



ILLINOIS NATURAL HISTORY SURVEY

A two-year mist-netting survey for bats in Cook, DuPage, Kane, Kankakee,
Lake, McHenry, and Will counties in northeastern Illinois

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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, primarily in public ownership, in Cook, DuPage, Kane, Kankakee, Lake, McHenry, and Will counties that were deemed to provide high-quality summer habitat for the Indiana bat. Most of these areas included multiple netting sites. The Illinois Natural History Survey (INHS) conducted the survey during the summers of 2006 and 2007. Results of the survey, along with background information on Indiana bat habitat and records, are presented in this report.

Regional 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 [IDNR]).

The only other records for the Indiana bat in northern Illinois are from LaSalle and Jo Daviess counties. Blackball Mine near Utica in LaSalle County is a hibernaculum regularly 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 by mist netting 1.6 km from the mine in May 2006 (INHD). Three specimens were collected at an abandoned lead mine in Jo Daviess County in the northwestern corner of Illinois during December 1953 (Hoffmeister 1989). There are summer records for the species in at least 30 counties in central and southern Illinois (INHD).

Indiana bat maternity colonies occur in northern Indiana (USFWS 2007). In 2003 four non-reproductive females were caught near the Kankakee River in northwestern Newton County, Indiana (Shawn Cirton, USFWS, personal communication, 16 November 2006); Newton County is adjacent to Kankakee County, Illinois. Maternity colonies also occur in southern Michigan; their locations are as far north as the Chicago metropolitan region (USFWS 2007). The only Indiana bat record for Wisconsin is a specimen collected in a lead mine in Grant County in the southwestern corner of the state in November 1954 (Jackson 1961).

Other Bat Surveys in the Region

In addition to this survey, mist-netting and acoustic surveys for bats have been conducted at several sites in the Chicago metropolitan area. Reported efforts in the seven counties covered by the present survey are summarized below.

Cook County: A site on Black Partridge Creek in southern Cook County was netted for two nights during July 2005 (Hofmann and Amundsen 2005a). Species caught at this site were the big brown bat (*Eptesicus fuscus*) and northern bat (*Myotis septentrionalis*).

DuPage County: Illinois Department of Conservation (now IDNR) biologists netted for one night at Lyman Woods and Waterfall Glen in July 1988 (INHS bat survey database, maintained by J.E. Hofmann). Big brown bats and eastern red bats (*Lasiurus borealis*) were captured.

Kane County: A site on Big Rock Creek north of Jericho Road was netted for two nights in August 2005 (Hofmann et al. 2006). Species captured at the site were the big brown, eastern red, and little brown (*Myotis lucifugus*) bats. Netting was conducted at one upland-forest site in Blackhawk Forest Preserve, two sites on Brewster Creek, and one site on a tributary of Brewster Creek (two nights/site) during July 2005 (Carter 2005). Big brown bats, eastern red bats, and eastern pipistrelles (*Pipistrellus subflavus*) were caught. Netting on Mill Creek at its confluence with the Fox River for one night in July 1995 was unsuccessful (Hofmann 1996a).

Kankakee County: Netting was conducted near the mouth of Davis Creek in Kankakee River State Park for one night in July 1993 and one night in June 1994 (Hofmann 1996b). Species captured were the big brown and eastern red bats. Illinois Department of Conservation biologists netted at Momence Wetlands for two nights in June 1987 and captured an eastern red bat (INHS bat survey database).

Lake County: Scott (2007) captured big brown, eastern red, and northern bats at Lake County forest preserves during 2005. Acoustic monitoring at nine forest preserves, from mid-June to early September 2004 and late May to late August 2005, resulted in the detection of the big brown bat, hoary bat (*Lasiurus cinereus*), eastern red bat, eastern pipistrelle, silver-haired bat (*Lasionycteris noctivagans*), and *Myotis* spp. (Scott 2007). During July and August 1985 mist netting was conducted (one night/site) at five sites along the Des Plaines River (Gardner and Hofmann 1985a, 1985b). Big brown, eastern red, and little brown bats were caught.

McHenry County: Two sites along Crystal Creek in Algonquin were netted (two nights each) in July 2005; big brown, eastern red, and little brown bats were captured (Hofmann 2005). One site on Nippersink Creek at Alden Road was netted unsuccessfully for two nights in July 2005 (Whitaker and Everson 2005a).

Will County: Netting was conducted at six sites along Prairie Creek and two sites on Grant Creek at Midewin National Tallgrass Prairie (two nights/site) during May and June 2007 (Widowski et al. 2007). Species captured were the big brown, eastern red, silver-haired, and hoary bats. Netting was done at Long Run Creek and two sites along Spring Creek in Messenger Woods (two nights/site) during June 2005 (Hofmann and Amundsen 2005a). Species caught at the three sites were the big brown, hoary, and northern bats. Netting was conducted along the Des Plaines River at Lemont Road and Spring Creek near IL 6 (two nights/site) during July 2005 (Whitaker and Everson 2005b). Big brown, eastern red, and northern bats were captured at those sites. Two sites along Grant Creek at Midewin and three sites along Jackson Creek at the Joliet Training Area were netted (two nights/site) in August 2005 (Whitaker and Everson 2005c). Netting was successful

at three sites; big brown and eastern red bats were caught. During 2005 netting was unsuccessful along the Des Plaines River at two sites: Keepataw Preserve (Hofmann and Amundsen 2005a) and Lockport Prairie (Hofmann and Amundsen 2005b). One site each on Prairie and Grant creeks at the Joliet Arsenal (now Midewin) were netted for one night in August 1993 (INHS bat survey database). Big brown and eastern red bats were captured at Prairie Creek (INHS Bat Survey Database). Netting was performed at Forked Creek near Wilton Center and Plum Creek at Old Post Road (one night/site) in July 1991 (Gardner 1991). Species captured were big brown, eastern red, and hoary bats.

In addition, an acoustic survey was conducted at 15 areas in Cook and Kane counties during the summer and autumn from 1997 through 1999 and at five areas in McHenry County during 1998 and 1999 (Gehrt and Chelsvig 2003, Gehrt and Chelsvig 2004). The big brown bat, eastern red bat, silver-haired bat, eastern pipistrelle, hoary bat, and *Myotis* group were identified.

Indiana Bat Summer Habitat and Roosts

The summer habitat requirements of Indiana bats are not completely understood (USFWS 2007, 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 and Feldhamer 2005). 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, Kurta 2004, Hendricks et al. 2005, Ritzi et al. 2005). Male Indiana bats use caves, abandoned mines, artificial roosting structures, and bridges as well as trees as 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 2004). 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 and Feldhamer 2005). 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 occupied 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, pasture, and a swamp (Gardner et al. 1991, Kurta et al. 1993a, Carter and Feldhamer 2005). Indiana bat maternity colony members occupy primary roosts that are exposed to high levels of solar radiation (Menzel et al. 2001, USFWS 2007). The death of an overstory tree creates a light-gap in the forest canopy; dead trees along forest edges, in fencerows, or in areas impacted by flooding or storm damage 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 is possible that Indiana bats prefer forested areas with an open understory for ease of movement. Most Indiana bat roost trees have been close to, or surrounded by, water (e.g. Humphrey et al. 1977; Gardner et al. 1991; Kurta et al. 1996, 2002; Callahan et al. 1997; Carter and Feldhamer 2005), 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). A maternity colony in Indiana, however, recently was found roosting in trees near a major highway (J.M. 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 located 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 (Kurta 2004). 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). Only 33% of the landscape occupied by a maternity colony in western Illinois was forested (Gardner et al. 1991), while forest cover within a 3-km radius of four maternity colonies in Missouri ranged from 19-30% (Callahan 1993). 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, 2007). 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 5.2 or 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 5.2 or 6.1 m and the nets can be lowered to remove bats. This system is described by Gardner et al. (1989). Nets typically 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-min intervals for 4.5 hours. Netting is conducted on nights when environmental conditions are considered favorable for bat captures, i.e. no precipitation, no strong winds, and temperatures above 9°C. If conditions deteriorate after netting has begun, the session is terminated. However, if there is only a brief period of light rain, the nets are closed and netting is resumed after the rain has ended to complete the 5-hour session. Each site is netted for two nights (consecutive nights, if weather is favorable).

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 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.

Selection of Survey Areas

Biologists at the USFWS Chicago office, aided by discussions with natural resources personnel from counties in northeastern Illinois, developed a list of areas in public ownership that seemed to provide suitable summer habitat for the Indiana bat. A major selection criterion was the presence of potential roost trees. Following site visits, the list was pared to 20 survey areas in Cook, DuPage, Kane, Kankakee, Lake, McHenry, and Will counties. At many of the areas, more than one site was to be surveyed. The number of sites was specified for some areas; for others a range was provided. As the survey was being conducted, a few alterations were made to the list based on conditions encountered at the survey areas. These involved the number of sites netted at an area or substitution of areas. The survey was completed at 43 sites in 20 survey areas (Table 1).

Table 1. Survey areas for a mist-netting survey for bats by the INHS in northeastern Illinois, 2006-2007.

<u>County</u>	<u>Survey Area</u>	<u>Number of Sites</u>
Cook	Schiller Woods/Robinson Woods	2
Cook	Palos Preserve	2
Cook	Deer Grove	2
Cook	Bemis Woods/Brezina Woods	3
Cook	Thornton Lansing Nature Preserve/Sauk Trail Woods	2
Cook	Dam No. 1 Woods East	2
DuPage	Waterfall Glen	2
Kane	Norris Woods Nature Preserve	1
Kane	Leroy Oakes Forest Preserve	1
Kane	Les Arends Forest Preserve	1
Kane	Hannaford Woods	1
Kankakee	Momence Wetlands	8
Lake	Edward L. Ryerson Nature Preserve	2
Lake	MacArthur Woods Nature Preserve	1
Lake	Ethel's Woods	2
McHenry	Kishwaukee River at Thorn Road	3
McHenry	Kishwaukee River at Deer Pass Road	2
McHenry	Beck's Woods	2
Will	Goodenow Grove Nature Preserve	2
Will	Hickory Creek Forest Preserve	2

Descriptions of Survey Sites

The locations of all survey sites are shown in Figure 1; maps illustrating the locations of the sites in each county are in Appendix 1. Appendix 2 contains photographs of each site surveyed during the 2006 field season. Photographs of sites surveyed during the 2007 season are in Appendix 3 (except Hickory Creek Site 1 in Will County for which photographs were lost). Unless otherwise specified in an individual site description, a "Net" consisted of two tiers (i.e. two nets stacked vertically) and reached a height of 5.2 or 6.1 m.

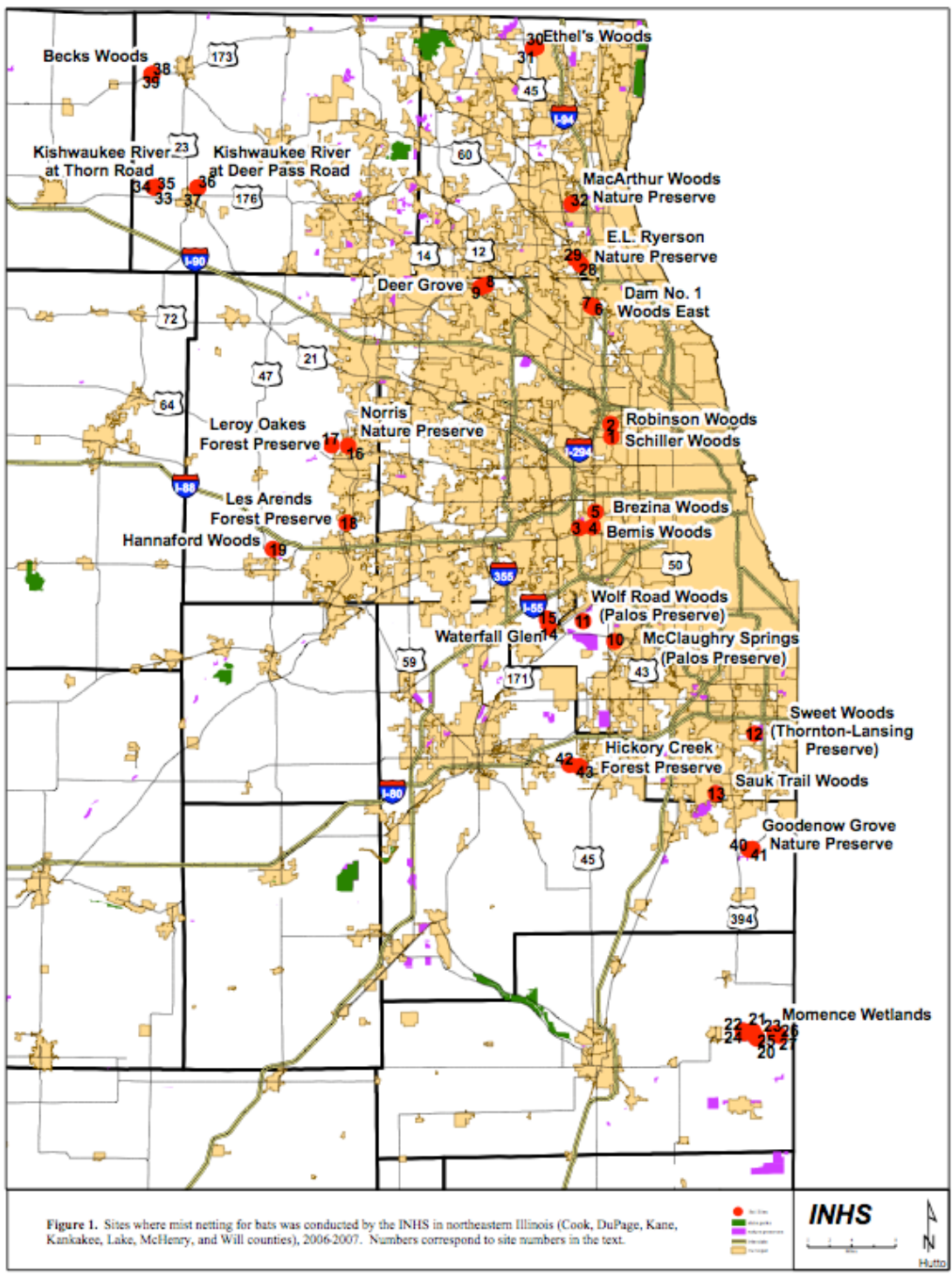


Figure 1. Sites where mist netting for bats was conducted by the INHS in northeastern Illinois (Cook, DuPage, Kane, Kankakee, Lake, McHenry, and Will counties), 2006-2007. Numbers correspond to site numbers in the text.

Cook County

1. Schiller Woods South: east side of 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 2006. 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 Des Plaines River at 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 2006. 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 only 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 2006. 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 2006. 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). This site was along the southern edge of Salt Creek Woods Nature Preserve.

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 2006. 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 east of 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 2006. The site was at an oxbow in the middle of forest east of the main channel of the Des Plaines River. Trees present included silver maple, elm, oak, and black walnut (*Juglans nigra*). 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 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 2006. 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.

8. Deer Grove Site 1: unnamed creek and bike path (T.42N, R.10E, NW/4 of SW/4 Sec. 4, Lake Zurich 7.5' topographic quadrangle; UTM 410916mE, 4666294mN, Zone 16 NAD 83); 6 and 11 June 2007. At this site a paved bike path (formerly a road) crossed a small, unnamed creek. There was a fenced restoration area on the east side of the path. The stream was 3 m wide, except for a wider pool adjacent to the culvert beneath the path. The substrate was sand and silt. There were riffles at intervals of 10-20 m. Net A consisted of 6 m-long nets placed diagonally across the stream 10 m downstream (east) of the bike path. The water was 20 cm deep, but the channel contained a large amount of debris (building material) near the net. There was extensive forest on both sides of the creek. Trees near the creek included American elm, basswood, cottonwood, ash, and sugar maple. There was a partial canopy above the net and the flyway was unobstructed. The terrain near the net was level, but there was a forested slope downstream. Net B was 6 m in length and was positioned across the bike path 70 m south of the creek. There was a closed, low canopy above most of the trail, but only a partial canopy above the net. Extensive forest was present on both sides of the path. Trees near the net included slippery elm, white oak, and dogwood (*Cornus* sp.).

9. Deer Grove Site 2: bike path through oak-hickory forest (T.42N, R.10E, SE/4 of SW/4 and SW/4 of SE/4 Sec. 5, Lake Zurich 7.5' topographic quadrangle; UTM 410151mE, 4665976mN, Zone 16 NAD 83); 12 and 13 June 2007. The nets were placed across a paved bike path (formerly a park road) approximately 600 m southwest of site 1. The path was 5 m wide and covered by a closed canopy. There was extensive forest on both sides of the path. Both nets were 6 m in length. Net B was 30 m south of, and slightly uphill from, Net A. Trees near the nets included red oak, sugar maple, hop hornbeam, basswood, and honey locust (*Gleditsia triacanthos*). There also were shagbark hickories nearby. The understory was relatively dense because of the presence of many saplings.

10. McClaughry Springs (Palos Preserve): Mill Creek at McClaughry Springs picnic area (T.37N, R.12E, SW/4 of SE/4 Sec. 22, Palos Park 7.5' topographic quadrangle; UTM 429675mE, 4614262mN, Zone 16 NAD 83); 30 and 31 May 2007. There was a steep, forested hillside on the west side of Mill Creek. Most of the east bank was wooded. Trees at the site included elm, ash, black walnut, cottonwood, and white oak. The water in the creek was 10 cm deep and the substrate was rocks, many which were partly exposed. Both nets were 6 m long. At Net A the channel was approximately 6 m wide and full of water. There was a slight riffle beneath the net and a pool downstream. The east bank had a narrow, wooded riparian zone, beyond which was a clearing (picnic area). There was a closed canopy above the net and the flyway was unobstructed. Net B was 45 m downstream of Net A. The channel was approximately 8 m wide. The net was at the edge of a pool, with a riffle extending a long distance downstream. There was a

downed tree trunk across the channel just upstream of the net. The east pole was at the edge of the clearing, with forest on the downstream side. There was no canopy above the net. There was a potential roost tree on the east bank midway between the nets.

11. Wolf Road Woods (Palos Preserve): dirt trail through oak-hickory forest south of Tomahawk Slough (T.37N, R.12E, SW/4 of SE/4 Sec. 7, Sag Bridge 7.5' topographic quadrangle; UTM 425130mE, 4617330mN, Zone 16 NAD 83); 23 and 24 July 2007. The forest was dominated by white oaks, and shagbark hickories also were present. The nets were placed across a narrow (3-5 m), dirt trail that paralleled the shoreline of Tomahawk Slough. The distance from the trail to the water was about 65 m. The forest was 30 m wide; approximately 25 m of small trees and 10 m of herbaceous vegetation occurred between the forest and the water's edge. There was extensive forest south of the trail. Net A consisted of 9-m long nets. There was canopy above the net and above the trail in both directions. A group of dead trees produced a gap in the forest southeast of Net A. Net B was 6 m in length and located 45 m east of Net A. The canopy was high above the net, with some low branches extending a short distance over both sides of the trail.

12. Sweet Woods (Thornton-Lansing Preserve): trail through forest near Thorn Creek (T.35N, R.14E, NW/4 of NW/4 Sec. 2, Calumet City 7.5' topographic quadrangle; UTM 450116mE, 4600912mN, Zone 16 NAD 83); 5 June and 5 July 2007. Nets were set along a trail in the woods located approximately 100 m west of Thorn Creek; the high water level in the creek precluded establishing netting sites over water. The forest included basswood, white oak, and ash. Canopy cover was approximately 90%. The majority of trees had a dbh of less than 40 cm; canopy height was 50 m. There was a well defined "flight corridor" over the trail. The trail ran north-south. Because of the narrowness of the trail (about 3 m) the nets were arranged diagonally across it. Net A was 55 m south of net B. Net A was 9 m long; Net B was 6 m long and consisted of a single tier. A large ash tree (dbh approximately 50 cm) was located near Net A. Three snags (oaks and a basswood) were located within a 5-m radius of Net B.

13. Sauk Trail Woods: Thorn Creek (T.35N, R.14E, NW/4 of NE/4 Sec. 31, Steger 7.5' topographic quadrangle; UTM 444494mE, 4592238mN, Zone 16 NAD 83); 6 and 7 July 2007. Thorn Creek was approximately 12 m wide, with a depth of 0.5 m. There were no riffles and the substrate consisted of sand and mud. The flyway above the creek was unobstructed. The surrounding forest was dominated by basswood, ash, white oak, hickory, black locust (*Robinia pseudoacacia*), and black cherry. The majority of trees had a dbh greater than 40 cm. Canopy cover was 80%; height of trees was 60 m. Net A was 12 m long and was placed along a bridge (anchored to the railing) that spanned the creek. Net B consisted of a single tier 12 m in length and was suspended above the creek 30 m east of Net A. There was a large locust tree with a hollow side on the north bank of Thorn Creek near Net B. The south pole of Net B was near a large (dbh > 75 cm), dead white oak.

DuPage County

14. Waterfall Glen Site 1: Sawmill Creek near its confluence with 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 2006. 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.

15. Waterfall Glen Site 2: Sawmill Creek upstream (north) (T.37N, R.11E, NE/4 of SW/4 Sec.10, Sag Bridge 7.5' topographic quadrangle; UTM 419850mE, 4617674mN, Zone 16 NAD 83); 8 and 23 June 2006. The direct, linear distance between the two sites at Waterfall Glen 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

16. Norris Nature Preserve: east side of 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 2006. 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. 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 relocated for the second night 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.

17. Leroy Oakes Forest Preserve: Ferson Creek (T.40N, R.8E, NW/4 of SE/4 Sec. 20, Geneva 7.5' topographic quadrangle; UTM 388420mE, 4642964mN, Zone 16 NAD 83); 19 and 20 June 2007. The north bank of Ferson Creek was forested. South of the creek was a narrow riparian zone, beyond which was mowed grass with "islands" of unmowed herbaceous vegetation and trees (parkland). Trees along the creek banks included ash, boxelder, dogwood, willow, and black walnut. There were riffles along this stretch of the creek, including one between the two nets that was created by a low, rock dam. The creek bottom was sand and gravel, with some rocks. Net A consisted of 9-m long nets suspended across a pool. The channel was approximately 11 m wide and full of water that was 25 cm deep. There was no canopy above the creek near Net A. Net B was 6 m long and located 55 m downstream, and around a bend, from Net A. The channel was 8.5 m wide and the water was slightly deeper. There was a partial canopy just upstream of Net B, formed by two leaning ash trees. A few low, dead branches extended over the channel near the net. A riffle occurred approximately 50 m downstream.

18. Les Arends Forest Preserve: backwater channel on west side of Fox River (T.39N, R.8E, NW/4 of SW/4 Sec. 27, Aurora North 7.5' topographic quadrangle; UTM 390570mE, 4631674mN, Zone 16 NAD 83); 25 and 26 June 2007. This was an area of backwater channels and small islands. The floodplain was dominated by large silver maples. To the west, the forest sloped up to a narrow, paved bike path. There was also forest on the west side of the trail. The understory on the main island (between the two nets) was open. Net A consisted of 9-m long nets across the widest channel, which was at the base of the forested slope. The channel was 9.5 m wide at the net and full of shallow (25 cm), flowing water. The substrate consisted of rock. A partial canopy was high above the channel, but branches extended halfway across the channel above the net. Net B was 6 m long and suspended at the confluence of multiple small channels. It was 35 m from, and oriented perpendicular to, Net A. The channel was 8 m wide at Net B. The water was slightly deeper than at Net A and had a relatively swift current. The bottom was mostly sand and gravel. There was a canopy directly above the net.

19. Hannaford Woods: bike path through oak-hickory forest (T.38N, R.7E, NE/4 of NW/4 Sec. 9, Sugar Grove 7.5' topographic quadrangle; UTM 379891mE, 4627857mN, Zone 16 NAD 83); 27 and 28 June 2007. This site was added because a suitable second site could not be found at Les Arends Forest Preserve. The nets were suspended across a gravel bike path, which was 5 m wide. Extensive forest was present on both sides of the path. It contained numerous mature white oaks and some shagbark hickories. There also were elms and ashes near the nets. The understory contained many saplings, but there was no shrub layer. Net A was 6 m in length and located approximately 18 m from an

edge of the forest. Beyond the forest was a large grassland, with Blackberry Creek running through it. The canopy was closed above this stretch of the path. Net B was located 55 m from Net A along the path. It was uphill from Net A and there was an S-curve between the two nets. Net B also was 6 m long. The canopy was open on both sides of the net, but closed directly above it.

Kankakee County

The eight sites in Kankakee County were along the Kankakee River east of Momence, an area referred to as Momence Wetlands. The Kankakee River was designated as a Class B stream (highly valued aquatic resource) by the Illinois Biological Stream Characterization Work Group (Hite and Bertrand 1989).

20. Momence Wetlands — Blackhawk Trail: Kankakee River shoreline and backwater slough (T.31N, R.14E, NW/4 of NE/4 Sec. 22, Illiana Heights 7.5' topographic quadrangle; UTM 450318mE, 4556785mN, Zone 16 NAD 83); 11 and 12 July 2007. This site was near the end of North Blackhawk Trail (paved road) on the north side of the Kankakee River. It was on IDNR property. Net A was 6 m long and positioned across the shore perpendicular to the river, which flowed north at this site. The shore consisted of exposed sand and had a gradual slope up to an extensive floodplain forest dominated by silver maple. The understory was relatively open. The east pole was at the edge of the forest under the branches of silver maples. The west pole was in the water approximately 5 cm from the shore. The river was 37 m wide and there was a row of houses along the south bank. Net B, which also was 6 m long, was suspended across a backwater slough 95 m downstream of Net A and 35 m from the bank of the Kankakee River. The slough was approximately 6 m wide and mostly dry. There was a pool of very shallow water 4 m from the net. The slough was surrounded by the floodplain forest and provided a flyway through it. There was a partial canopy above the net.

21. Momence Wetlands — Oxbow West: western arm of oxbow/slough on north side of Kankakee River (T.31N, R.14E, SW/4 of SW/4 Sec. 15, Illiana Heights 7.5' topographic quadrangle; UTM 449724mE, 4557600mN, Zone 16 NAD 83); 16 and 17 July 2007. This site was located on the western arm of an oxbow/slough on the north side of the Kankakee River. The oxbow was within an extensive forested area owned by the IDNR. The net site was approximately 100 m from the bend in the oxbow, which was near the northern edge of the forest. The water in the slough was 9-10 m wide and approximately 40 cm deep. It formed a continuous pool. The substrate was sand and silt. Some downed wood and low branches were present, but the flyway above the water was mostly unobstructed. East of the net site was relatively flat floodplain forest dominated by silver maple. It had an open understory. On the west side the riparian corridor was 40 m wide. A wooded hillside sloped up to a grassland area, with a soybean field beyond. Net A consisted of 9-m long nets. There was a partial canopy above the slough to the north, but limited canopy coverage to the south. Net B was 9 m in length and located 42 m south of Net A. The canopy was complete and branches were right above the net.

22. Momence Wetlands — Singleton Ditch: floodplain forest adjacent to Singleton Ditch (T.31N, R.14E, NE/4 of SW/4 Sec. 16, Illiana Heights 7.5' topographic

quadrangle; UTM 448394mE, 4557666mN, Zone 16 NAD 83); 19 and 22 July 2007. Nets were placed across an unpaved roadbed through floodplain forest on the east side of Singleton Ditch approximately 400 m from its entry into the Kankakee River. This channelized ditch was 30 m wide and had very high banks covered with herbaceous vegetation. There was extensive forest on both sides of the roadbed; the land south of the road was DNR property. The road, which was 6 m wide, provided an unobstructed flyway through the forest to the ditch. The forest was dominated by silver maple, but some ash, cottonwood, and black cherry were present. The understory was open. Net A consisted of 6-m long nets and was at the edge of the forest and 15 m from the water. There was a closed canopy above the net. Net B, also 6 m in length, was located 67 m east of Net A in the forest interior. There was no canopy directly above Net B.

23. Momence Wetlands — Oxbow East: eastern arm of oxbow/slough on north side of Kankakee River (T.31N, R.14E, SE/4 of SW/4 Sec. 15, Illiana Heights 7.5' topographic quadrangle; UTM 449845mE, 4557564mN, Zone 16 NAD 83); 31 July and 1 August 2007. This site was located in the same forest as site 21, but 200 m to the east. It was on the eastern arm of the oxbow/slough approximately 100 m south of the forest edge. A prairie restoration area in private ownership was north of the forest. The principal tree species were sycamore, silver maple, ash, elm, red oak, and river birch (*Betula nigra*). Many trees possessed exfoliating bark and numerous woodpecker holes. The width of the water was 15 m and the depth ranged from 25 cm to 1 m. The bottom of the slough was sand and silt. There were no riffles. Canopy cover above the slough was 50%; in the surrounding forest canopy cover was approximately 90%, with trees reaching a height of about 50 m. The majority of trees had a dbh less than 35 cm. There was a sparse understory in the area. Net A measured 12 m in length. It was on the shore and oriented parallel to the slough. Net B was 9 m long. It was suspended across the slough perpendicular to, and about 30 m south of, Net A.

24. Momence Wetlands — Essigs Point: Kankakee River at Essigs Point on Vails Island (T.31N, R.14E, SE/4 of SW/4 Sec. 16, Illiana Heights 7.5' topographic quadrangle; UTM 448531mE, 4557337mN, Zone 16 NAD 83); 2 and 3 August 2007. This site was located on the south bank of the Kankakee River. The riverbank was flat and consisted of sand and mud, with areas of sparse grass. The edge of the floodplain forest was approximately 10 m from the shoreline. Dominant trees near the mist nets were silver maple, river birch, yellow birch (*Betula alleghaniensis*), and willows. Canopy closure was 80% and the average dbh of trees was less than 40 cm. Net A was 12 m in length. It paralleled the river on the shoreline. Net B was 9 m long. It was positioned in the water perpendicular to the shoreline and 40 m east of Net A. There was no canopy cover above either net. The river was 50 m wide and approximately 10 m deep. There was a row of houses along the south bank within 100 m of the netting site.

25. Momence Wetlands — River Isle: floodplain forest south of Kankakee River in the vicinity of River Isle Day Use area (T.31N, R.14E, SW/4 of NE/4 Sec. 22, Illiana Heights 7.5' topographic quadrangle; UTM 450421mE, 4556512mN, Zone 16 NAD 83); 7 and 8 August 2007. The floodplain forest at this site was dominated by silver maple, some of which were very large. Ash, river birch, slippery elm, and sugar maple also occurred

near the nets. The understory was relatively open. Net A consisted of 6-m long nets suspended across a strip of mowed grass leading towards the Kankakee River. It was 70 m south of the river. There was a large mowed area near the river and no trees were on the bank directly north of the net. A recreational vehicle was parked in the eastern part of this maintained area. Floodplain forest was present on both sides of the mowed strip. There was partial canopy cover above half of the net and a more complete canopy above the mowed strip to the north. Net B was 6m in length and was suspended above a narrow (2.5 m) unpaved roadbed that ran parallel to the Kankakee River through the floodplain forest. Net B was 23 m west and 27 m south of Net A. There was a partial canopy above the net. Puddles of water occurred in the road ruts.

26. Momence Wetlands — Nature Preserve: backwater channel of Kankakee River near Momence Wetlands Nature Preserve (T.31N, R.14E, NE/4 of NW/4 Sec. 24, Illiana Heights 7.5' topographic quadrangle; UTM 453053mE, 4557229mN, Zone 16 NAD 83); 7, 8, and 13 August 2007. This site was on private land bordering the Momence Wetlands Nature Preserve (owned by the IDNR). The nets were positioned across a backwater channel of the Kankakee River. The channel was 10 m wide. Trees near the nets were ash, river birch, catalpa (*Catalpa* sp.), willow, silver maple, and snags covered with grape (*Vitis* sp.). The height of the trees was approximately 50 m and their dbh was less than 50 cm. There was no canopy above the channel. Net A consisted of 12-m long nets and spanned the channel approximately 40 m from its confluence with the main stem of the river. The water was 0.5 to 1 m deep and the substrate was sand and mud. Net B was 30 m north of Net A, near the confluence. Net B was a 6-m long single tier. The depth of the water at Net B ranged from 0.5 to 1.5 m. Abundant human activity in the area was evidenced by “weekend-use” cabins along the backwater.

27. Momence Wetlands — Woodland: berm through floodplain forest near Woodland (T.31N, R.14E, NE/4 of NE/4 Sec. 24, Illiana Heights 7.5' topographic quadrangle; UTM 453729mE, 4556890mN, Zone 16 NAD 83); 9 and 10 August 2007. This site was in a tract of forest owned by the Kankakee River Conservancy District. A 3-m wide berm ran west from a paved road near the bank of the Kankakee River to an unoccupied, one-room cabin. The berm separated two areas of floodplain forest with standing water. The top of the berm was covered with mowed grass. A well-defined flight corridor existed above the berm. The cabin was in disrepair and surrounded by the forest. It was approximately 75 m from the road. Net A was placed in front of the cabin and was oriented east-west. It measured 12 m in length. Net B consisted of 2.6-m long nets and was positioned across the berm. The nets were approximately 30 m apart. Canopy closure ranged from 25% above Net A to 40% above Net B. Trees included river birch, yellow birch, hickory, silver maple, red oak, black cherry, and white pine (*Pinus strobus*). The average dbh of trees was less than 50 cm.

Lake County

28. Edward L. Ryerson Nature Preserve Site 1: confluence of an unnamed tributary and 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 2006. 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.

29. Edward L. Ryerson Nature Preserve Site 2: ephemeral stream and east shore of 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 2006. 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 a single 12-m long net. 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.

30. Ethel's Woods Site 1: near 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 2006. 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.

31. Ethel's Woods Site 2: interior of Ethel's Woods (T.46N, R.11E, SW/4 of NW/4 Sec. 19, Antioch 7.5' topographic quadrangle; UTM 417767mE, 4700774mN, Zone 16 NAD 83); 27 and 28 June 2006. 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.

32. MacArthur Woods Nature Preserve: unnamed tributary of 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 2006. 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

33. Kishwaukee River at Thorn Road Site 1: Kishwaukee River approximately 150 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 2006. The Kishwaukee River in western McHenry County was designated a Class A stream (unique aquatic resource) by the Illinois Biological Stream Characterization Work Group (Hite and Bertrand 1989); this includes the stretch near Thorn Road. The river was 25 m wide at this site. 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 and near the east bank. Net B was 50 m south (downstream) of Net A.

34. Kishwaukee River at Thorn Road Site 2: Kishwaukee River approximately 70 m west of Thorn Road (T.44N, R.5E, SW/4 of NW/4 Sec. 28, Garden Prairie 7.5' topographic quadrangle; UTM 362616mE, 4680608mN, Zone 16 NAD 83); 30 and 31 May 2007. The Kishwaukee River was 14 m wide at this site and flowed west. The water was 1.5 m deep and the bottom consisted of sand and mud. The riparian forest was dominated by silver maples, but beeches (*Fagus grandifolia*) also were present on the north side of the river. The canopy was 60 m high; canopy cover above the river ranged from 60 to 70%. Net A was a single 12-m long net stretched across most of the river. The south bank was sloping and a few snags with exfoliating bark were within 10 m of the net pole. The north pole was located 2 m from a very steep, 2-m high bank. Net B consisted of 12-m long nets and was situated 45-50 m east (upstream) of Net A. A silver maple with exfoliating bark extended over the river between the nets.

35. Kishwaukee River at Thorn Road Site 3: Kishwaukee River approximately 200 m west of Thorn Road (T.44N, R.5E, SE/4 of NE/4 Sec. 29, Garden Prairie 7.5' topographic

quadrangle; UTM 362473mE, 4680606mN, Zone 16 NAD 83); 16 and 17 July 2007. The Kishwaukee River flowed north at this location, which was downstream of a sharp bend. The width of the river was 12 m and the depth ranged from 15 cm to 1.5 m. Riffles covered 40% of this stretch of the river. There were numerous fallen trees and much woody debris in the river. The substrate was sand and mud. The dominant tree species in the riparian forest was silver maple. Most trees had a dbh less than 30 cm. A fallow field was located 50 m southwest of the river. Net A consisted of 6-m long nets. Canopy cover above the net was 75%. Net B was 30 m south of Net A and consisted of 9-m long nets. The west pole was attached to a fallen tree approximately 2 m from the bank. Canopy closure above Net B was 30%.

36. Kishwaukee River at Deer Pass Road Site 1: Kishwaukee River approximately 75 m west of Deer Pass Road (T.44N, R.5E, SE/4 of NE/4 Sec. 25, Marengo North 7.5' topographic quadrangle; UTM 368882mE, 4680468mN, Zone 16 NAD 83); 23 and 24 July 2007. The Kishwaukee River near Deer Pass Road also was designated a Class A stream (unique aquatic resource) by the Illinois Biological Stream Characterization Work Group (Hite and Bertrand 1989). At this location the Kishwaukee River flowed east to west. The river was 9 m wide, with a depth ranging from 25 cm to 1.8 m. There were very few riffles. The river bottom was sand and mud. Common tree species in the riparian forest were silver maple, willow, and boxelder. The dbh of most trees was less than 25 cm. Canopy cover above the river was 60%. Net A consisted of nets 6 m in length. There were four snags within 20 m of the north pole of this net. Net B was located approximately 30 m west of Net A and was 9 m long.

37. Kishwaukee River at Deer Pass Road Site 2: Kishwaukee River 300 m west of Deer Pass Road (T.44N, R.5E, SE/4 of NE/4 Sec. 25, Marengo North 7.5' topographic quadrangle; UTM 368826mE, 4680494mN, Zone 16 NAD 83); 25 and 30 July 2007. The Kishwaukee River flowed south at this site. Its width was 9 m and the water ranged in depth from 0.5 to 2.0 m. Riffles occurred along 25% of this stretch of the river. The substrate was sand and mud. The riparian corridor was dominated by silver maples, most with a dbh less than 40 cm. Some of the maples leaned over the river. Net A was separated from Net B by approximately 30 m. Net A was 6 m in length, while Net B was 9 m long.

38. Beck's Woods Site 1: Piskasaw Creek upstream (T.45N, R.5E, NW/4 of NE/4 Sec. 5, Capron 7.5' topographic quadrangle; UTM 362305mE, 4697054mN, Zone 16 NAD 83); 21 and 22 May 2007. Piskasaw Creek was designated a Class A stream (unique aquatic resource) by the Illinois Biological Stream Characterization Work Group (Hite and Bertrand 1989). The creek, which flowed west at this site, was 12 m wide and consisted entirely of riffles. Water depth was approximately 20 cm and the substrate was cobble. The banks were steep and covered with grasses and woody debris. Trees in the riparian corridor included mature red oak, basswood, ash, boxelder, and willow. A dense understory of honeysuckle (*Lonicera* sp.) and grape occurred on some trees. Canopy cover was approximately 10% and canopy trees were 50 m tall. Both nets were 9 m long. Net A was 30 m east (upstream) of Net B. A fallen willow just southeast of Net A

created a minor flyway obstruction. A pedestrian bridge was located 100 m downstream of the netting site.

39. Beck's Woods Site 2: Piscasaw Creek downstream (T.45N, R.5E, NW/4 of NE/4 Sec. 5, Capron 7.5' topographic quadrangle; UTM 362140mE, 4696957mN, Zone 16 NAD 83); 23 and 29 May 2007. This site was located approximately 120 m downstream of site 1. This stretch of Piscasaw Creek was oriented in an east-west direction and was 10 m wide. The water was 30 cm deep and the bottom consisted of cobbles with sandy areas near the shoreline. The site was open, with no trees in the riparian zone and park facilities on the south side of the creek. Vegetation along the banks comprised primarily grasses interspersed with honeysuckle and mullein (*Verbascum thapsus*). A thicket of shrubs was located 15-20 m north of the creek. A river birch and silver maple were the only trees at the site; they were within 15 m of Net B. Both nets were 12 m in length and crossed the stream diagonally. Net A was 15 m west (downstream) of the pedestrian bridge and approximately 40 m upstream of Net B.

Will County

40. 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 2006. 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.

41. 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 2006. 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.

42. Hickory Creek Forest Preserve Site 1: Hickory Creek east of Schoolhouse Road (T.35N, R.11E, SE/4 of SW/4 Sec. 13, Mokena 7.5' topographic quadrangle; UTM 423107mE, 4596393mN, Zone 16 NAD 83); 21 and 22 May 2007. The channel of Hickory Creek was 12-14 m wide and mostly filled with shallow (20 cm) water. The substrate was primarily sand and gravel, with some rocks. There were no riffles at the net site. The north and south banks of the creek were forested; trees present included silver maple, slippery elm, ash, and white oak. Net A consisted of 9-m long nets suspended above the channel 62 m upstream of a bridge on a paved bike path. The canopy was not closed above the creek at this location and the flyway was unobstructed. Net B also was 9 m in length and was located 42 m downstream of Net A. There were trees leaning into the channel upstream and downstream of Net B, but the flyway was relatively unobstructed. There was a complete canopy just upstream of the net. This site was located within the Hickory Creek Barrens Nature Preserve.

43. Hickory Creek Forest Preserve Site 2: Hickory Creek upstream (east) (T.35N, R.12E, SW/4 of SW/4 Sec. 18, Mokena 7.5' topographic quadrangle; UTM 424550mE, 4596184mN, Zone 16 NAD 83); 23 and 24 May 2007. The linear distance between the two sites on Hickory Creek was approximately 1.5 km. The channel was 13-14 m wide and the water had a slow current. The water was only 10-20 cm deep in the center of the channel, but approximately 0.5 m deep near the north bank. The substrate was composed of sand mixed with silt. The banks were wooded except for the area near a bridge on a paved bike path. Dominant trees in the riparian corridor were ash, silver maple, boxelder, and black walnut. There was no closed canopy above most of the creek at this site. Net A consisted of 9-m long nets and was located 28 m downstream of the bridge. Net B was 12 m long and located 32 m downstream of Net A. The flyway near Net B was restricted to the center of the channel. This site also was within the Hickory Creek Barrens Nature Preserve.

Overall Results

During this survey mist netting was conducted for 87 nights at 43 sites. This represented 176 net-nights of effort (1 net-night = 1 net checked for one night). There were 227 bat captures at 37 sites. There were no captures at Robinson Woods (Cook County), Brezina Woods (Cook County), two sites at Momence Wetlands (Kankakee County), Ethel's Woods Site 1 (Lake County), or Beck's Woods Site 2 (McHenry County). The exact number of individuals is unknown because some bats may have been caught more than once. The number of captures at successful sites ranged from one to 32.

Eight species were netted during the survey (Table 2). The most frequently encountered species was the big brown bat (132 captures). Big brown bats were captured in all seven counties and at 29 of the 37 successful sites. The two other species caught in relatively large numbers were the northern bat (54 captures) and eastern red bat (27 captures). No Indiana bats were captured during the survey.

Table 2. Number of bat captures in northeastern Illinois by species, 2006-2007.

<u>Common Name</u>	<u>Species</u>	<u>Number of Captures</u>
big brown bat	<i>Eptesicus fuscus</i>	132
silver-haired bat	<i>Lasionycteris noctivagans</i>	1
eastern red bat	<i>Lasiurus borealis</i>	27
hoary bat	<i>Lasiurus cinereus</i>	2
little brown bat	<i>Myotis lucifugus</i>	7
northern bat	<i>Myotis septentrionalis</i>	54
evening bat	<i>Nycticeius humeralis</i>	2
eastern pipistrelle	<i>Pipistrellus subflavus</i>	2

Results for Individual Counties and Sites

Cook County

Mist netting was conducted at 13 sites in Cook County. There were bat captures at 11 sites (Table 3); no bats were caught at Robinson Woods or Brezina Woods. Very little bat activity was detected with an Anabat II[®] 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. The second night of netting at Schiller Woods and Robinson Woods ended one hour and 30 minutes early, respectively, because of people on ATVs approaching the net sites. One night at Deer Grove Site 1 also was shortened by 15 minutes because of the presence of unauthorized people near the site.

The total number of captures at Cook County sites was 76. Individuals of five species were captured. The most frequently caught species was the big brown bat. Bemis Woods Site 2 had the highest number of captures (32) of any site during the two-year survey. All but one capture was a big brown bat, indicating that the net site was near a maternity roost.

Table 3. Bat captures at mist-netting sites in Cook County, Illinois, 2006-2007.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
Schiller Woods (10 and 11 July 2006)					
big brown bat	<i>Eptesicus fuscus</i>	3	A	M	NR
hoary bat	<i>Lasiurus cinereus</i>	1	A	M	NR

Table 3 continued on following page

Bemis Woods Site 1 (12 and 13 July 2006)					
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
Bemis Woods Site 2 (25 and 26 July 2006)					
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
Dam No. 1 Woods East Site 1 (5 and 6 July 2006)					
eastern red bat	<i>Lasiurus borealis</i>	4	A	M	NR
Dam No. 1 Woods East Site 2 (8 and 9 August 2006)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	F	NR
Deer Grove Site 1 (6 and 11 June 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
Deer Grove Site 2 (12 and 13 June 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	F	PG
		1	A	F	L
northern bat	<i>Myotis septentrionalis</i>	1	A	M	NR
McClaghry Springs (30 and 31 May 2007)					
northern bat	<i>Myotis septentrionalis</i>	1	A	F	PG
Wolf Road Woods (23 and 24 July 2007)					
big brown bat	<i>Eptesicus fuscus</i>	3	A	F	PL
		1	J	F	NR
eastern red bat	<i>Lasiurus borealis</i>	1	J	F	NR
northern bat	<i>Myotis septentrionalis</i>	1	J	M	NR

Table 3 concluded on following page

Sweet Woods (5 June and 5 July 2007)

big brown bat	<i>Eptesicus fuscus</i>	1	A	M	SC
northern bat	<i>Myotis septentrionalis</i>	1	A	F	L
		1	A	M	NR
eastern pipistrelle	<i>Pipistrellus subflavus</i>	1	A	M	NR

Sauk Trail Woods (6 and 7 July 2007)

big brown bat	<i>Eptesicus fuscus</i>	1	A	F	L
eastern red bat	<i>Lasiurus borealis</i>	2	A	F	L
		1	A	M	SC

M = male; F = female; A = adult; J = juvenile (young-of-year); PG = pregnant; L = lactating; PL = post-lactating; SC = scrotal; 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 4). The most frequently captured species were the big brown bat and northern bat.

Table 4. 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>
Waterfall Glen Site 1 (5 and 7 June 2006)					
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
Waterfall Glen Site 2 (8 and 23 June 2006)					
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

Bats were surveyed at four sites in Kane County. Norris Nature Preserve was substituted for Ferson Creek Fen Nature Preserve and Hannaford Woods for the second site at Les Arends Forest Preserve. Bats were captured at every site, but not in large numbers (Table 5). The total number of captures was nine. The most frequently netted species was the

big brown bat, which was the only species caught at Les Arends Forest Preserve and Hannaford Woods.

Table 5. Bat captures at mist-netting sites in Kane County, Illinois, 2006-2007.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
Norris Nature Preserve (5 and 6 July 2006)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	PL
Leroy Oakes Forest Preserve (19 and 20 June 2007)					
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	NR
little brown bat	<i>Myotis lucifugus</i>	2	A	F	L
Les Arends Forest Preserve (25 and 26 June 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
Hannaford Woods (27 and 28 June 2007)					
big brown bat	<i>Eptesicus fuscus</i>	2	A	F	L
		1	A	M	NR

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

Kankakee County

Bats were captured at six of the eight sites surveyed in Kankakee County (Table 6). Netting was unsuccessful on the south side of the Kankakee River at the Essigs Point and Woodland sites; no bats were seen or heard (with a bat detector) at the Woodland site. Netting ended early on 7 August at the Nature Preserve site because of rain and was netted for two more nights. Bats, however, were caught only on 7 August so all three nights were used in determining the number of net-nights. The total number of captures in the county was 29. The highest number of captures was eight at the Oxbow West site, but there were six captures at three other sites. Members of five species were caught. The most frequently encountered species was the big brown bat, although it was only netted at four of the sites.

Table 6. Bat captures at mist-netting sites in Kankakee County, Illinois, 2007.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
Momence Wetlands – Blackhawk Trail (11 and 12 July 2007)					
northern bat	<i>Myotis septentrionalis</i>	1	A	F	PL
Momence Wetlands – Oxbow West (16 and 17 July 2007)					
big brown bat	<i>Eptesicus fuscus</i>	2	A	F	PL
		2	A	M	NR
eastern red bat	<i>Lasiurus borealis</i>	1	J	F	NR
little brown bat	<i>Myotis lucifugus</i>	2	A	M	NR
		1	-	-	-- *
Momence Wetlands – Singleton Ditch (19 and 22 July 2007)					
big brown bat	<i>Eptesicus fuscus</i>	2	A	M	NR
northern bat	<i>Myotis septentrionalis</i>	3	J	F	NR
evening bat	<i>Nycticeius humeralis</i>	1	J	M	NR
Momence Wetlands – Oxbow East (31 July and 1 August 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	F	PL
		2	J	F	NR
northern bat	<i>Myotis septentrionalis</i>	1	A	F	PL
		1	A	M	NR
		1	J	M	NR
Momence Wetlands – River Isle (7 and 8 August 2007)					
big brown bat	<i>Eptesicus fuscus</i>	2	J	F	NR
		1	J	M	NR
eastern red bat	<i>Lasiurus borealis</i>	3	J	F	NR
Momence Wetlands Nature Preserve (7, 8, and 13 August 2007)					
little brown bat	<i>Myotis lucifugus</i>	1	A	F	NR
evening bat	<i>Nycticeius humeralis</i>	1	J	F	NR

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

Lake County

Mist netting was conducted at five sites in Lake County. Originally, three sites were to have been surveyed at Ethel's Woods. Because of low capture success, limited bat activity (determined by using bat detectors), and the presence of few dead trees with exfoliating bark, only two sites were netted. No bats were captured at Ethel's Woods Site 1, but there were 34 captures at the other four sites in the county (Table 7). Capture success was highest at Edward L. Ryerson Nature Preserve Site 1 and MacArthur Woods Nature Preserve. Three species were netted. The species caught most frequently was the big brown bat, although there were multiple captures of northern bats at Ryerson Site 1.

Table 7. 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>
Edward L. Ryerson Nature Preserve Site 1 (19 and 20 June 2006)					
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
Edward L. Ryerson Nature Preserve Site 2 (24 and 25 July 2006)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
		3	A	F	PL
Ethel's Woods Site 2 (27 and 28 June 2006)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
		3	A	F	L
MacArthur Woods Nature Preserve (30 June and 7 August 2006)					
big brown bat	<i>Eptesicus fuscus</i>	4	A	M	NR
		3	A	F	L
		1	A	F	PL
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

Netting was conducted at seven sites in McHenry County and bats were captured at six (Table 8). No bats were caught at the second site in Beck's Woods. The total number of captures was 30. Netting success was highest at the first two sites along the Kishwaukee River at Thorn Road. Six species were caught in the county. The northern bat had the highest number of captures (19).

Table 8. Bat captures at mist-netting sites in McHenry County, Illinois, 2006-2007.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
Kishwaukee River at Thorn Road Site 1 (18 and 20 July 2006)					
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>	1	A	F	L
		3	A	F	PL
		2	A	F	NR
		2	J	F	NR
Kishwaukee River at Thorn Road Site 2 (30 and 31 May 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	F	PG
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	-- *
northern bat	<i>Myotis septentrionalis</i>	8	A	F	PG
little brown bat	<i>Myotis lucifugus</i>	1	A	M	NR
eastern pipistrelle	<i>Pipistrellus subflavus</i>	1	A	F	PG
Kishwaukee River at Thorn Road Site 3 (16 and 17 July 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	F	PG
		1	A	M	NR
northern bat	<i>Myotis septentrionalis</i>	1	J	F	NR
Kishwaukee River at Deer Pass Road Site 1 (23 and 24 July 2007)					
big brown bat	<i>Eptesicus fuscus</i>	1	A	M	NR
northern bat	<i>Myotis septentrionalis</i>	1	A	F	NR
Kishwaukee River at Deer Pass Road Site 2 (25 and 30 July 2007)					
northern bat	<i>Myotis septentrionalis</i>	1	A	F	PL

Table 8 concluded on following page

Beck's Woods Site 1 (21 and 22 May 2007)

eastern red bat	<i>Lasiurus borealis</i>	1	A	F	PG
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M = male; F = female; A = adult; J = juvenile (young-of-year); PG = pregnant; L = lactating; PL = post-lactating; NR = non-reproductive; * = escaped before reproductive status could be determined

Will County

Originally, three sites were to be surveyed at Goodenow Grove Nature Preserve, but a suitable third netting site was not located. Bats were captured at all four sites netted in Will County (Table 9). The total number of captures was 30. The most productive site was Goodenow Grove Site 1. Individuals of four species were caught. The big brown bat was the most frequently captured species. The only silver-haired bat caught during the survey was netted at Hickory Creek Forest Preserve.

Table 9. Bat captures at mist-netting sites in Will County, Illinois, 2006-2007.

<u>Common Name</u>	<u>Species</u>	<u>No.</u>	<u>Age</u>	<u>Sex</u>	<u>Reprod.</u>
Goodenow Grove Nature Preserve Site 1 (29 June and 17 July 2006)					
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
Goodenow Grove Nature Preserve Site 2 (18 and 24 July 2006)					
eastern red bat	<i>Lasiurus borealis</i>	1	A	M	NR
		1	A	F	PL
Hickory Creek Forest Preserve Site 1 (21 and 22 May 2007)					
big brown bat	<i>Eptesicus fuscus</i>	2	A	F	PG
silver-haired bat	<i>Lasionycteris noctivagans</i>	1	A	M	NR
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	PG
		1	-	-	-- *
northern bat	<i>Myotis septentrionalis</i>	1	A	F	NR

Table 9 concluded on following page

Hickory Creek Forest Preserve Site 2 (23 and 24 May 2007)

big brown bat	<i>Eptesicus fuscus</i>	3	A	F	PG
		2	A	M	NR
eastern red bat	<i>Lasiurus borealis</i>	1	A	F	PG

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

Discussion

During this survey in northeastern Illinois, there were 227 bat captures during 87 nights (representing 176 net-nights). Netting was successful at 37 of 43 sites. Minimal bat activity was observed at three of the six unsuccessful sites (Ethel's Woods Site 1 in Lake County, Robinson Woods in Cook County, and Momence Wetlands – Woodland in Kankakee County). At eight sites there were more than 10 bat captures, while at 12 sites there were only one or two captures. The number of captures averaged 1.29/net-night for the entire survey or 1.49/net-night for successful sites. Netting success is highly variable, but the average number of captures for the present survey was within the range for recent surveys in the region. At five sites in Kane, Kendall, and Grundy counties netted during 2005 there were 1.80 captures/net-night (Hofmann et al. 2006). For five sites in Will and Cook counties surveyed during 2005 the number of captures averaged 2.15/net-night (Hofmann and Amundsen 2005a). Also during 2005, four sites (with multiple nets) in Kane County yielded 0.26 captures/net-night (Carter 2005) and five sites in Will County produced 0.45 captures/net-night (Whitaker and Everson 2005c).

It should be noted that although mist netting is the most effective method for capturing bats in flight (Kunz et al. 1996), not all bats at a netting location necessarily would be caught. Other species could be present at a site and a species may be under-represented by the number of captures.

No Indiana bats were captured by mist netting during the survey, although this does not prove conclusively that the species is absent from the region. None were captured during other recent mist-netting efforts in the Chicago metropolitan area (described in Other Bat Surveys in the Region). Since 1965 more than 12,000 bats tested for rabies in Illinois have been identified to species by the INHS (INHS rabies specimen database). Only 11 have been Indiana bats, but members of this species are unlikely to be found and turned in because of their small size and the fact that they typically do not roost in buildings. The ten bats that had locality information were from Adams, Champaign, Franklin, and Jackson counties. Thus, an individual collected in Chicago in September 1928 (specimen at Field Museum of Natural History) remains the only Indiana bat record for the Chicago metropolitan region.

Gardner and Cook (2002) mapped the potential summer range of the Indiana bat based on the apparent maximum migration distance from Priority One hibernacula (520 km). The recovery of banded individuals, for example, has shown that Indiana bats migrate

between summer roosts in southern Michigan and caves in southern Indiana and Kentucky (Kurta 1980, Kurta and Murray 2002). Northeastern Illinois falls within that range (Gardner and Cook 2002). Furthermore, a hibernaculum occupied by Indiana bats in LaSalle County, Illinois (Blackball Mine) is within 140 km of downtown Chicago.

The city of Chicago is at 41°51'N latitude. Counties occupied by Indiana bat maternity colonies in southern Michigan (USFWS 2007) are located between 42° and 43°N (nearly as far north as Milwaukee, Wisconsin). Iowa counties with maternity colonies (USFWS 2007) are between 41° and 42°N, at least as far north as Kankakee (41°07'N). Average monthly temperatures during the maternity season (April through August) for Newton, Iowa (Jasper County) are slightly higher than those for Kankakee (e.g. the June average lows are 15°C and 14°C for Newton and Kankakee, respectively, and the average high is 28°C for both locales; www.weatherbonk.com). The monthly averages in Easton County, Michigan, location of one of the northernmost maternity colonies in the Midwest, are lower than for Chicago. For example, the average high temperature for June is 25°C at Charlotte (Easton County) and 26°C in Chicago, while the average low temperature is 13°C at Charlotte and 16°C in Chicago (www.weatherbonk.com). Maternity colonies also have been discovered at more northerly latitudes in upstate New York and Vermont (USFWS 2007). Thus, it would seem that general climatic conditions would not preclude Indiana bats from occurring in northeastern Illinois.

At least a few potential Indiana bat roost trees in the form of dead or partially dead trees with exfoliating bark were present at all sites; at several sites there also were shagbark hickories. At 33 of the sites at least one net was positioned above water. One site included a net on the shore of the Kankakee River and the remaining nine sites all were within 300 m of water. Thus, roost sites and water should not have been limiting factors.

Survey sites in McHenry and Kankakee counties were situated in rural settings. The Chicago metropolitan area encompasses a large portion of northeastern Illinois so other sites were in a landscape dominated by urban or suburban development. Cook, DuPage, Kane, Lake, and Will counties, however, have protected more than 131,000 acres of land through their forest preserve systems (acreages from the websites of the county forest preserves districts). Thus, even the sites closest to downtown Chicago were located in relatively large tracts of green space. Indiana bat maternity colonies typically inhabit agricultural areas with fragmented forest (Kurta 2004). It might have seemed that urban development was unsuitable for Indiana bats, but a maternity colony is now known to occupy a rural area near the Indianapolis International Airport; the area is at the edge of residential and commercial development (Whitaker et al. 2004). In addition, Belwood (2002) documented several cases of Indiana bats roosting in proximity to people. Thus, the lack of Indiana bat captures may not be attributable specifically to the extent of urbanization in northeastern Illinois.

Twelve species of bats occur regularly in Illinois (Hoffmeister 1989). The southeastern bat (*M. austroriparius*) and Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) are limited to the southernmost portion of the state and the gray bat (*M. grisescens*) occupies caves year round and is uncommon in Illinois (Hoffmeister 1989). During this survey

individuals of eight species were captured, representing all bats of potential occurrence in northern Illinois except the Indiana bat.

Kurta and Teramino (1992) found that species diversity of bats was significantly lower in an urban park (Detroit metropolitan area) than in rural areas. Species richness, however, was similar for rural and urban areas (5 and 4 species, respectively). The results of the present survey show that species richness is still high at the regional level in northeastern Illinois. As discussed below, species richness at individual sites tended to be low.

The big brown bat was, not surprisingly, the most frequently captured species (132 captures) and was caught at 29 of the 37 successful sites. This species occurs throughout Illinois (Hoffmeister 1989, INHS bat survey database). It roosts primarily in buildings and is the most common “house bat” in the southern Great Lakes region (Kurta 1995). The big brown bat was the most frequently detected species during acoustic surveys in Cook, Kane, Lake, and McHenry counties (Gehrt and Chelsvig 2004, Scott 2007). Big brown bats also are submitted in large numbers from the Chicago region for rabies testing by Illinois Department of Public Health and Department of Agriculture laboratories (INHS rabies specimen database, maintained by J.E. Hofmann). During 2006, for example, 477 individuals were submitted from Cook, DuPage, Kane, Lake, McHenry, and Will counties; they represented 49% of all big brown bats tested in the state.

The second most commonly captured species during the survey was the northern bat (54 captures). It was caught at 16 sites and in all counties except Kane. Maternity colonies of this species sometimes roost in buildings and other structures, but frequently use trees (Kurta 1995). While they roost under exfoliating bark on dead trees, northern bats also roost inside cavities, including cavities in live trees (Foster and Kurta 1999, Carter and Feldhamer 2005, Scott 2007). Thus, the roosting habits of northern bats overlap, but are considerably broader than, those of the Indiana bat.

Only seven little brown bats were captured at four sites during the survey. This species is widely distributed in the northern portion of North America and there are records throughout Illinois (Hoffmeister 1989, INHS bat survey database). Maternity colonies of little brown bats roost mostly in buildings and other structures (Fenton and Barclay 1980) so the species would seem to be an “urban bat.” According to Kurta (1995), however, the species is not common in urban areas of the southern Great Lakes region (which includes northeastern Illinois adjacent to Lake Michigan), but is the most common bat occupying buildings in more northerly forested areas. The little brown bat is thought to be declining in Indiana, largely through displacement from roosts by big brown bats (Cope et al. 1991, Whitaker et al. 2002). The abundance of big brown bats may have had an adverse impact on little brown bat populations in northeastern Illinois as well.

There are relatively few records of the eastern pipistrelle in northern Illinois. Specimens have been collected in Jo Daviess, Carroll, and LaSalle counties, mostly during the winter (Hoffmeister 1989). Twelve have been identified among bats turned in for rabies testing from the region covered by this survey, all from Cook and Will counties (INHS rabies specimen database). Given their size, however, pipistrelles are less likely to be found and

turned in than larger species of bats. The only known mist-netting capture prior to this survey was in Kane County (Carter 2005), although the species has been detected during acoustic surveys in northeastern Illinois (Gehrt and Chelsvig 2004, Scott 2007).

The capture of a silver-haired bat during the survey (in Will County) was not expected. The silver-haired bat has been found in Illinois most commonly during spring and autumn migration periods (Hoffmeister 1989). The species largely seems to spend the summer in Canada and northern states (Whitaker and Hamilton 1998). Seventeen of 144 Illinois specimens in the University of Illinois Museum of Natural History/Illinois Natural History Survey Mammal Collection were collected between 15 May and 15 August and only 11 silver-haired bats had been caught during previous INHS surveys in the state (INHS bat survey database). Coincidentally, Widowski et al. (2007) captured a silver-haired bat in Will County on 1 June 2007. Silver-haired bats have been detected in northeastern Illinois during acoustic surveys (Gehrt and Chelsvig 2004, Scott 2007), but it was not stated if the species was present throughout the summer or primarily during late summer and autumn.

The site with the greatest number of captures was Bemis Woods Site 2 in Cook County (32). All but one capture was a big brown bat, which indicates that there was a maternity roost near the net site. 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). However, only two species were caught at each site and one of these was always the big brown bat. Bemis Woods and Waterfall Glen are embedded in suburban development. Goodenow Grove has a more rural location, but is near a four-lane highway, a horse racetrack, and residential areas. Gehrt and Chelsvig (2003) recorded consistently high levels of bat activity at Bemis/LaGrange Woods, but low levels of activity at Waterfall Glen during 1997-1999.

At most of the successful sites only one to three bat species were captured (although other species may have been present). The site where the largest number of species was netted was the Kishwaukee River at Thorn Road Site 2 in McHenry County. Five species were captured there and a sixth species was caught nearby at Thorn Road Site 1. This area, surrounded by farmland, was one of the most rural in the survey. A total of four species was captured at the two sites on an oxbow of the Kankakee River at the Momence Wetlands survey area. This also was a rural area, consisting of a large tract of state-owned bottomland forest adjacent to crop fields and farmland undergoing prairie restoration. However, four species were caught at Hickory Creek Forest Preserve Site 1 in Will County, which was surrounded by development.

There were 141 bat captures over 74 net-nights during the 2006 field season and 86 over 102 net-nights during 2007. Capture success was 1.91/net-night and 0.84/net-night for the 2006 and 2007 seasons, respectively. Seven of the eight sites that produced more than 10 captures were netted during 2006. The same protocol was followed so there was no apparent difference in netting techniques between years that would explain the more than 50% decline in capture success. There also was no consistent difference in weather between years. April and July 2007 were cooler than the corresponding months of 2006,

while May and June 2007 were warmer, based on average maximum air temperature, average minimum air temperature, and average air temperature measured at St. Charles (www.sws.uiuc.edu/warm/datalist.asp). Similarly, precipitation was higher for April and July 2007 and lower for May and June 2007 than for corresponding months during 2006 (www.sws.uiuc.edu/warm/datalist.asp). Thus, the difference in capture success between the two years of the survey cannot be attributed to a specific cause.

Insect abundance was not quantified during this survey, but low numbers of flying insects were observed while netting at the majority of sites. Exceptions included an abundance of mosquitoes at a site on the Kishwaukee River and mayfly emergences at Ferson Creek (Leroy Oakes) and Sawmill Creek (Waterfall Glen). The number of mosquitoes at Momence Wetlands was said to be unusually low in 2007; this was attributed to a local drought (Tim Lastauskas, resident, personal communication, 7 August 2007). However, precipitation during the maternity season was not low in northeastern Illinois overall (not including Kankakee County) during 2006 and 2007. During 2006 the region experienced a recovery from the drought of 2005 and precipitation for the first nine months of 2007 was above normal (www.sws.uiuc.edu/atmos/statecli/Events/NE-IL-trends/rainfall.htm).

If insect abundance actually has decreased in northeastern Illinois, bat populations could be adversely affected. Geggie and Fenton (1985) found that big brown bats spent more time foraging in Ottawa (Ontario) than in rural areas and concluded that insect abundance was lower in urban areas. Kurta and Teramino (1992) reached a similar conclusion after comparing mist-netting results for urban and rural sites in Michigan. One possible cause of declining insect abundance would be pesticide use. Agricultural pesticides presumably are applied on the remaining farmland in the Chicago metropolitan region and lawns in urban/suburban areas may be subject to chemical management. In addition, Chicago and at least some suburbs began spraying for mosquitoes following the outbreak of West Nile virus in the region in 2002 (Huhn et al. 2005; "Chicago spraying mosquitos [sic] to combat West Nile," www.planetark.org, 9 September 2002; "City to begin battle against West Nile virus: 28 trucks will spray," Chicago Sun-Times, 15 August 2006). Secondly, on-going urban development causes habitat loss and tends to replace areas of diverse vegetation with a limited number of non-native species, thereby depriving some insects of necessary shelter or food plants (Dr. Catherine Eastman, INHS entomologist, personal communication, 14 December 2007). A climate factor that might affect insect abundance is the presence of a "warming hole" in northeastern Illinois where mean annual temperatures currently are lower than they had been in the mid 20th century (www.sws.uiuc.edu/atmos/statecli/Events/NE-IL-trends/rainfall.htm).

Urbanization has been deemed potentially detrimental to bats in terms of abundance, species diversity, and, perhaps, reproductive success (Kurta and Teramino 1992). The abundance of bats cannot be determined from mist-netting captures or acoustic surveys and the reproductive success of urban bats also needs to be measured by other methods. This mist-netting survey and previous surveys (e.g. Gehrt and Chelsvig 2004), as well as the identification of specimens turned in for rabies testing (INHS rabies specimen database), document the presence of several species of bats in the Chicago metropolitan area. Gehrt and Chelsvig (2003, 2004) found a positive relationship between bat activity

and the degree of urbanization during an acoustic survey in Cook, Kane, and McHenry counties. They suggested that urban areas in the Midwest represent habitat “islands” for bats in a landscape dominated by row-crop agriculture (Gehrt and Chelsvig 2003, 2004; Gehrt 2004). Forest preserves and urban parks provide both roosting and foraging habitat for bats, while older or upper-class communities tend to have many trees. In addition, buildings and other artificial structures are used as roost sites by some bat species. Gehrt and Chelsvig (2003, 2004) concluded that even the fragmented woodlands in the Chicago area were important for bats. The results of the present mist-netting survey support the importance of the network of forest preserves in northeastern Illinois for preserving species richness of the bat community. Although only one to three species were captured at most sites, the survey of multiple sites in the region resulted in the capture of all species of possible occurrence except the endangered Indiana bat.

Summary

Mist netting was conducted at 43 sites in 20 survey areas in Cook, DuPage, Kane, Kankakee, Lake, McHenry, and Will counties in northeastern Illinois during the 2006 and 2007 field seasons. There were 227 captures of bats at 37 sites. No bats were caught at Robinson Woods (Cook County), Brezina Woods (Cook County), Ethel’s Woods Site 1 (Lake County), two sites at Momence Wetlands (Kankakee County), or Beck’s Woods Site 2 (McHenry County). The highest 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 the survey. The species captured were the big brown bat, northern bat, eastern red bat, hoary bat, eastern pipistrelle, evening bat, and silver-haired bat. The most frequently captured species was the big brown bat (132 captures), but there also were many captures of northern bats (54) and eastern red bats (27).

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