

DISTRIBUTION AND ABUNDANCE OF THE TIMBER RATTLESNAKE  
(CROTALUS HORRIDUS HORRIDUS)  
IN MISSISSIPPI PALISADES STATE PARK

BY  
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## ACKNOWLEDGMENTS

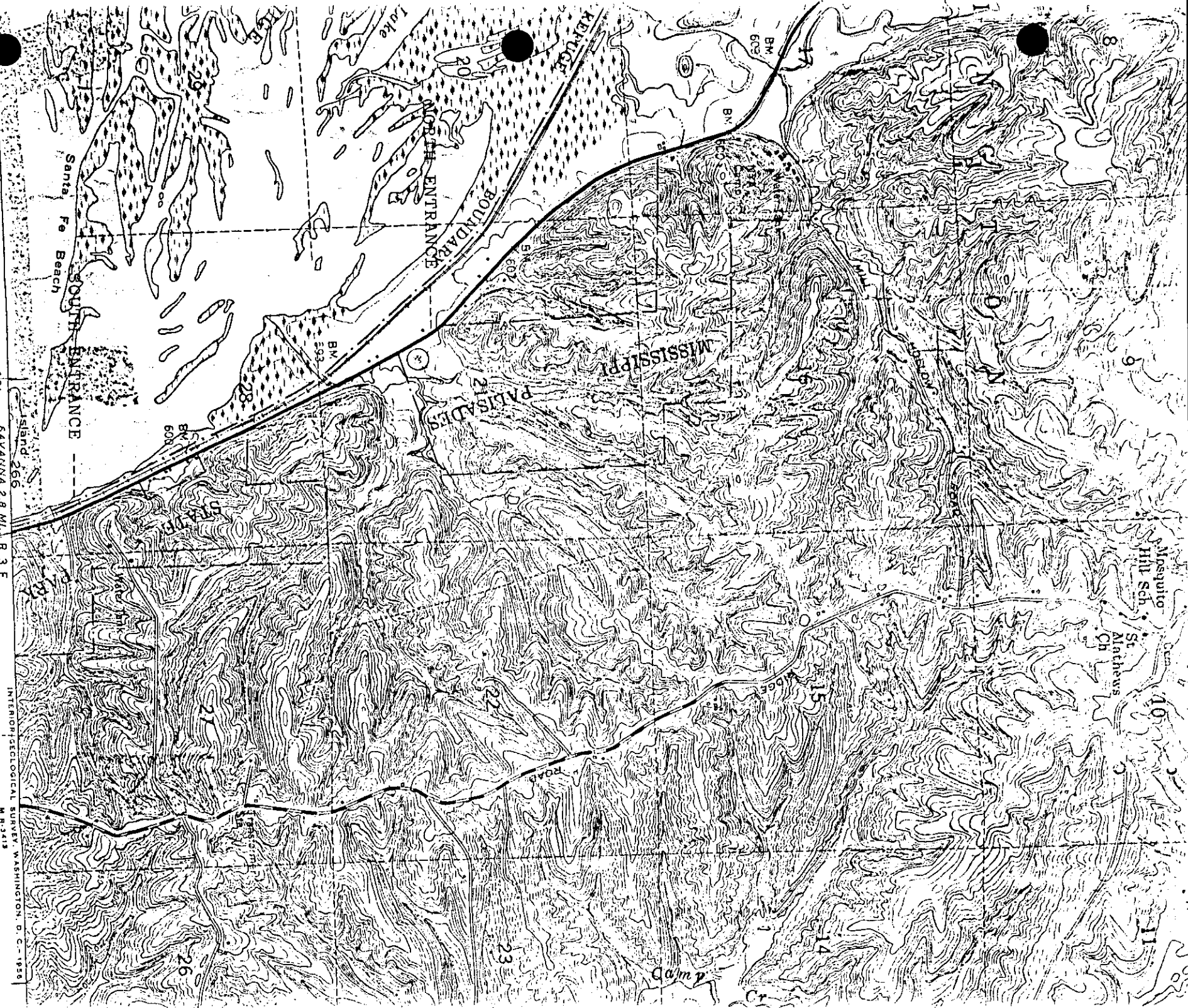
I wish to express my thanks to Mr. John Jachino, Site Superintendent of Mississippi Palisades State Park, and his staff for their help during the course of this investigation.

I am grateful to Mr. Randy Nyboer, Natural Heritage Biologist for his guidance and suggestions.

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LE 1:24000

12 900 000 FEET (10WA)

10'

SAVANNA 2.8 MI. R 3 E.  
THOMPSON 12 MI.

111

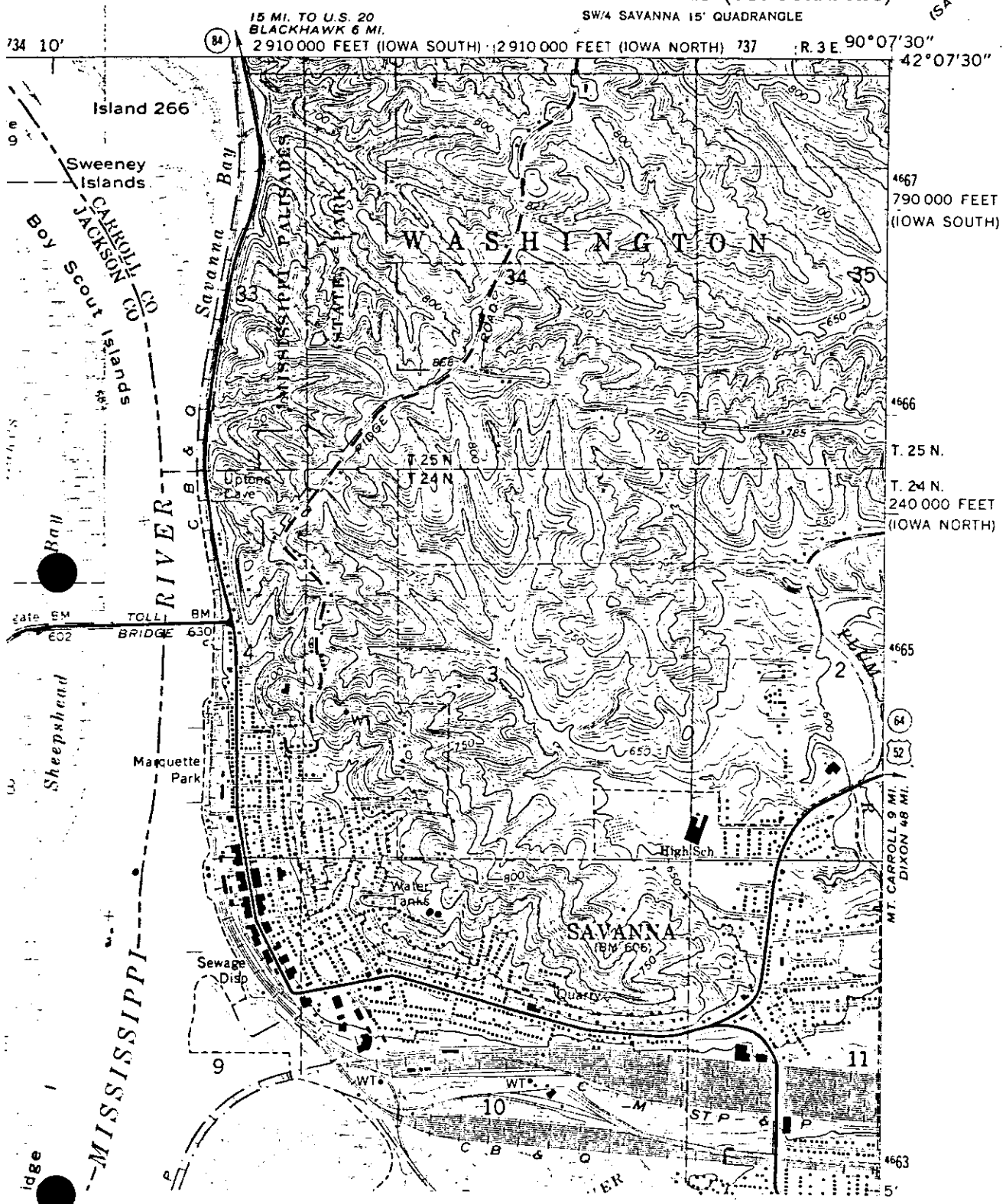
INTERIOREGIOLOGICAL SURVEY WASHINGTON, D. C. 1958  
M R 3413

ROAD CLASSIFICATION

Heavy-duty  Light-duty 

SAVANNA QUADRANGLE  
ILLINOIS-IOWA  
7.5 MINUTE SERIES (TOPOGRAPHIC)  
SW/4 SAVANNA 15' QUADRANGLE

2965 11  
(SAVANNA 1:62 500)



## INTRODUCTION

Several species have figured prominently in the culture and history of man in North America. Those species possessing the ability to effect great bodily harm on man were feared, worshipped and revered by the native Americans. Early settlers and explorers also feared the same species but held them in contempt and started the elimination of them from most of their original range.

The grizzly bear and timber wolf are two such creatures symbolic of the remaining wilderness in the Rocky Mountains and northern forests of the United States. Both species have been considered a threat to man and have been persecuted relentlessly throughout the history of our country. Only today have they been given sanctuary areas and their numbers closely monitored in an attempt to save the last of them.

One can not relax his "fight or flight" mechanism in grizzly country and walk without some feelings of fear. Most wilderness supporters would have it no other way, for a cleansed and sanitized wilderness devoid of the species dangerous to man is not true wilderness. There exist wild areas in Illinois where similar feelings are evoked. These areas too have been the target of the white man who will not

tolerate creatures hazardous to him. These areas are the high rocky bluffs of the major rivers and the creature is the timber rattlesnake.

A good representative example of typical timber rattlesnake habitat exists at Mississippi Palisades State Park in the "driftless" section of northwestern Illinois in Carroll County north of Savanna.

The park's history shows the timber rattlesnake figuring prominently in the early years of its existence. Much controversy resulted when it was decided to eliminate the rattlesnakes from the park. The park was originally purchased in 1929 with an acquisition of 420 acres. During the early years the park was under the care of the Department of Public Works. A Mr. H. H. Cleaveland was in charge of the fate of the rattlesnakes as one of the high ranking officials of this department. He was concerned for the safety of park visitors especially "city types" who were not familiar with the danger from the snakes. He sought the help of many scientific and nature societies of this era including the aid of famed herpetologist Raymond Ditmars of the New York Zoological Society. This correspondence remains on file at the park. Many letters from Mr. Cleaveland show quite clearly that he would not be easily dissuaded from the course of action he decided to take. This was to introduce sheep and hogs into the known den areas of the rattlers as well as fill the den crevices with

concrete. The controversy unfortunately stemmed from the methods proposed and not from the end result. Almost all correspondence show agreement with Cleaveland's proposal to eliminate the snakes. The objections mostly arose because of the fear that the sheep and hogs would destroy the wildflowers of the park. Thus the consensus of opinion concerning the rattlers in this era was decidedly against their existence and the only problem was getting everyone to agree on the methods to be used. From the list of suggestions Cleaveland finally authorized the filling of the den crevices with concrete, the hiring of men to kill the snakes at \$1.00 per snake, and the introduction of hogs in a small enclosure near the main den area. A rejected method was to introduce the mongoose into the park.

In 1936, several years after the initial action was taken, a letter from a Mr. Luker, Superintendent of State Parks, stated that few rattlesnakes had been seen in the park over the last two years and the CC camps were continuing to fill in the dens with concrete.

As the park's lands were expanded from 1940 to the present many more acres of rock bluff were encompassed. Sightings of rattlesnakes continued as did the attempt to eliminate them although on a smaller scale. In recent years the attitude and views of the park administration including the site staff reflect a desire to maintain the park for the benefit of all of its species. The current site

superintendent shows genuine concern for the continued existence of the rattlesnake in the park.

Since data on existing populations of timber rattlesnakes does not exist for any state owned properties in northwestern Illinois and since this species is declining throughout its range, an attempt was made to ascertain its distribution and abundance in Mississippi Palisades State Park. If suitable sanctuary areas could be identified they might be isolated from the areas of public use and managed for the continued survival of the species. Extensive field study of the rock bluff areas of the park during the season of activity would yield information on their distribution and abundance. This study commenced in July of 1989 and ended in June of 1990. In addition to the field work, interviews were conducted and questionnaires employed to survey personnel frequenting the area both park staff and Illinois State Highway Maintenance workers.



## STUDY AREA

Mississippi Palisades State Park is currently comprised of 2550 acres of rugged limestone bluff and upland forest. Its name was given due to its similarity to areas along the Hudson River. Its most obvious feature is the rock escarpment running approximately 3.5 miles. This high bluff overlooks the Mississippi River to the west. Below the escarpment Illinois Route 84 runs parallel along its entire length. This major highway, The Great River Road, is extensively used and its proximity to the bluff is such that falling rock often appears on the road shoulder and surface for much of the length of the park. This north-south road is paralleled by a railroad track to the west and then the east bank of the Mississippi River. The escarpment is dissected by wooded ravines in several places. The bluff area is, for purposes of the study, divided into three sections. The first section starts at the north boundary, Mill Hollow Road, and runs south to the north entrance. The middle section starts at the north entrance and runs to the south entrance. The last section starts at the south entrance and ends at the southern park boundary.

## MATERIALS AND METHODS

From 21 July 1989 to 1 October 1989 and from 24 April 1990 to 1 June 1990 searches were conducted on foot. These searches primarily were performed along the rock bluff, entirely completing one north to south pass of all 3 sections and then concentrating on the most likely den areas. These possible hibernacula sites were identified from interviews with park employees and from obvious physical features allowing optimum spring and fall basking. Rock features similar to those in den areas encountered along the Maquoketa River in Iowa were searched extensively. A number of timber rattlesnakes remain at these den areas throughout the season of activity (Keenlyne, 1972; Brown, 1987; Harwig in Klauber, 1972).

Specimens encountered would be photographed and identified by pattern recording (Bielema, 1973). This non-mutilation technique has proven to be effective on snakes with blotch patterns and a form was developed to better enable quick sketching of characteristic markings on the head, neck and forward back section.

Sightings would be recorded on a topographic map of the area.

Interviews were conducted with several park employees who had been employed at the park for many years.

Questionnaires were given to personnel from the Mt. Carroll office of the Illinois State Highway Maintenance Department as they maintain Route 84 along the park.

The appearance of small mammals during the searches were noted to compare the relative abundance of prey items to a similar area along the Maquoketa River in Iowa which supports a population of timber rattlesnakes.

## RESULTS

Nine questionnaires were completed by highway maintenance personnel. Of these nine, three had never seen any rattlesnakes along this section of Route 84. The six that responded positively had terms of employment of 8,13,16,17,20 and 23 years. The three others had 3,6 and 20 years with the department. The number seen per year ranged from 1 to 5 but only one respondent had seen any in 1989. This was a single sighting. The total sightings per year were as follows: 1989-1, 1988-2, 1987-5, 1986-6, 1985-2, 1984-1 and 1983-1. The season of the year sightings were made was mainly spring followed by summer. No respondents listed sightings in the fall. Only one believed that the numbers were decreasing with the remaining five stating that the population was staying the same. Respondents were asked to record specific sighting points. Most of these occurred in the north section of the park specifically north of the maintenance shop area for a distance of 300 yards. The Black Angus Supper Club is located on the west side of Route 84 less than 100 yards north of the maintenance shop. Most included this establishment as a reference point for their sightings. All sightings occurred on the east side of the road. Only 2 sightings occurred outside this north section. These were near a water fountain located on the north side

of the south entrance road which would be in the middle section of the park.

No sightings were made in 1990 as of 1 June per phone call to the Mt. Carroll office.

Interviews conducted with park employees gave areas where sightings commonly occurred. Ozzie's Point, a lookout south of the north entrance and above a small sewage treatment facility, was probably one of two known dan areas as it was mentioned frequently. The other area where sightings were made was once again the section around the maintenance shop north of the north entrance. This area is believed to contain the second den site.

Park employees had seen no more than 5 in any recent year. In 1989 there was only one sighting and this was a "possible" seen while an employee was mowing a campground area east of the north entrance. Up to 1 June no sightings had been made for 1990. One employee had worked for 6 years and had never seen a rattlesnake. In the early 1930's as many as 30 were killed each year.

During the course of the study 24 search days totaling 50.23 hours yielded no sightings. These searches were conducted during the months of July, August, September and October of 1989 and during April, May and June of 1990. Each search day began with a careful drive along the total length of the park on Route 84 and ended with a retracing of this route.

Small mammal sightings included 1 eastern chipmunk, 2 gray squirrels and 3 cottontail rabbits over the course of the study.

## DISCUSSION

An area as extensive as that included in this study can not be censused to produce absolute values of population numbers by even a large number of research personnel. One researcher working during essentially one complete seasonal cycle can not validly state that no timber rattlesnakes now exist at Mississippi Palisades State Park. The relative abundance was the project's goal as was the distribution. Based on the results obtained by searches and supported by personnel frequenting the area it is questionable that a viable population now exists there.

The oldest section of the park is the most southern one. Here is where crevices were cemented, hogs were introduced and men hunted the bountied snakes. Recent research suggests that timber rattlesnakes imprint on a den and use no other as generation after generation continue to hibernate in the same den area (Brown, 1987). The eradication method of cementing dens may have been effective for this reason. Direct killing of the snakes was also a successful eradication technique because the timber rattlesnake does not reproduce abundantly. It has been determined that a litter is only produced every third year by a given female, the age of maturation may be 7 or 8 or even older, the litter size is small (averaging nine) and

juvenile mortality high (Brown, 1987). A gravid female removed from the den's population may well significantly affect the future survival of the colony.

The north and middle sections of the park are younger in terms of park owned properties and this may explain why the last sightings were in these areas. These areas did not come under the attack of the early park administrators.

Route 84, the continuously swinging scythe bordering the bluff to the west, has certainly played a major role in the decline of this species. During the searches traffic was almost constant. This high volume of traffic coupled with the proximity of the hibernacula must certainly make this a primary factor in the destruction of snakes in the bluff area. Casual dispersal as well as the intentional seeking of the warmth of the road surface must have caused many deaths.

The park is obviously used by a great many people as the trails are well traveled and signs of their passage exist even in the most remote areas. The trails follow the upper ledge as well as much of the area along the bottom. This extensive trail use may have resulted in many encounters in past years which in many cases probably ended with the death of a snake.

The noticeable lack of eastern chipmunks is also a concern as the area referred to previously along the Maquoketa River was populated with a large number of these.

Almost continuously while searching for rattlesnakes along the Maquoketa one could see or hear a chipmunk. The mast crop seems to be adequate in the park and the lack of chipmunk sightings is not easily explained. Chipmunks, mice and squirrels are the main prey items of the timber rattlesnake (Klauber, 1972).

Causes of population decline listed previously may also be aided by more subtle climatic and environmental changes which may be the result of man's activities globally as well as locally. One rattlesnake hunter believes the recent drought to be a contributing factor to a decline in their numbers throughout this part of Illinois.

At this time the fate of the timber rattlesnake in the park is not known for sure but it is clear that the park can no longer support a thriving population. The volume of people using the park for recreation and motoring past it will only increase and therefore it is not feasible to consider the dedication of any part of the park for a preserve for this species even if a healthy den population could be located.



## SUMMARY

Mississippi Palisades State Park was once populated with numbers of timber rattlesnakes. This study has shown that the population is low and may no longer be viable. Possible reasons for this decline include the proximity of a major highway and high volume recreational park use. A contributing factor may be the low numbers of eastern chipmunks present. Climatic changes such as the recent drought may also further depress a declining population.

Looking at the early history of the park we can see that even environmentally concerned organizations agreed to the elimination of the rattlesnake. Such a narrow view still exists today and there are few voices for such persecuted creatures as the timber rattlesnake. Some states have given this species full protection. These include New Jersey, Massachusetts, Connecticut and New York (Brown, 1987). It is necessary for Illinois to protect what colonies remain before this uniquely American form can no longer be found within its borders. The lofty rock bluffs of the Mississippi River will not be truly wild without the threat of a chance encounter with this creature. It deserves to have the protection of the law and the dedication of sanctuary areas as it, like the timber wolf and grizzly, is a living symbol of the wild places remaining in our country.

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