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To promote understanding, appreciation, and conservation of reptiles and amphibians, to encourage respect for their habitats, and to foster responsible captive care.

## The Western Cottonmouth (*Agkistrodon piscivorus leucostoma*)

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by Michael Smith

Which of our North American venomous snakes will drop into your boat for the pure joy of watching everyone jump overboard, form “nests” into which water skiers may fall, and chase fishermen down the boat dock? Well, actually, none of them. But the bad reputation and tall tales about the cottonmouth “water moccasin” live on among fishermen and outdoorsmen everywhere. A brief search of the Internet turns up statements like this one: “...they not only will NOT run away from you, they will seek you out and chase you down.” More than one person has told me they know someone who knew some water skier who released the tow rope, sank down into the water and landed in a nest of “water moccasins” and died

a horrible death from hundreds of bites. It’s time to expose this murderous demon of the swamp for what it is: a not-so-demonic pit viper, dangerously venomous but not much of a threat to people who use caution and good judgment.

### Classification

Cottonmouths and copperheads are rather closely related. Both these pit-vipers are in the genus *Agkistrodon*. This name combines a Greek word for “fishhook” with another Greek word meaning “tooth,” referring to their backward-curving fangs. Cottonmouths are given the species name *piscivorus*. This translates to “fish-eating,” referring to one item on their diet. There are three subspecies of cottonmouths, all of which are found from Vir-

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ginia through the southeastern states to Texas. The western cottonmouth has the subspecies name *leucostoma* which literally means “white mouth.”

The name “water moccasin” is pretty nonspecific, as people will apply that name to many larger aquatic snakes (including water snakes). In parts of the U.S., “moccasin” has been a name given to a number of snakes, with “highland moccasin” being an older name for northern copperheads.

**Description**

Western cottonmouths grow to be medium-size, chunky snakes. Most adults are at or under three feet long, and Conant & Collins (1998) give the record length as just over five feet. The scales on the back are keeled and the scales underneath the tail are in *one* row just below the vent (in the harmless water snakes the scales under the tail are divided). The pupil of the eye is elliptical, and the top of the head is flattened so that the eyes are under a ridge. The harmless water snakes have round pupils in eyes that seem to be set higher on the head. The pit organ is a small indentation between the eye and the nostril, covered with a thin membrane.



Adult cottonmouths tend to be rather plain brown to charcoal or black in color. The wavy bands seen on juvenile cottonmouths fade or disappear with age, but adults may have some indistinct bands, especially toward the sides. On the side of the face there is a dark band running behind the eye to the jawline, edged in white below it. The scales of the cottonmouth’s lips are not dark-edged, whereas the harmless water snakes have these prominent

lip bars.

Juvenile cottonmouths are strongly marked with wavy crossbands vaguely resembling those of the copperhead. Further, their coloration tends to be lighter and often reddish or rusty, so that at first glance they do look like small copperheads.



Newborn cottonmouth - Big Thicket area



Juvenile cottonmouth—north Texas

**Venom**

Snake venom is a mixture of numerous enzymes, some of which act to destroy blood cells, blood vessel walls, connective tissue,

heart muscle, or nerve cell firing. The venom of pit vipers (including cottonmouths) tends to be more tissue-destroying than that of the coral snake, which is more neurotoxic (affecting nerve conduction and producing paralysis). Price (1998) notes that cottonmouth venom has somewhat greater red blood cell-destroying action than does copperhead venom. He cites information suggesting that cottonmouth venom is somewhat more potentially lethal than that of copperheads (though the effects of a bite depend on such factors as the amount injected and the condition of the victim, making questions of “which is most dangerous” hard to answer). Werler & Dixon (2000) report that cottonmouths account for only about 7% of snakebites in Texas and very few people die from cottonmouth bites. They did note that local tissue destruction and gangrene are a high risk with this species.

**Habitat**

Coastal marshes, flooded bottomlands, and permanent wetlands of east Texas are the favored habitats of these snakes. From east Texas, they generally follow major river systems westward to near Wichita Falls in north Texas and San Angelo in central and west Texas. Sometimes they are found in dry upland areas, such as the one Steve Campbell and I saw on the road in the LBJ Grass-

lands a few years ago (that area does contain a couple of small lakes and numerous small ponds). However, I never found one in the prairie stream I used to frequent west of Fort Worth. The western cottonmouth is relatively common at the Fort Worth Nature Center where it takes advantage of the marsh and bottomland habitat around Lake Worth.

### Prey

The diet of the cottonmouth is varied, and despite the name "piscivorus" they are not as skillful at catching and swallowing fish as are the nonvenomous water snakes. Cottonmouths take fish, frogs, sirens, birds, other snakes, small turtles, baby alligators, rats and mice, and to some extent invertebrates such as crayfish. Birds are often taken as they land to drink. Cottonmouths may take advantage of fish trapped in drying pools of water during summer drought.

Juvenile cottonmouths are born with yellow or greenish tails, and they use the tail as a lure. Coiled motionless with the tail tip wiggling like a worm or insect, a frog or other small animal may come to investigate and be eaten by the baby cottonmouth.

### Behavior

For the longest time I had little field experience with cottonmouths, and while I did not believe the wild stories I had heard, I was prepared for a snake that might be at least as aggressive as the diamondback rattlesnakes I had encountered. The field experience I have since obtained shows me that most cottonmouths are not very aggressive. In one of my encounters, a particularly foolish one for me, I nearly stepped on one. Carl Franklin and I rolled a log at the water's edge and I did not see the small adult at first as I took another step. Carl called out "cottonmouth!" and I altered stride and stepped over it. The snake did not snap, but it did slide into the water and swim away before we could get a photo.

For comparison: a blotched water snake (below, left) and diamondback water snake (right) - both are harmless species often confused with the cottonmouth



In a less embarrassing encounter, Carl and I found a subadult on the road in northeast Texas. We stopped and took photos as the cottonmouth flattened and gave us a great display of mouth-gaping. When threatened, cottonmouths sometimes tilt their heads up toward the adversary and simply open their mouths, displaying the white interior. Mouth-gaping is not striking, and the mouth is simply held open for a few seconds. We collected the

snake for an educational institution, and I don't recall it striking at us.

In the Big Thicket, Steve Campbell and I found one at dusk, and we collected it for photos the next day. The snake did not attempt to chase me down or otherwise attack me. The next day I positioned it in dappled sunlight for photos and

followed it around for a while until I had what I wanted. The snake put up with my following it around without getting the slightest bit aggressive.

Whit Gibbons and Michael Dorcas (2002) published an investigation of cottonmouth defensive behavior. They put the snake's notorious reputation to the test, seeking out 45 wild cottonmouths in South Carolina and doing one of three things. They stood beside the snake, with a boot touching it; they stepped on the snake with just enough force to restrain it; or they picked it up with a set of tongs outfitted with a glove and a shirt sleeve to simulate a human arm and hand. When they stood beside and touching the snake, some tried to escape and others gave a defensive display, but none bit the boot. "Defensive displays" included tail-rattling, musking, gaping, or striking without biting. Of those that were stepped on, most gave a defensive display and only one of 22 bit the boot. Of those that were picked up, only 36% bit the artificial hand!

This should not under any circumstances lead anyone to take stupid chances with cottonmouths. None of the above reports is any kind of guarantee that a particular cottonmouth won't bite, and remember that the venom is pretty nasty. However, what these reports do help estab-



Mouth-gaping

### **Reproduction**

Werler & Dixon report that mating can occur at various points during the snake's active season, and viable sperm may be stored by the female for some time. Ovulation occurs in spring or early summer, resulting in the live birth of 1 to 16 babies in August or September (Werler & Dixon, 2000). Newborn cottonmouths average a little over 10 inches long.

### **Abundance**

In suitable habitat in the southeastern part of Texas, the western cottonmouth reportedly may be among the commonest larger snakes. The further west one travels, the less common they become.

### **References & Further Reading**

Conant, R., and J.T. Collins. 1998. A field guide to reptiles and amphibians: Eastern and central North America (3<sup>rd</sup> Ed.).

Houghton Mifflin, Boston.

Gibbons, J.W., and M.E. Dorcas. 2002. Defensive behavior of cottonmouths (*Agkistrodon piscivorus*) toward humans. *Copeia* 2002 (1), Pp. 195-198.

Price, A.H. 1998. Poisonous snakes of Texas. Texas Parks & Wildlife Press, Austin.

Werler, J.E., and J.R. Dixon. 2000. Texas snakes: Identification, distribution, and natural history. University of Texas Press, Austin.

lish is that the cottonmouth is not vicious. A couple of things that may contribute to its nasty reputation is that it may be less likely to immediately run away than the non-venomous water snakes, and frightened humans probably mistake its mouth-gaping display for an attempt to bite. The stories about them dropping into the boat simply reflect their habit of resting on low branches over the water, and when a boat comes by and startles them their first instinct is to drop down and swim away. And needless to say, cottonmouths do not "nest" in the water.

One additional note about their behavior that helps in identification: cottonmouths have a large functional lung and are quite buoyant in the water. Unless frightened or purposefully diving, most cottonmouths swim right on the surface of the water. By contrast, a harmless water snake generally swims below the surface or at least rests lower in the water.

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