

TIMBER RATTLESNAKE STATUS SURVEY

FINAL REPORT

PRINCIPAL INVESTIGATORS

Ronald A. Brandon, Project Director
Department of Zoology
Southern Illinois University at Carbondale
Carbondale, IL 62901-6501
Telephone (618) 453-4138

Jay M. Rubinoff, Graduate Assistant
Department of Zoology
Southern Illinois University at Carbondale
Carbondale, IL 62901-6501
(Current Address P. O. Box 374
New Baltimore, NY 12124)

David Mauger
27640 Egyptian Trail
Monee, IL 60440

Thomas G. Anton
900 Oak Street, #3B
Winnetka, IL 60093

Brian J. Bielema
21491 Lake Road
Morrison, IL 61270

Project Period: March 10 to August 31, 1994

Submitted to:

Illinois Endangered Species Protection Board
524 South Second Street
Springfield, Illinois 62701

August 31, 1994

TABLE OF CONTENTS

Part 1

Brandon & Rubinoff

STATUS OF THE TIMBER RATTLESNAKE IN THE SOUTHERN HALF OF ILLINOIS

INTRODUCTION 4

OBJECTIVES 4

METHODS 5

 Identifying Historic Sites 5

 Field Surveys 5

RESULTS 6

DISCUSSION 14

 Population 14

 Conservation 15

 Records 16

ACKNOWLEDGMENTS 18

LITERATURE CITED 19

TABLES & MAP 21

Part 2

Mauger, Anton, & Bielema

A PRELIMINARY REPORT ON THE STATUS OF THE TIMBER RATTLESNAKE IN FOUR NORTHERN ILLINOIS COUNTIES

MATERIALS AND METHODS

SURVEY RESULTS

ACKNOWLEDGEMENTS

LITERATURE CITED

MAPS

Part 1

Brandon & Rubinoff

STATUS OF THE TIMBER RATTLESNAKE IN THE
SOUTHERN HALF OF ILLINOIS

INTRODUCTION

The historic range of the timber rattlesnake, *Crotalus horridus*, in Illinois apparently was quite broad and included forests of the Ozark Hills, the Mississippi Border, the Southern Division, the Western Division, and the Jo Daviess Hills. Populations apparently occurred throughout the Shawnee Hills, the steep ravines of local rivers and creeks in the Mount Vernon Hill Country and the most dissected and wooded eastern and southern portions of the Springfield Plain, all along the forested Mississippi River bluffs, unglaciated extreme northwestern Illinois, and along the Illinois River valley at least as far north as La Salle County. There are timber rattlesnake records for 33 of the state's 102 counties (Figure 1). Portions of these counties offer the rocky hillside bluffs for den sites and woodland forests for summer habitat.

Brown (1993) described three distinct habitats where timber rattlesnakes may be encountered during the year (den sites, summer ranges, and transient areas) within their activity ranges, and pointed out that habitat may vary with age and sex of the individual. *Den sites* seem to be of three types: fissures in rocky ledges, talus or rock slides, and fallen rock partly covered by soil. During summer months, males and non-gravid females inhabit a more distant *summer range* in heavy forest where they are sit-and-wait predators (references in Brown, 1993). Gravid females, on the other hand, use rocky, more open sites closer to dens where they bask and feed but little as their embryos develop. *Transient habitat* is a term Brown (1993) gives to the habitat within 200 m of a den. Transient habitat contains basking locations used as the rattlesnakes migrate from and to the dens during spring and autumn, respectively, and it is where females gestate and give birth. Shelter rocks here may be frequented year after year (Brown, 1993).

Within most of Illinois, extensive habitat alteration and purposeful killing have greatly reduced the number of timber rattlesnakes and there is justifiable concern for the survival of many of the known populations. It has not been difficult to find people who claim to have killed a timber rattlesnake or know someone who has, despite the fact that the snake receives special protection by its threatened status. During the period March-August, 1994, we carried out field, library, and museum work with the following objectives in mind.

OBJECTIVES

1. Conduct field surveys of localities where the timber rattlesnake is known to have occurred in Illinois to (1) search for extant populations and (2) evaluate the likelihood of occurrence even where no current evidence of presence is obtained,
2. Wherever possible, estimate the sizes of extant populations,

3. Compare past and present distribution and abundance of the timber rattlesnake in Illinois.

METHODS

1. Identifying historic sites. Information on historical localities was obtained from two sources: (1) the published and unpublished literature, and (2) voucher specimen or photographs received from the following museum collections: Carnegie Museum of Natural History (CM), Chicago Academy of Science (CAS), Field Museum of Natural History (FMNH), Illinois Natural History Survey (INHS), Milwaukee Public Museum (MPM), National Museum of Natural History (USNM), Natural History Museum of Los Angeles County (LACM), Southern Illinois University at Carbondale Herpetology Collection (SIUC), and University of Illinois Museum of Natural History (UIMNH), and the University of Michigan Museum of Zoology (UMMZ). Other museums queried had no Illinois specimens: American Museum of Natural History, Academy of Natural Sciences of Philadelphia, Florida Museum of Natural History, Louisiana State University Museum of Natural Science, Museum of Comparative Zoology, Museum of Vertebrate Zoology, Texas Cooperative Wildlife Collection, Tulane University Museum of Natural History, and the University of Kansas Museum of Natural History.

2. Field Surveys. We attempted to locate rattlesnakes in the southern half of the state by several methods. First, we searched in historical areas and in areas where timber rattlesnakes are suspected of occurring by exploring along bluffs during the spring, and by road cruising and rummaging through debris of old building foundations during the summer. Furthermore, we contacted Illinois Department of Conservation (IDOC) personnel, state park superintendents and technicians, National Forest Service personnel, and university professors who were reliable sources for rattlesnake location records or contacts. We queried numerous newspapers for articles on rattlesnake encounters. Lastly, we contacted residents of areas where rattlesnakes have been reported.

When a rattlesnake was found it was captured with a pair of tongs and restrained with a noose stick. Once secured, sex was determined by inserting a probe posteriorly into the cloaca; the reproductive condition of females was determined by palpating the abdomen for embryos (Fitch 1960). Snout-vent length was measured in centimeters with a meter tape. Finally, the snake was marked by clipping a unique combination of ventral scales (Brown and Parker 1976) and by dabbing bright nail polish on both sides of the base of the rattle.

For timber rattlesnake sightings reported by reliable individuals, we noted the location, date and estimated size. Sightings by local residents were taken with skepticism without a

confirming photograph or skin or unless the ability of the person to identify a rattlesnake was vouched for by a credible source.

RESULTS

A total of 340 person-hours were spent in the field searching for timber rattlesnakes. Approximately 120 of those were spent searching along roadways at night or during early morning in the hot summer months when rattlesnakes are known to become nocturnal. We found a total of nine rattlesnakes in six locations during our field survey (Table 1), but none during evening road cruises. Overall, we came across information on rattlesnake occurrences from 21 of the 28 counties examined in this survey (Table 2). Sightings also were reported from three additional counties, Gallatin, Madison, and Williamson, for which no voucher specimen had existed. A voucher for Madison County was obtained by Scott R. Ballard during this study.

Biological information was recorded for five of the eight snakes found and three were marked (Table 1). One of the six locations, SW Fountain Bluff, appeared to be a den site where three, possibly four, individuals were seen. Two large individuals were found by the entrance of a crevice in the rock. They were not captured, however, because the necessary equipment was not readily available. The following day two rattlesnakes were found in the same area. One was not accessible and may have been an individual seen the previous day.

The information gathered from newspapers and the numerous personal contacts is given in the following paragraphs and in Table 2. Although specimen and photographic vouchers are lacking for many of these accounts, the observers were considered reliable. The locations of all timber rattlesnakes recorded in this report are plotted on a county map of Illinois (Figure 1).

Adams County

Old specimen records exist for Quincy, and for the northeast part of the county near the Hancock County border. In the mid 1980's, Chuck Deverger, a professor at John Wood Community College and herpetology enthusiast, was shown a photograph of a rattlesnake killed in the Liberty area (pers. comm.). Although we had contacted many people associated with Adams County, this was the only account we heard of a rattlesnake in recent years. A population may persist there but the numbers are undoubtedly low.

Alexander County

Rattlesnakes persist in this county. Local populations occur throughout the Ozark Hills north of Olive Branch. The latest preserved voucher dates to 1938, near Thebes. Besides the individual found during our survey (Table 1), Dave Maginell, a Nature Conservancy

employee, informed us that he has found rattlesnakes on his property 3.2 km northeast of Olive Branch over the last few years, including 1994. A person who hunts and eats rattlesnakes told us he found them in the bluffs west of Tamms in the late 1980' s. In July of 1989, Mike Redmer found a large adult, approximately 1.25 meters long, on McClure Road 1.7 km northwest of Diswood.

Bond County

Smith (1961) examined a specimen from central Bond County. Besides the information in his report and an undated skin from Old Ripley, we have not come across any information confirming the present existence of rattlesnakes in this county.

Calhoun County

Good populations apparently persist along the river bluffs and in the hills of this county. In 1985, fifteen to twenty individuals were located by Scott Ballard, three of them gravid, near a den site north of Bellview along the river bluffs (Brandon and Ballard 1991). In the mid 1980' s, local residents killed 24 timber rattlesnakes around a den site along the river bluffs north of Bellview (Pike Press, 10-4-1989). In May 1994, along the road through Howell Hollow, three women repeatedly ran over a 120.7 cm rattlesnake with their vehicles and then shot it with a .22 rifle (Pike Press, 5-20-1994). Taxidermist Mike Miller (pers. comm.) was given a specimen in 1993, also from Howell Hollow. On the other side of the county, a rattlesnake was found by Mark Phipps (pers. comm.) in 1992 by a dilapidated barn just south of Hardin.

Clark, Coles, Cumberland, & Jasper counties

The timber rattlesnake was recorded in these counties although Smith (1961) considered it rare in this part of the state. Brandon and Ballard (1991) noted that in the early 1980' s a specimen was found in an area of Clark County that is now flooded by Mill Creek Reservoir. More recently, early May 1994, a dead timber rattlesnake was found in Melrose Township by a mushroom hunter (Marshall Independent, 4-1994). It appears that a population persists in Clark County. Smith (1961) examined specimens from Coles, Cumberland, and Jasper counties during field work from 1947 to 1953. Other records of occurrence in Cole County date back to the early part of the century. Brandon and Ballard (1991) mentioned that rattlesnakes have been seen now and then in Cumberland County over the past 25 years. According to Bob Szfoni (pers. comm.) and the superintendent of Fox Ridge State Park (pers. comm.), there have been no sightings in quite a few years in Cumberland and Cole counties. Timber rattlesnakes may have been extirpated from Jasper County. This view is shared by Todd Strole (pers. comm.). In our search in Jasper County, one of us (JR) contacted employees of Sam Parr State Park, Newton Lake Fish & Wildlife Area, and Jasper County State Prairie Chicken Sanctuary to inquire about past or

present accounts of timber rattlesnakes in the area. These people had no knowledge of any past or present sightings within the county.

Effingham County

Records of timber rattlesnakes along the Little Wabash River north of Effingham exist from 1956. Populations apparently persist along the Little Wabash River but sightings have been infrequent. Just outside of Shumway, a 142-cm animal was killed in 1987 (Effingham Daily News, 7-20-1987). In the late 1980's, John Tucker (pers. comm.) found rattlesnakes in several areas of Effingham County. He found two in Wildcat Hollow (one live and one DOR), near the junctions of Limestone Creek and county road 1000E with Fulfer Creek, in 1988 and 1989; two DORs near Green Creek just west of St. Marys in 1986; three in 1989 at a stone bridge believed to be a den site located approximately 1.6 km upstream from the Little Wabash River in Shoal Creek; and a few in the steep ravines near a radio tower along Sugar Creek, 4 km north of Effingham, in the early 1980's. Tucker believes they still occur in the area and local residents report having seen them. In the late 1970's, Tucker found a den in the bluffs along the Little Wabash River just south of where Route 32 & 33 crosses the river. The area on top of the bluff has been developed. He believes habitat loss and human encroachment have resulted in the extirpation of rattlesnakes from this area.

Fulton and McDonough counties

Besides the records of occurrence from McDonough County dated before 1966, we have not come across any other accounts of timber rattlesnakes in this county. Although the last record of a timber rattlesnake in Fulton County was in 1939, we were informed about a more recent unconfirmed report. Roger Cox, site superintendent of Anderson Lake Fish and Wildlife Area, told us that in the mid 1980's a friend of his killed a rattlesnake in Fulton County. Dan Holm, Ken Russel, Terry Ellis, and Herald Swank (pers. comm.), all state employees in this region, have not come across any information indicating the presence of timber rattlesnakes in these counties. Timber rattlesnakes seem to be either extirpated or extremely rare in these counties.

Gallatin County

Although no photograph or specimen voucher has been obtained from this county, Todd Strole (pers. comm.) and his father came upon a timber rattlesnake on the southwest slope of Wildcat Mountain in April of 1993 while turkey hunting. There appears to be suitable habitat here and in bordering counties. The southwest part of Gallatin County is part of Shawnee National Forest and is very similar to neighboring southeast Saline County and northern Hardin County where rattlesnakes have been recorded.

Greene County

One of us (JR) spoke with Mr. Ersil Sherwin, a long-time resident of northern Green County where a timber rattlesnake had been collected in 1938. He told us he has killed rattlesnakes on his property every year for quite a few years and showed JR rattles and skins. Just north of Eldred near the southern end of the county, Todd Strole (pers. comm.), in the spring of 1994, spoke with a local resident who claimed there have been sightings of timber rattlesnakes in the area over the last five years. In the same area, JR spoke with a young man who mentioned seeing a timber rattlesnake along a trail near a bluff, in 1993. Although the reliability of the last two accounts is open to question, it does appear that at least one timber rattlesnake population persists in Greene County. Additional surveys need to be conducted in the area north of Eldred.

Hancock County

It appears doubtful that there are any remaining timber rattlesnake populations in this county. Records date prior to 1966. The people we contacted had no first-hand or second-hand knowledge of any rattlesnake in the area for many years.

Hardin County

There seem to be timber rattlesnake populations throughout this county although reports of sightings are not frequent. Information on new rattlesnake locations was obtained in this survey. In the spring of 1991, one specimen was seen by Leon Levine near an old house foundation site a few kilometers north of Spark Hills along the Gallatin County border. The Hardin County Independent reported a rattlesnake killed near Iron Furnace on July 16, 1991, and one killed near Hicks on August 6, 1993 (Hardin County Independent, 7-19-1991 and 8-19-1993). The Shawnee Hills extend throughout Hardin County and there is plenty of potential rattlesnake habitat.

Jackson County

Timber rattlesnakes are found more often in this county than in any other. Sightings are reported on a regular basis from areas along the Mississippi and Big Muddy river bluffs. In the spring and summer of 1994 alone, there were ten sightings at eight different locations, probably representing five separate populations (see Table 1 for information on five of them). One of these snakes was killed on the property of Mr. Florio, 3 km north of the Route 3/149 junction on June 9, 1994 (part of the specimen was recovered). A road kill north of Pomona on Route 127 in early May 1994 was reported to us by SIUC Zoology graduate student Dean Corgiat. Another SIUC Zoology graduate student, Elizabeth Wagle (pers. comm.), came across a small rattlesnake on the northwest side of Fountain Bluff in June of 1994. Also in June of 1994, Steve Wikowski (pers. comm.) found a rattlesnake approximately 122 cm long along the Big Muddy levy half way

between Howardton and John Spur. Conservation Officer Chris Mohrman (pers. comm.) confiscated a rattlesnake that was killed a few miles southeast of Ava in July of 1994. Mohrman informed JR that rattlesnakes are seen frequently in the area around Kinkaid Lake.

On 22 August 1992, one of us (JR) found an 85 cm (SVL) male coiled under a piece of sheet metal next to a fallen house 6.5 km south southeast of Ava. Mike Redmer and Tom Anton furnished us with the following records of their encounters with timber rattlesnakes over the past few years: on the south side of Fountain Bluff one subadult was seen in September of 1988 and another subadult was seen in September of 1992; one adult was found in October of 1988 at Black Walnut Research Area in Giant City State Park; two in the spring of 1989 and three in the spring of 1990 were seen at an old farm site north of Pine Hills; approximately 3.2 km south of Rt. 3/149 junction, one was seen in early September of 1990; one subadult was found on June 4, 1993, along the levee road in Oakwood Bottoms; at Horseshoe Bluff, one adult and two juveniles were encountered on October 10, 1992; and sometime between 1983 and 1993, one DOR adult was found on the Pine Hills North lower bluff road just inside Jackson County.

Jefferson and Williamson counties

Numerous IDOC personnel working in Jefferson County were contacted and asked about timber rattlesnakes. These individuals had no first-hand or second-hand knowledge of any rattlesnakes being seen in the area for many, many years. Gary Statton (pers. comm.), regional forester, has second-hand knowledge, from what he claims is a reliable source, of rattlesnakes seen just east of Rayse Creek, 1.6 km south of Interstate 64, in the mid 1980's. Excluding this second-hand sighting, the last report of a timber rattlesnake in Jefferson County we were able to locate was in 1892. The species may still be present in this county, but the population density is undoubtedly low. Surveys should be conducted in the Rayse Creek area.

This survey has not found any documented records of timber rattlesnakes in Williamson County, but Tracy Evans, an SIUC zoology graduate student, told us of seeing a 107-cm -long timber rattlesnake south of Crab Orchard Lake, near Blue Gill Pond, on June 1993. Southwest Williamson County has topography similar to that of the surrounding counties that contain timber rattlesnake populations.

Jersey County

Reported in the area as far back as the early 1940's, timber rattlesnake populations still exist along the Mississippi River bluffs. A rattlesnake was seen in 1993 and in June 1994 near the Mississippi State Fish and Wildlife Areas office by some of the technicians (Cannon, pers. comm.). Just south of this office, in Pere Marquette State Park, Richard

Nemyer informed one of us (JR) that timber rattlesnakes were seen in park in the early 1990' s. Some of these sightings were reported in April near the bluffs located just north of the northwest corner of Williams Hollow - a possible hibernaculum area.

An historic den site along the bluffs below Principia College, east of Elsay, has remained active over the years. In the spring of 1994, Doug Warren (pers. comm.), biology professor at Principia, saw a few timber rattlesnakes near the den site. He informed us that he had seen them in the area in previous years as well. John Tucker supplied us with information on a DOR specimen collected just east of Principia College by an IDOC employee in September 1992.

Johnson and Pulaski counties

Specimens were collected from Johnson County in the 1950' s and 1960' s, and at least one population persisted in the county as of 1992. Max Hutchison (pers. comm.) has been informed by reliable sources of timber rattlesnakes seen in the Little Black Slough-Heron Pond Natural Area in the late 1980' s and early 1990' s. In 1992, one was found by Jim Weycules (pers. comm.) near his home north of Belknap. Many areas within this county offer the southwest facing bluffs and forested areas, such as Draper' s and Cedar Bluffs, suitable for timber rattlesnake dens.

Pulaski County may no longer sustain rattlesnake populations. The most recent record we were able to find for this county was reported by Necker (1939).

Madison and St. Clair counties

There are short extensions of the Mississippi River Bluffs in both counties. Voucher specimens that date back to the early part of the century exist for St. Clair County, and there are recent records for Madison County. Dean Corgiat encountered one in Glen Carbon in the summer of 1979. On 6 October 1993, an approximately 152-cm female was found by John Tucker on the bicycle path just northwest of Clifton Terrace Road and Route 100 junction. Scott Ballard came across a DOR in the summer of 1994, and this specimen was catalogued as a voucher (SIUC R-2684). The areas in which rattlesnakes have been observed in these counties have been developed. Due to loss of habitat and human encroachment, rattlesnakes may have been extirpated from St. Clair County. In Madison County, the population probably is in jeopardy of extirpation.

Monroe County

Timber rattlesnakes were found along the Mississippi River Bluffs south of Valmeyer and south of Fults in the 1930' s, 1940' s, and 1960' s. They still occur along these bluffs but probably at reduced numbers because of habitat loss due to increased development of the area. Brandon and Ballard (1991) reported that rattlesnakes were seen as recently as 1991 near both Valmeyer and Fults.

Perry County

Timber rattlesnake have been recorded from this county since the 1930' s. Populations persist in the historical localities and they have been found elsewhere more recently. Just outside Tamaroa, in an area they had not been previously recorded from, a timber rattlesnake was run over on Shamrock Road on 28 July 1983 (DuQuoin Evening Call, 7-28-1983). The newspaper article stated that rattlesnakes were becoming more common in Perry County because of the numerous strip hills between DuQuoin, Pinckneyville, and Cutler. In May of 1994, Wade Graskewicz, a resident of Pinckneyville, ran over and killed a rattlesnake north of Winkle, an area of historical occurrence.

Pike County

Timber rattlesnake population persist along the Mississippi Bluffs and in the hills of Pike County. Thurow and Sliwinski (1991) reported seeing rattlesnakes in southeastern, southwestern, western, and northwestern areas of the county. Many of the reported sightings from the 1940' s up to the 1990' s have been from the hills in southeast Pike County, around Pearl. In the mid 1980' s, a group of men killed over twenty timber rattlesnakes west of Pilot Bluff as they cleared brush from a field (Pike Press, 10-4-1989). In July of 1994, a landowner residing along Bee Creek showed one of us (JR) a 107-cm specimen killed next to his house. This person informed JR that at least two or three timber rattlesnakes are encountered in the area annually.

Pope County

Specimens had been collected in north central and northeastern Pope County as early as the mid 1960' s. We received information on rattlesnake sightings from the 1990' s. K. C. Batha (pers. comm.) told JR he has seen rattlesnakes in the Lusk Creek Wilderness area during the 1990' s, and he has seen them on the road from Williams Hill to Hartsville. In late April 1992, a forestry technician reported to Steve Wikowski (pers. comm.) that he encountered a rattlesnake in the southern part of the county around Burke Creek. The photograph of a rattlesnake killed near Eddyville in late August 1994 appeared in a local newspaper. The forested hills of much of Pope County provide potential habitat for timber rattlesnakes.

Randolph County

The Mississippi River bluffs, excellent potential habitat, extend all along the western border of the county. The most recent confirmed record of a timber rattlesnake dates to 1940. In 1992, one of us (JR) found a gravid female approximately 97 cm long (SVL) under debris of an old house foundation in Rockwood. During August 1994, CPO Carl Holland obtained one that had been run over near Rockwood. A local resident informed JR that rattlesnakes have been killed around Rockwood on an annual basis. A Turkey Bluff

State Fish & Wildlife Area employee claimed to see timber rattlesnakes on occasion, most recently in 1993.

Saline County

All the reports of timber rattlesnakes come from the southeastern section of the county where there are extensive west and southwest-facing bluffs. There have been numerous recent sightings in addition to from the one specimen we marked on Wamble Mountain. Leon Levine reported to us that two snakes were killed in Garden of the Gods Wilderness Area (an historic location) over Memorial Day weekend in 1994. Judy DeNeal, a long time resident near Wamble Mountain, told us she has had rattlesnakes on her property almost every year in the 1980's and 1990's. Wamble Mountain is a particularly good-looking denning area. DeNeal mentioned that many of her neighbors kill rattlesnakes on an annual basis as they disperse from the mountain. In the summers of 1993 and 1994, graduate student Jody Shimp (pers. comm.) saw six timber rattlesnakes in Dennison Hollow. In Saline County Conservation Area, the campground host saw one rattlesnake in the campground area (Stilley, pers. comm.). The consistent number of annual sightings indicates that there is a good timber rattlesnake population in the southeastern part of this county.

Union County

Records exist mainly in the western part of the county along the Mississippi and Big Muddy river bluffs and throughout the Shawnee Hills. Rattlesnake are observed on an annual basis throughout this region, so healthy populations apparently persist. Besides the specimen captured in this study at Pine Hills (Table 1), other sightings have been reported from 1993 and 1994. In the spring of 1994, E. O. Moll took one of us (RB) to a den site that has been active for over twenty years, and two rattlesnakes were seen. SIUC graduate student Steve Fadden (pers. comm.) came across a timber rattlesnake in Trail of Tears State Forest at gate 17B while turkey Hunting on 30 April 1994. In Trail of Tears State Forest (TTSF), Andy West (pers. comm.) informed JR that in the spring of 1994 a worker killed a 162.6-cm timber rattlesnake near a camp site just west of the tree nursery. An approximately 110-cm rattlesnake was seen at the maintenance building in 1993 (West, pers. comm.) West mentioned that many (>10) rattlesnakes were seen in the summer of 1994 in TTSF by him and his co-workers. Beth Shimp observed a rattlesnake in the summer of 1993 and again in 1994 near Government Rock at Pine Hills. In June 1994, two graduate students, Anne-Marie Monty and Diane Tecic, found a large rattlesnake at the south end of lower Pine Hills road. Ray Smith, on 17 May 1994, encountered a small timber rattlesnake in a bush, about 1 meter up, while leading a field trip down the old Halsey Road in La Rue-Pine Hills Ecological Area. One rattlesnake was seen by JR and

Kirby Puckett on 2 October, 1993, approximately 1.5 km south of the north gate of lower Pine Hills Road. Scott Ballard knows of a small den along this road.

Mike Redmer and Tom Anton furnished us with records of the following encounters with timber rattlesnakes over the past few years in Union County: two juveniles observed at the bluff over Winter's Pond on April 30, 1983, and one subadult in the same area on April 4, 1991; two found near the bluff at Otter Pond, one on April 18, 1985, the other on October 9, 1992; a DOR specimen found in TTSF near the tree nursery in May 1987; and, in the fall of 1990, one found on an old farm site southwest of TTSF.

Wabash County

The last report of a timber rattlesnake in this county was by Garman (1892). In the summer of 1994, the assistant site superintendent of Beall Woods encountered a timber rattlesnake (Reihnehart, pers. comm.). He informed JR that it was the first seen in several years. This sighting was in the same general area as the historical record from 1892. Given the infrequency of rattlesnake sightings in this county, it would seem that the extant population is small.

Other

In 1975, the Illinois Department of Transportation published a report entitled "Rare and Endangered Vertebrates of Illinois." This report supplied a list of rare and endangered species collected or observed in each Illinois county. Of the counties surveyed, the timber rattlesnake was listed for Adams, Coles, Fulton, Hancock, Jefferson, Pulaski, Randolph, St. Clair, and Wabash counties. Also listed was Shelby County, from which we know of no records. Smith's (1961) distribution map, however, indicates that the southern half of Shelby County may be within its range.

DISCUSSION

Population

No enough individuals were found at any site to allow us to estimate population sizes of timber rattlesnake populations found in this survey. Finding rattlesnakes other than during emergence and return to hibernation sites depends upon good luck. Additional years of detailed, site-specific spring **and** autumn monitoring will be needed to locate den sites where estimates of population sizes can be obtained through an intensive marking and recapturing study. Brown (1993) refers to an extensive study conducted in Pennsylvania in which the researchers visited known hibernacula two to four times annually for four to five years to get a reasonably accurate estimate of den site populations. We assume some Illinois populations are thriving better than others, because of geographic differences in the

amount of suitable habitat. Areas where rattlesnakes are seen on a regular basis most likely have larger populations than other areas where they are observed infrequently.

Monitoring the distribution of timber rattlesnakes and pin-pointing denning areas more precisely could be aided by the assistance of people who spend substantial amounts of time in favorable habitat, such as turkey hunters. Turkey hunters are in the field during the time rattlesnakes emerge from their dens. Distribution and den site information could be obtained by asking state personnel, graduate students, loggers, etc., to fill out element of occurrence records or telephone an appropriate contact person when a rattlesnake is sited. Local residents can be advised to contact their local Natural Heritage Biologist or Conservation Officer when they encounter a timber rattlesnake, or any other venomous snake, on their property.

Conservation

The consensus among herpetologists seems to be that timber rattlesnake populations have declined in most of Illinois during the last century (Brandon and Ballard (1991). The findings of this survey show that timber rattlesnakes still occur in many of the areas where they historically were found, but the sizes of these populations are unknown. To summarize the information we gathered from the many individuals contacted during this survey, the numbers of rattlesnake sightings reported annually have diminished in most areas, and have remained constant in some. Habitat destruction, human disturbance and exploitation, vegetative changes, destruction of den sites, and logging and mining all threaten timber rattlesnake populations (Brown, 1993).

One simple fact verified during this survey is that most human/rattlesnake encounters result in the death of the snake. Few people understand how exaggerated the threat of timber rattlesnakes to human beings is, and that even venomous snakes have a place in nature. It is clear that a broad-spectrum public relations/public education campaign is required to change more attitudes and make protection of this threatened species a reality. Without it nearly every timber rattlesnake encountered will continue to be killed. The efforts of William Brown and the State of New York could be taken as a model.

The life history characteristics of these animals are such that the removal of just one, especially a mature female, is quite detrimental to the population. There have been several studies from other states on the reproductive biology of *C. horridus*. The age of first reproduction in females has been reported to be four years in Wisconsin and Kansas (Keenlyne, 1978; Fitch, 1985), between ages five and nine in Virginia (Martin, 1988), and ages seven to 11 in New York (Brown, 1993). Reproductive cycles have been observed to be biennial, triennial, or quadrennial (Ernst, 1992). Litter sizes range from six to ten (Ernst, 1992). Predation by a number of animals such as hawks, raccoons, foxes, and

other snakes and high overwinter mortality result in a low survivorship of juveniles. Brown (1993:21) commenting on the impact of removing just one individual from a population stated that: "Populations are characterized by stability, and probably by a predominance of older age classes, little annual turnover, and variable annual recruitment. The impact of removing a single adult animal from a population with this life history pattern would be relatively high." He concluded: "Although population growth rates would be low, depleted populations of Timber Rattlesnakes, if left alone, do have the capability of recovering." The reproductive biology of Illinois populations has been studied little.

With the reduction of habitat and encroachment of the human population into rattlesnake areas, the number of encounters will increase. So will the likelihood of den sites being discovered. These pose serious threats to the continued survival of this animal in Illinois. The slaughtering of snakes at their hibernacula, as in Calhoun and Pike counties, could annihilate entire populations. Emphasis should continue to be placed on locating and protecting the den sites and surrounding transient habitat. To help ensure the survival of a timber rattlesnake population, the den site, plus an adequate area of surrounding transient and summer habitat should be protected. In New York, Brown (1993) found that non-gravid females migrate a mean distance of 2.05 km from the den sites, and gravid females less. He recommended that an area 2.4 km in radius around the hibernaculum should be protected. These den sites should then be monitored during spring emergence and fall return. Summer, when they are dispersed, is not the optimal time to search for these snakes. Activity ranges are as large as 500 acres and males have been found as much as 4.5 miles away from their den (Brown, 1993).

In areas where rattlesnakes are known to occur in numbers, informative warning signs could be erected to protect people and the snakes. When a rattlesnake is encountered in a residential area or other heavy use area, there should be a formal, non-lethal nuisance removal system. W. S. Brown (pers. comm.) believes that quick response to a nuisance snake would be helpful because, for the people who have this problem, it would build their confidence in the program. In New York, Brown (pers. comm.) issued snake tongs to people with rattlesnake problems. Finally, educating the public about the biology and ecological importance of timber rattlesnakes will be very important for the continued survival of this species in Illinois.

Records

Published records and voucher specimens of timber rattlesnakes in the southern half of Illinois are known from the following localities: **Adams County**: Quincy (FMNH 84056; Gloyd, 1940; LMK 9324-9325); 4 km S Augusta, 1941 (FMNH 38242-38243); S and SW (Thurow and Sliwinski, 1991). **Alexander County**: Olive Branch, 1907 (FMNH 2229,

2234, 2240-2241); Thebes, 1938 (INHS 2260); Olive Branch (FMNH 2140); Fountain Bluff, 1947 (FMNH 162944). **Bond County:** Old Ripley (INHS skin). **Calhoun County:** N of Belleview, 1985 (SIUC R-2321). **Clark County:** (Smith, 1961). **Coles County:** Charleston (EIU; Hankinson, 1917); about 4.8 km E of Charleston (Hankinson, 1917). **Cumberland County:** 1.6 km N Greenup on Highway 130 (Peters, 1942). **Effingham County:** 6.4 km E Shumway, 1956 (INHS 8169). **Fulton County:** Lewiston (FMNH 764; Necker, 1939). **Greene County:** 9.6 km N Hillview, 1936 (INHS 1548). **Hancock County:** Augusta (Necker, 1939; FMNH 38242-38243); Warsaw (Gloyd, 1940, MPM 671); E before 1966 (Thurow and Sliwinski, 1991). **Hardin County:** Cave Hill area, T9S, R7E Sect. 3; T11S R8E Sec 34; T11S R9E Sec 16 (Brandon and Ballard, 1991). **Jackson County:** no locality (UMMZ 68477, 79400); Little Grand Canyon, 1933 (FMNH 18657-18658); 14.4 km SW Murphysboro, 1950 (UIMNH 1214, INHS 5360); 16 km SW Murphysboro, 1942, 1946 (INHS 1814-1816); 1922 (UIMNH 84782); 17.6 km SW Murphysboro, 1948 (UIMNH 1215-12-16); 19.2 km SW of Murphysboro (SIU 444, 445, 395, 441, 442); Murphysboro, 1947 (INH 2555, CAS 4462-4463, 12483); Carbondale (CAS 6171-6172); Fountain Bluff, 1888 (SIUC R-820); Horseshoe Lake, 16 km W Murphysboro, 1971 (FMNH 191052); Gorham Rd. 0.05 mi W of Rt. 3 intersection, 1988 (SIUC R-2070); 1 mi S Gorham, 1963 (SIUC R-306); Rattlesnake Canyon (SIUC R-1631); Chalk Bluff, 8 mi SW Murphysboro, 1937, 1938, 1954, 1958 (SIUC R-1629, R-1630, R-90, R-197); Little Grand Canyon S of Murphysboro, 1966 (SIUC R-1285); Horseshoe Bluff, 1974 (FMNH 204659). **Jasper County:** 4.8 km W Rosehill, 1938 (INHS 1551). **Jefferson County:** Mount Vernon (Garman, 1892). **Jersey County:** Grafton, 1932 (FMNH 19201); Grafton, 1941 (INHS 1654). **Johnson County:** Huckleberry Hollow (Klimstra and Hutchison, 1965). **McDonough County:** SW before 1966 (Thurow and Sliwinski, 1991). **Monroe County:** 4 km N Valmeyer, 1949 (INHS 4334); 4.8 km S Valmeyer, 1939 (INHS 4335); 3.2 km S Valmeyer, 1949 (INHS 4336); 0.3 mi S jct. Harris and Bluff roads S of Valmeyer, 1994 (SIUC uncataloged, skin); Fults Hill Prairie Nature Preserve (Brandon and Ballard, 1991). **Peoria County:** Peoria (Garman, 1892). **Perry County:** Pinckneyville, 1938 (INHS 1549); NW of Pinckneyville, 1959 (SIUC R-581). **Pike County:** 4.8 km NW Pearl, 1948 (INHS 3661-3662); 4.8 km W Pearl, 1951 (INHS 5832, UIMNH 50961, 52103, 41320); ESE, SW, W, NW (Thurow and Sliwinski, 1991). **Pope County:** near Lusk Creek Canyon (Robinson, 1966); near Herod (Robinson, 1966), Williams Hill Lookout Tower area, 1990 (SIUC R-2253-photo voucher); Nine-day trail ride area in the One Horse Gap Area (T11S R7E Sec 32 SE 1/4), 1990 (SIUC R-2220); highway near Herod, T11S R7E Sec 9; **Pulaski County:** (Necker, 1939).

Randolph County: Gloyd, 1940, LMK 8470-8473; (Necker, 1939). **Saline County:** Garden of the Gods, T10S R7E Sec 36; Cave Hill area, T9S R7E Sec 3. **St. Clair County:** 1891 (USNM 56733); Falling Springs (Hurter, 1911). **Union County:** 0.8 km W of Ware, 1936 (FMNH 23733); Horseshoe Bluff, 1966 (FMNH 203966-203998, 204081); Horseshoe Bluff, 1971, 1974 (FMNH 204002, 204659); CCC Camp, Hutchins, 1935 (INHS 1406-1407, 1556); Jonesboro, 1938 (INHS 1550, FMNH 23736); Aldredge, 1947 (INHS 2525); 4.8 km NE Reynoldsville, 1957 (INHS 8790); CCC Camp, T12S R2W Sec 33, Shawnee National Forest, 1988 (SIUC R-2069, R-2293); Pine Hills, 1957, 1965 (SIUC R-205, R-1931); Pine Hills rd. 2.15 mi N of S gate, 1988 (SIUC R-2035); Pine Hills rd. 0.05 mi N of southern gate, 1988 (SIUC R-1971); Pine Hills, 300 yd NW of McGee Hill, 1963 (SIUC R-979); upper Pine Hills road 4 km from Wolf Lake entrance, 1993 (SIUC R-2490); Pine Hills, 0.5 km N of Winters Pond, 1993 (SIUC R-2499); Pine Hills, on road just S of Winters Pond, 1992 (SIUC R-2529, photo); Pine Hills, lower bluff road, August (SIUC R-2530, photo); LaRue-Pine Hills Ecological Area, 1993 (SIUC R-2579); approx. 6 mi SW of Jonesboro at Luther Gibbs' place at Bluff Lake, 1966 (SIUC R-1534); on road to Bald Knob, 1955 (SIUC R-111). **Wabash County:** (Garman, 1892).

ACKNOWLEDGMENTS

We are extremely grateful to the many individuals who helped with this project. Field assistance and locality information was provided by Scott Ballard, Ed Bower Jr., Dean Corgiat, Judy DeNeal, Terry Ekhardt, Todd Fink, Kathy Harrocks, Bari Klein, Bob Lindsay, Bruce McAllister, Anne-Marie Monty, Mark Phipps, Mike Redmer, Scott Simpson, Todd Strole, Kirby Tolch, John Tucker, and Elizabeth Wagle.

The following people (state employees, forest service employees, SIUC graduate students, and local residents) provided us with valuable information on rattlesnake occurrence: Tom Anton, Ralph Axtell, K. C. Batha, Dan Bridges, John Cannon, Joyce Collins, Hank Courtois, Roger Cox, Dempsey Deavers, Chuck Deverger, Terry Ellis, Ed Moll, Dan Holm, Ken Russel, Bob Szfoni, Wade Graskewicz, Mike Ellsworth, Tracy Evans, Mr. Florio, Eric Ford, Scott Fritschle, Tony Gerard, Max Hutchison, Joe Juhl, Beverly Latin, Leon Levine, Dave Maginell, Earl Mason, Mike Miller, Chris Mohrman, Richard Nemyer, Leon Stille, Jack Reihnehart, Herald Swank, Robert Myers, Dr. Romano, Mike Sanders, Ersil Sherwin, Beth Shimp, Jody Shimp, Ray Smith, James Spivey, Jay Stanford, Gary Stratton, Diane Tecic, John Tipitt, Rita Throop, Paul Von Kiedrowski, Doug Warren, Jim Weycules, Warren Wilson, Andy West, and employees from Forest Park Nature Center, Fox Ridge State Park, Marshall State Fish and Wildlife

Area, Newton Lake Fish and Wildlife Area, Panther Creek Conservation Area, Rend Lake State Park, Rice Lake Conservation Area, Sam Parr Fish and Wildlife Area, and Turkey Bluffs Conservation Area.

We are grateful to the following museum curators for supplying data on Illinois specimens from their collections, and local newspapers for finding and providing us with articles on rattlesnake encounters: Alan Resetar, Field Museum of Natural History (FMNH); Kevin Cummings, Illinois Natural History Survey (INHS); Robert P. Reynolds, National Museum of Natural History (USNM); Jeffrey A. Seigel, Natural History Museum of Los Angeles County (LACM); Southern Illinois University at Carbondale Herpetology Collection (SIUC), and Steven D. Sroka, University of Illinois Museum of Natural History (UIMNH); Greg Schneider, University of Michigan Museum of Zoology; Effingham Daily News, Hardin County Independent, Marshall-Independent, and The Weekly Messenger.

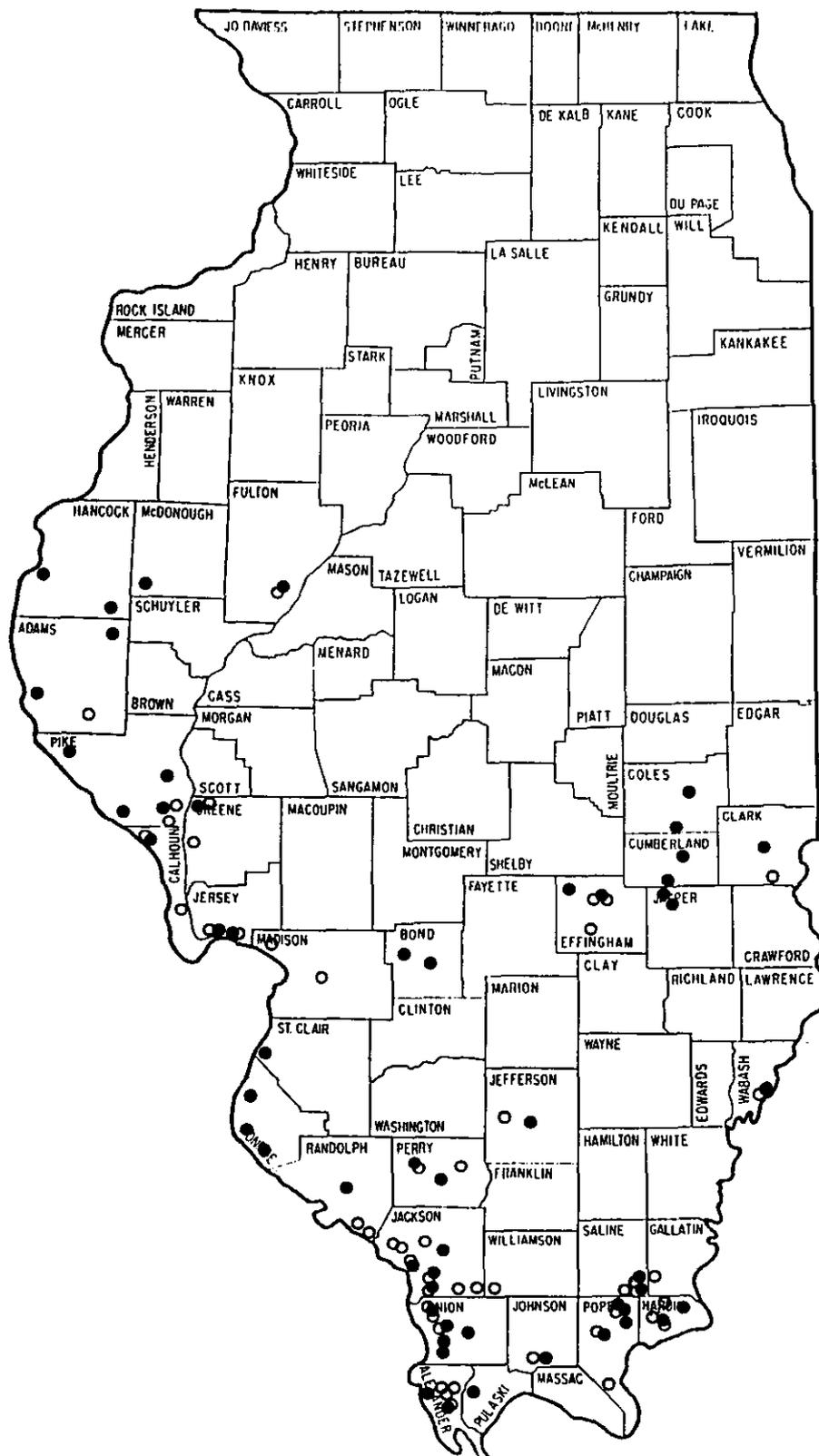
LITERATURE CITED

- Ackerman, K. 1975. Rare and endangered vertebrates of Illinois. Illinois Department of Transportation, Bureau of Environmental Science.
- Brandon, R. A. and S. R. Ballard. 1991. Inventories of amphibians and reptiles in Illinois. Final report submitted to the Division of Natural Heritage, Illinois Department of Conservation.
- Brown, W. E. 1992. Emergence, ingress, and seasonal captures at dens of northern timber rattlesnakes, *Crotalus horridus*. Pages 251-258 In *Biology of the pitvipers* (J. A. Campbell and E. D. Brodie, Jr., editors). Selva, Tyler, Texas.
- Brown, W. S. 1993. Biology, status, and management of the timber rattlesnake (*Crotalus horridus*). A guide for conservation. SSAR Herpetol. Circular No. 22.
- Brown, W. S. 1994. Nuisance rattlesnakes: Rescuing the unpopular. Abstract of talk at the New York Natural History Conference, April 1994.
- Brown, W. S. 1994. Natural history of the timber rattlesnake in the eastern Adirondacks. Adiron. Ab. Rev. March 1994.
- Brown, W. S. and Parker, W. S. 1976. A ventral scale clipping system for permanently marking snakes (Reptilia, Serpentes). *J. Herpetol.*, 10:247-249.
- Ernst, C. H. 1992. *Venomous reptiles of North America*. Smithsonian Institution Press, Washington D.C.
- Fitch, H. S. 1960. Criteria for determining sex and breeding maturity in snakes. *Herpetologica*, 16:49-51.

- Fitch, H. S. 1985. Observations on rattle size and demography of prairie rattlesnakes (*Crotalus viridis*) and timber rattlesnakes (*Crotalus horridus*) in Kansas. Univ. Kansas Mus. Nat. Hist. Occ. Pap., 118:1-11.
- Garman, H. 1892. A synopsis of the reptiles and amphibians of Illinois. Illinois State Lab. Nat. Hist., Bull. 3:215-385 + 10.
- Gloyd, H. K. 1940. The rattlesnakes, genera *Sistrurus* and *Crotalus*. Chicago Acad. Sci. Special Publ., 4, vii = 266 pp.
- Hankinson, T. L. 1917. Amphibians and reptiles of the Charleston region. Illinois Acad. Sci. Trans., 10:322-330.
- Hurter, J. 1911. Herpetology of Missouri. St. Louis Acad. Sci. Tran., 20:59-274.
- Keenlyne, K. D. 1978. Reproductive cycles in two species of rattlesnakes. Am Midl. Nat., 100:368-375.
- Klimstra, W. D. and M. Hutchison. 1965. A collection of amphibians and reptiles in southern Illinois. Illinois State Acad. Sci., Trans., 58:152-155.
- Martin, W. H. 1988. Life history of the timber rattlesnake. Catesbeiana, 8:9-12.
- Necker, W. L. 1939. Poisonous snakes of Illinois. Chicago Naturalist, 2:35-47.
- Peters, J. A. 1942. Reptiles and amphibians of Cumberland County, Illinois. Copeia, 1942:182-183.
- Robinson, F. B. 1966. Amphibians and reptiles of Massac, Johnson, Pope, and Hardin counties, Illinois. Master of Science thesis, Univ. IL, 140 pp.
- Smith, P. W. 1961. The amphibians and reptiles of Illinois. Illinois Nat. Hist. Surv. Bull., 28:1-298.
- Thurrow, G. R. and R. P. Sliwinski. 1991. Herpetological distribution records from Illinois. Chicago Herp. Soc, Bull., 26:129-132.

Part 1

Tables and Map



Map 1. Localities for the timber rattlesnake, *Crotalus horridus*, in the southern half of Illinois. Solid circles are documented by voucher specimens or are taken from the literature. Open circles represent sight records or specimens observed during this survey.

Part 2

Mauger, Anton, & Bielema

A PRELIMINARY REPORT ON THE STATUS OF THE TIMBER
RATTLESNAKE IN FOUR NORTHERN ILLINOIS COUNTIES

**A PRELIMINARY REPORT ON THE STATUS OF THE
TIMBER RATTLESNAKE (*Crotalus horridus*)
IN FOUR NORTHERN ILLINOIS COUNTIES**

BY

**DAVID MAUGER
THOMAS G. ANTON
AND
BRIAN J. BIELEMA**

PREPARED FOR:

**DR. RONALD A. BRANDON
THE ILLINOIS ENDANGERED SPECIES PROTECTION BOARD
ILLINOIS DEPARTMENT OF CONSERVATION**

17 August 1994

MATERIALS AND METHODS

The time period covered by this summary report is 10 May - 11 June 1994 (DM,TGA). Nine excursions (field days) totalling 67 field hours were spent on sites in Carroll, Jo Daviess, La Salle, and Rock Island counties: 1 day-4 hours Carroll, 5 hours Jo Daviess Cos.; 5 days (37 hours) La Salle Co.; and 3 days (16 hours) in Rock Island County. Likely C. horridus habitat was reconitered by car (see maps 1-4, yellow highlighted areas). Habitat photos were taken of each site and specific localities were pinpointed on USGS quadrangle maps.

The Carroll/Jo Daviess County area of northwestern Illinois is being extensively surveyed by one of us (BJB) in an attempt to determine the number of viable Crotalus horridus populations remaining. The accompanying map (Map 5) shows the results to date. Hollow symbols indicate areas searched. Half-shaded symbols indicate areas which have been searched with no specimens found, but have yielded 1994 sightings by local residents who were extensively interviewed and believed reliable. Solid symbols indicate areas which have yielded sightings. The following survey dates were recorded for Jo Daviess County by one of us (BJB): 19, 21 and 30 May; 9 and 15 June; 3 July, and 2 and 4 August 1994. On these dates, 1-3 hours were dedicated to foot searching new areas/sites. In addition, weekly visits to monitor the South Whitton Road (Hanover Bluff) birthing rookery group were maintained.

SURVEY RESULTS

Carroll County:

Mississippi Palisades State Park was visited on 21 May 1994. Due to prior field work and summaries by Bielema (1990), the site was not assigned high priority by the investigators. C. horridus is currently considered severely depleted if not extirpated until further field work or reliable, local contacts produces more specimens. Any remaining C. horridus may not constitute viable populations, and would be isolated and sporadic in occurrence. The site was searched throughout an entire active season and yielded no sightings. It has been the only Carroll County site surveyed (Bielema, 1990).

Jo Daviess County:

An apparently stable C. horridus population of as yet undetermined size and status persists in the vicinity of Hanover, east of the Savannah Army Depot on South Whitton Road. The habitat is a mix of privately owned cattle pasture and Illinois dedicated nature preserve. It consists of a south-facing slope on the west rim of an intermittently active quarry and has full-sunlight exposed limestone boulders in the pasture portion and rocky, heavily-wooded hillsides in the portion dedicated as nature preserve. Cattle are present on the site. The investigators visited this site on 21 May 1994. Author (BJB) has been monitoring this population closely over a period of over 5 years and identifies individuals via enigmatic pattern details.

To date, between six and eight adult, reproductive females have been observed, including the two individuals seen on 21 May. A proposed expansion of Route 20 near Galena is also being searched; this is one of a dozen possible sites being investigated and is based on reports of sightings by locals. Many of these areas were reported by a local rattlesnake hunter from Galena.

Mr. Les Deininger hunted C. horridus for many years and has indicated many of his dens (hollow symbols, Map 5). These sites may not have yielded recent sightings. The individual in question has ceased hunting snakes. Other locals interviewed by one of us (BJB) have indicated sightings within 5 years at these sites. Additional time is needed to properly survey these sites. None have yielded sightings by author (BJB) to date.

There are many additional areas to survey in Jo Davies County based on reports continuing to come in. Tapley Woods, Galena Territory, Irish Hollow Road and areas south of Elizabeth and north of Galena all must be investigated further. There is additional habitat and sighting reports from the blufflands bordering the Mississippi River which may contain viable populations. The Hanover area contains several more possible sites. Foot searches will require many more hours to satisfactorily determine the presence and viability of any populations at these sites.

The continuing encroachment of man by the construction of dwellings in the Jo Daviess hills, maintaining its present rate, will probably eliminate C. horridus within 5-10 years. Sanctuary areas should be set aside as soon as possible. The South Whitton Road population needs protection and would be ideal as an extension

of Hanover Bluff Nature Preserve. Most areas searched are severely overshadowed, which may be an important factor in the decline of C. horridus (Brown, 1993).

La Salle County:

Specimens of Crotalus horridus from La Salle County collected 9 June 1962 are extant (INHS 9646-7). The collector, H. Walley, has recorded sightings as recently as 1992. The animals came from a site known as Blackball Mine (T33N, R2E, Sec. 19, NE 1/4), now an Illinois Nature Preserve. A large abandoned brick kiln and foundation were extensively searched, as were several west-facing bluffs and dolomite talus slides, some of which contained very large limestone slabs, and represented the best available habitat for C. horridus in the immediate area. Human traffic in the form of hikers and bicyclists is both audible and visible from the site. A railroad line, canal, and bicycle path run east-west alongside the bluff. A recently burned oak savanna area was also reconoitered. The site is heavily overgrown with woody vegetation, though upland summer range habitat appears excellent for C. horridus.

No specimens of C. horridus were found at this locality during the survey at the date of this writing (4 August 1994). Four black rat snakes (Elaphe obsoleta) were seen, one queen snake (Regina septemvittata) and five northern water snakes Nerodia sipedon were observed in the bridge abutment of Pecansaugan Creek, where the latter enters a weedy, channelized canal. Single specimens of the eastern yellowbelly racer (Coluber constrictor flaviventris) and eastern milk snake (Lampropeltis triangulum) (both potential predators of juvenile C. horridus) were also observed. Turtle

species included painted turtles (Chrysemys picta) and snapping turtles (Chelydra serpentina). Anurans included Acris crepitans, Bufo americanus, Rana catesbeiana and R. clamitans. Work will continue at Blackball Mine in the fall and will center on the best potential boulder/talus areas and possible hibernacula.

Other areas searched included two private cement quarries owned by Lone Star Cement Company. These quarries varied in degree of disturbance. Both were west of Mathiessen State Park and north of Marjorie Carleson Nature Preserve. (T33N, R1E, Sec. 36, SE1/4 of SE1/4, La Salle Quadrangle). On 4 June the older, least catastrophically mined quarry yielded a single female C. horridus (753.5 g., ca. 90 cm S-VL). The snake was basking in full shade partially concealed by poison ivy at the foot of a south-facing vertical limestone quarry wall, an area which may serve as potential hibernacula. This specimen was collected and held for photographs, and was subsequently found to be non-reproductive following a radiograph performed by a veterinarian. A stool deposited yielded mammal hair, including eastern cottontail (Sylvilagus floridanus). A hole into which the snake attempted to retreat during capture was lined with cottontail fur. After data from the snake was obtained, it was released at the site of capture on 10 June 1994.

The quarry from which the snake originated was heavily overgrown with rushes, Virginia creeper (Parthenocissus quinquefolia), sumac (Rhus), fescue (Festuca), etc. The water level at the east end had receded due to damming and channelization by beavers (Castor canadensis) and muskrats (Ondatra zibethicus).

Remaining deep pools harbored bass (Micropterus salmoides) and green sunfish (Lepomis cyanellus). Snapping turtles (Chelydra serpentina) and painted turtles (Chrysemys picta) were present, as were Nerodia sipedon, Acris crepitans, Rana catesbeiana and R. clamitans. Human access was limited to mining roads, and on one occasion mountain bikers were observed. Overall, there is comparatively less human traffic at this site than at Blackball Mine.

Rock Island County:

A single record with a voucher specimen (INHS 3704) collected 12 May 1945 by Robert C. Schroeder exists. The locality is given as Andalusia (INHS printout), S of Andalusia (Brandon & Ballard, 1991). The investigators visited this site on 14 May, 10 and 11 June 1994. A local sporting-goods dealer, park ranger (Loud Thunder State Park) and maintenance crews were interviewed and had no knowledge of the presence of C. horridus in the park or in the vicinity of Andalusia. A regional U.S. Fish & Wildlife Service officer also had no recollection of the occurrence of C. horridus in Andalusia (G. Bade, pers. comm. 1994).

Aside from intermittent small rock outcrops, there were none of the extensive south or southwest facing limestone bluff formations and boulder-strewn slopes characterizing optimal timber rattlesnake habitat, such as that described by Bielema (1990, 1992, 1993), Reinert (1984), and pers. obs. This area, part of the central lowland province, was once glaciated via the onset of the Nebraskan, Kansan, and Illinoisian advances. Soil composition consists of sand/clay alluvial sediments on bottomlands, and thick

loess (Neely & Heister, 1987). Glacial till was confirmed in the areas surveyed by us (DM,TGA).

It is unlikely that suitable habitat exists for C. horridus in Rock Island County in the vicinity of the Andalusia locality. The circumstances/conditions surrounding the collection of the sole voucher specimen remains unknown. There are no literature references to the specimen. Such references do exist for other herp material from the region collected by Schroeder in the 1950s, and deposited in the UIMNH collection (Moll, 1962). One possibility is that the snake arrived at the locality via a flood, rafting on organic or anthropogenic debris from Iowa or the better-known population in Jo Daviess county to the north. Records indicate a moderate (ca. 5' above flood stage) flood in 1944 at Keokuk, Iowa (Chrzastowsky et. al., 1994). Rafting is a natural phenomenon which is reliably considered to be a factor in the dispersal of various species; Illinois examples may include the relict populations of the coachwhip (Masticophis flagellum), great-plains rat snake (Elaphe guttata emoryi), and the scorpion Centruroides vittatus. That the C. horridus taken at Andalusia (which would have been a county record) was not published may indicate hesitation on the part of the collector, reflecting uncertainty as to the exact origin of the specimen.

ACKNOWLEDGEMENTS

The authors wish to thank the following individuals for field assistance and other helpful contributions to this report; Gerald R. Bade of the Rock Island Field Office, USFWS, Mike Redmer and Kirby Tolch. Michael J. Miller, DVM, performed the radiograph on the La Salle Co. C. horridus. Alan Resetar proofed the manuscript. Special thanks goes to Ronald A. Brandon and the Illinois Department of Conservation for making this project possible.

LITERATURE CITED

- Bielema, B.J. 1990. Distribution and abundance of the timber rattlesnake (Crotalus horridus horridus) in Mississippi Palisades State Park. Unpubl. report to the Illinois Department of Conservation.
- _____. 1992. The timber rattlesnake (Crotalus horridus) in northwestern Illinois. Unpubl. Report to the Illinois Department of Conservation.
- _____. 1993. A birthing rookery of timber rattlesnakes (Crotalus horridus) in northwestern Illinois. Unpubl. report to the Illinois Department of Conservation.
- Brandon, R.A., and S.R. Ballard. 1991. Inventories of amphibians and reptiles in Illinois: Final Report. Unpubl. report to the Division of Natural Heritage, Illinois Department of Conservation.
- Brown, W.S. 1993. Biology, status and management of the timber rattlesnake (Crotalus horridus): a guide for conservation. SSAR Herpetological Circular No. 22. 78 p.
- Chrzastowsky, M.J., M.M. Killey, R.A. Bauer, P.B. DuMontelle, A.L. Erdmann, B.L. Herzog, J.M. Masters and L.R. Smith. 1994. The great flood of 1993: geologic perspectives on flooding along the Mississippi and its tributaries in Illinois. Illinois State Geological Survey Special Report No. 2. 45 p.
- Moll, E.O. 1962. Recent herpetological records for Illinois. Herpetologica 18(3): 207-209.
- Neely, R.D. and C.G. Heister, compilers. 1987. The natural resources of Illinois. Illinois Natural History Survey Special Publication No. 6. 224 p.
- Reinert, H.K. 1984. Habitat variation within sympatric snake populations. Ecology 65 (5): 1673-1682.