Lambert  
Conformal Conic  
Datum: North American  
1983  
Sources: Apex, Clean  
Energy, ESRI, USGS  
Date: 12/9/2015

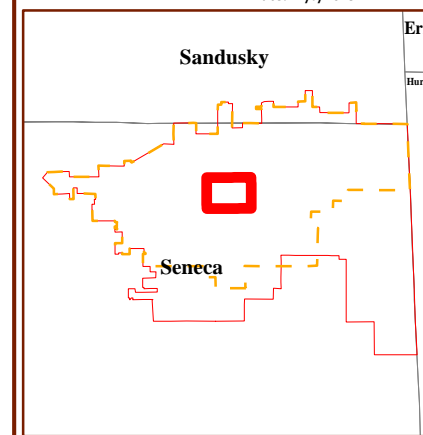


Figure 14. Foraging area utilized by bat 779, Republic Wind Project, 2015.

**This foregoing document was electronically filed with the Public Utilities**

**Commission of Ohio Docketing Information System on**

**12/26/2018 2:46:44 PM**

**in**

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

Summary: Application Exhibit J Part 11 of 33 electronically filed by Teresa Orahod on behalf of Dylan F. Borchers