



Indiana Bat (*Myotis sodalis*) Survey

150 Acres, Massillon Road
Green, Summit County, Ohio

August, 2011





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Qualifications

Davey Resource Group holds federal and state scientific collecting permits for the study of the federally endangered Indiana bat (*Myotis sodalis*). Davey personnel involved in this survey included Jessica Hickey, Benjamin Schuplin, Joe May, Ana Burns, and Roy Montane.

Introduction

The 150-acre Massillon Road Project, located in the City of Green, Summit County, Ohio, consists of undeveloped fields, woodlots, wetlands, and streams which is planned to be transformed into a mixed use development. Portions of this property will be cleared to allow for development. A county location map is provided in Appendix A and on the highway map provided in Appendix B.

To determine if Indiana bat utilizes this study corridor for travel, foraging, or roosting, a mist-net survey was determined necessary by the United States Fish and Wildlife Service (USFWS). This report describes survey methodology and results.

Description of Site

The project area consists mainly of young to mid-successional forest dominated mainly by smaller trees, 2- to 12-inch DBH, with a few larger trees interspersed. Understory in the project area ranges from moderate to dense (Photograph 1). This area has been logged previously. Tree species consisted mainly of maple, sassafras, oak, linden, and beech. Some small hickory trees were present. A few ATV trails exist within the project area, mostly associated with pipeline Right-of-Ways (ROWs) and access roads (Photograph 2). A large field exists in the center of the project area and a small pond exists on the western side. Small streams are also present through the project area; however, these have heavy overhanging vegetation, restricting their use as a travel corridor. Land use surrounding the project area includes residential subdivisions, farmfields, active construction, and interstate.



Photograph 1 (August 3, 2011). The project area consists of young to mid-successional forest with moderate to dense understory.



Photograph 2 (August 3, 2011). Travel corridors within the project area are restricted mainly to existing pipeline ROWs and ATV access trails.

Indiana Bat (*Myotis sodalis*)—Natural History Summary

The known range of the federally endangered Indiana bat (*Myotis sodalis*) includes eastern Oklahoma, north to Iowa, Wisconsin, and Michigan, east to New England, and south to western North Carolina, Virginia, and northern Alabama. The Indiana bat is migratory, and the above-described range includes both summer and winter habitat. Major populations of this species hibernate in Indiana, Kentucky, and Missouri, with smaller populations reported in Alabama, Arkansas, Georgia, Illinois, Maryland, Mississippi, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Virginia, and West Virginia. This rare species is a migratory hibernator and caves are the exclusive winter habitat or hibernacula. Moreover, the species appears highly selective in its choice of caves, occupying only those that have stable winter temperatures.

Following hibernation, female bats disperse (March–May) and can potentially be found throughout Ohio. After emerging from winter hibernation, females migrate to summer maternity roosts to rear young. The Indiana bat is highly specific concerning maternity roost selection. Maternity roosts are generally large trees more than 16-inch DBH, and at least 29 tree species have been identified as being used by Indiana bats during the summer and during spring and fall migrations. In addition to trees, Indiana bats have been found in attics, utility poles, and bat boxes; however, use of man-made structures appears to be rare.

Additional roost tree characteristics include exfoliating bark, crevices, deadwood, and open cavities larger than a fist. *Carya ovata* (shagbark hickory) is commonly cited as the classic maternity roost tree for this species. Two types of roosting habitat have been identified, primary and alternate. Generally, primary maternity roosts need to be positioned to receive sufficient amounts of direct sunlight to provide thermal conditions necessary for the rapid development of young (Humphrey, *et al.*, 1977; Kurta, *et al.*, 1993). However, an alternate roosting site, which tends to support smaller populations of bats for shorter periods of time, can be found in the interior of woods with less sunlight exposure. Trees at the edges of streams or beaver ponds, within fence-rows, or at the edges of forest clearings are usually chosen for primary maternity roosting sites.

It is not certain if all bats in a roosting colony return to the same tree, but there is evidence that many bats return to the same watershed each year (Humphrey, *et al.*, 1977). The inadvertent destruction of all suitable roosting trees within a watershed or large geographical area can play a major role in the decline of this species. If a pregnant female migrant returns to a traditional roost watershed to find no suitable roosting trees, she faces additional energy drains in searching for a suitable site at a time when she is already stressed from hibernation, migration, and the energy demands of pregnancy. These additional stresses may be sufficient to cause her mortality or that of her offspring.

Indiana bats forage over wooded areas and riparian and floodplain forests near small- to medium-sized streams (Humphrey, *et al.*, 1977). Riparian corridor use may be more a function of availability than preference, since clearing has left fewer habitats in upland areas.

Methods

Mist-Netting Techniques

Mist-netting procedures followed protocols included in the 2007 *Agency Draft Indiana Bat (Myotis sodalis) Revised Recovery Plan* (USFWS, 2007). A study plan proposal was accepted by USFWS that two net sites with at least four net sets would be a sufficient level of effort for this survey. Nylon, low-visibility mist-nets were erected within the project area where bat activity was anticipated or otherwise noted. When possible, nets were erected to sufficient height and width to entirely block the flight corridor. Nets were secured to a rope-and-pulley system suspended from telescoping poles (Kunz, 1988). Nets were raised during the twilight hours and monitored every 10 minutes for a five-hour period. All nets were 75 denier/2 ply (1.5-inch mesh), nylon mist-nets.

Site Selection

Flight corridors were restricted to the existing pipeline ROW and ATV trails. Nets were set at the existing pond area; along a tree line within the open field; along a pipeline ROW adjacent to a stream; along a wooded pipeline ROW; and along an existing ATV trail, to be sure that all habitat areas were sufficiently sampled. These netting locations are shown on the aerial photograph included in Appendix C and photographs are located in Appendix D.

Data Collection

Basic biological data were collected from all bats netted, including species identification, forearm length, gender, age (juvenile or adult), weight in grams, and reproductive condition (if discernible). Additional information recorded included the climatological conditions, date, time of capture, lunar phase, and percent cloud cover. Representative photographs were taken of each species (Appendix D). Bats were released after data collection was complete.

U.S. Fish and Wildlife Service has directed all permit holders to follow set decontamination procedures to minimize the potential spread of White Nose Syndrome. This deadly disease has decimated many of the bat populations in numerous eastern and midwestern states. Precautionary actions are taken during all mist-net surveys to prevent the potential spread of this fatal disease. Davey followed protocols set forth in *Disinfection Protocol for Bat Field Studies U.S. Fish and Wildlife Service – Region 3, January, 2011*.

Results

Information for the individual netting sites and data collected are listed by survey night. Netting locations are listed in Table 1. Netting occurred on August 3, 4, 8, and 9, 2011. A total of 29 bats were identified at Site 1 and 7 bats were identified at Site 2. Bat species information is included in Tables 2 and 3. An aerial map provided in Appendix C shows the net locations. Photographs of nets and representative photos of bats captured during this survey are included in Appendix D. Data sheets are included in Appendix E.

Table 1. Latitude and Longitude Coordinates for Netting Locations

Site/Net #	Latitude	Longitude	Dates Netted (2011)
Site 1/Net 1	40.947688 N	81.456425 W	August 3, 4
Site 1/Net 2	40.948059 N	81.455710 W	August 3
Site1/Net 2	40.948413 N	81.455132 W	August 4
Site2/Net 1	40.951421 N	81.456273 W	August 8, 9
Site2/Net 2	40.950355 N	81.461392 W	August 8, 9

August 3, 2011

Site 1/Net 1

Habitat: Net 1 was located along an existing access trail and pipeline ROW adjacent to a stream. The stream was too cluttered with understory vegetation to net. Nets were stretched across the dirt trail to each tree line. Canopy cover was 90 percent.

Net Location: 3 tiers of 12m nets across the trail

Bats Captured: 5 eastern red bats (*Lasiurus borealis*), 10 big brown bats (*Eptesicus fuscus*), and 1 little brown bat (*Myotis lucifugus*)

Site 1/Net 2

Habitat: Net 2 was located among mid-successional woods adjacent to a small pond. Nets were stretched along the perimeter of the pond. Canopy cover was 85 percent.

Net Location: 3 tiers of 12m nets across the pond edge

Bats Captured: 1 little brown bat (*Myotis lucifugus*)

August 4, 2011

Site 1/Net 1

Habitat: Net 1 was located along an existing access trail and pipeline ROW adjacent to a stream. The stream was too cluttered with understory vegetation to net. Nets were stretched across the dirt trail to each tree line. Canopy cover was 90 percent.

Net Location: 3 tiers of 12m nets across the trail

Bats Captured: 7 big brown bats (*Eptesicus fuscus*) and 2 little brown bats (*Myotis lucifugus*)

Site 1/Net 2

Habitat: The location of Net 2 was changed to a third sampling location due to low bat activity at the original site for Net 2 (pond). Net 2 was re-located to a site in an old field adjacent to the forest edge. Canopy cover was 5 percent.

Net Location: 3 tiers of 12m nets along tree line within open field

Bats Captured: 1 eastern red bat (*Lasiurus borealis*), and 2 big brown bats (*Eptesicus fuscus*)

August 8, 2011

Site 2/Net 1

Habitat: Net 1 was located along an ATV trail surrounded by young-successional forest. Nets were stretched across the trail to each forest edge. Canopy cover was 100 percent.

Net Location: 3 tiers of 6m nets across the ATV trail

Bats Captured: None

Site 2/Net 2

Habitat: Net 2 was located along a maintained pipeline ROW. The ROW was surrounded by mid-successional woods. Nets were stretched across the ROW to each tree line. Canopy cover was 85 percent.

Net Location: 3 tiers of 6m nets across the maintained pipeline ROW

Bats Captured: 1 northern long eared bat (*Myotis septentrionalis*)

August 9, 2011

Site 2/Net 1

Habitat: Net 1 was located along an ATV trail surrounded by young-successional forest. Nets were stretched across the trail to each forest edge. Canopy cover was 100 percent.

Net Location: 3 tiers of 6m nets across the ATV trail

Bats Captured: 1 eastern red bat (*Lasiurus borealis*) and 1 big brown bat (*Eptesicus fuscus*)

Site 2/Net 2

Habitat: Net 2 was located along a maintained pipeline ROW. The ROW was surrounded by mid-successional woods. Nets were stretched across the ROW to each forest edge. Canopy cover was 85 percent.

Net Location: 3 tiers of 6m nets across the maintained pipeline ROW

Bats Captured: 1 eastern red bat (*Lasiurus borealis*), 1 northern long eared bat (*Myotis septentrionalis*) and 2 little brown bats (*Myotis lucifugus*)

Table 2. Species List and Biological Data for Site 1

Net #	Date	Time	Species	Sex ¹	Age ²	Reproductive Status ³	Forearm Length (mm)	Weight (g)	Band Number/ Additional Notes	Researchers
1	8/3/2011	9:00 PM	eastern red (<i>L. borealis</i>)	M	A	NR	37.65	8.5	—	JH, SB
1	8/3/2011	9:00 PM	eastern red (<i>L. borealis</i>)	F	A	PL	40.71	12.5	—	JH, SB
1	8/3/2011	9:00 PM	big brown (<i>E. fuscus</i>)	—	—	—	—	—	Escaped from bag	JH, SB
1	8/3/2011	9:00 PM	big brown (<i>E. fuscus</i>)	F	A	PL	46.47	14.0	—	JH, SB
1	8/3/2011	9:15 PM	little brown (<i>M. lucifugus</i>)	F	A	PL	38.88	7.5	—	JH, SB
1	8/3/2011	9:40 PM	big brown (<i>E. fuscus</i>)	M	J	NR	45.69	14.5	—	JH, SB
1	8/3/2011	10:00 PM	big brown (<i>E. fuscus</i>)	F	A	NR	44.50	15.0	—	JH, SB
1	8/3/2011	10:30 PM	big brown (<i>E. fuscus</i>)	M	J	NR	48.18	15.0	—	JH, SB
1	8/3/2011	10:30 PM	big brown (<i>E. fuscus</i>)	M	A	A	45.76	16.0	—	JH, SB
1	8/3/2011	10:30 PM	big brown (<i>E. fuscus</i>)	F	A	PL	45.22	26.0	—	JH, SB
1	8/3/2011	10:30 PM	big brown (<i>E. fuscus</i>)	M	J	NR	43.73	14.5	—	JH, SB
1	8/3/2011	11:10 PM	eastern red (<i>L. borealis</i>)	M	A	NR	38.24	9.0	—	JH, SB
1	8/3/2011	11:10 PM	eastern red (<i>L. borealis</i>)	F	A	NR	40.80	11.5	—	JH, SB
1	8/3/2011	11:40 PM	big brown (<i>E. fuscus</i>)	F	A	PL	46.45	7.5	—	JH, SB
1	8/3/2011	12:30 AM	eastern red (<i>L. borealis</i>)	F	A	NR	41.96	4.0	—	JH, SB
1	8/3/2011	12:50 AM	big brown (<i>E. fuscus</i>)	M	A	A	44.74	14.5	—	JH, SB
2	8/3/2011	1:40 AM	little brown (<i>M. lucifugus</i>)	M	A	NR	37.54	6.0	—	JH, SB
1	8/4/2011	9:20 PM	big brown (<i>E. fuscus</i>)	F	A	PL	45.49	18.0	—	JH, SB, AB, RM
1	8/4/2011	9:20 PM	big brown (<i>E. fuscus</i>)	—	—	—	—	—	Escaped from hand	JH, SB, AB, RM
2	8/4/2011	9:40 PM	big brown (<i>E. fuscus</i>)	F	J	NR	45.68	14.5	—	JH, SB, AB, RM
1	8/4/2011	10:30 PM	big brown (<i>E. fuscus</i>)	F	A	PL	46.44	18.0	—	JH, SB, AB, RM
1	8/4/2011	10:30 PM	little brown (<i>M. lucifugus</i>)	M	A	NR	37.97	7.5	—	JH, SB, AB, RM
1	8/4/2011	11:20 PM	big brown (<i>E. fuscus</i>)	F	A	PL	45.46	17.0	—	JH, SB, AB, RM
1	8/4/2011	11:20 PM	big brown (<i>E. fuscus</i>)	F	A	PL	47.21	20.0	—	JH, SB, AB, RM
1	8/4/2011	11:50 PM	little brown (<i>M. lucifugus</i>)	M	A	NR	37.87	6.5	—	JH, SB, AB, RM
1	8/4/2011	11:50 PM	big brown (<i>E. fuscus</i>)	M	J	NR	46.29	14.5	—	JH, SB, AB, RM
1	8/4/2011	12:15 AM	big brown (<i>E. fuscus</i>)	F	J	NR	42.87	14.0	—	JH, SB, AB, RM
2	8/4/2011	1:30 AM	eastern red (<i>L. borealis</i>)	M	—	—	—	—	Escaped from net	JH, SB, AB, RM
1	8/4/2011	2:00 AM	big brown (<i>E. fuscus</i>)	M	A	—	—	—	Escaped from hand	JH, SB, AB, RM

¹ M(ale) or F(emale)

² A(dult) or J(uvenile)

³ N(on)-R(eproductive), A(ctive), L(actating), P(ost)-L(actating)

Table 3. Species List and Biological Data for Site 2

Net #	Date	Time	Species	Sex ¹	Age ²	Reproductive Status ³	Forearm Length (mm)	Weight (g)	Band Number/ Additional Notes	Researchers
1	8/8/2011	9:30 PM	northern long-eared (<i>M. septentrionalis</i>)	M	A	NR	33.22	6.0	—	JH, JM
1	8/9/2011	11:15 PM	eastern red (<i>L. borealis</i>)	F	J	NR	39.60	10.0	—	JH, JM
1	8/9/2011	11:15 PM	big brown (<i>E. fuscus</i>)	F	J	NR	48.73	10.5	—	JH, JM
2	8/9/2011	12:00 AM	eastern red (<i>L. borealis</i>)	F	A	NR	42.17	12.0	—	JH, JM
2	8/9/2011	1:30 AM	little brown (<i>M. lucifugus</i>)	M	A	NR	37.56	6.5	—	JH, JM
2	8/9/2011	2:00 AM	northern long-eared (<i>M. septentrionalis</i>)	M	A	NR	32.47	6.0	—	JH, JM
2	8/9/2011	2:30 AM	little brown (<i>M. lucifugus</i>)	F	A	NR	37.99	7.0	—	JH, JM

¹ **M**(ale) or **F**(emale)

² **A**(dult) or **J**(uvenile)

³ **N**(on)-**R**(eproductive), **A**(ctive), **L**(actating), **P**(ost)-**L**(actating)

Summary and Discussion

A survey for the federally endangered Indiana bat (*M. sodalis*) was conducted within a 150-acre project area along Massillon Road, in the City of Green, Summit County, Ohio. Tree clearing will occur to allow for construction of a mixed use development. Two net sites with at least 4 net locations were deemed an appropriate level of effort by USFWS for the survey.

The study area consists of a diverse matrix of young to mid-successional forest, old fields, wetlands, and streams intersected with ATV trails and pipeline ROWs. Tree species consist mostly of maple, sassafras, oak, linden, and beech ranging from 2- to 12-inch DBH. Understory vegetation is dense. Netting occurred at five locations within the study area: nets were set at the existing pond area; along a tree line within the open field; along a pipeline ROW adjacent to a stream; along a wooded pipeline ROW; and along an existing ATV trail. Bat activity was heavier near Site 1 than Site 2 and also within the pipeline ROW as compared to existing ATV trails.

A total of 29 bats were identified at Site 1 and 7 bats were identified at Site 2. Thirty-six bats from 4 different species were captured during the survey: 6 little brown bats (*M. lucifugus*); 20 big brown bats (*E. fuscus*); 8 eastern red bats (*L. borealis*); and 2 northern long-eared bats (*M. septentrionalis*). No Indiana bats were captured.

Appendix F contains references used in the creation of this report, and Appendix G provides the profile of the lead Davey Resource Group biologist who completed the survey and report.

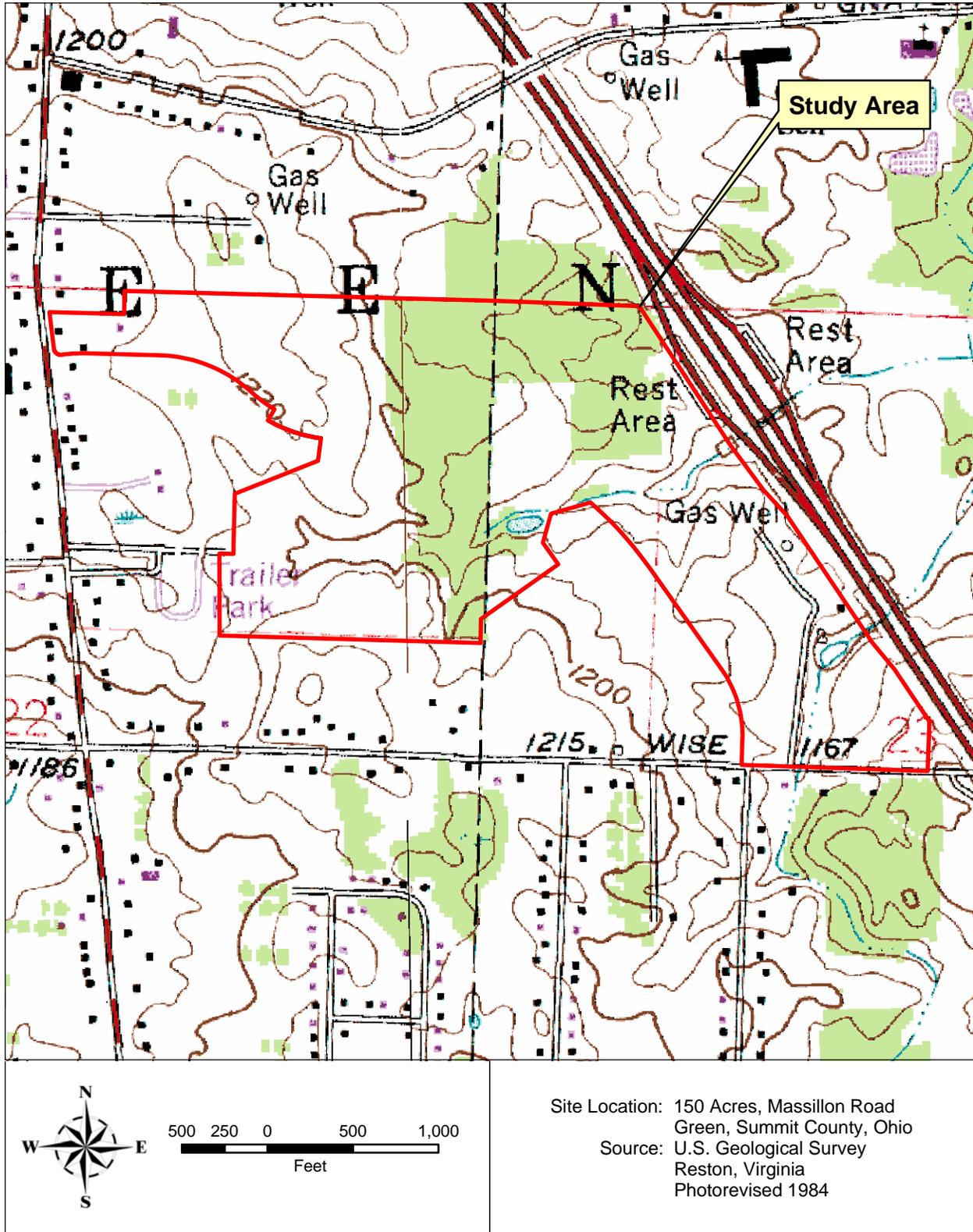
Appendix A

Location of Study Area on Highway Map



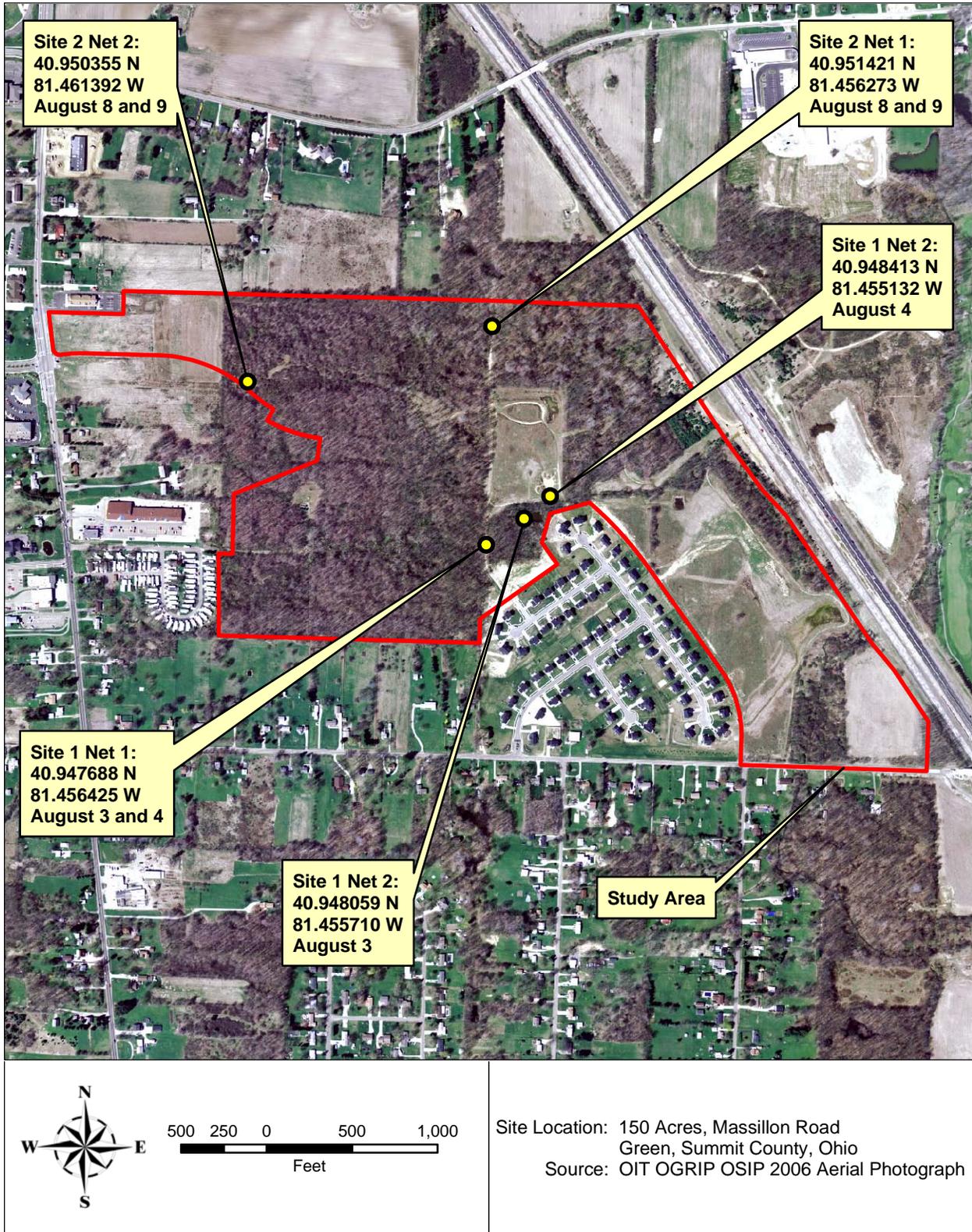
Appendix B

Location of Study Area on USGS 7.5-Minute Topographic Map (North Canton Quadrangle)



Appendix C

Location of Net Sites on Aerial Photograph



Appendix D Photographs



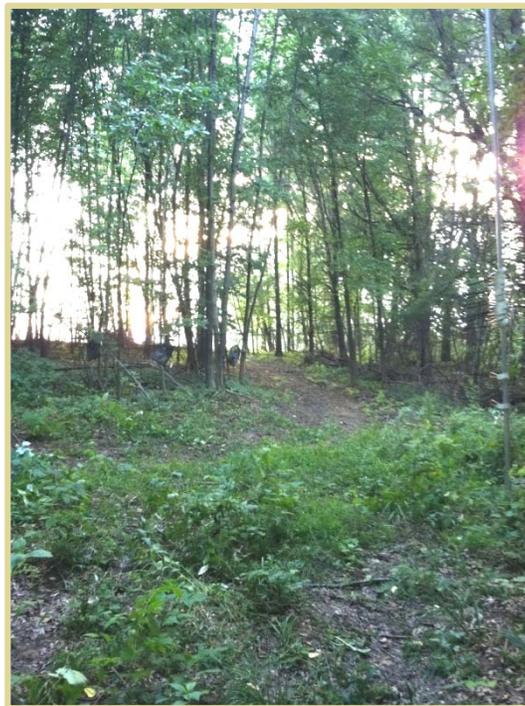
Photograph 1 (August 3, 2011). Net #1—Three tiers of 12-meter nets were stretched across a forested road in the study site.



Photograph 2 (August 3, 2011). Net #2—Three tiers of 12-meter nets were stretched across the edge of a small, forested pond in the study area.



Photograph 3 (August 4, 2011). Net #2 (moved)—Three tiers of 12-meter nets were stretched across the perimeter of an old field adjacent to the forest edge in the project area.



Photograph 4 (August 8, 2011). Net #1—Three tiers of 6-meter nets were stretched across an existing wooded ATV trail along a ridge in the project area.



Photograph 5 (August 8, 2011). Net #2—Three tiers of 9-meter nets were stretched across a maintained pipeline ROW in the project area.



Photograph 6 (August 3, 2011). This male little brown bat (*M. lucifugus*) was captured during the survey.



Photograph 7 (August 9, 2011). This male northern long-eared bat (*M. septentrionalis*) was captured during the survey.



Photograph 8 (August 4, 2011). This female big brown bat (*E. fuscus*) was captured during the survey.



Photograph 9 (August 3, 2011). This female Eastern red bat (*L. borealis*) was captured during the survey.

Appendix E

Data Sheets

Bat Capture Data Form

Date: 8/3/11 Project Name: 150 Acres Massillon Rd Location (state, nearest town, area): Green OHS. Time: 8:45 S. Temp: 75.9 °F E. Time: 1:45 E. Temp: 72.1 °F Precipitation: none fog/mist light rain medium rain heavy rainMoon: 1/4 full new Wind: 0 1 2 3 4 5 % Cloud Cover: 0 25 50 75 100Crew Leader: J. Hickey Crew: B. SchoplinCapture Technique: mist net harp trap Site Description: Forested river corridor meets road corridor, nearby field, nearby pond, adj residential develop
Type of sets: #1 3x12 (trail), #2 3x12 (pond) tree: 6-12" dbh moderate dense understory, intersecting small stream corridor
Hickory, oak, maple, basswood

Beaufort Wind Scale:

Beaufort Wind Scale	Wind Speed (mph)	Description
0	< 1	CALM: smoke rises vertically
1	1-3	LIGHT AIR: rising smoke drifts; weathervane inactive
2	4-7	LIGHT BREEZE: leaves rustle; can feel wind on face
3	8-12	GENTLE BREEZE: leaves and twigs in constant motion; small flags extend
4	13-18	MODERATE BREEZE: moves small branches; raises dust and loose paper (too windy to monitor)
5	19-24	FRESH BREEZE: small trees begin to sway (way too windy to monitor)

#	Capture Time	Species	Gender	Age	Reproductive Status	Forearm Length (mm)	Weight (g)	Net #	Band Number	COMMENTS
1	9:00	LABO	M	A	N/A	37.65	16.5	1	—	
2	9:00	LABO	F	A	PL	40.71	20.5	1	—	
3	9:00	EPFU	-	-	-	-	-	1	—	Escaped from bag
4	9:00	EPFU	F	A	PL	46.47	22.0	1	—	
5	9:15	MYLU	F	A	PL	38.88	15.5	1	—	
6	9:40	EPFU	M	J	N/A	45.69	22.5	1	—	
7	10:00	EPFU	F	A	N/A	44.50	23.0	1	—	
8	10:30	EPFU	M	J	N/A	48.18	23.0	1	—	
9	10:30	EPFU	M	A	A	45.76	24	1	—	
10	10:30	EPFU	F	A	PL	45.22	24	1	—	
11	10:30	EPFU	M	J	N/A	43.73	22.5	1	—	
12	11:10	LABO	M	A	N/A	38.24	17.0	1	—	
13	11:10	LABO	F	A	NA	40.80	19.5	1	—	
14	11:40	EPFU	F	A	PL	46.45	23.5	1	—	
15	12:30	LABO	F	A	NA	41.96	20.0	1	—	

GENDER: M(ale) or F(emale) Age: A(dult) or J(uvenile)

REPRODUCTIVE STATUS: (Pregnant), L(actating), A(ctive), or N(on)-R(eproductive)

Bag Weight: _____ Included in Table Weight Calculations Y N

Bat Capture Data Form

Date: 8/14/11 Project Name: 150 Acres Massillon Rd Location (state, nearest town, area): Green OHS. Time: 8:50 S. Temp: 74.5 °F E. Time: 2:00 AM E. Temp: 67.1 °F Precipitation: none fog/mist light rain medium rain heavy rainMoon: 1/2 full new Wind: 0 1 2 3 4 5 % Cloud Cover: 0 25 50 75 100Crew Leader: J. Hickey Crew: B. Schuplin, A. Burns, R. MontoneCapture Technique: mist net harp trap Site Description: forested-river corridor meets road corridor, nearby pond, nearby field, adj. residentType of sets: #1 3x12 (trail), #2 3x12 (forest edge)
tree: 6-12" dbh, moderate dense understory
intersecting small stream corridor near forest edge
trees: sassafras, hickory, oak, maple, basswood

Beaufort Wind Scale:

Beaufort Wind Scale	Wind Speed (mph)	Description
0	< 1	CALM: smoke rises vertically
1	1-3	LIGHT AIR: rising smoke drifts; weathervane inactive
2	4-7	LIGHT BREEZE: leaves rustle; can feel wind on face
3	8-12	GENTLE BREEZE: leaves and twigs in constant motion; small flags extend
4	13-18	MODERATE BREEZE: moves small branches; raises dust and loose paper (too windy to monitor)
5	19-24	FRESH BREEZE: small trees begin to sway (way too windy to monitor)

#	Capture Time	Species	Gender	Age	Reproductive Status	Forearm Length (mm)	Weight (g)	Net #	Band Number	COMMENTS
1	9:20	EPFU	F	A	PL	45.49	26.0	1	-	
2	9:20	EPFU	-	-	-	-	-	1	-	escaped from band
3	9:40	EPFU	F	J	NA	45.68	22.5	2	-	
4	10:30	EPFU	F	A	PL	46.44	26.0	1	-	
5	10:30	MYLU	M	A	NA	37.97	15.5	1	-	
6	11:20	EPFU	F	A	PL	45.46	25.0	1	-	
7	11:20	EPFU	F	A	PL	47.21	28.0	1	-	
8	11:50	MYLU	M	A	NA	37.87	14.5	1	-	
9	11:50	EPFU	M	J	NA	46.29	22.5	1	-	
10	12:15	EPFU	F	J	NA	42.87	22.0	2	-	
11	1:30	LABO	-	-	-	-	-	2	-	escaped from net
12	2:00	EPFU	M	A	NA	-	-	1	-	escaped from hand

GENDER: M(ale) or F(emale) Age: A(dult) or J(uvenile)

REPRODUCTIVE STATUS: (Pregnant), L(actating), A(ctive), or N(on)-R(eproductive)

Bag Weight: 8 Included in Table Weight Calculations N

Appendix F

References

- Humphrey, Stephen R., A.R. Richter, and C. James. 1977. *Summer Habitat and Ecology of the Endangered Indiana Bat (Myotis sodalis)*. J. Mamm. 58:334-346.
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Appendix G

Personnel Profile

Jessica Hickey, M.S., Biologist/Project Manager

Resume



Jessica Hickey is a biologist and project manager for a wide range of ecological projects. She has over nine years' experience in wetlands delineation, mitigation, and monitoring; Section 404/401 permitting; stream and wetland restoration; aquatic and terrestrial surveys, including bat mist-netting, radio-telemetry, habitat and emergence studies; Phase I Environmental Site Assessments; and water quality testing. She currently oversees the coordination of all wetland mitigation monitoring projects for Davey Resource Group. Ms. Hickey's experience at Davey includes project management of the Wildlife-Wind Turbine Interaction Study occurring at the Great Lakes Science Center in Cleveland, Ohio; the preparation of an Environmental Assessment for the Blue Ridge Electric Cooperative special use permit renewal for the Andrew Pickens Ranger District of the Sumter National Forest, South Carolina; and the preparation of a Biological Assessment report for USFWS assessing potential impacts to the federally endangered Indiana bat (*Myotis sodalis*) on a large-scale residential development site.



Ms. Hickey has over six years' experience conducting habitat, emergence, and mist-netting surveys for rare bats throughout Ohio and West Virginia, and has captured, identified, and tracked federally endangered Indiana bats (*Myotis sodalis*). She currently holds a Federal Fish and Wildlife Endangered Species Permit (TE235639-0) and State issued permits from Ohio, Pennsylvania, West Virginia, and Indiana to conduct surveys for the Indiana bat.

Education

- ✦ M.S., Biology, 2002, John Carroll University, University Heights, Ohio
- ✦ B.S., Environmental Science, 1998, University of Toledo, Toledo, Ohio

Bat Certifications/Special Training

- ✦ Federal Fish and Wildlife Endangered Species Permit for scientific research of the Indiana bat (*Myotis sodalis*)
- ✦ Scientific Collectors Permit to work with federally endangered Indiana bat (*Myotis sodalis*) in Pennsylvania
- ✦ Scientific Collectors Permit to work with federally endangered Indiana bat (*Myotis sodalis*) in Ohio
- ✦ Scientific Collectors Permit to work with federally endangered or threatened species of bats including Indiana bat (*Myotis sodalis*) in West Virginia
- ✦ Scientific Collectors Permit to work with federally endangered or threatened species of bats including Indiana bat (*Myotis sodalis*) in Indiana
- ✦ ANABAT Training Workshop, Camp Christopher, Bath, Ohio. May, 2009. Instructors included Chris Corben, and Kim Livengood, Training and Education Coordinator, Northtronic USA. Course included detailed and extensive classroom and fieldwork involving mobile and passive monitoring techniques and bat identification of field calls. Equipment used included passive monitoring units and mobile ANABAT System with PDA and GPS.
- ✦ MetroParks, Serving Summit County Bat Workshop, Camp Christopher, Bath, Ohio. August, 2009. Instructors included Mike Johnson and Marlo Perdicas. Participation was as a mist-net leader/assistant. Taught participants set-up, handling, identification, and recording of species. Also participated in a radio-tracking exercise taught by John Chenger and Janet Tyburec of Bat Conservation Management.
- ✦ Bat Conservation International Training, Bat Conservation and Management Workshop. August, 2007. An Indiana bat was captured and identified. Instructors, John Chenger and Janet Tyburec. One-week intensive study including lectures and fieldwork. Mist-netting of 2 different hibernacula occurred resulting in handling and identification of over 200 bats.



Jessica Hickey, M.S., Biologist/Project Manager

Resume

Mist-Netting Experience

- ✦ Presence/Absence Survey—150-acre development site; Green, Ohio (August, 2011)
- ✦ Presence/Absence Survey—ODOT Slip repair project; Warren Township, Jefferson County, Ohio (August, 2011)
- ✦ Presence/Absence Survey—Bridge replacement project; Lake, Newton, and Jasper Counties, Indiana (July, 2011)
- ✦ Presence/Absence Survey—Remediation site; Barberton, Ohio (June, 2011)
- ✦ Public Bat Workshops and Mist-Net Demonstrations—Portage Park District; Mantua Township, Portage County, Ohio (August 2005-2010)
- ✦ Presence/Absence Survey—110-mile utility pipeline project; Pennsylvania and West Virginia (May-August, 2010)
- ✦ MetroParks, Serving Summit County Bat Workshop. Assisted with teaching workshop participants net setup, bat capture, identification, and processing, Bath Township, Summit County, Ohio (August, 2009)
- ✦ Public Bat Workshop and Mist-Net Demonstration—Portage Park District; Mantua Township, Portage County, Ohio (August, 2009)
- ✦ Presence/Absence Survey—Utility project; Perry, Ohio (July, 2009)
- ✦ Northern long-eared Bat (*Myotis septentrionalis*) Survey Battelle-Darby Creek Metropark; Franklin County, Ohio (July, 2009). **Nineteen bats were captured; nine were Indiana bats.** Radio tracking-northern long-eared bats.
- ✦ Presence/Absence Survey—27-mile utility pipeline project; Kanawha and Clay Counties, West Virginia (May-July, 2009)
- ✦ Indiana bat Fall Swarming Survey; Wayne National Forest (September, 2008)
- ✦ Public Bat Workshop and Mist-Net Demonstration—Portage Park District; Franklin Township, Portage County, Ohio (August, 2008)
- ✦ Presence/Absence Survey—6.1-mile electric utility corridor; Pike County, Ohio (August, 2008)
- ✦ Indiana Bat Mist-Net Survey and Radio Telemetry to Identify Maternity Roost Trees and Determine Foraging Ranges; Battelle Darby Creek Metropark (June-July, 2008). **Twenty-eight bats were captured, four of which were Indiana bats. Two Indiana bats radio-tagged and tracked to determine foraging patterns and maternity roosts.**
- ✦ Seasonal biologist position, MetroParks, Serving Summit County. Tasks included mist netting and spring and fall emergence surveys. **One Indiana bat was captured, identified, and radio-tagged (April - October, 2008).**
- ✦ Seasonal biologist position, MetroParks, Serving Summit County. Tasks included mist netting and spring and fall emergence surveys (May - November, 2007).
- ✦ Voluntary Bat Species Inventory, Deep Lock Quarry and Gorge Metro Park; Akron, Ohio, for MetroParks, Serving Summit County (July, 2006)
- ✦ Presence/Absence Survey—Commercial development; Wooster, Ohio (May, 2006)
- ✦ Presence/Absence Survey—Residential development; Reminderville, Ohio (August, 2005)
- ✦ Presence/Absence Survey—Residential development; Brunswick Township, Medina County, Ohio (July, 2005)
- ✦ Presence/Absence Survey—Residential development; Strongsville, Ohio (May, 2005)
- ✦ Voluntary Bat Species Inventory—Liberty MetroPark, Twinsburg, Ohio (August and October, 2004)

Habitat and Emergence Survey Experience

- ✦ Habitat Survey and Clearing Oversight—ODOT Slip Repair Project, Jefferson County, Ohio (September, 2011)
- ✦ Habitat Survey—Dominion Pipeline Project, Ohio and Brooke Counties, West Virginia (August, 2011)
- ✦ Habitat and Emergence Survey—Springfield High School, Springfield Township, Ohio (June, 2011)
- ✦ Habitat Survey—Cleveland Clinic, Avon, Ohio (April, 2011)
- ✦ Emergence Survey—Infrastructure Project, City of Toronto, Ohio (May, 2010)
- ✦ Habitat Survey—Burr Oak Waterline, Athens County, Ohio (October, 2010)
- ✦ Habitat Survey—Electric Transmission Line, Pike County, Ohio (August, 2008)
- ✦ Emergence Survey—Utility Line, Wayne and Summit Counties, Ohio (August, 2008)
- ✦ Emergence Survey—Commercial Development, Lorain, Ohio (May, 2007)
- ✦ Habitat Survey—Le-Ax Water District, Hocking County, Ohio (July and August, 2006)
- ✦ Emergence Survey—Commercial Development, Zanesville, Ohio (June, 2006)
- ✦ Emergence Survey—Residential Development, North Royalton, Ohio (July, 2005)
- ✦ Emergence Survey—Residential Development, Mayfield Heights, Ohio (August, 2004)

