of North Carolina

NORTH CAROLINA MUSEUM of NATURAL SCIENCES

VENOMOUS SNAKES of North Carolina









VENOMOUS SNAKES of North Carolina

by

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NORTH CAROLINA STATE MUSEUM OF NATURAL SCIENCES Raleigh, NC

Published by the North Carolina State Museum of Natural Sciences N.C. Department of Environment and Natural Resources 11 West Jones Street Raleigh, NC 27601 ISBN 0-917134-24-9 ©2003 All rights reserved

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Acknowledgments

Documenting a state's natural resources requires the combined efforts of many institutions, dedicated professionals, and a concerned public, and we thank all who assisted in the production of this booklet.

Editing and publication assistance provided by Stephen Busack, John Cooper, Lynn Farrow, Margaret Martin, and Zelma Myers. Scientific illustrations by Renaldo Kuhler. Design layout by Lisa Yow. Cover photo, juvenile Copperhead, by Jack Dermid. All other photographs by Alvin Braswell.

Funds to publish this booklet were generously provided by the N.C. Department of Transportation.

About this book

Venomous snakes are part of North Carolina's diverse fauna, and residents and visitors alike should be aware of the different species they might encounter. In the unlikely event of a bite, accurate identification of the snake responsible helps medical personnel select the most appropriate treatment.

This publication is a basic guide to the identification of North Carolina's venomous snakes. Distribution maps and natural history information are provided for each species, along with conservation information and additional references. Usage of common and scientific names follows Collins (1990) — although it will be a long time before the name Copperhead will replace "highland moccasin," "poplar leaf," "white oak," or "pilot" for many North Carolinians.

Descriptions were compiled mostly from specimens in the collections of the North Carolina State Museum of Natural Sciences. Total length measurement is an approximation for adults of a given species; the last measurement listed is the largest verifiable specimen record. For example, adult Eastern Coral Snakes in North Carolina range between 18 and 36 inches in total length; the largest specimen examined measured 36 inches. Rattlesnake measurements do not include the rattle.

Distribution data are based primarily on records in collections of the N.C. Museum of Natural Sciences, as well as specimens in more than 50 additional herpetological collections (Palmer and Braswell 1995). Range maps include only sites supported by museum specimens (solid circles), by documentation from the scientific literature, or by verified sight records (open circles). Persons who encounter any of these species at a previously unreported location are encouraged to report the occurrence to the N.C. Museum of Natural Sciences.

Comprehensive distribution maps for all snakes in the eastern United States may be found in Conant and Collins (1998). See also Resources, page 28.



Introduction

Thirty-seven snake species are recorded from North Carolina (Palmer and Braswell 1995, Conant and Collins 1998), but only six are venomous and potentially dangerous to humans and livestock. Five venomous species are pit vipers (members of the snake subfamily Crotalinae within the family Viperidae), characterized by having a heat sensitive pit located between (and slightly below) the eye and nostril and long, movable fangs in the front of the upper jaws. In North Carolina, pit vipers include the Copperhead, the Cottonmouth, and three species of rattlesnake.

The sixth venomous species, the Eastern Coral Snake, is a member of the snake family Elapidae, a family containing some of the world's most dangerous snakes. Coral snakes have short, permanently erect fangs in the front of the upper jaws, and bright red, yellow, and black rings that encircle the body.

Venomous snakes are generally abroad both day and night, except for the coral snake, which is apparently active at the surface only during the daytime. During the hot summer months, snakes are active most often in early morning, late afternoon, or at night.

Snakes can be discouraged from living near dwellings by removing the cover under which they might seek shelter and food. Scrap sheet metal, lumber, boards, woodpiles, and similar debris sometimes attract both snakes and the small animals upon which they feed. Raising materials off the ground promotes dryer storage and attracts fewer critters.

Conservation

The Eastern Diamondback Rattlesnake and the Eastern Coral Snake were added to North Carolina's State List of Endangered Species in 2001. The Timber Rattlesnake and Pigmy Rattlesnake are State-listed Species of Special Concern. Loss of habitat and declining populations justified the protected status of these species. Official listing provides protection under North Carolina's Endangered Wildlife Law. Legal protection does not infringe on landowner rights or on the rights of persons to defend themselves. It does protect these species from commercial harvest and unnecessary killing, while it encourages habitat conservation and public awareness of species survival status.

Legal restrictions that protect sensitive populations serve to protect humans, too. Populations that require very specific habitat conditions often are the first to decline because of environmental problems. These species may be our best indicators of environmental change that could be detrimental to humans.

Wild Populations

Throughout the range of a species, different populations may vary significantly in physical and behavioral characteristics. Introduction of alien animals, even animals of the same species, into established populations can therefore be quite harmful. Introduced animals may harbor disease organisms that can devastate native populations. Novel genetic material introduced into a population adapted to a specific environment is more likely to harm the gene pool than to strengthen it. And many released captives are ill-equipped to survive in an alien environment.

Please respect the health of wild populations. A population's well-being is far more important to a species' survival than is the life of an individual specimen. Captive animals should be released only in the area from which they were collected, and sick individuals should never be released.

Key to the Venomous Snakes of North Carolina

Each pair of statements lists traits found in North Carolina's venomous snakes. To identify a snake, begin at number 1 and follow the numbers that correspond to traits describing the snake at hand.



FIGURE 1 Side view of Copperhead; note elliptical pupil and pit between eye and nostril.



undivided anal plate and mostly undivided scales.



FIGURE 3

Underside of tail of Eastern Coral Snake; note divided anal plate and divided scales. All nonvenomous snakes in North Carolina have divided scales under tail; many have divided anal plates as well.



FIGURE 4 Underside of rattlesnake tail; note undivided anal plate, mostly undivided scales, and rattle at tail tip. 3. Top of head with large symmetrical plates (FIG. 5)

Carolina Pigmy Rattlesnake (p. 22)

 Head with two diagonal yellow lines enclosing a dark stripe that extends from eye to mouth; diamond-shaped blotches with yellow margins on a dark background

Eastern Diamondback Rattlesnake (p. 24)

Head without diagonal yellow lines; pattern of blotches or chevron-shaped crossbands on a pinkish to almost black background

Timber Rattlesnake (p. 26)



FIGURE 5 Top view of Copperhead; note large symmetrical plates (also characteristic of Cottonmouth and Pigmy Rattlesnake).



FIGURE 6

Top view of Timber Rattlesnake; note irregular scales (also characteristic of Eastern Diamondback Rattlesnake). Head with wide dark stripe from eye to angle of jaw; semi-aquatic species in Coastal Plain and occasionally in lower Piedmont (FIG. 7)

Cottonmouth (p. 20)

Head without wide dark stripe (FIG. 8); hourglassshaped crossbands on a pinkish to chestnut background (FIG. 9)

Copperhead (p. 18)

 Red, yellow, and black rings encircling body; snout black; tail with wide black rings and narrow yellow rings

Eastern Coral Snake (p. 16)

Coloration variable, pattern variable or absent; if red, yellow, and black rings present, snout not black and tail not black with yellow rings

Nonvenomous snake

(31 species in North Carolina)



FIGURE 7 Cottonmouth. Wide dark stripe from eye to angle of jaw.



FIGURE 8 Copperhead. No wide dark stripe from eye to angle of jaw.





EASTERN CORAL SNAKE

Micrurus fulvius (Linnaeus)

Eastern Coral Snake from New Hanover County.



DESCRIPTION

A moderately slender, medium-sized, brightly colored snake with a body pattern of red, yellow, and black rings. Red rings include conspicuous black patches and the tail displays wide black rings separated by narrow yellow rings.

Total length 18-36 inches.

The rhyme "red on yellow, kill a fellow; red on black, venom lack" is a useful reminder that red and yellow bands touch each other on the Eastern Coral Snake. Red and black bands are in contact on the Scarlet Snake and Scarlet Kingsnake, both harmless species.

NATURAL HISTORY NOTES

The Eastern Coral Snake is found most often in sandy woods of pine and scrub oaks. In North Carolina, the species is rare and is listed as Endangered; only about 35 specimens from the state exist in museum collections worldwide. The Eastern Coral Snake has a black nose; the nonvenomous Scarlet Snake and Scarlet Kingsnake have red noses.



Information on the species' natural history in North Carolina is scarce. All specimens for which the time of collection is known were found in the daytime, and most were discovered abroad in early morning.

Food consists primarily of small snakes and lizards. This is the

only venomous snake in North Carolina that lays eggs. Nothing else is known of its breeding habits in the state.

Coral snakes seldom attempt to bite unless handled or restrained. If carelessly picked up, they can be quick to bite, and if disturbed they can move rapidly. The species is closely related to cobras and possesses virulent neurotoxic venom, which can produce paralysis and respiratory failure. Fortunately, apparently no record exists of coral snake bites in North Carolina.

DISTRIBUTION IN NORTH CAROLINA

The Eastern Coral Snake reaches its northernmost limit in North Carolina, where it is rare and restricted to the lower Coastal Plain and Sandhills of North Carolina. There are no recent records from the Sandhills region.



COPPERHEAD

Agkistrodon contortrix (Linnaeus)



Copperhead from Wake County.

DESCRIPTION

A large, moderately stout-bodied snake with brown or chestnut hourglass-shaped markings on a brown, tan, or pinkish background. The belly is light brown, yellowish, or pinkish and may be stippled or mottled with gray or black. The top of the head has large symmetrical plates.

Juveniles differ from adults by having a greenish-yellow tail tip, and from young Cottonmouths by not having a conspicuous dark bar extending from eye to angle of the jaw.

Total length 24-46 inches.

Two subspecies of Copperhead are recognized in North Carolina: a southern race (*A. c. contortrix*) in the Coastal Plain and a northern race (*A. c. mokasen*) in the Piedmont and Mountains. In higher elevations in the Mountains, the northern race exhibits a grayish ground color.

Copperhead populations in the Coastal Plain and much of the Piedmont are composed of snakes resembling one or both races. These populations are best considered as intergrades between northern and southern subspecies (Palmer and Braswell 1995; see also Gloyd and Conant 1990).



NATURAL HISTORY NOTES The Copperhead occupies a wide variety of habitats from coastal flatwoods to rocky mountainsides at elevations of 3000 feet or

more. Insects, amphibians, reptiles, birds, and small mammals serve as food. Captive females from North Carolina gave birth from August to October to broods of 2 to 18 young. Newborn snakes ranged from about 7 inches to 9.9 inches in total length (Palmer and Braswell 1995).

Although not aggressive, Copperheads inflict perhaps 90 percent of all venomous snakebites in North Carolina. Most bites result from stepping on or touching the snake. Authenticated reports of human fatalities from bites are very rare and apparently only one death from Copperhead bite has been recorded in North Carolina.

DISTRIBUTION IN NORTH CAROLINA Statewide, except for the Outer Banks.



COTTONMOUTH

Agkistrodon piscivorus (Lacépède)

Cottonmouth from Dare County.



DESCRIPTION

A large, heavy-bodied, olive, brown, or blackish semiaquatic snake with wide, dark-margined, light-centered crossbands. The pattern can be faint in adults and is virtually absent from some large specimens. The head has a dark bar extending from the eye to the angle of the jaw. The belly is light and mottled with gray or black. The adult tail is black. Large symmetrical plates cover the top of the head. More colorful than the adult, the juvenile is tan with a conspicuous banded pattern. The tail tip of a juvenile is greenish-yellow.

Total length 27-60 inches.

When approached, some Cottonmouths are quick to retreat; others will coil, vibrate their tails, and open their mouths in a threatening pose. This behavior is an excellent "field mark" for distinguishing between Cottonmouths and any of several large nonvenomous water snakes that occur in the same habitats but do not vibrate the tail or gape the mouth.

One subspecies, the Eastern Cottonmouth (A. p. piscivorus), occurs in North Carolina.

NATURAL HISTORY NOTES

Almost any permanent or semi-permanent aquatic situation may provide habitat. The Cottonmouth has been collected in cypress and gum swamps, along rivers and streams, around roadside canals and ditches, and from marshes bordering brackish sounds and estuaries.

Fishes, amphibians, reptiles, birds, and small mammals constitute the varied diet of this species. Despite its abundance in some areas, little is known of its reproductive habits in North Carolina. Young born in captivity in late August and September numbered from 5 to 11 per brood and ranged between 9.3 inches and 11.5 inches in total length (Palmer and Braswell 1995).

DISTRIBUTION IN NORTH CAROLINA

The Cottonmouth occurs throughout most of the Coastal Plain and, in some eastern sections, it is among the most abundant of all snakes. There are several records of Cottonmouths from the lower Piedmont and along the fall line.



PIGMY RATTLESNAKE

Sistrurus miliarius (Linnaeus)

Pigmy Rattlesnake from Hyde County (reddish phase).



DESCRIPTION

A small, moderately slender-bodied, grayish, brownish, or reddish rattlesnake with narrow, light-margined, dark brown blotches. Often a narrow, reddish middorsal stripe is present. A pair of wavy brown bands run from the top of the head to the neck. On the side of the head, a dark brown or red-brown stripe bordered below by a narrow light line extends from the eye to the angle of the jaw. There are large symmetrical plates on top of the head. The belly is whitish or reddish with dark spots. There is a tiny rattle on the tip of the tail. Unlike the adult, the juvenile is lighter, has a yellow tail tip, and possesses a small inconspicuous "button" instead of a tiny rattle.

Pigmy Rattlesnakes at the northern edge of the range in Beaufort, Hyde, and Pamlico counties are characterized by a bright reddish, pinkish, or orange color; Pigmy Rattlesnakes in southern North Carolina are grayish or gray-brown. Color patterns in snakes found between these areas range from gray to red (Palmer and Williamson 1971).

Total length 15-25 inches.

One subspecies, the Carolina Pigmy Rattlesnake (*S. m. miliarius*), occurs in North Carolina.

NATURAL HISTORY NOTES

Sandy woods of Longleaf Pine and scrub oaks provide habitat for the Pigmy Rattlesnake. It also occurs in coastal Pigmy Rattlesnake from Moore County (gray phase).



flatwoods but is most abundant in mixed forests of Loblolly Pine and hardwood on the southern Albemarle-Pamlico Sound peninsula (Palmer and Williamson 1971).

Frogs, lizards, snakes, and small mammals constitute the principal food. Captive females from North Carolina gave birth in August and September to broods of 3 to 9 young. Newborn snakes ranged from 5.9 inches to 7.5 inches in total length (Palmer and Braswell 1995). A specimen collected in Hyde County in 1983 has lived more than 19 years in captivity, the current longevity record for the species.

The Pigmy Rattlesnake usually attempts to crawl away; if restrained or further molested, it is quick to strike. The tiny rattle produces a faint insect-like buzz that, in even the largest snakes, is inaudible at a distance of several yards.

DISTRIBUTION IN NORTH CAROLINA

Chiefly in the Sandhills and lower Coastal Plain north to Beaufort and Hyde counties. Much remains to be learned about distribution in the interior Coastal Plain and the Piedmont, where specimens are known only from southeastern Cleveland, southwestern Gaston, and west-central Montgomery Counties.



EASTERN DIAMONDBACK RATTLESNAKE

Crotalus adamanteus Palisot de Beauvois

Eastern Diamondback Rattlesnake from Pender County.



DESCRIPTION

A very large, heavy-bodied, brown or grayish rattlesnake with light-centered, yellow-margined, diamond-shaped, dark brown or black blotches. On the side of the head, two diagonal yellow lines enclose a dark stripe that extends from the eye to the mouth. The belly is yellowish and stippled or mottled with gray. On the tip of the tail is a large rattle or enlarged "button."

Total length 36-69 inches (probably to 72+ inches).

The largest and potentially most dangerous snake in the United States, the Eastern Diamondback usually is quick to defend itself, sounding the rattle and assuming a defensive coil. If not molested, the snake will slowly retreat, backing away while still facing the intruder.

NATURAL HISTORY NOTES

Flatwoods, interspersed with thick bays or pocosins, and sandy ridges of pine and oak provide the most favorable habitat. Throughout its range this rattlesnake feeds on rabbits. Rabbit remains have been found in several North Carolina specimens. Juveniles and subadults eat mice, rats, and other small mammals.

Wild-caught North Carolina females have produced broods of 16 and 21; both gave birth in September. Young ranged in size from about 15 inches to 16.7 inches (Palmer and Braswell 1995). Little else is known about its reproductive biology in North Carolina.

DISTRIBUTION IN NORTH CAROLINA

The Eastern Diamondback reaches its northernmost limit in North Carolina, where it is rare and restricted to the Coastal Plain as far north as Carteret and Craven Counties.



TIMBER RATTLESNAKE

Crotalus horridus Linnaeus

Timber Rattlesnake from Granville County.



DESCRIPTION

A large, heavy-bodied, pinkish to blackish rattlesnake with dark, light-centered blotches and crossbands. The tail of the adult is black. The belly is yellowish, pinkish, or cream with gray or black stippling. There is a prominent rattle or enlarged "button" on the tip of the tail.

Total length 36-68 inches.

Timber Rattlesnakes in the Coastal Plain and most of the Piedmont generally are larger and more vividly patterned than those from the Mountains. Some authorities consider these eastern populations to represent a subspecies known as the "canebrake" rattlesnake.

NATURAL HISTORY NOTES

Habitat varies from dense coastal pocosins and low pine flatwoods to rocky mountainsides. Although relatively rare at elevations above 5000 feet, Timber Rattlesnakes have been observed on peaks of 6000 feet or more (Huheey and Stupka 1967).

In the Mountains, the Timber Rattlesnake congregates during the fall of the year around crevices and fissures in rocky outcrops. It hibernates through the winter in these "dens," where numerous snakes of several species may seek refuge. Small mammals constitute the principal food of this species, and large adults are fully capable of Timber Rattlesnake from Transylvania County (dark phase).



swallowing squirrels and small rabbits.

One specimen from Mitchell County lived at the N.C. Museum of Natural Sciences for 21

years, 9 months, and another from North Carolina lived 28 years, 1 month. Broods born to captive Timber Rattlesnakes in late August and September ranged between 4 and 20, and young measured 12 inches to 15 inches in total length (Palmer and Braswell 1995).

When discovered, this rattlesnake usually remains motionless or attempts to crawl away. While attempting to remove a large rattler from a burrow in the side of a sawdust pile, Bill Palmer worked for several minutes unaware that another was partially concealed in vegetation about 10 inches from his foot. This snake made no attempt to move or defend itself until later aggravated with a stick.

DISTRIBUTION IN NORTH CAROLINA

The Timber Rattlesnake probably ranged throughout the state at one time but has been extirpated from many areas in recent years. Today it is most often found in association with large forested tracts in the Mountains, the Coastal Plain, and in certain sections of the Piedmont.



Resources

Books

Venomous Reptiles of North America. Ernst, Carl H. 1992. Smithsonian Institution Press, Washington, DC.

Amphibians and Reptiles of the Carolinas and Virginia. Martof, Bernard S., William M. Palmer, Joseph R. Bailey, and Julian R. Harrison III. 1980. Univ. North Carolina Press, Chapel Hill.

Reptiles of North Carolina. Palmer, William M., and Alvin L. Braswell. 1995. Univ. North Carolina Press, Chapel Hill.

Reptiles and Amphibians of the Smokies. Tilley, Stephen G., and J. E. Huheey. 2001. Great Smoky Mountains Natural History Association, Gatlinburg, TN.

Web Sites

N.C. State Museum of Natural Sciences www.naturalsciences.org

Herpetological Conservation, Davidson College www.bio.davidson.edu/Biology/herpcons/herpcons.html

N.C. Wildlife Resources Commission www.ncwildlife.org/index.htm

Partners in Amphibian and Reptile Conservation www.parcplace.org

Society for the Study of Amphibians and Reptiles www.ukans.edu/~ssar/

Literature cited

Collins, J. T. 1990. Standard common and current scientific names for North American amphibians and reptiles. Third Edition. *Society for the Study of Amphibians and Reptiles Herpetological Circular* No. 19.

Conant, R, and J. T. Collins. 1998. A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Third Edition, Expanded. The Peterson Field Guide Series. Houghton Mifflin Co., New York, NY.

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______ and G. M. Williamson. 1971. Observations on the natural history of the Carolina pigmy rattlesnake, *Sistrurus miliarius miliarius* Linnaeus. *Journal of the Elisha Mitchell Scientific Society* 87:20-25.

Snake Safety

The possibility of venomous snakebite is real but bites are rare, even in areas where venomous snakes are relatively common. Snakebite can be prevented.

- Never place hands, feet, or any part of the body into unexamined places. Snakes are often found under logs, wood scraps, and rocks.
- 2. Never handle a presumably dead snake unless you are certain that it is nonvenomous.

"Dead" snakes may still possess the nerve reflex for biting. Use a stick longer than the snake if you must move or otherwise examine a dead snake.

- 3. Use a flashlight at night; venomous snakes are often active on warm nights.
- 4. Caution young children (without instilling fear) to leave all snakes alone.
- Leave alone venomous snakes found away from human habitations. Many serious bites occur during attempts to kill venomous snakes.
- 6. Consult a physician about packing antivenom into remote areas.

For antivenom sources: Carolinas Poison Center www.ncpoisoncenter.org P.O. Box 32861, Charlotte, NC 28232-2861; 1.800.222.1222 during business hours

Museum Identification Services

Museum curators identify animals as a public service. Please contact the Museum before bringing in live or freshly killed specimens.

- 1. Phone 919.707.9800 (toll-free 1.877.4NATSCI) and ask to speak with a herpetologist.
- E-mail your inquiry using the "Ask A Naturalist" feature on the Museum's Web site, www.naturalsciences.org. Staff e-mail addresses are also listed in the staff directory.
- Write to Curator for Herpetology, N.C. State Museum of Natural Sciences, 11 West Jones Street, Raleigh, NC 27601-1029.
- Visit the Museum's Naturalist Center to learn how to identify your specimen using teaching collections and field guides. See the Museum's Web site for open hours.

Additional copies of this book and a companion poster, "Venomous Snakes of North Carolina," may be purchased at www.naturalsciences.org.



SNAKEBITE TREATMENT

- 1. Stay calm. Call **911** or Carolinas Poison Center **1.800.222.1222** immediately.
- 2. Try to identify the snake by sight only. Look for color, markings, and head shape.
- 3. Do not try to kill the snake; it could bite again.
- 4. Keep the patient calm and immobile (preferably lying down).
- 5. Keep the affected limb at an even level with the rest of the body.
- Do not use a tourniquet.
 Do not cut the wound.
 Do not try to suck out the venom.
 Do not pack the wound in ice.
- Bites from nonvenomous snakes should be washed with warm soapy water; a tetanus shot may be needed.

Courtesy of Carolinas Poison Center www.ncpoisoncenter.org

An estimated 7000 to 8000 venomous snakebites occur each year in the United States, but only 5 or 6 of these bites actually result in death (Langley and Morrow 1997). Medical research on snake venom has greatly enhanced recovery from snakebite.