

# A Mist-netting Survey for Bats in Northeastern Illinois: 2006 Field Season

Illinois Natural History Survey Technical Report 2006 (6)

December 2006

Submitted by

Joyce E. Hofmann, Joseph F. Merritt, Jean M. Mengelkoch, and Samantha K. Carpenter  
Division of Ecology and Conservation Science  
Illinois Natural History Survey  
1816 S. Oak Street  
Champaign, IL 61820

Prepared for

Bureau of Design and Environment, Illinois Department of Transportation  
Illinois State Toll Highway Authority  
U.S. Fish and Wildlife Service, Chicago Office

The Illinois Department of Transportation's Bureau of Design and Environment, Illinois State Toll Highway Authority, and Chicago office of the U.S. Fish and Wildlife Service (USFWS) developed a plan in 2006 for a mist-netting survey in northeastern Illinois to determine if the federally endangered Indiana bat (*Myotis sodalis*) occurs in the region. The USFWS staff produced a list of 20 survey areas in public ownership in Cook, DuPage, Kane, Kankakee, Lake, McHenry, and Will counties that might provide high-quality habitat for the Indiana bat. Most of these areas include multiple netting sites. The Illinois Natural History Survey (INHS) is conducting the survey during the summers of 2006 and 2007. This report presents the results of the 2006 field season.

### **Indiana Bat Records**

An Indiana bat was collected at the Field Museum of Natural History building near the Chicago lakeshore on 18 September 1928 (Hoffmeister 1989). Given the date, this may have been a migrating individual. There are no recent Indiana bat records in the Chicago metropolitan area (Illinois Natural Heritage Database [INHD], Illinois Department of Natural Resources). The only other records for the species in northeastern Illinois are from La Salle County. Blackball Mine near Utica is a hibernaculum used by hundreds of Indiana bats (Hoffmeister 1989, Kath 2002). In addition, three males were collected at the mine in May 1971 (Hoffmeister 1989) and a male was captured 1.6 km from the mine by mist netting in May 2006 (INHD). Indiana bat maternity colonies occur in northern Indiana and southern Michigan (USFWS 1999). In 2003 four non-reproductive female Indiana bats were captured near the Kankakee River in northwestern Newton County, Indiana (Shawn Cirton, USFWS, personal communication, 16 November 2006), which is adjacent to Kankakee County, Illinois.

### **Indiana Bat Summer Habitat and Roosts**

The summer habitat requirements of Indiana bats are not completely understood (USFWS 1999, Menzel et al. 2001), but the density of potential roost trees seems to be the most important factor determining habitat suitability (Farmer et al. 2002). Maternity colonies primarily roost beneath slabs of exfoliating bark on dead trees and snags, but also have been found beneath the "shaggy" bark of some live hickories (*Carya*) and oaks (*Quercus*) and in tree crevices (e.g. Cope et al. 1973; Humphrey et al. 1977; Gardner et al. 1991; Kurta et al. 1993a, b, 1996, 2002; Callahan et al. 1997; Carter 2003). Maternity colonies, however, recently have been found roosting in three buildings (a church, house, and barn), artificial roosting structures (e.g. bat houses), and utility poles (Carter et al. 2001, Butchkoski and Hassinger 2002, Chenger 2003, Hendricks et al. 2005, Kurta 2005, Ritzi et al. 2005). Males use caves, mines, artificial roosting structures, and bridges as well as trees for diurnal roosts during summer (Mumford and Cope 1958, Gardner et al. 1991, Salyers et al. 1996, Ford et al. 2002, INHD).

Many known maternity roost trees have been relatively large, with a dbh (diameter at breast height) greater than 30 cm (e.g. Gardner et al. 1991; Kurta et al. 1993a, 1996; Callahan et al. 1997; Whitaker and Brack 2002). Female and juvenile Indiana bats have been documented roosting in more than 30 species of trees (Kurta 2005). Tree species

known to have been used by Indiana bat maternity colonies in Illinois are northern red oak (*Q. rubra*), white oak (*Q. alba*), post oak (*Q. stellata*), pin oak (*Q. palustris*), slippery elm (*Ulmus rubra*), American elm (*U. americana*), shagbark hickory (*C. ovata*), bitternut hickory (*C. cordiformis*), silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), and sweetgum (*Liquidambar styraciflua*) (Gardner et al. 1991, Kurta et al. 1993a, Carter 2003). Indiana bats use more than one roost tree during the summer, but the number of roost trees a maternity colony needs presumably is variable (Menzel et al. 2001). A colony in Michigan roosted in 23 trees (Kurta et al. 1996), while four Missouri colonies used 10-20 roost trees each (Callahan et al. 1997). Because roost trees are ephemeral, it seems reasonable that sustainable habitat would include a variety of dead trees, shagbark hickories, and numerous large, senescent trees that would provide future roost sites.

Trees used by Indiana bats in Illinois have been located in upland and floodplain forests, pastures, and a swamp (Gardner et al. 1991, Kurta et al. 1993a, Carter 2003). There is a consensus that Indiana bat maternity colonies occupy primary roosts that are exposed to high levels of solar radiation (USFWS 1999, Menzel et al. 2001). The death of an overstory tree creates a light-gap in the forest canopy; dead trees along forest edges or in areas impacted by flooding also have high levels of exposure to sunlight. Some alternate roosts used by maternity colonies, as well as roosts used by male Indiana bats, are in shaded locations (Gardner et al. 1991, Callahan et al. 1997). It has been suggested that Indiana bats prefer forested areas with an open understory (USFWS 1999). Most Indiana bat roost trees have been close to (or surrounded by) water (e.g. Humphrey et al. 1977; Gardner et al. 1991; Callahan et al. 1997; Kurta et al. 1996, 2002; Carter 2003), but some have been found 2 km or more from a perennial stream (Gardner et al. 1991, Kurta et al. 1993a). Trees occupied by reproductively active female and juvenile Indiana bats in Illinois were rarely within 500 m of a paved highway (Gardner et al. 1991). Some adult males roosted less than 240 m from a paved highway, but the mean distance was 930 m (Gardner et al. 1991). However, a maternity colony in Indiana recently was found roosting in trees near a major highway (Jean Mengelkoch, personal observation) and an adult male in West Virginia occupied a tree only 13 m from the nearest road (Ford et al. 2002).

Most Indiana bat maternity colonies in the Midwest have been found in landscapes that were a mosaic of forest and agricultural areas (e.g. Cope et al. 1973; Humphrey et al. 1977; Gardner et al. 1991; Kurta et al. 1993a, b, 2002; Callahan et al. 1997; Carter 2003). Despite the fact that they roost in trees, the presence of Indiana bats does not seem to be correlated with forest cover. In Missouri, for example, the amount of forest cover did not differ significantly between sites where Indiana bats were captured and not captured (Miller et al. 2002). In Illinois, Carter et al. (2002) found significantly fewer and smaller patches of urban development in the vicinity of Indiana bat roosts than at random sites. There also was less residential land around Indiana bat capture sites than unsuccessful netting sites in Missouri (Miller et al. 2002). However, Belwood (2002) documented a maternity colony occupying trees in a wooded subdivision in Ohio and a maternity colony near the Indianapolis Airport occupies a rural area surrounded by urban/suburban development (Whitaker et al. 2004, Sparks et al. 2005).

## **Protocol for Mist Netting Bats**

Bats are surveyed during the period 15 May-15 August by mist netting, following guidelines in the draft Indiana bat recovery plan (USFWS 1999). Black nylon mist nets (38 mm mesh) are used (Avinet, Inc., Dryden, NY); these nets are 6, 9, and 12 m in length and can be spread to a width of 2.6 m. Mist netting is most often conducted at sites where branches of riparian trees create a natural canopy above the channel of a stream or small river, but it can also be done along old roadways, trails, or in forest clearings if aquatic sites are unavailable or unsuitable. The nets are suspended across the flyway between a pair of metal poles 6.1 m tall. Two nets of equal length are stacked vertically and loops at the ends of the nets are placed on a rope and pulley system attached to each pole. Using the pulley systems, the top of the uppermost net can be raised to a height of 6.1 m and the nets can be lowered to remove bats. This system is described by Gardner et al. (1989). Nets are positioned perpendicular to the stream channel or other flyway and directly under the canopy, if present. An additional single net sometimes is spread across the flyway just above water or ground level to catch low-flying bats. Two nets, spaced at least 30 m apart, are erected at each site. Typically two high nets are set up; if conditions at a site make that unfeasible, one or two single nets are used in addition to the high net. Nets are opened at dusk and monitored continuously for 30 minutes. They are then checked at 10-minute intervals for 4.5 hours. Mist netting is conducted only on nights when environmental conditions are considered favorable for bat captures, i.e. no precipitation, no strong winds, and temperatures above 9°C. Each site is netted for two nights.

The following data are recorded for each bat captured: species, sex, age class (juvenile or adult), reproductive condition, and weight. Age class in bats is determined by the degree of closure of the phalangeal epiphyses; juveniles (i.e. young of the year) are recognizable because of the incomplete ossification of the epiphyses (Anthony 1988). The reproductive condition of male bats is determined by the size of the epididymides, which are covered by pigmented sheaths and located lateral to the tail. Sexually mature males have enlarged or distended epididymides that can be seen through the interfemoral membrane (Racey 1988). Pregnant females can be recognized by gently palpating the fetus through the abdomen, and lactating and post-lactating females by examination of the teats. Weights are recorded to the nearest 0.1 g by suspending the bats from a Pesola scale in a small cloth bag. Bats are released at the capture site immediately after examination.

## **Description of Survey Sites**

During the 2006 field season mist netting was conducted at 18 sites in ten survey areas in Cook, DuPage, Kane, Lake, McHenry, and Will counties. Locations of these sites are shown in Figure 1 and the appendix contains photographs of each site.



## Cook County

**1. Schiller Woods South:** east side of the Des Plaines River near the mouth of an unnamed, intermittent tributary (T.40N, R.12E, SW/4 of NE/4 Sec. 22, River Forest 7.5' topographic quadrangle; UTM 429236mE, 4644210mN, Zone 16 NAD 83); 10 and 11 July. The floodplain forest had some very large trees (60-80 cm dbh). Species present included cottonwood, silver maple, hackberry (*Celtis occidentalis*), boxelder (*Acer negundo*), and slippery elm. The understory was relatively open. Net A consisted of 9-m long nets suspended across a small tributary of the Des Plaines River. The tributary was 10 m wide, but contained no water. There was a closed canopy high above the net and an unobstructed flyway to the river. Net B, consisting of 9-m long nets, was positioned across an 8-m wide dirt trail that ran parallel to the river. It was located approximately 75 m south of net A. There was a complete canopy high above the net.

**2. Robinson Woods South:** east side of the Des Plaines River near the mouth of an unnamed, intermittent tributary (T.40N, R.12E, NW/4 of NE/4 Sec. 15, River Forest 7.5' topographic quadrangle; UTM 429130mE, 4646027mN, Zone 16 NAD 83); 10 and 11 July. The floodplain forest had some very large trees, no understory, and little or no herbaceous vegetation. Dominant canopy species were silver maple, ash, and slippery elm. A small tributary angled toward the river. Upstream the channel contained a lot of downed wood. Initially there were shallow pools of water in the tributary (upstream of net A the water was green), but it rained on the second day of the netting session. Net A consisted of 9-m long nets across a dirt trail that paralleled the river. The west pole was 15 m from the riverbank, while the east pole was about 4 m from the tributary. There was a closed canopy high above the net. Net B was located 42 m from net A. It consisted of 6-m long nets suspended above the tributary approximately 6 m from its mouth. There was a canopy above the net. There were some low branches just upstream, but the flyway was relatively unobstructed. The stream bottom was covered with a thick silt layer.

**3. Bemis Woods Site 1:** Salt Creek north of parking lot in Bemis Woods South (T.39N, R.12E, SE/4 of NW/4 Sec. 31, Hinsdale 7.5' topographic quadrangle; UTM 424501mE, 4630898mN, Zone 16 NAD 83); 12 and 13 July. Both sides of Salt Creek were forested. The creek was divided into two channels by a small island at this site. Net A consisted of 9-m long nets suspended across the upstream entrance of the narrower channel that was south of the island. The channel was approximately 12 m wide and contained a pool of water up to 1 m deep. The substrate was cobble. There was essentially no canopy above the net, although there was a low canopy downstream. The island was covered mostly with small trees. Trees on the south bank included basswood (*Tilia americana*), ash, black alder (*Alnus glutinosa*), and hop hornbeam (*Ostrya virginiana*). Net B consisted of 6-m long nets positioned across a dirt trail along the top of the south bank. The trail was 10-20 m from the creek. There was a complete canopy above net B. The upland forest at this site included some large oaks. It had a relatively dense understory of saplings.

**4. Bemis Woods Site 2:** Salt Creek in eastern part of Bemis Woods (T.39N, R.12E, SW/4 of NE/4 Sec. 32, Hinsdale 7.5' topographic quadrangle; UTM 426473mE, 4630997mN, Zone 16 NAD 83); 25 and 26 July. Forest was present on both sides of Salt Creek. Net

A consisted of 9-m long nets suspended across a narrow channel of the creek that was north of an island at least 50 m wide. The pool of water was 65 cm deep, but only about 4 m wide. The substrate was silt. The north pole was at the base of a high, vertical bank, while the south pole was on the low, sloping bank of the island. The island was wooded, with an open understory and silver maple as the dominant species. The forest on the north bank was dominated by oaks and had a relatively open understory. There was a closed canopy above the channel. Net B, also 9 m long, was placed above a blacktop bike path parallel to Salt Creek (downstream of the island). It was located 56 m from net A. There was a complete canopy above the trail. Dominant canopy species in the surrounding forest were black oak (*Q. velutina*), elm, hackberry, black cherry (*Prunus serotina*), and hickory (not shagbark hickory).

**5. Brezina Woods:** Salt Creek east of La Grange Road (T.39N, R.12E, NW/4 of NW/4 Sec. 28, Hinsdale 7.5' topographic quadrangle; UTM 426907mE, 4633236mN, Zone 16 NAD 83); 12 and 13 July. Both banks of Salt Creek were forested, but the site was near La Grange Road, which produced a gap in the riparian corridor. The creek was 50 m wide, with no canopy. Net A consisted of 9-m long nets suspended above a portion of the creek; it was near the south bank and next to the La Grange Road bridge. The water was about 50 cm deep and swiftly flowing. The substrate was sand covered with remains of mollusks. Trees on the south bank included American elm and oak. Net B was approximately 75 m from net A. It consisted of 9-m nets suspended above a gravel bike path that was 5 m wide. There was forest on both sides of the path. Tree species included slippery elm, black cherry, red oak, white oak, and basswood. Five trees near the net were large (ca. 60 cm dbh). There was a complete canopy high above the path.

**6. Dam No. 1 Woods East Site 1:** oxbow of the Des Plaines River (T.42N, R.11E, SE/4 of NE/4 Sec. 13 [near edge of R.12E, Sec. 18], Arlington Heights 7.5' topographic quadrangle; UTM 426602mE, 4663115mN, Zone 16 NAD 83); 5 and 6 July. The oxbow was in the middle of forest to the east of the main channel of the Des Plaines River. Trees included silver maple, elm, oak, and black walnut. Buttonbush (*Cephalanthus occidentalis*) was abundant along the edge of the oxbow. An ephemeral stream entered the oxbow from the north. Net A consisted of 9-m long nets and was suspended above a pool of water (30 cm deep) in the stream channel near the edge of the oxbow. There was minimal canopy above the net. Net B, also consisting of 9-m long nets, was positioned across the stream channel approximately 30 m from net A. There was little water in this portion of the channel and the substrate was mud. Canopy cover was minimal. A bike path was located east of the nets.

**7. Dam No. 1 Woods East Site 2:** unnamed, intermittent tributary near its confluence with the Des Plaines River (T.42N, R.11E, SW/4 of NE/4 Sec. 13 [near edge of SE/4 of NE/4], Arlington Heights 7.5' topographic quadrangle; UTM 426188mE, 4663344mN, Zone 16 NAD 83); 8 and 9 August. There was extensive forest on both sides of the tributary, which entered the Des Plaines River from the east. Trees included silver maple, elm, ash, boxelder, and red oak. The canopy was partially closed above the tributary. Nets A and B consisted of 9-m long nets and were located 30 m apart along the tributary. Net A was above standing water approximately 5 m from the bank of the Des

Plaines River. Net B was upstream on a dry portion of the creek. The channel had a substrate of mud and a vegetative cover of grass approximately 30 cm high. There was a bike path east of the nets.

### **DuPage County**

**8. Waterfall Glen Site 1:** Sawmill Creek near its confluence with the Des Plaines River (T.37N, R.11E, SW/4 of NE/4 Sec. 15, Sag Bridge 7.5' topographic quadrangle; UTM 420060mE, 4616490mN, Zone 16 NAD 83); 5 and 7 June. Extensive forest was present on both sides of the creek. Dominant canopy species included ash, elm, and silver maple and the understory was relatively open. Net A consisted of 12-m long nets suspended above a very shallow (3 cm) riffle. The channel was 17-18 m wide at this point, but only half full of water. The substrate was cobble and gravel. There was little canopy above most of the stream, but there was a partial canopy above the net, which was positioned under the branches of a leaning silver maple. A few low branches partially obstructed the flyway above the creek. Net B consisted of 6-m long nets and was located 30 m upstream of net A. The channel was 11-12 m wide at this location. There was no canopy above the stream and no trees occurred on the east bank upstream of net B. The net was above a pool of water 6 m wide and 50 cm deep. A single 6 m net was placed just above water level next to net B.

**9. Waterfall Glen Site 2:** Sawmill Creek upstream (north) (T.37N, R.11E, NW/4 of SE/4 Sec.10, Sag Bridge 7.5' topographic quadrangle; UTM 419850mE, 4617674mN, Zone 16 NAD 83); 8 and 23 June. The direct, linear distance between the two sites was 1.2 km. The channel along this stretch of Sawmill Creek was 6-7 m wide. There were shallow pools of water interspersed with dry sections. The substrate was cobble and rock. There was extensive forest on both sides of the creek. On the west side of the creek the ground was level and the forest had a closed canopy. Canopy species included sugar maple (*A. saccharum*), cottonwood, and white oak. The understory was relatively dense in some places, relatively open in others. East of the creek there was a steep hillside with large oaks and sugar maples. Net A was located 114 m downstream of a maintenance road bridge. The channel was full of water at this location. Nets 6-m long were suspended above a pool of water 30 cm deep. There was a relatively low canopy above the creek, but the flyway was mostly unobstructed. Net B was 30 m upstream of net A. It consisted of 6-m long nets above a pool of water 5 m wide and 50 cm deep. There was a partial canopy above the net.

### **Kane County**

**10. Norris Nature Preserve:** east side of the Fox River at St. Charles (T.40N, R.8E, SW/4 of SW/4 Sec.22, Geneva 7.5' topographic quadrangle; UTM 390850mE, 4642850mN, Zone 16 NAD 83); 5 and 6 July. This site was substituted for Ferson Creek Fen Nature Preserve, which was on the opposite bank of the Fox River, because it included a large number of red oaks that had been killed by oak wilt. The preserve is primarily dry-mesic upland forest dominated by red and white oaks. Net A consisted of 12-m long nets suspended across a clearing on the relatively steep, west-facing hillside. Higher up the slope was a group of dead red oaks. Live trees included red oak, hop hornbeam, and black walnut (*Juglans nigra*). There was a partial canopy high above the



net. A clear flyway extended from the net down to the bike path at the base of the hill. Ground cover in the clearing included spring ephemerals, oak seedlings, and berry bushes (*Rubus* sp.). Net B, which was 9 m wide, was positioned across a gap in the trees along the east shore of the Fox River. It was 10 m from the river's edge. This area between the bike path and the river was mowed. There were large red oaks near both poles and a canopy high above the net. The forested hillside east of the path had several dead red oaks. Net B was located 200 m south and 100 m west of net A. Because heavy bat activity was detected above the bike path, net B was changed on the second day of the netting session. Nets 6-m long were suspended across the path 50 m north of the original location. The floodplain forest between the net and the river was 30 m wide. East of the bike path the upland forest had a relatively dense understory. There was a closed canopy above the path.

### **Lake County**

**11. Edward L. Ryerson Nature Preserve Site 1:** confluence of an unnamed tributary and the Des Plaines River (T.43N, R.11E, NE/4 of SE/4 Sec. 26, Wheeling 7.5' topographic quadrangle; UTM 424775mE, 4669322mN, Zone 16 NAD 83); 19 and 20 June. Extensive forest was present on the east bank of the Des Plaines River. Canopy species included silver maple, cottonwood, elm, basswood, and white oak. There were some oaks with a dbh of more than 60 cm, but most trees were smaller (< 38 cm dbh). The tributary was narrow and followed a sinuous course. It contained pools of relatively shallow water and had a sand bottom. One high net and two single nets were set up at this site. Net A, the high net, consisted of 6-m long nets spanning the creek upstream of a wooden bridge that was part of a trail system. The creek was about 4 m wide at this location, the water 12 cm deep. There was an unobstructed flyway above the creek. Net B was a single 9-m long net positioned diagonally across a bend in the creek channel downstream of the bridge. The channel had high banks and contained pools of water up to 50 cm deep. Net C, also a single 9-m long net, was placed in the river across the mouth of the creek. There was no canopy directly above this net. The water was 60 cm deep, the substrate muddy. Net C was 20 m from Net B and 45 m from Net A.

**12. Edward L. Ryerson Nature Preserve Site 2:** ephemeral stream and east shore of the Des Plaines River (T.43N, R.11E, NE/4 of NW/4 Sec. 26, Wheeling 7.5' topographic quadrangle; UTM 424008mE, 4670079mN, Zone 16 NAD 83); 24 and 25 July. There was extensive wet floodplain forest on the east side of the Des Plaines River. The canopy was 85% complete and trees included silver maple, boxelder, ash, and willow (*Salix* sp). The understory was relatively open. Net A consisted of 12-m long nets. It was positioned in the water parallel to the shoreline of the Des Plaines River and across the mouth of an ephemeral stream. The water was approximately 50 cm deep. There was no canopy above the net. Net B consisted of 9-m long nets and was located 75 m from Net A. It was suspended across the channel of the ephemeral stream. There was no standing water and the substrate was mud. The canopy was closed above the channel.

**13. Ethel's Woods Site 1:** near the northern edge of Ethel's Woods (T.46N, R.11E, NE/4 of NW/4 Sec. 19, Wadsworth 7.5' topographic quadrangle; UTM 418274mE, 4700983mN, Zone 16 NAD 83); 26 and 27 June. Ethel's Woods was a large tract of

mature oak-hickory forest. Numerous shagbark hickories were present, but there were few dead trees or snags with exfoliating bark. The forest had a relatively open understory, with few shrubs or saplings. There was no creek in the forest that could be used as a netting site. Net A consisted of 12-m long nets placed across a gap at the edge of the woods. This gap provided a flyway between the interior of the forest and a large emergent wetland immediately to the north. The net was above dry ground along the edge of a dirt road, but very close to water in the wetland. There was a partial canopy high above the net. Net B consisted of 9-m long nets suspended above shallow water ( $\leq 50$  cm) at the narrow, north end of a pond in the interior of the forest. There was a partial canopy high above the net and the forest north of the pond had an open understory, which provided a flyway to the water.

**14. Ethel's Woods Site 2:** interior of Ethel's Woods (T.46N, R.11E, NW/4 of SW/4 Sec. 19, Antioch 7.5' topographic quadrangle; UTM 417767mE, 4700774mN, Zone 16 NAD 83); 27 and 28 June. This site was along a 3-m wide dirt road in the interior of the forest. There was a nearly complete canopy above the road, which formed a well-defined corridor. Net A consisted of 9-m long nets suspended across the road. Canopy species included red and white oaks, basswood, shagbark hickory, and black walnut. Trees had a dbh of 15-60 cm. Net B, also 9 m in length, was positioned across the road approximately 100 m southwest of Net A. Trees in the vicinity included white oak, shagbark hickory, and red maple (*A. rubrum*) and were smaller in diameter than those near Net A. There were no snags near either net, but some oaks contained cavities. The road led to a large reservoir about 200 m west of Net B.

**15. MacArthur Woods Nature Preserve:** unnamed tributary of the Des Plaines River (T.44N, R.11E, NE/4 of NE/4 Sec. 34, Libertyville 7.5' topographic quadrangle; UTM 423445mE, 4678093mN, Zone 16 NAD 83); 30 June and 7 August. There was extensive dry-mesic forest on both sides of the creek, which was 8-10 m wide. The water was 5-15 cm deep on the first night of netting, but had decreased by the second night (five weeks later). The substrate was sand. There was a closed canopy above the creek and the flyway was unobstructed. Trees included hickories, white oak, basswood, elm, and sugar maple. Nets A and B consisted of 9-m long nets spanning the creek and were 75 m apart. The linear distance from the site to the Des Plaines River was approximately 900 m.

### **McHenry County**

**16. Kishwaukee River at Thorn Road Site 1:** Kishwaukee River approximately 200 m west of Thorn Road (T.44N, R.5E, SW/4 of NW/4 Sec. 28, Garden Prairie 7.5' topographic quadrangle; UTM 362552mE, 4680565mN, Zone 16 NAD 83); 18 and 20 July. This stretch of the Kishwaukee River was designated an A stream (unique aquatic resource) by the Illinois Biological Stream Characterization Work Group (1995). The river was 25 m wide. The water was up to 60 cm deep, with sand bars exposed in parts of the channel. The floodplain forest was dominated by silver maple (35-60 cm dbh). There was a partial canopy above the river. In some places fallen trees partially obstructed the flyway above the river. Nets A and B consisted of 9-m long nets. They were placed in the river (perpendicular to the current) near the east bank. Net B was 50 m south (upstream) of Net A.

## **Will County**

**17. Goodenow Grove Nature Preserve Site 1:** forested portion of Plum Creek (T.34N, R.14E, SE/4 of NW/4 Sec. 27, Dyer 7.5' topographic quadrangle; UTM 449293mE, 4584076mN, Zone 16 NAD 83); 29 June and 17 July. The channel of Plum Creek was 6 m wide. Shallow water (mostly pools) was present in parts of the channel and the substrate was sand. There was extensive forest on both sides of the creek. Canopy species included oaks, hickories, ash, slippery elm, black walnut, and basswood. The understory was relatively open. Net A consisted of 6-m long nets across a run of very shallow water (10 cm) that filled less than half of the channel. There was a high canopy above the net and the flyway was unobstructed. Net B also was 6 m long. It was located 41 m upstream and around a bend in the creek from net A. A slightly deeper pool of water covered more than half of the channel. There was a closed canopy above the net, but none upstream or downstream.

**18. Goodenow Grove Nature Preserve Site 2:** Plum Creek north of Foxfire II campground (T.34N, R.14E, SW/4 of NE/4 Sec. 27, Dyer 7.5' topographic quadrangle; UTM 449781mE, 4584083mN, Zone 16 NAD 83); 18 and 24 July. There were numerous dead trees and snags on a wide floodplain covered with dense herbaceous vegetation. Plum Creek was divided into at least two narrow channels in this area. Net A consisted of 6-m long nets across a shallow pool of water in a channel on the south side of the floodplain. The net was approximately 10 m from the edge of a fairly large tract of forest between the creek and a campground. The dominant canopy species was swamp white oak; other species included basswood, ash, shagbark hickory, and hop hornbeam. The understory, composed primarily of saplings, was dense. North of the net there was an island with a few dead trees and snags and tall herbaceous vegetation. Net B consisted of 6-m long nets suspended across a mowed trail at the edge of the campground. Fields dominated by goldenrod (*Solidago* sp.) were on both sides of the trail. Because little bat activity was detected near net B, it was replaced for the second night of netting. A single 6-m long net was positioned along the north edge of the channel approximately 30 m upstream of net A. It stretched across a gap between two dead trees.

## **Results**

During the 2006 field season mist netting was conducted for 36 nights at the 18 sites. There were 140 bat captures at 15 sites. The number of individuals is unknown because some bats may have been caught more than once. The number of captures per successful site ranged from one to 32. Only four species were netted: big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), hoary bat (*L. cinereus*), and northern bat (*Myotis septentrionalis*). Results for each county are presented below.

## **Cook County**

Mist netting was conducted at seven sites in Cook County. There were 57 captures at five sites (Table 1); no bats were caught at Robinson Woods or Brezina Woods. Very little bat activity was detected with an Anabat II<sup>®</sup> bat detector (Titley Electronics Pty Ltd., Ballina, Australia) at the Robinson Woods site. At Brezina Woods, however, bats

were observed flying above both nets and over the La Grange Road bridge. Bemis Woods Site 2 had the highest number of captures (32) of any 2006 site. The species most frequently caught was the big brown bat.

Table 1. Bat captures at mist-netting sites in Cook County, Illinois, 2006.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
<b>Schiller Woods (10 and 11 July)</b>					
big brown bat	<i>Eptesicus fuscus</i>	3	A	M	NR
hoary bat	<i>Lasiurus cinereus</i>	1	A	M	NR
<b>Bemis Woods Site 1 (12 and 13 July)</b>					
big brown bat	<i>Eptesicus fuscus</i>	4	A	M	NR
		5	A	F	PL
		2	J	M	NR
		1	J	F	NR
		2	-	-	-- *
eastern red bat	<i>Lasiurus borealis</i>	2	A	M	NR
<b>Bemis Woods Site 2 (25 and 26 July)</b>					
big brown bat	<i>Eptesicus fuscus</i>	4	A	M	NR
		13	A	F	PL
		1	A	F	NR
		5	J	M	NR
		6	J	F	NR
		2	-	-	-- *
eastern red bat	<i>Lasiurus borealis</i>	1	A	M	NR
<b>Dam No. 1 Woods East Site 1 (5 and 6 July)</b>					
eastern red bat	<i>Lasiurus borealis</i>	4	A	M	NR
<b>Dam No. 1 Woods East Site 2 (8 and 9 August)</b>					
big brown bat	<i>Eptesicus fuscus</i>	1	A	F	NR

M = male; F = female; A = adult; J = juvenile (young-of-year); PL = post-lactating; NR = non-reproductive; \* = escaped before age and sex could be determined

### DuPage County

Only one area (Waterfall Glen County Forest Preserve) was surveyed in DuPage County. There were 19 captures, representing three species, at the two netting sites (Table 2). The most frequently captured species were the big brown bat and northern bat.

Table 2. Bat captures at mist-netting sites in DuPage County, Illinois, 2006.

---

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
<b>Waterfall Glen Site 1 (5 and 7 June)</b>					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
		1	A	F	L
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	NR
<b>Waterfall Glen Site 2 (8 and 23 June)</b>					
big brown bat	<i>Eptesicus fuscus</i>	5	A	M	NR
		2	A	F	L
northern bat	<i>Myotis septentrionalis</i>	3	A	M	NR
		6	A	F	L

M = male; F = female; A = adult; L = lactating; NR = non-reproductive

---

### Kane County

The single site netted in Kane County during 2006 was Norris Nature Preserve. Only two bats were captured (Table 3), but there was much bat activity (detected with an Anabat II) above the bike path.

Table 3. Bat captures at Norris Nature Preserve in Kane County, Illinois, 5 and 6 July 2006.

---

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	PL

M = male; F = female; A = adult; PL = post-lactating; NR = non-reproductive

---

### Lake County

Mist netting was conducted at five sites in Lake County. Originally, three sites were to be surveyed at Ethel's Woods. Because of low capture success, limited bat activity (determined by using an Anabat II), and the presence of few dead trees with exfoliating

bark, only two sites were netted there. No bats were captured at Ethel's Woods Site 1, but there were 33 captures at the other four sites (Table 4). Capture success was highest at Edward L. Ryerson Nature Preserve Site 1 and MacArthur Woods Nature Preserve. The species caught most frequently was the big brown bat.

Table 4. Bat captures at mist-netting sites in Lake County, Illinois, 2006.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
<b>Ryerson Nature Preserve Site 1 (19 and 20 June)</b>					
big brown bat	<i>Eptesicus fuscus</i>	2	A	M	NR
		2	A	F	L
northern bat	<i>Myotis septentrionalis</i>	2	A	M	NR
		8	A	F	L
<b>Ryerson Nature Preserve Site 2 (24 and 25 July)</b>					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
		3	A	F	PL
<b>Ethel's Woods Site 2 (27 and 28 June)</b>					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
		2	A	F	L
<b>MacArthur Woods Nature Preserve (30 June and 7 August)</b>					
big brown bat	<i>Eptesicus fuscus</i>	4	A	M	NR
		4	A	F	L
eastern red bat	<i>Lasiurus borealis</i>	1	A	M	NR
northern bat	<i>Myotis septentrionalis</i>	1	A	M	NR
		1	A	F	PL
		1	J	F	NR

M = male; F = female; A = adult; J = juvenile (young-of-year); L = lactating; PL = post-lactating; NR = non-reproductive

### McHenry County

Only one site was netted in McHenry County during 2006. Eleven captures, representing three species, occurred on the Kishwaukee River (Table 5). The northern bat had the highest number of captures.

Table 5. Bat captures at the Kishwaukee River (Thorn Road Site 1) in McHenry County, Illinois, 17 and 19 July 2006.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
		1	A	F	L
hoary bat	<i>Lasiurus cinereus</i>	1	A	F	NR
northern bat	<i>Myotis septentrionalis</i>	7	A	F	PL
		1	J	F	NR

M = male; F = female; A = adult; J = juvenile (young-of-year); L = lactating; PL = post-lactating; NR = non-reproductive

### Will County

Netting was conducted at one area in Will County during 2006. Originally, three sites were to be surveyed at Goodenow Grove Nature Preserve, but a suitable third site was not found. There were 18 captures at the two Goodenow Grove sites (Table 6). The big brown bat was the most frequently captured species.

Table 6. Bat captures at mist-netting sites in Will County, Illinois, 2006.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
<b>Goodenow Grove Nature Preserve Site 1 (29 June and 17 July)</b>					
big brown bat	<i>Eptesicus fuscus</i>	2	A	M	NR
		4	A	F	L
		5	A	F	PL
		2	J	M	NR
		1	J	F	NR
		1	-	-	-- *
eastern red bat	<i>Lasiurus borealis</i>	1	J	M	NR
<b>Goodenow Grove Nature Preserve Site 2 (18 and 24 July)</b>					
eastern red bat	<i>Lasiurus borealis</i>	1	A	M	NR
		1	A	F	PL

M = male; F = female; A = adult; J = juvenile (young-of-year); L = lactating; PL = post-lactating; NR = non-reproductive; \* = escaped before age and sex could be determined

## Summary

Mist netting was conducted at 18 sites in ten survey areas in Cook, DuPage, Kane, Lake, McHenry, and Will counties in northeastern Illinois during the 2006 field season. There were 140 captures of bats at 15 sites. No bats were caught at Ethel's Woods Site 1 (Lake County), Robinson Woods (Cook County), and Brezina Woods (Cook County). The greatest netting success was at Bemis Woods Site 2 (Cook County) where there were 32 captures. The next most successful sites, with 16 captures each, were Bemis Woods Site 1 (Cook County), Goodenow Grove Nature Preserve Site 1 (Will County), and Waterfall Glen Site 2 (DuPage County). No Indiana bats were caught during 2006. The only four species captured were the big brown bat, eastern red bat, hoary bat, and northern bat. This survey will continue during the 2007 field season as 22-28 additional sites are netted in Cook, Kane, Kankakee, McHenry, and Will counties.

## Acknowledgments

The forest preserve districts of Cook, DuPage, Lake, McHenry, and Will counties and the St. Charles Park District (Kane County) graciously provided permits, information, and access to sites. We specifically acknowledge Chris Anchor and Chuck Rizzo (Cook County), Scott Meister (DuPage County), Jennifer Filipiak and Nan Buckardt (Lake), Dave Robson, Karen Rinke, and staff at the Goodenow Nature Center (Will County), and Mary Ochsenschlager (St. Charles). Jacquelyn Potter-Henson (INHS) was a valuable member of the survey team at many sites. Scott Meister, Robert Sliwinski, Jeremy Tiemann (INHS), Jeffrey Mengler (USFWS), Steve Amundsen (INHS), Ron Abrant (USACE), Frank Hensley (Trinity Christian College), and John Oldenburg (DuPage County) assisted with field work.

## References

- Anthony, E.L.P. 1988. Age determination in bats. Pages 47-58 *in* Ecological and behavioral methods for the study of bats. T.H. Kunz, ed. Smithsonian Institution Press, Washington, D.C.
- Belwood, J.J. 2002. Endangered bats in suburbia: observations and concerns for the future. Pages 193-198 *in* The Indiana bat: biology and management of an endangered species. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Butchkoski, C.M. and J.D. Hassinger. 2002. Ecology of a maternity colony roosting in a building. Pages 130-142 *in* The Indiana bat: biology and management of an endangered species. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Callahan, E.V., R.D. Drobney, and R.L. Clawson. 1997. Selection of summer roosting sites by Indiana bats (*Myotis sodalis*) in Missouri. *Journal of Mammalogy* 78:818-825.
- Carter, T.C. 2003. Summer habitat use of roost trees by the endangered Indiana bat (*Myotis sodalis*) in the Shawnee National Forest of southern Illinois. Ph.D. dissertation, Southern Illinois University, Carbondale. 82 p.



- Carter, T.C., G. Feldhamer, and J. Kath. 2001. Notes on summer roosting of Indiana bats. *Bat Research News* 42:197-198.
- Carter, T.C., S.K. Carroll, J.E. Hofmann, J.E. Gardner, and G.A. Feldhamer. 2002. Landscape analysis of roosting habitat in Illinois. Pages 160-164 *in* The Indiana bat: biology and management of an endangered species. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Chenger, J. 2003. Iowa Army Ammunition Plant 2003 Indiana bat investigations. Unpublished report, Iowa Army Ammunition Plant, Middletown.
- Cope, J.B., A.R. Richter, and R.S. Mills. 1973. A summer concentration of the Indiana bat, *Myotis sodalis*, in Wayne County, Indiana. *Proceedings of the Indiana Academy of Science* 83:482-484.
- Farmer, A.H., B.S. Cade, and D.F. Stauffer. 2002. Evaluation of a Habitat Suitability Index model. Pages 172-179 *in* The Indiana bat: biology and management of an endangered species. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Ford, W.M., J.M. Menzel, M.A. Menzel, and J.W. Edwards. 2002. Summer roost-tree selection by a male Indiana bat on the Fernow Experimental Forest. U.S. Department of Agriculture Forest Service, Northeastern Research Station, Newtown Square, PA. 7 p.
- Gardner, J.E., J.D. Garner, and J.E. Hofmann. 1989. A portable mist netting system for capturing bats with emphasis on *Myotis sodalis* (Indiana bat). *Bat Research News* 30:1-8.
- Gardner, J.E., J.D. Garner, and J.E. Hofmann. 1991. Summer roost selection and roosting behavior of *Myotis sodalis* (Indiana bat) in Illinois. Final report, submitted to Endangered Species Coordinator, Region 3, U.S. Fish and Wildlife Service and Indiana/Gray Bat Recovery Team, U.S. Fish and Wildlife Service. Illinois Natural History Survey, Champaign. 56 p.
- Hendricks, W.D., R. Ijames, L. Alverson, J. Timpone, M. Muller, N. Nelson, and J. Smelser. 2005. Notable roosts for the Indiana bat (*Myotis sodalis*). Pages 133-138 *in* Indiana bat and coal mining: a technical interactive forum. K.C. Vories and A. Harrington, eds. U.S. Department of Interior, Office of Surface Mining, Alton, IL and Coal Research Center, Southern Illinois University, Carbondale.
- Hoffmeister, D.F. 1989. *Mammals of Illinois*. University of Illinois Press, Urbana. 348 p.
- Humphrey, S.R., A.R. Richter, and J.B. Cope. 1977. Summer habitat and ecology of the endangered Indiana bat, *Myotis sodalis*. *Journal of Mammalogy* 58:334-346.
- Illinois Biological Stream Characterization Work Group. 1995. Biological stream characterization of Illinois streams. Second ed. Illinois Natural History Survey, Champaign. map
- Kath, J.A. 2002. An overview of hibernacula in Illinois, with emphasis on the Magazine Mine. Pages 110-115 *in* The Indiana bat: biology and management of an endangered species. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Kurta, A. 2005. Roosting ecology and behavior of Indiana bats (*Myotis sodalis*) in summer. Pages 29-42 *in* Indiana bat and coal mining: a technical interactive forum. K.C. Vories and A. Harrington, eds. U.S. Department of Interior, Office of Surface Mining, Alton, IL and Coal Research Center, Southern Illinois University, Carbondale.

- Kurta, A., J. Kath, E.L. Smith, R. Foster, M.W. Orick, and R. Ross. 1993a. A maternity roost of the endangered Indiana bat (*Myotis sodalis*) in an unshaded, hollow sycamore tree (*Platanus occidentalis*). *American Midland Naturalist* 130:405-407.
- Kurta, A., D. King, J.A. Teramino, J.M. Stribley, and K.J. Williams. 1993b. Summer roosts of the endangered Indiana bat (*Myotis sodalis*) on the northern edge of its range. *American Midland Naturalist* 129:132-138.
- Kurta, A., K.J. Williams, and R. Mies. 1996. Ecological, behavioural, and thermal observations of a peripheral population of Indiana bats (*Myotis sodalis*). Pages 102-117 in *Bats and Forests Symposium*. R.M.R. Barclay and R.M. Brigham, eds. Research Branch, British Columbia Ministry of Forests, Victoria Working Paper 23.
- Kurta, A., S.W. Murray, and D.H. Miller. 2002. Roost selection and movements across the summer landscape. Pages 118-129 in *The Indiana bat: biology and management of an endangered species*. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Menzel, M.A., J.M. Menzel, T.C. Carter, W.M. Ford, and J.W. Edwards. 2001. Review of the forest habitat relationships of the Indiana bat (*Myotis sodalis*). U.S. Department of Agriculture Forest Service, Northeastern Research Station, Newtown Square, PA. 21 p.
- Miller, N.E., R.D. Drobney, R.L. Clawson, and E.V. Callahan. 2002. Summer habitat in northern Missouri. Pages 165-171 in *The Indiana bat: biology and management of an endangered species*. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Mumford, R.E. and J.B. Cope. 1958. Summer record of *Myotis sodalis* in Indiana. *Journal of Mammalogy* 39:586-587.
- Racey, P.A. 1988. Reproductive assessment in bats. Pages 31-45 in *Ecological and behavioral methods for the study of bats*. T.H. Kunz, ed. Smithsonian Institution Press, Washington, D.C.
- Ritzi, C.M., B.L. Everson, and J.O. Whitaker Jr. 2005. Use of bat boxes by a maternity colony of Indiana myotis (*Myotis sodalis*). *Northeastern Naturalist* 12:217-220.
- Salyers, J., K. Tyrell, and V. Brack. 1996. Artificial roost structure use by Indiana bats in wooded areas in central Indiana. *Bat Research News* 37:148.
- Sparks, D.W., C.M. Ritzi, J.E. Duchamp, and J.O. Whitaker Jr. 2005. Foraging habitat of the Indiana bat (*Myotis sodalis*) at an urban-rural interface. *Journal of Mammalogy* 86:713-718.
- U.S. Fish and Wildlife Service. 1999. Agency draft Indiana bat (*Myotis sodalis*) revised recovery plan. Fort Snelling, MN. 53 p.
- Whitaker, J.O. Jr. and V. Brack Jr. 2002. Distribution and summer ecology in Indiana. Pages 48-54 in *The Indiana bat: biology and management of an endangered species*. A. Kurta and J. Kennedy, eds. Bat Conservation International, Austin, TX.
- Whitaker, J.O. Jr., D.W. Sparks, and V. Brack Jr. 2004. Bats on the Indianapolis International Airport area, 1991-2001. *Proceedings of the Indiana Academy of Science* 113:151-161.