

# HABITAT UTILIZATION AND STATUS OF THE EASTERN MASSASAUGA RATTLESNAKE, *Sistrurus catenatus catenatus*, IN THE CHICAGO REGION

Kenneth S. Mierzwa

## ABSTRACT

The Chicago region includes an ecotone between eastern forest and midwestern tallgrass prairie communities. Like many organisms, the eastern massasauga has adapted to somewhat different habitat conditions in eastern and western parts of the region.

At present, Illinois populations tend to be associated with forest edge situations near rivers. Modern day habitat utilization within two northeastern Illinois populations is described and compared with presettlement conditions, and with *Sistrurus* populations in nearby regions.

## INTRODUCTION

The eastern massasauga, *Sistrurus catenatus catenatus*, is relatively rare and sporadically distributed in the Chicago region (Figure 1), an area defined as the 22 counties with the majority of their area within a 75-mile radius of downtown Chicago, including 11 counties in Illinois, seven in Indiana, three in Wisconsin, and one in Michigan.

This paper summarizes the regional status of the massasauga and describes the habitat of three populations of *Sistrurus c. catenatus* within the context of regional geology and plant communities.

## REGIONAL OVERVIEW

Like most areas within the range of the eastern massasauga, the Chicago region landscape is largely a product of Wisconsinan glaciation (Willman, 1971). The retreat of the ice sheet left a series of concentric moraines roughly parallel to the modern shoreline of Lake Michigan, of which the Valparaiso moraine is the largest and best known. The moraines impounded post-glacial lakes of various sizes and durations. The most important of these post-glacial lakes was Lake Chicago, a higher version of Lake Michigan which covered most of what is now the city of Chicago and had its outlet to the southwest through the Illinois River valley.

Newly exposed areas immediately adjacent to the glacier may have been barren and tundra-like. Pollen studies have indicated that boreal forests dominated by spruce occurred at a somewhat greater distance from the ice, and these gradually gave way to pine and, eventually oak dominated areas. The post-glacial forest may have been more diverse than its present day counterpart (Benninghoff, 1968). A subsequent xerothermic period is believed to have allowed a "prairie peninsula" to penetrate at least as far east as Ohio (Wright, 1968; Geis and Boggess, 1968). Relict populations of a variety of western plants and animals persist in grassland openings within this area today.

When the first European settlers arrived in the 1830s, the Chicago region was a wilderness grading from treeless tallgrass prairie at the western edge to vast oak forest broken by occasional prairie, savanna, and

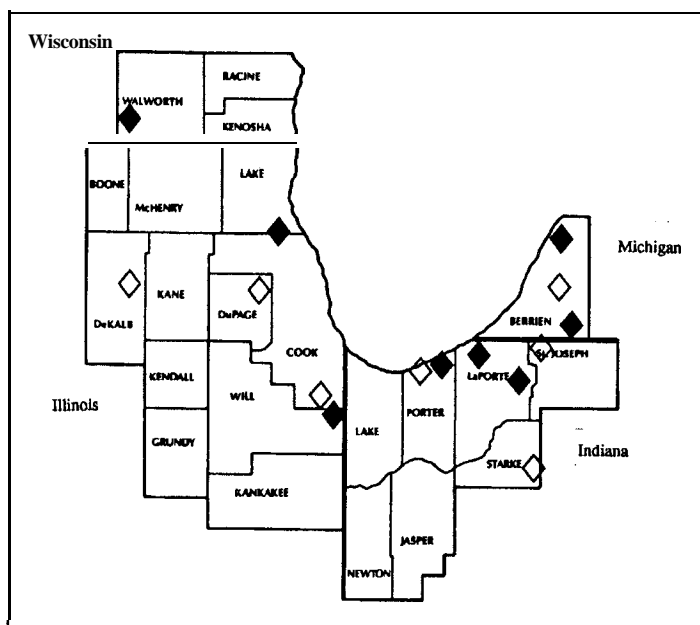


Figure 1. Distribution of the eastern massasauga rattlesnake, *Sistrurus c. catenatus*, in the Chicago region. solid symbols indicate extant populations; open symbols indicate historical localities believed to be extirpated or with no recent data.

wetland openings to the east. The ecotone between prairie and forest was an important factor in determining the distributions of various animals (Mierzwa, in press).

## REGIONAL DISTRIBUTION

There are at least 14 known historical populations of *Sistrurus c. catenatus* in the Chicago region (Figure 1). However, only seven of these have produced verifiable sightings of massasaugas within the past few years.

### Illinois

Four massasauga populations are known from the Illinois portion of the Chicago region. Two of these populations are presumed to have been extirpated. A single very old museum specimen documents the former presence of the species near Cortland in DeKalb County. This area is predominantly agricultural today. Museum specimens are also available from the Wood Dale area in DuPage County. No specimens have been collected recently (Ludwig et al., 1990) despite intensive sampling at Wood Dale Grove, one of the few patches of relatively natural land within this heavily suburban region. The remaining two northeastern Illinois populations have been recently verified and are described below.

#### Des Plaines River valley population

One of the better known populations of *Sistrurus c. catenatus* occurs along an approximately five mile (eight kilometer) stretch of the Des Plaines River in Cook and Lake Counties (Schroeder, 1987) in the far northern suburbs of Chicago. This affluent area is developing rapidly, with almost constant construction of expensive homes and corporate office buildings. This massasauga population was formerly continuous and may once have extended even further south. At present, it is fragmented into three major and possibly several much smaller sub-populations separated by developed land or areas of marginal habitat. Massasaugas are still observed most years at each sub-population, but numbers are relatively low. Even though most sightings are now made on county-owned land and the number of snakes appears to be stable in the short term, the long term viability of this population is uncertain.

The entire population is located on moraine, ground moraine, and recent alluvial deposits. Soils generally have a high clay content and clay hardpans are common in the areas of most frequent massasauga sightings.

In presettlement times the area west of the Des Plaines River was almost entirely tallgrass prairie. The river acted as a firebreak preventing prairie fires driven by the prevailing west winds from consuming the protected band of forest to the east (Moran, 1978). A narrow and discontinuous strip of floodplain forest rapidly rose into a mesic forest characterized by sugar maple (*Acer saccharum*) and basswood (*Tilia americana*). To the east the mesic forest graded into a mosaic of dry-mesic forest and northern flatwoods, both dominated by oaks (*Quercus* sp.). The flatwoods areas have an impermeable clay hardpan with a perched water table and are dotted with numerous vernal ponds. Swamp white oak (*Quercus bicolor*) is a characteristic species of the flatwoods community (White, 1979). These areas are extremely wet in the spring, but become quite dry in late summer. The oaks are relatively small and stunted. Sedges (*Carex* sp.) are common in the understory. The flatwoods communities may have been fire maintained to some degree, and were probably more open in presettlement times than the surviving examples are today.

Continuing eastward, these wooded communities graded into an area of oak savanna with slightly more topographic relief. The savannas were probably very open, with considerable sunlight reaching the ground. Higher sections were usually dominated by bur oak (*Quercus macrocarpa*); lower and wetter areas and prairie openings of various sizes were interspersed throughout the savanna (D. Brouillard, pers. comm. 1992). Long thought to have been an open woodland with a prairie understory, savannas are now known to be a distinct community with a unique herbaceous understory (Packard, 1989). Regular fires maintained savannas in an open condition. With the suppression of wildfire after white settlement, savannas became overgrown and are now among the rarest of midwestern plant communities.

Today, massasaugas mainly inhabit forest-edge and shrubby old field situations. Most recent sightings have been in or near areas of Montgomery silty clay and Nappanee silt loam, heavy clay soils of grassy wetlands and woodland, respectively. These soils tend to be very wet in the spring and may pond after heavy rains. However, they become very dry during the summer months.

Most of the publicly owned savannas and flatwoods of southeastern Lake and northeastern Cook counties are now overgrown with shrubs and young trees. Encroachment of woody vegetation and development of private land are the major threats to the massasauga in this area.

### *Plum Creek population*

Massasaugas have long been known to occur along a six and one half mile (10.5 kilometer) reach of Plum Creek in eastern Will County and extreme southeastern Cook County, Illinois. Locality data on most old museum specimens is vague and recent attempts to locate massasaugas in this area have met with limited success. Two specimens, one of which was a roadkill, were found in the late 1980s at the southern extreme of the area. Subsequent random searches and drift fencing in 1990-1991 by several workers did not yield any additional massasaugas, although many other snakes were collected (Mierzwa et al., 1991). Two subadult massasaugas were finally found in 1992. Recent land acquisitions by the Forest Preserve District of Will County include several suitable parcels, and search efforts will continue. A massasauga was reportedly observed along the Cook County reach of Plum Creek in 1991 (R. Smith, pers. comm. 1992).

Forests along Plum Creek are less extensive than those along the much wider Des Plaines River, but there are some similarities in composition. Areas of northern flatwoods with associated clay soils, especially Ashkum silty clay loam, are common. These grade into upland bur oak savannas. The flatwoods and savannas are overgrown and degraded today, but were much more open in presettlement times (M. DeMauro, pers. comm. 1992). The Plum Creek woodlands were surrounded by treeless prairie, which have now been converted to agriculture and outlying suburban subdivisions. All massasauga records with precise locality data are within a very short distance of the treeline.

### *Indiana*

*Sistrurus c. catenatus* has been reported from six localities in the Indiana portion of the Chicago region. Recent sightings are known from only three of these populations.

Massasaugas are occasionally reported from Indiana Dunes National Lakeshore, but sightings are so few and localities so scattered that it is difficult to define an area occupied by the species or to describe its habitat. No massasaugas have been seen recently at Cowles Bog, where reports were frequent in the early part of this century.

The status of the Starke County locality cited by Whitaker and Gammon (1988) and Minton (1972) is uncertain. Two LaPorte County localities are believed to support viable populations, and one of these is described below.

### *Springfield Fen population*

The Des Plaines River and Plum Creek localities discussed above (and all other Illinois *Sistrurus* localities) are within regions which once were predominantly prairie or savanna, with relatively small forested areas. Springfield Fen is located well to the east, in LaPorte county, Indiana, and is part of a very different ecosystem. Much of LaPorte county was once covered by extensive forests. Springfield Fen is a prairie fen, a large grassland opening in the forest. Calcareous seepage from the base of a 100-foot high hill has created a wetland consisting of saturated peat deposits crossed by small rivulets, eventually merging to form the headwaters of the Galena River. Like the grasslands to the west, fens also burned occasionally. Fire suppression has resulted in the encroachment of shrubs over much of the fen. Clearing and controlled burning have been initiated by the Indiana Department of Natural Resources to remove the shrub cover.

The status of *Sistrurus c. catenatus* at Springfield Fen is uncertain, but the species appears to be fairly common there (Resetar, 1988). Most of the snakes have been seen basking on sedge tussocks in areas of deep organic substrate (T. Post, pers. comm., 1992).

### *Michigan*

At least three massasauga localities are known from Berrien county, Michigan, and two of these have been verified within the past ten years (D. Sever, pers. comm., 1992; Michigan Natural Features Inventory, 1992). Little

is known about habitat associations in Berrien county, although most populations appear to be associated with wetland complexes.

### *Wisconsin*

Three counties in Wisconsin fall within the Chicago region. Massasaugas have been reported from a previously known Walworth county population within the past 10 years (G. Casper, pers. comm., 1992). Reports from Racine and Kenosha counties have not been verified at this time, and have not been included on the map.

### *SUMMARY OF CHICAGO REGION HABITAT UTILIZATION*

All Chicago region massasauga localities with precise locality data are within areas where the water table is close to the surface of the ground during at least part of the year. Populations in the western part of the region occur on and immediately adjacent to clay hardpans, usually where crayfish burrows are common, while those in Indiana and Michigan may be associated with water-saturated organic substrates. Snakes are usually found near scattered shrubs or small trees, but sightings become infrequent as woody vegetation becomes dense. All northeastern Illinois populations occur near a presettlement ecotone between woodland and wet prairie, or within areas of open woodland, savanna, or flatwoods where considerable sunlight would have reached the ground and an herbaceous layer would have been present.

### *MANAGEMENT IMPLICATIONS*

The eastern massasauga is clearly in peril within the Chicago region, and we can no longer afford to ignore its habitat requirements. Aggressive management will be required at some locations. Possible actions include:

- 1) Additional land acquisition should be initiated where unprotected habitat remains. Some populations are located on small parcels of public land.
- 2) Investigation of groundwater conditions may be useful at some sites. Drain tiles or ditches have reduced seasonal ponding, reduced the extent of wetlands, and lowered the water table in some areas.
- 3) Site managers should strive for an approximation of presettlement conditions, with an emphasis on restoring the mosaic of sunlight and shade once typical of the flatwoods/savanna community. Brush clearing and fire are the primary tools, but not more than one-third of the site should be burned at any one time. Temporary removal of all ground cover could expose snakes to predation. Also, not all shrubs and trees should be removed. The growth of some native shrubs should be encouraged to provide shade for thermoregulation.
- 4) Educational efforts are important. Too many members of the public are still willing to destroy what they do not understand.
- 5) Protection must be extended to additional jurisdictions. Although included on the list of endangered and threatened species by Indiana and Wisconsin, the massasauga is not currently protected in Illinois (as of this writing, it has been proposed for state endangered status but not yet approved). Increased enforcement by state, county, and local agencies may be necessary, since collectors and others still remove snakes from some populations.

Implementing this series of recommendations will not always be easy, especially in these days of federal, state, and local budget constraints. A sustained effort will be necessary. If they are successful, future generations will still be able to experience the thrill of seeing a massasauga in the wild.

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