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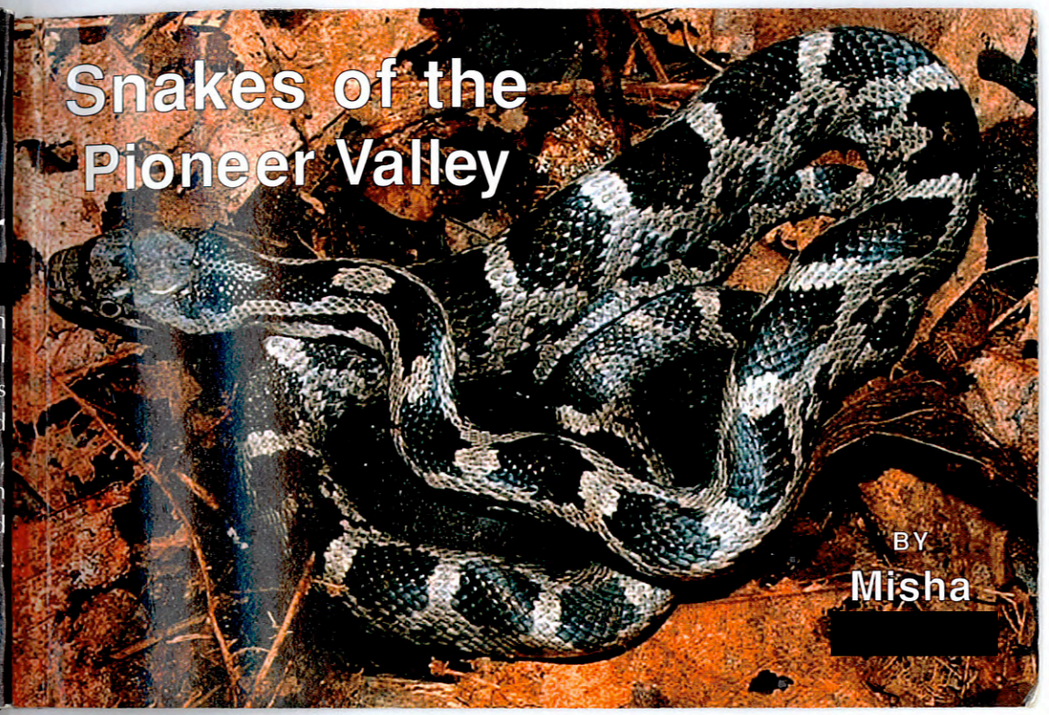
Snakes of the Pioneer Valley

by Misha

A Field Guide Used to Identify Snakes
in Western Massachusetts

About the Author

Misha
is a twelve year old seventh grader at the Amherst Regional Middle School. He has always had a deep love of nature and of writing. He enjoys reading, climbing trees, hanging out with friends, listening to music and playing Ultimate Frisbee.



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No book like this could be possible for a kid to write without a lot of support. My father, Paul , encouraged me from the beginning and gave me a lot of ideas about the book. He was always ready to help when I needed it and inspired me to do my best. My mother, Amy Rothenberg's frequent rollerblading on the bike path led me to be interested in snakes in the first place; she would come home with dead specimens that she found on the side of the path, carried on the end of a stick for us to see. She instilled in me a love of both nature and writing. Both of my parents always tell my brother, sister and I that we can do anything we set our minds to do, so this book is one of those things.

I could not ask for a better brother and sister. My sister, Sophie, could be seen cajoling me from time to time, pushing me to finish this project. My brother, Jonah, contributed to this book by highlighting the photographic details of the snakes. He's not too fond of snakes, so I really appreciate that he did that job.

My teachers at the Common School in Amherst, especially Kate Lamdin and Jenny Jaros always fed my interest in nature and my ability to write.

My long time friends, Austin , Aaron , Benny , and Tani have shared a curiosity about the world with me and many hours of thinking, talking and wondering; they have been fine friends to have along on any adventure.

I would like to especially acknowledge some of the resources used in this book. All of them are listed in the bibliography but some are also mentioned here. This guide was made possible by looking at three types of resources. The first was books of all snakes in the United States. The book by Tennant and Bartlett, *Snakes of North America, Eastern and Central Regions* was a great resource. It is a great book and should be included in every library. The second kind of book was about snakes in the region. Here there were two great books, the first was DeGraaf and Rudis' *Amphibians and Reptiles of New England, Habitats and Natural History*. And the second was Tyning's *A Guide to Amphibians and Reptiles, Stokes Nature Guides*. Both books were meant as introductions to the snakes, as an orientation and were great!

The third type of information was gathered over the World Wide Web. The bibliography lists many sites but one of the best is **fwie.fw.vt.edu/VHS/snakes_of_virginia.htm** which is the address for Snakes of Virginia. It had a lot of great information listed in a very organized way. Besides that, it contained a lot of great pictures by John White.

In terms of photographs, we contacted several sites that contained beautiful photographs of snakes, pictures that I wanted to use in this guide. Almost every single person gave us permission to use their copyrighted pictures in this guide. They are listed in the bibliography, but I wanted to thank them each here. The photographs had to be cropped and shrunk but the originals are great and can be viewed at:

1. **Doug Buckland**, pictures found at South Dakota Department of Game, Fish and Parks website: **www.state.sd.us/gfp/DivisionWildlife/Diversity/Digest%20Articles/sgsnake.htm**
2. **Dennis Desmond**, pictures found at hognose.com website: **www.hognose.com/pages/photos/east.htm.**
3. **Curtis Eckerman**, pictures found at the website: **www.public.iastate.edu/~curteck/hognose.htm**
4. **Jeff Leclere**, pictures found at Iowa Herpetology, **www.herpnet.net/Iowa-Herpetology/index.html.** and a similar site for the snakes of Minnesota at the website: **www.herpnet.net/Minnesota-Herpetology/**
5. **Mark Moran**, pictures found at Study of Northern Virginia Ecology website: **www.fcps.k12.va.us/StratfordLandingES/Ecology/home.htm**
6. **Gene Ott**, pictures found at South Carolina Reptiles website: **www.snakesandfrogs.com/scra/species.htm**
7. **Mardi Snipes,** pictures found at the website: **www.coastalreptiles.com/venomous_snake_pictures.htm**
8. **www.turtletails.com,** a great website with lots of pictures.
9. **John White,** pictures found at Snakes of Virginia website: **fwie.fw.vt.edu/VHS/snakes_of_virginia.htm** and **fwie.fw.vt.edu/VHS/timber_rattlesnake2.htm**

All the sites contain many more pictures, are great, and should be visited.

Snakes of the Pioneer Valley

Introduction

A few years ago, my father and I, while walking, spotted a snake on the Norwottuck Rail Trail. It was about three feet long and very dark and thick. It was lying coiled at the swamp's edge, next to the trail. We did not know if it was dangerous or not. We wanted to know what kind of snake it was, so we went to Jones Library to look for books on snakes. Surprisingly, the only books on the subject were really long, and included hundreds of snakes. It was nearly impossible to figure out which snake we saw.

When we went to the libraries, we found shelves and shelves of books on birds and only a few on snakes. Birds are easier to write about because they are everywhere, colorful, fly around us, and make noises with their songs. Snakes are different. They are secretive by nature. As a result, people rarely interact with them.

We took out a few books anyway and went back to the trail. Then we spotted a few similar snakes in the same area. We eventually figured out it was a Northern Water Snake, but it took such a long time to identify.

Black Rat Snake

© John White

It was a lot of trouble to figure out which snake it was. We decided to check out nature centers, like the Hitchcock Center for the Environment, to see if they had better books to use. We went to the Hitchcock Center, the Fish and Wildlife Service, as well as other libraries. They all had large books with too much information. The Hitchcock Center, though, had a nice pamphlet/booklet (*A Guide to Amphibians and Reptiles of the Greater Amherst Area,* by Jaana Cutson) describing most of the snakes in Massachusetts, on one double page. While it was useful as an orientation, it was missing the Timber Rattlesnake, and it went in the other extreme, not having enough information on the snakes that one might see.

I decided that I should write a short, but thorough field guide for identifying local snakes. The information should be enough to clearly identify the snake and tell something about it. I also decided to add lots of pictures, so that people using the book would not have to rely on words alone. The lack of pictures was one problem with many of the books I saw.

The first step in writing my book was listing the attributes I wanted the book to possess. Some of my list included the idea that the book should be:

- ***Small.*** It should be small enough to carry comfortably in the field.
- ***Accurate.*** It has to be correct in information as possible dangerous errors could be made.
- ***Easy to use.*** The book should be easy and quick to use in order to find what snake you're looking at before it leaves.

- ***Fun to read/use.*** I did not want there to be so much information that it would be boring to read.
- ***Help save the wildlife.*** One of the problems that snakes have is that people do not know enough about them. As a result many snakes are killed. I hope this book will educate people and help snakes survive.

This book is meant to be used as a field guide. This means that it is not meant to be read from page one onward, but to be used in identifying a particular snake and reading about it. Each chapter stands alone and is separate. You do not need to read them in order.

I would ask a favor of you. If you see a snake, could you send me a letter or email mentioning the type of snake, the date, the time and the location, and anything else about what you saw. Please mail the note to Misha , 356 Middle Street, Amherst, MA 01002, or send it by email to **misha@nesh.com**.

I also hope that other people would catalogue the bio-diversity of the Pioneer Valley. There are many living species in the Valley, it would be nice for people to know about all that surrounds us. It is by showing understanding and respect, that those species can survive us.

Misha
Amherst, Massachusetts
December 20, 2003

Some General Facts About Snakes

There are more than 2,000 species of snakes in the world which fall into 11 families, of which five exist in the United States. Two families of snakes reside in New England, the Colubridae and the Viperidae. The Colubridae family makes up 3/4 of all snakes. We are home to some 16 species of snakes in New England, 13 in the Pioneer Valley. Snakes live from sea level but can be found all the way to 14,000 feet.

Some snakes are poisonous, some venomous and some neither. All snakes have teeth, but only the venomous ones have fangs. Snakes have no legs, eyelids or external ears. All snakes have round pupils but the venomous Viperidae snakes have elliptical pupils (if you get that close to see their pupils, which you really should not!)

Snakes use their tongues for smelling and tasting. All snakes are carnivorous and swallow their prey whole. They have a very poor sense of hearing, but can use a very good sense of vibration instead.

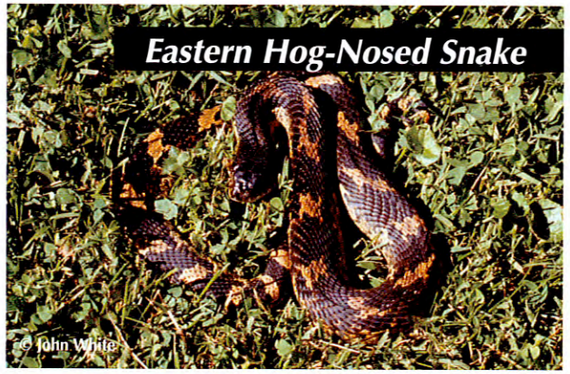
Pit vipers also use small pits to the sides of their nose in order to sense small changes in temperature. This helps them sense the heat associated with the presence of prey.

Snakes are made up of three parts: the head, the body and the tail. This always seemed funny to me, because the whole snake looked like a tail. But officially, the snake tail begins at the vent or cloacae.

The snake's body is covered with scales on the outer layer of skin. The scales are either smooth or keeled. Keeled means it has a raised ridge running down the middle. A large scale covering the cloacae is also known as an anal plate.

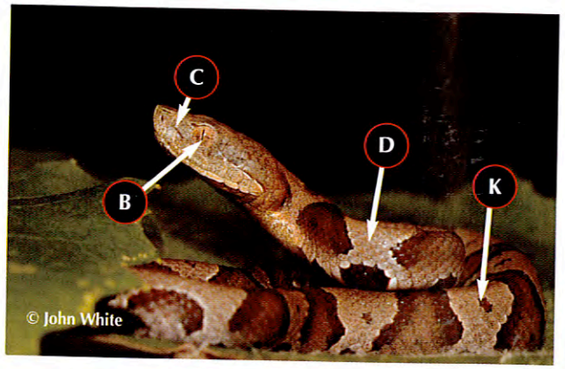
Snakes grow throughout their lifetimes; the females are usually bigger than the males.

Some snakes seem oviparous (i.e. egg laying) and some viviparous (giving birth to live young) but really they are not truly viviparous but are ovo-vivaparous. They keep the eggs inside for a long time, then the young are born in a sort of gel sac and then hatch; so it seems like they are born live but it is really a kind of sac, or egg, that they are born in.



NORTHERN COPPERHEAD SNAKE

Family *Viperidae*



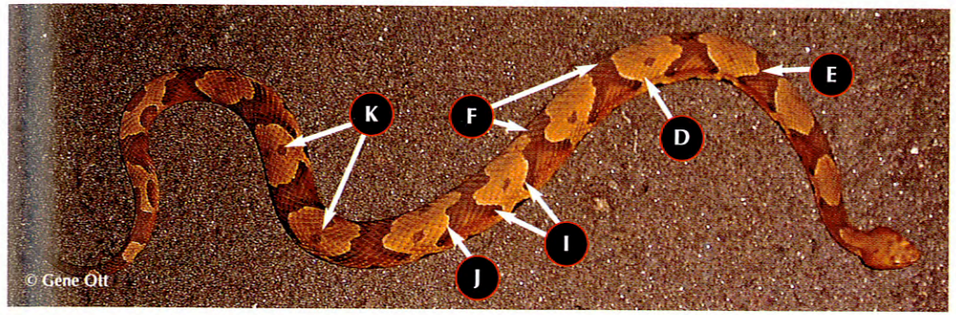
There are 2 families of snakes that exist here. One contains most of the snakes, the non-venomous *Colubridae* family. The other is the venomous *Viperidae* family. This contains one subfamily that inhabits our area, the *Crotalinae* (pit vipers) subfamily, which contains the *Crotalus* or Rattlesnake genus, with one species, which is the Timber Rattlesnake. The other genus is the *Agkistrodon* containing the Copperheads. In North America, there are three species and five subspecies of Copperheads, with only one subspecies, the Northern Copperhead, living here. Both venomous snakes are extremely rare in our area, comprising no more than a few dozen individuals each. They are both listed as endangered in Massachusetts, and should not be harmed or bothered at all.

LATIN NAME

Agkistrodon contortrix mokasen

HOW COMMON

If you were to look at a map of the United States and see the territory that the Copperheads inhabit, what you would find is that the northernmost spot that the Copperheads inhabit is the Pioneer Valley. They are extremely rare here; there are probably less then a few dozen individuals left in the mountains around here, probably only in the Holyoke Range. They are listed as endangered in the state. They are more common in the counties south of here, though even there, they are rare. Since the endangered status, this snake is making a comeback.



CAUTION

The Northern Copperhead Snake has bitten more people than any other venomous snake in the United States. Except for children, few have died from the painful bite. This is because the venom is not as poisonous to humans and especially because the snake can not deliver enough of it to kill our larger bodies. This, however does not mean they are not dangerous; they are. Bitten on a foot or a hand, you could easily lose part of that limb. While all this is true, it gives a negative view of the snake. There is more.

The snake is actually very shy, and therefore hardly ever seen. If you should come upon one, its main defense will be to freeze in place, and not move at all, letting its great camouflage try to fool you. If this does not work, it will often just slither away. The biting part comes only if it is directly threatened. The reason most bites occur is because of their great camouflage, which hides them. Then, accidentally, a person steps on them or near them or grabs a stick which turns out to be the snake! So their primary defense, that of camouflage turns out to work against them, when it comes to humans who are not aware where they are stepping. If stepped on, the Copperhead will quickly strike, but when you think about it, it is not all that different from any other animal. It is just the venom that makes this situation unique. It is not that this snake is naturally aggressive towards humans. Adding to the confusion, is the fact that the Northern Copperhead Snake lacks a rattle. Instead, it vibrates its tail on dry leaves, which makes a person think that this is a Rattlesnake. This mimicking behavior is another survival adaptation which works well against potential predators, but when it comes to humans, the behavior just gives people one more reason to kill them. When it comes to direct experience with venomous snakes, the closest most of us have gotten has been watching a western movie. In those movies, the snake never comes out winning.

Each Copperhead is born with two initial fangs, but it has from five to seven other 'replacement' fangs. The fangs grow as the snake grows, with longer snakes having longer fangs, which also contain more venom. Beware of newborn Copperhead Snakes, they have fangs that are fully operational and capable of delivering venom, which is just as potent as that of the adults.

The venom is very hemolytic, which causes major hemorrhaging to the prey. As for us humans, the symptoms are: pain, swelling, weakness, vertigo, breathing difficulty, hemorrhage, ecchymosis (black and blues), fever, sweating, headache, intestinal pain, either an increased or decreased pulse, nausea and vomiting, gangrene, and unconsciousness. In short, these are symptoms of shock.

If you compare the Copperhead Snake to the Timber Rattlesnake, you will see that the Copperhead Snake is smaller, which means it contains less venom; this being one reason why the bites are less lethal than those of the Rattlesnake. Also, not all bites are delivered with venom. In a reactive, defensive bite, not one for food, but one for defending itself, they may bite without using any venom at all.

The best thing to do is to stay away from them. In fact, it is illegal to harass, capture, or kill them. If you spot one, please notify the Fish and Wildlife Service, as they would like to know. Aside from the law, know that even the experts do not play with this snake. They may observe it, but they do not try to touch it. Don't get hurt and do not hurt the snake. Keep distance between the two of you. Walk away. It will not chase after you.

IDENTIFICATION

Size and Shape

Newborns or juveniles are anywhere from six to twelve inches long.

Adult Copperheads are twenty-four to thirty-five inches long, two to three feet, and are thick or stocky in appearance. Copperheads are actually sexually different in size. The male's tail is longer, but the female's total length is longer than that of the male.

The Copperhead is well known to have a triangular "pie slice" shaped head (A), with the head broader than the neck. The truth is that it is not always clearly noticed. The triangle is most easy to see when the snake is frightened, because when threatened, the snake flattens its head, making the pie shaped outline it is known for, clearer. In either case, the neck will be smaller than the rest of the head. This is one simple way to tell the difference between this snake and other large snakes, like the Northern Water Snake or Milk Snake.

This snake in general, has a very short tail, given its size, shorter in the female than in the male. Also note that its tail does not have a rattle.

Their scales are keeled.

Color

One of the problems all large snakes in our area have is that people think they are all venomous and dangerous, they are all Copperhead Snakes and therefore should be killed. This comes from lack of knowledge about snakes. One quick and easy way to tell a Copperhead from any other

Juvenile Northern Copperhead Snake

non-venomous snake is to look at its eyes. You should not have to get close to do this. Copperhead and Rattlesnake eyes are the only two around here that are vertically elliptical (B), like a cat, the pupils are not round at all. All the non-venomous snakes that we have here have round pupils; these include the patterned large Northern Water Snake, the Milk Snake, as well as the Hog-Nosed Snake.

Copperheads are pit vipers, which does not relate to living in pits. Rather, it refers to holes, or 'pits,' one on each side of the face, right between the eye and the nostril (C). This pit area is actually a heat-sensing organ, almost like a different sort of eye, supplementing or enhancing their regular eye vision. This pit organ makes it much easier to find rodents, which are warmer than their surroundings, and it helps the snake to make more exact strikes at its prey or at its predator.

As mentioned before, this snake has a pair of long hollow fangs that deliver venom. There are five or six other fangs to replace this first set, should they break.

The heads of Northern Copperheads are unmarked (A), or unpatterned, and are red, reddish-brown, russet, or copper in color (A).

Their bodies are tannish-brown, or copper, to orange or pink in color (D).

On this ground color, this snake is heavily banded (E). The bands are used successfully for great camouflage coloration, mimicking fallen dried leaves. They can really disappear within a woodsy background very well. These snakes are banded, with twelve to twenty-five darker brown, red-brown, chestnut-colored hourglass shaped bands crossing the body (E). The hourglass pattern is wider on its sides (F) and narrow on the top of the back (G). In other words they contract towards

the spine. The lateral bands are sometimes broken up along the spine. They may even be shifted or staggered (H). The bands are edged darkest along the sides (I) and edged with lighter color along the spine (J). This alternating, shifting color helps to break up a solid color and helps in its camouflage. This is the same way that the army camouflages its tanks and uniforms, to break up a solid surface into a non-pattern. There are irregular brownish, darker spots (K) between the bands on the back. Again, this pattern, or lack of pattern, helps in this snake's incredible camouflage.

The belly is a lighter pale brown, with darkish splotches painted on to break up the color. These darker spots are more on the sides, on the lateral aspect of the snake, where the belly and the sides of the snake meet. The darker spots help blend in the snake with its environment.

Young Copperhead Snakes are lighter in color than the adults (L), but otherwise look the same, though only six to twelve inches long. The major difference is that the tail is yellow tipped or greenish-yellow tipped (M). When young, they move this part of the tail back and forth and use it to attract prey. The yellowness fades by the time they are three or four years old.

LIFE CYCLE

Mating

Copperhead courtship and mating occurs in late May or in early fall. Female Copperheads are able to store sperm for months at a time. However, no matter when copulation took place, ovulation still occurs only in the springtime. This means that more than one male could be the father of juveniles in the same litter.

The males go through intense actions with each other (fighting for mating rights) in the spring and fall. Usually, the larger the male is, the more likely he is to win. If a male loses the fight, he will usually not fight again and therefore not mate. Only the winners of the fights get to mate in the future.

The fighting consists of trying to overpower one another. For thirty minutes to an hour they try to pin each other to the ground. They raise half their bodies off the ground, swaying side to side, trying to hook around the other snake's neck. They may coil around each other from head to tail. Many times they do this right in front of the female. Female Copperheads sometime go through the same beginning ritual of this fight with potential mates. If the male backs away, then he is not worthy for mating.

Breeding takes place from April to May and from August to September. If the female breeds in the fall, she will store the collected sperm until she emerges from brumation the next spring. There are two places where the female stores sperm. If she stores it in the cloaca, then it must be used soon after, and she must ovulate in the same season. On the other hand, if the sperm is stored high up in the seminal receptacles in the oviducts then it can be stored there to be used even a year later.

Once a male has won a battle, he will seek out a sexually active female, by 'tasting the air' to find her pheromones. Once he has located the female, the mating ritual, which can take up an hour, begins. First the male moves his head, rubbing his chin on the ground, back and forth. The tails of both snakes move in some sort of rhythm that slows and speeds up. Eventually, the male lines up his body with the female's. When the female is ready, she lifts her tail exposing her

cloaca. The male lifts his tail, sticking out his sex organs and they mate. This union lasts from four to eight hours. This process takes so long that females will only mate once a year. However, if she stored sperm from a previous union from the fall, then she can mate in the spring and still have two different male fathers for the same litter.

Copperheads have a gestation period of three to five months. They tend to give birth in August and September.

At two to four years of age, the female is sexually mature and is able to reproduce. They are about two feet long at that time. Adult females usually give birth every two years.

Birth

In August or September, litters of young snakes are born near the female's overwintering den. The snakes produce a small litter of two to ten young, averaging around four or five, the larger females produce larger broods. After birth, a female has nothing to do with her young.

Females are ovo-viviparous which means that eggs develop inside the body. The snake is enclosed in a membrane, and is delivered inside it. Each egg has all the nutrients the snake needs until birth. When fully developed, the young are expelled within a membranous sac, not a real egg, and hatch out of the membrane within ten to fifteen minutes of being expelled.

Young Copperhead Snakes are lighter in color than the adults, but otherwise look the same, though only six to twelve inches long. The major difference is that their tail is yellow tipped or greenish-yellow tipped (M). When young, they move this part of the tail back and forth and use it to attract prey. The yellowness fades by the time they are three or four years old. Their fangs are totally operational at birth.

Overwintering

Copperheads do not like the cold and so return to the den to hibernate early and are one of the last to come out in the springtime. They overwinter with Timber Rattlesnakes, Black Racers, and Black Rat Snakes, in communal dens, at high elevations. The dens are often reused over the years. They will overwinter from September or October through to April.

Death

There are many predators that kill the Copperhead. Cats, either housecats or wild ones such as bobcats, as well as dogs, coyotes, and even the common opossum can kill the snake. Hunting birds, such as hawks and owls also prey on the Copperhead. Big bullfrogs kill the juvenile Copperheads, as do other snakes, such as Black Racers and Milk Snakes.

By far the most deadly thing out there to Copperheads, are humans. People are just full of fear about this snake and often kill it on sight, without a second thought. This snake will not attack you unless you give it reason to do so. If you don't bother it, it will not bother you. Walk away from it.

The life span of the Copperhead is about eighteen years.

BEHAVIOR AND LOCATION

There is a lot to say about this snake. The more we know about it, the more likely it will be that it will survive on the one hand and that we will not be hurt by it on the other hand. The first point to make is that it is by nature an unaggressive snake. It mainly does nothing for a great deal of its awake time. It tends to be very secretive and has developed strategies to succeed in that. As mentioned in the coloration section, it is very well camouflaged, so that it looks exactly like the background of dried leaves that it rests in. Also, it most often lies coiled up and hardly moves. Because of a really slow metabolism, and the fact that it hardly moves, it hardly has to eat.

The problem is when people are involved. Since it does not move, and just sits coiled, matching its skin to the background of leaves, it becomes easy to accidentally step on it. As soon as that happens, the snake may strike and the report of another snake bite and the dangers of the snake resurface. People look to those stories and imagine a violent scary snake. In truth, it mostly lies around, doing nothing, and if we did not bother it, it would not bother us.

The next point has to do with the temperatures and the environment that it lives in. The snake is mostly active when the temperature is not too cold or too hot and the land not too dry. As a result what we see is that the snake is most active during the day in the spring and the fall, being diurnal; in the hot summer months, it becomes nocturnal, being active at night. In the summer, the busiest times will be during the nights that follow a light rain. At that time, it is most successful in hunting, as their prey is most active then.

Typically, Copperheads use rocky outcroppings or rocky areas on hilltops as dens, especially on the south side of the hills. The snakes need light and heat to regulate themselves, the more sun, the sooner in the season, the better. If you want to avoid the snake, then simply stay away from those areas in the spring and fall.

The snake tends to come out of the den and begin to sun itself. It does this by lying close to a large rock that is exposed to the sun. As the sun heats the rock, the rock then heats the snake. This is different from other snakes, like the Northern Water Snake, that just work off the direct action of the sun. In the springtime, the snake will be found near the den, rocky outcropping on the southern side of hills, courting. As the snake ages, it takes on a solitary existence. As spring turns into summer, they individually move away from their dens, to grassy feeding areas, which could be up to a mile or two away, eventually returning to their dens by fall.

As a result of the different times of the year, they exist in a variety of habitats. This snake moves from its rocky hillside, to more forested areas, liking oak forests, because it blends in nicely with the dried leaves, stones, and bark found on the ground, lying under rotting wood and hardly moving.

On the summer's wetter nights they forage where rodents can be found, in overgrown fields, near edges of bodies of water, maybe near a stream, pond or swamp, open woodlands and overgrown or abandoned fields.

During the summer you can find them around man made locations like abandoned houses and barns, wood, brush, or rock piles created by the clearing of the land, or under sheets of metal or plywood. These habitats provide three things the snake needs: food, heat and shelter.

FEEDING

The Copperhead is an 'ambush predator,' using venom to disable its prey. It stays in exactly the same place for days or weeks, usually next to mice runways, or highways, hiding near natural cover, like a large rock or log.

This snake can swallow prey a few times bigger than its own diameter. It is able to do this because it has a jaw that disarticulates (unhinges). Copperhead fangs inject its prey with hemolytic venom, which breaks down red blood cells, making its prey easy for the snake to swallow. It swallows the prey whole.

The Copperhead is able to find prey easier by using the pits on its head, which are heat sensitive 'eyes.' They help the snake sense differences in temperature of surrounding areas. Since mammals are warmer than their surroundings, it helps them find the warm bodies of the prey. When they say that adult Copperheads are ambushers, it means that they wait, then when the prey is near, they bite it, injecting the venom and then letting go of the animal. They wait for the venom to take effect, then go after the dying animal, find it, and swallow it. Smaller prey is not let go of, but is held in its mouth until it dies.

When during the day Copperheads eat depends on the time of the year. They are most active April or May through October, being diurnal in the spring and fall, and nocturnal during the hot dry summer months. When air temperatures are too high in the summer, they tend to become nocturnal. Humid nights, during or after a rain, are the best times for Copperheads to be active. This is true for two reasons. Small animals, which are their prey, are most active on rainy nights. Scents that these animals leave behind in their highways are stronger at wet times, and easier for the Copperhead to detect.

When pregnant, some females will not eat at all because the embryos take up too much space. In any case, they hardly eat at all, only six to nine meals in the whole awake season. This may be possible because of their very slow metabolism and their lack of mobility, which means they do not need to take in as much nutrients and energy because they do not use so much to start with.

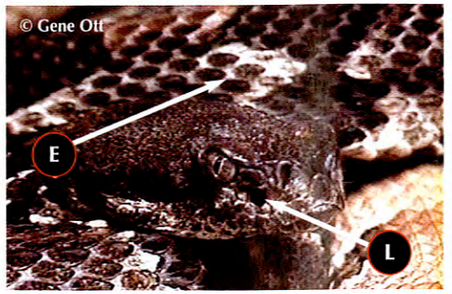
Copperhead adults mostly eat mice, mostly raiding small mammal nests, eating and then resting for a couple weeks before doing this again. These snakes do not eat often, eating about once or twice a month, at most. After the meal, they are no longer hunting. As a result it has been found that mice will actually build their nests near the snake! It is a kind of win/lose decision where the mice decide that it is best to lose a couple of mice every month but gain an incredible level of security from having the snake live by them, protecting them. After eating, the snake just lies around without moving, without threatening the rest of the mice community at all.

They might also eat other rodents like chipmunks, muskrats, small ground birds, lizards, small snakes, amphibians like frogs, toads and salamanders.

Young Copperheads eat insects; especially caterpillars, grasshoppers, cicadas. They have a yellowish tip to their tail. They flick it back and forth, attracting prey, who are attracted by this yellow caterpillar-looking thing.

TIMBER RATTLESNAKE

Family *Viperidae*

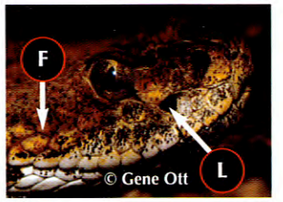


There are 2 families of snakes that exist here. The viper snake family *Viperidae* with the genus *Crotalus*, found in the valley, and only one species found here, the Timber Rattlesnake, *Crotalus horridus horridus*. The other *Viperidae* genus is the *Agkistrodon*, containing the Copperheads. All the other snakes in the valley belong to another snake family, the *Colubridae*. Unlike the *Colubridae*, all viper snakes have poisons that they inject into their prey by fangs. Both are extremely rare in our area, comprising no more than a few dozen individuals each. They are both listed as threatened and endangered in Massachusetts, and should not be harmed or bothered at all.

Crotalus comes from the Greek *krotalon*, which means a "rattle." *Horridus* is Latin for "standing on end." Together they describe this snake's stalking pose, where it raises its head to look at you, as well as producing a sound.

LATIN NAME

Crotalus horridus horridus



HOW COMMON

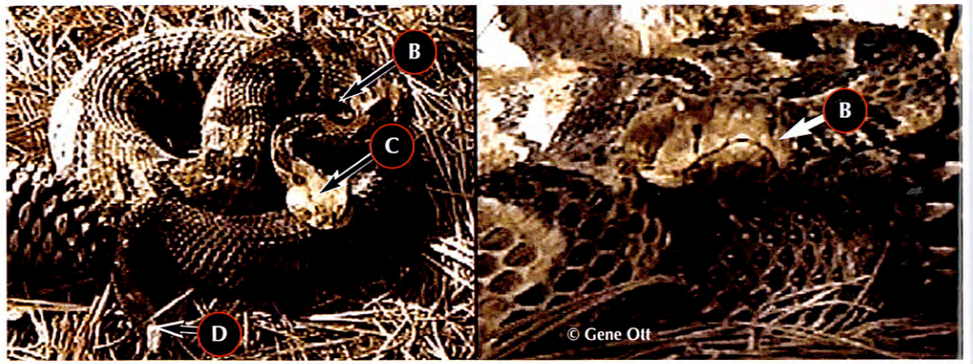
Due to the fact that the snake is poisonous, it had been extirpated, or hunted to near extinction. The process of reducing population is easy, because the most easily found individuals are pregnant female snakes, who do not hide as well as males. This cuts down on the next generation a lot. Other issues that have cut down on the population include the fact that these snakes do not reproduce every year, and that they have to get old to be able to reproduce at all. In our valley, there are only a few dozen individuals, and they are found mostly in the Holyoke Range. Since the endangered status, this snake is making a comeback.

CAUTION

This snake is extremely dangerous to approach and handle. Timber Rattlesnakes are venomous snakes. They have large replaceable fangs that insert the venom by a bite. The amount of venom released depends on the age and size of the individual snake, the older and larger the snake, the more venom it can deliver at a bite. The venom is hemolytic, breaking down the blood, as well as "pre-digesting" the victim. In other words, part of the venom makes the actual prey's body break down. Unlike the Copperhead, with enough Rattlesnake venom, the snake can kill humans. This, however, usually does not happen. Most often, the snake does not release enough venom to kill a human. Instead there is localized swelling and pain, blue-black discoloration

showing that the blood is breaking down, and bleeding. The person goes into shock, with weak pulse, rapid heart beat, nausea, vomiting, diarrhea, and finally unconsciousness. Scary thought. But there is another side of the story!

The Timber Rattlesnake, like other snakes, does not want to be disturbed by humans. If it has the opportunity, it will try to escape. That is often its first defensive strategy. However, if it still feels threatened, it is then that it will strike at the person. Unlike the Copperhead, the Timber Rattlesnake sends clear signs that it feels threatened and that you are in danger. First, it rattles, by vibrating its tail, to give warning (A). This is not really a rattling sound but a buzzing sound. As this is happening, it begins to coil up, then raises its head, looking at you. This forms a kind of "S" shape to the body (B). If it is still threatened and if you are in striking range, then it will lunge at you. Should you come across the snake, walk away. Should you hear the rattling or see the snake in a coil, walk away. It will not chase you but will strike if you persist and get closer.



It is illegal to harass, capture, or kill them. If you spot one, please notify the Fish and Wildlife Service, as they would like to know. Aside from the law, know that even the experts do not play with this snake. They may observe it, but they do not try to touch it. Do not get hurt and do not hurt the snake. Keep a distance between the two of you. Reckless behavior can lead to a strike, which will lead to the symptoms listed above. Newspapers will report on it, and the next thing we know, the snake is hunted down and killed. For the sake of both species, do not get close. If you plan on looking at them bring binoculars.

IDENTIFICATION

Size and Shape

The newborns and juveniles are from nine to thirteen inches long.

The adult sizes range from three to four feet, or thirty-four to forty-eight inches long, making this one of the larger snakes around. It is at least a foot larger than the Copperhead. Males are longer than females, and have a longer tail. Pregnant females in late summer look bulkier than males.

Note that the head is much thicker than the neck in circumference (C), this can be one easy way to tell this snake from non-venomous snakes.

The snake has a rattle at the end of its tail (D), giving its common name. The rattle is made up of loose-fitting hollow coned scales as the last segments of the tail. They make an apparent rattling, or buzzing sound when the snake vibrates its tail. Hatchlings only have one segment, called a button, and the rattle grows as the snake ages, with a new segment added with each shedding of skin, once a year. However, they also break off, so it is not possible to tell how old a snake is that way.

Color

The description given by Tennant and Bartlett in their book is very precise, paraphrased here. There are two different color phases, or color types, in the Timber Rattlesnake. One is a dark/blackish color with a dark ground color (E) and the other is a lighter yellow/gold with a yellowish ground color (F). Both phases have 15-34 large V-shaped broad dark dorsal markings. Regarding these markings, the front half of the snake has blotches running lengthwise along the spine (G), along with some side blotches (H), but in the back half of the snake the blotches run more as a band surrounding the top part of the snake (I). In both phases, the snake darkens about two thirds of the way along the trunk (J), darkening more towards the tail. The tail is dark and one color (K).

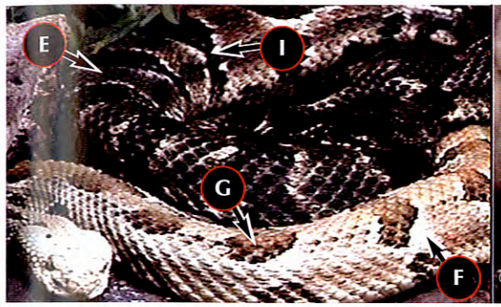
Regarding the head, the Timber Rattlesnake is the only large snake around here with many smallish scales at the top, which are not striped (C). In the dark phase of this snake, there is a dark black stripe that runs up and down from the end of the mouth up towards the top in front of the eye. This is not found in the light phase of this snake. You can see a depression of dark color that is on either side of the nose towards the eye. This is the "pit" that makes these snakes fit within the pit viper category of snakes (L).

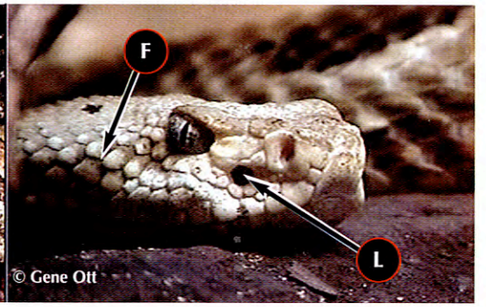
Both phases have a lighter greenish or reddish vertebral/spinal stripe (M), seen better in the front part of the snake. The stripe is seen between the dark bands on some of these snakes.

The belly is similar in both ground color phases, it is light yellow to whitish/pinkish and may have darkish black dots or splotches at the outer edges of the ventral-belly-scales.

Juveniles are similarly marked, but they may be lighter in tone.

This snake's scales are keeled, making its skin look rough.





LIFE CYCLE

Courtship, Mating

Unlike other snakes in the area, the Timber Rattlesnake gives birth in very low amounts. They begin to breed very late in life, some naturalists say even beginning at eight or nine years of age. The female has to be relatively large to breed. Also, females do not breed annually, as other snakes do. Some breed every two, three, four, or five years. This combination makes it difficult for the snake to survive humans, who hunt them to near extinction.

In the springtime courtship rituals begin, including aggressive combat dances between males. As in Copperheads, this fight can last an hour. The males face each other and raise about half their bodies off the ground. They then entwine their necks and begin to shove each other. This goes on until one snake falls and is pinned to the ground by the other snake. The defeated snake lets go of the winner and leaves. The winner has won the right to mate.

Mating can occur anytime, in early summer or early fall. The male finds the female by a scent she leaves behind, and strokes her neck with his chin. He will then align his body with hers, and then begin to jerk his head and body into hers repeatedly, to stimulate her. At a certain point, she raises her tail slightly, he then curls his tail under hers and inserts his hemipenis. They stay curled around each other like that for a few hours. The female can store the sperm until the following spring, if she mates in the fall. She is pregnant for six months.

Birth

The Timber Rattlesnake's young are born in late summer, in August or September. The Rattlesnake is considered ovo-viviparous. She lifts her tail and expels the young. The young are born every few minutes and for a few minutes stay in a transparent sac. Most litters contain three to ten snakes.

The newborns and juveniles are from nine to thirteen inches long. Juveniles are similarly marked as adults, but they may be lighter in color. Each hatchling already has a button, the beginning of its rattle which will grow a segment every year, but they may break off. They already have fangs that are operational.

The female and the hatchling stay together for a little over a week and then separate, although the young sometimes follow the adult for some time.

Overwintering

To survive the winter, the Timber Rattlesnake hibernates from September/October to April. They hibernate in rocky outcroppings, in crevices on hilltops: all dens are south facing, for maximum heat and light. They like to hibernate communally in large groups, if there are others around, using the same site for many years. The young find the den site and the adults by the scent the females leave behind.

Death

Hunting birds, like hawks, as well as cats, skunks, coyotes, dogs, and other large snakes like Racers and Milk Snakes may kill the young Timber Rattlesnake. Interestingly, the Milk Snake is somewhat immune to the snake venom and can therefore prey on the Rattlesnake.

Adult Timber Rattlesnakes are mostly harmed actively or passively by humans. People, fearing the

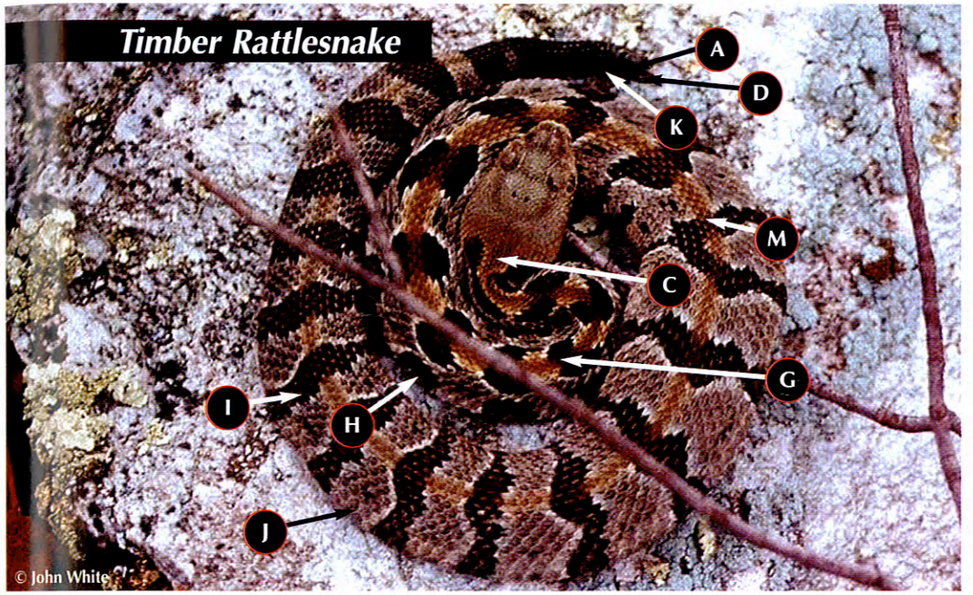
snake, have for years hunted and killed them on sight. We have also destroyed their dens and their habitat. An adult Rattlesnake can manage okay against other predators, but against humans they are almost defenseless. That is why they are almost extinct and why it is against the law to harm this snake.

The Timber Rattlesnake can live to be fifteen years old.

BEHAVIOR AND LOCATION

The Timber Rattlesnake has a very fixed habitat. It prefers forests, especially upland wooded areas, rocky fissures and outcroppings, crevices, and ridges in those areas. As a result, the Holyoke Range is the most suited habitat and that is where they are mostly found. Pregnant females need more heat. They are found in open fields, at the edges of forests, in less wooded areas, or at the edge of tree-covered mountains. They can get warmer and have the sun for a longer period of time. That is also the reason why they are easier to find and kill. As mentioned before, the snake likes the southern exposure of the mountain. Sometimes they are found in stone walls or abandoned sites.

As April arrives, the snake emerges from the den it hibernated in and suns itself. This is why the dens tend to face south. They are sometimes found with other snakes nearby. In May, they are mostly active during the daylight hours. As the days get longer and warmer the snake becomes more active, finally leaving the den site and traveling in a big circle over the span of the summer, finally coming back to the den around September/October. During the warm days of summer, the snake becomes more nocturnal, foraging at night. In midsummer the snake may be found near



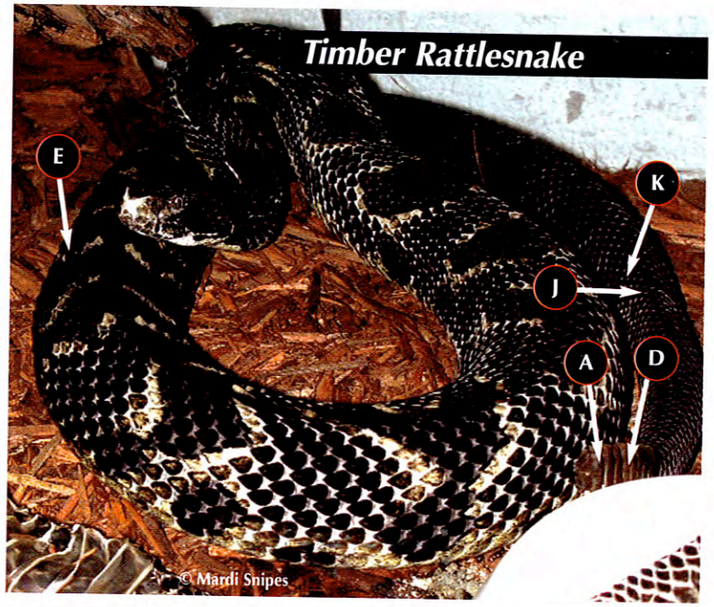
streams where it is close to its prey. Putting it all together, they are most easily found near their dens in early spring and fall, when they are in more concentrated numbers, and less mobile. If you spot this snake at that time of year, you can be sure to come back the next day, and most likely find the snake in the same spot. At this time of year they are not moving much at all, just using their time to sun themselves, and raise their body heat.

The Timber Rattlesnake migrates up to three or four miles away from their overwintering den in the big hunting circle that takes all summer to complete. Pregnant females tend to travel less, some traveling very little distance away from their hibernation site. Most likely, they do not want to use up their energy and want to give birth to the juvenile close to the den so that the young can more easily find their way there.

FEEDING

Pregnant females rarely eat. All others eat once to twice a month. The Timber Rattlesnake population prefers to eat warm-blooded animals, using their pit sense organ to benefit. Rabbit, squirrel, rat, mouse, shrew, mole, chipmunk, skunk and any other smallish mammal are the favored meal. They also, on occasion, eat birds and bird eggs that are found inside ground nests, including large birds like turkeys, chickens and other fowl, all the way down to sparrows. The most common food, however, are the smaller species, as in mice and smallish birds. Smaller, younger individuals may also eat lizards or amphibians.

To ensure success, the Rattlesnake has developed a strategy that works great. It is that of an 'ambush predator.' With a great sense for vibration and smell, the snake hunts for a mouse 'highway.' This is often by a fallen log. The mice have to go around the fallen log, thereby causing a path to develop. The snake coils its body, resting its head on top of the end of the log and waits. As a mouse gets to the log and needs to pass the obstacle, the snake strikes it as it passes. The mouse or other mammal is frightened and runs away. The snake slowly follows the scent of the dying prey. Soon it finds it, as the venom has taken its toll. It is easily eaten.



Eastern Hog-Nosed Snake

The genus of this snake is *Heterodon*, which is Latin for "different toothed." This refers to the fact that the snake has an odd set of big teeth set at the back of the jaw. There are three species, though only one found in Massachusetts.

NAME

Sometimes this snake is known as the Blow Adder or Puff Adder.

LATIN NAME

Heterodon platirhinos

HOW COMMON

This was a common snake, but common or rare does not matter here. Because of how slow they move and the ferocious way they act when people come across them, people kill them, so they have become threatened in Massachusetts.

CAUTION-Approaching and handling

There are many ways for a species to survive predators in the wild. The Hog-Nosed Snake is slow by nature, and thus, cannot outpace most predators. It had to come up with a different way to survive. One common way species survive is by mimicking behaviors, or physical characteristics that are unpleasant to potential predators. This snake is very good at mimicking and this strategy has led to two different but effective, behaviors in the snake.

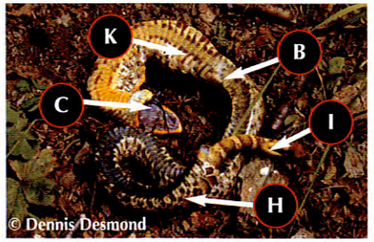
Its first strategy is to coil its body, tense up while facing you, and inflate its neck. It will extend and puff out its neck, as a Cobra does, waving its neck back and forth, presenting a menacing look (A). It then starts to act fiercely, and hisses at you, it may even make short, fake strikes, as if to bite, but its mouth is closed as it strikes. If you did not expect it, this behavior can be very scary. It acts like a Rattlesnake and looks like a Cobra. It is basically sending the message to predators that it is dangerous and to back away. This behavior becomes more intense the nearer you get.

This puffing behavior is where is got its lesser known names of Blow Adder or Puff Adder.

The snake is almost completely harmless, and will not bite, for the most part, and if it does, it is not venomous, though it is possible to get infections or an allergic reaction to the bite. The saliva is mildly toxic, though not to people. All of the above behaviors are bluffs.

If strategy number one does not work, there is a backup plan. Mimicry number two is to play dead (B). Strange to see, the snake transforms from a menacing, threatening viper to playing dead as if a switch got turned, as if the snake keeled over and died from the sheer excitement of it all.

It will turn over in a coil so that its head will be hidden and protected and the belly up (B). It will begin to twitch a little bit and then not move at all. It will look like it just died. It will then defecate, release musk, have its tongue hanging out (C), and release saliva or blood from its mouth. With the excrement, it begins to smell badly to predators. Many times, if the first strategy does not work, this dead, offensive snake becomes unappealing to want to eat, and the predator leaves, not harming the snake. Should you pick up the snake at this time, it will refuse to move and will play dead for a long period of time. If you turn the snake upright, it will turn back onto its back and play dead again.



So the good thing about these strategies is that they help the Hog-Nosed Snake survive faster, deadlier foes. The real problem it faces is related to people. When people come upon the snake, they are surprised by the snake and its threatening behavior, and are sure that the snake is dangerous. They think that the snake will spit in their eye, or attack and bite them. People kill them on sight.

Harming this snake is against the law in Massachusetts. People are not allowed to kill, harm, harass or collect them from nature. But they are disappearing from our land in part because of the strategies that they developed which worked with predators. Knowing that the snake is harmless should hopefully give the snake a chance at survival.

IDENTIFICATION

Size and Shape

Juveniles are six to ten inches in length, and are grayish with black blotches (D).

Adult Hog-Nosed Snakes can be anywhere from twenty to thirty-six or even forty inches long and

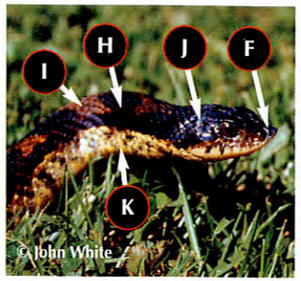
be very thick, stocky in body (E) and slow in movement.

As its name implies, this snake has an odd front. It has a short flat head, which ends in an enlarged upturned nose, or snout (F), that resembles a pig, and so the name.

Color

This snake has many, many different patterns and colors, so that is not going to be as important in identifying the snake. Rather its behaviors, its stocky body, slowness, and the hog-like nose will key the snake. Dennis Desmond states that there is a theory that the snake is still going through evolutionary choices and has not found which coloration is best for survival. In theory all the ones that are poorly adapted will be eaten and the ones that survive will be able to reproduce.

Often, the color variables fall into 2 phases. The *dark phase* is most often solid black, dark green, dark gray or brown-black (G). Most often it has no pattern. Also there is a *spotted phase*. This may have dark blotches (H) along the back and sides, on a pale brown or yellowish background (I).



The neck is hooded, and darkly spotted, just behind the jaw (J). That is the part that the snake spreads, like a Cobra, and is out when the snake is going through its offensive display.

The belly is gray, yellow, or green-gray (K), getting lighter as it goes backward, with the lightest part being under the tail.

The scales are keeled.

LIFECYCLE AND DEATH

Mating

Hog-Nosed Snakes reach sexual maturity at the age of about two years. They breed in the springtime, mostly in late April or May. The snake is oviparous; it lays eggs. The eggs are deposited in July, at times many snakes will deposit eggs into the same nest, communally.

Each female deposits ten to forty eggs, though typically twelve to twenty, in an underground hollow, usually under loose, sandy soil, but sometimes also under rocks, mulch, or logs.

The eggs are white, leathery and about three-quarters of an inch by one-inch ovals.

Incubation time is about two months, but the female does not stay with the eggs. This is possibly because it is so slow, that it could not really defend the eggs, when it is basically playing dead. Eggs deposited in July hatch in August or September.

Birth

After about two months, the young snakes hatch. Hatchlings are six to ten inches in length, and are grayish with black blotches (D). The adult darker coloring comes with age. An interesting thing to see is that, as it hatches, the juvenile spreads its neck and hisses as it does if threatened. It basically tries out its main threat-bluff right at birth. This could be a kind of a defense against anything that may be waiting to prey on it.

Death

The species is threatened in Massachusetts. One of the main reasons has to do with its chosen defense mechanisms. It mimics a dangerous snake so much, that people get scared and kill it. Also as pesticides hurt its main food supply, the snake is diminishing from lack of food.

Overwintering

The snake hibernates, or brumates, from late September or October to late April or early May. They often dig their own burrow to hibernate in, though they may at times use old abandoned mammal burrows.

The snake lives for about six years.

BEHAVIOR AND LOCATION

Most of the interesting points on behavior of this snake I mentioned in the Caution section.

Eastern Hog-Nosed Snakes are most often found in dry open areas with sandy soil or sandy woodlands. They can also be found in fields, or undisturbed farmland. The loose soil is important for the snake, because it finds its food there, and is able to more easily use its snout to dig up prey, just like a wild hog does, and can more easily hide in that terrain. It spends a good deal of time hiding, so it needs soils that are easy to tunnel into.

The snake is active in the warmer times of the day. This means that in early spring and in the fall, the snake moves later in the day, after it warms up. In the summer it is more active in the early morning and late afternoon and evening.

It often stays in a small range of only a couple of hundred yards, throughout the whole season.

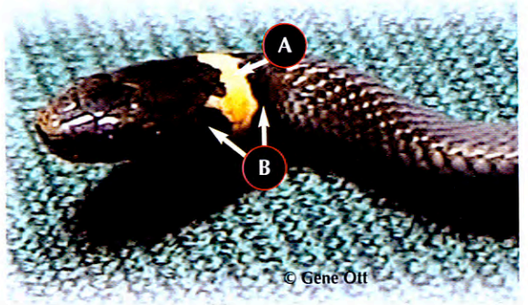
FEEDING

The Eastern Hog-Nosed Snake hunts mostly during the day. Amphibians, especially toads are the main prey for five choice reasons. First, the snake has a great sense of smell and can pinpoint a burrow where a toad is hidden. Second, they are able to use their oddly-shaped heads to dig up hidden toads. Third, this snake is immune to toxins that toads produce to protect themselves. This makes them able to prey on the toads in the first place. Further, the toad inflates itself to seem too large to be eaten and more formidable. However, the long teeth of the Hog-Nosed Snake, set in the back of the jaw, puncture the skin and 'deflate' the toad to a manageable size. Lastly, the hog-nosed saliva contains a mild toxin that is strong enough to paralyze its prey, although it is mostly harmless to humans. It is the presence of these unique teeth that gave the genus name Heterodon, Latin for "different toothed."

Also, other possible prey include many types of lizards, salamanders, frogs, and small mammals and birds, the eggs of reptiles and ground nesting birds. The young may eat insects, spiders and millipedes.

The Hog-Nosed Snake is not a constrictor. It simply grabs its prey headfirst and swallows it whole.

NORTHERN RING-NECKED SNAKE



There are twelve recognized sub-species of Ring-Necked Snakes, but we have only one in the Pioneer Valley, the Northern Ring-Necked Snake. The genus name is *Diadophis*, combining the Greek word, diadem, which is a headband, and ophis, which is snake. The name tells us a lot about how the snake looks.

LATIN NAME

Diadophis punctatus edwardsii

HOW COMMON

While this snake is common, it has particular needs in order to survive. The snake is dependent on forests, moist areas, and concealment. With development and the consequent drying up of wetlands, the snake will be threatened in the future.

CAUTION-Approaching and handling

The Northern Ring-Necked Snake is almost completely harmless, but they do rarely bite.

An interesting thing is that if you hold the snake, it may release a foul smelling discharge, called musk, from anal glands. But this is not dangerous in any way. It works the same way as the scent release in the common skunk.

Likewise, when the snake is held, similar smelly, musk-like saliva is released from its mouth. The saliva is mildly toxic to its prey, as it is with the Hog-Nosed Snake, but it is harmless to humans.

If you try picking it up, the snake may wiggle intensely to try to escape. Some of the subspecies, though not this one, do this by twisting around and at the same time raising and coiling their tail forward. This helps to draw attention to the colored tail, and away from their head.

Some individuals feign death, though this is also more common in other parts of the country than here. Again this is somewhat similar to the Hog-Nosed Snake.

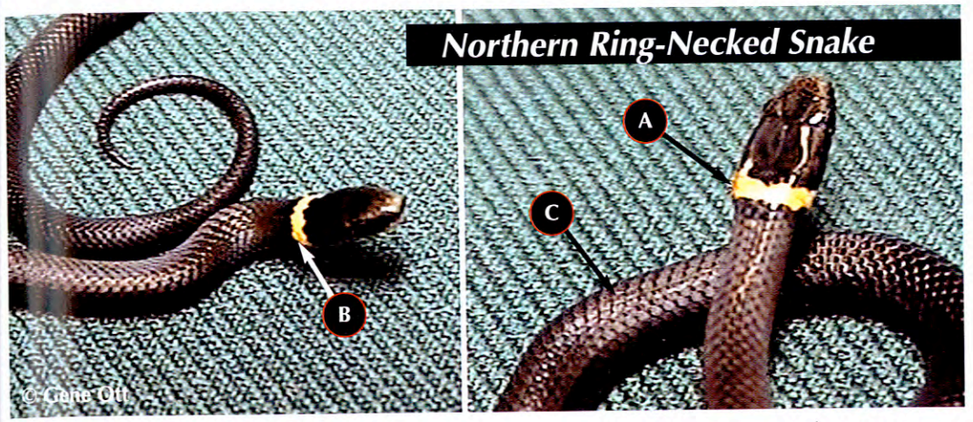
IDENTIFICATION

Size

The Ring-Necked hatchling is three and a half to four and a half inches long.

The adult is ten to eighteen inches long, and is as thin as a pencil.

The females are longer than the males.



Color

The most distinctive characteristic of this snake is a complete, solid yellow or yellow-orange colored band around the neck (A), just behind the head. This makes it very easy to identify, the band being found even in the juveniles. This is the key identifying feature of this snake. The scales on either side of the yellowish band are darker than the rest of the dorsal scales (B). Other smaller

similar snakes, such as the Brown or Red-Bellied Snake, may have some neck coloring but the band will not be complete as it is on this snake.

The dorsum or back part of the snake is plainly (C) gray, gray-black, gray-blue, or brown and has a satiny sheen. There are no particular head markings.

The belly of the snake is a solid yellowish color (D).

Newborn snakes have the same markings and coloration as adults do, already having the yellow band around the neck, although the dorsum is darker and the belly may be whiter than found in adults.

Their scales are smooth, and without keels.

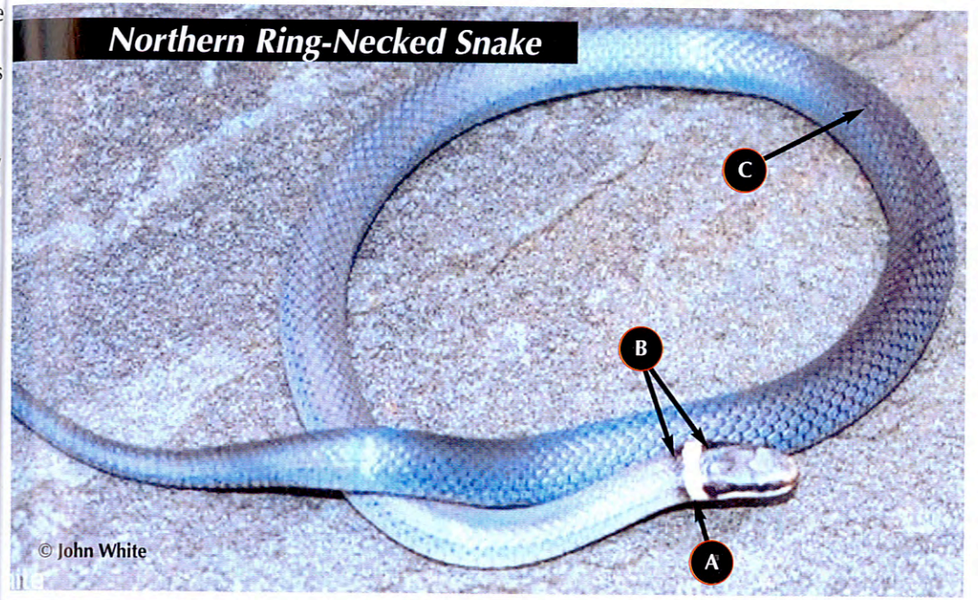
As mentioned before, this snake is often mistaken for other snakes, such as the Brown or Red-Bellied Snake, or for juvenile Black Rat or Black Racers. However, the Ring-Necked Snake is the only snake that has both a complete band around the neck, and no keels. Also, juvenile Black Racers and Black Rat Snakes have intense patterns; the Ring-Necked Snake does not.

LIFE CYCLE

Courtship, Mating

Sexual maturity is reached at the age of about two years. Mating takes place most often in the springtime, after emerging from hibernation, though also in the fall.

Ring-Necked Snakes are oviparous, laying eggs instead of giving birth to live young. The snake deposits from one to ten eggs, though typically around three to five. The larger and older the



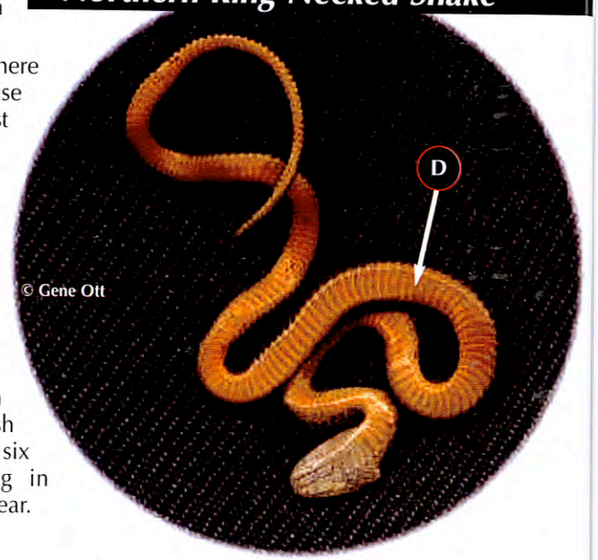
female snake, the more eggs she will deposit. The eggs are deposited in June or early July.

They lay their eggs in a cluster, but there are several clusters in one nest because several Ring-Necked Snakes may nest together.

The nests are usually found in moist places, such as rotting logs. Look for the nests around cleared forestlands, where rotting woods provide a good nesting opportunity. The nest can also be under flat rocks, under mulch piles, or rotting flat planks of wood.

The eggs are smooth, about one inch oblong and whitish, with yellowish ends. They incubate for between six weeks and two months, hatching in August. The female lays eggs every year.

Northern Ring-Necked Snake



Birth

The eggs hatch in August or September, later in the summer.

The Ring-Necked hatchling is three and a half to four and a half inches long.

Newborn snakes have the same markings and coloration as adults do, already having the yellow band around the neck, although the dorsum is darker and the belly may be whiter than found in adults.

Overwintering

These snakes hibernate from late September or October through to April.

Death

Since the snake is not very large, it has many predators. Snakes, such as Copperheads, Black Racers, and Milk Snakes prey on the Ring-Necked Snake. Some larger bullfrogs can also eat the snake. Smallish mammals, such as cats, raccoons, skunks and opossums also prey on this snake. Birds such as owls and hawks also take their share of them. Newly hatched snakes may even be prey to large spiders!!

As mentioned before, drying up wet areas will harm the snake as it deprives them of their food, and a place to nest.

It is possible that this snake only lives six to eight years.

BEHAVIOR AND LOCATION

There are two overriding aspects to its location and behavior; moisture and concealment.

It is a very small snake, by comparison to other predators, and so will want to hide itself. It also preys on things that live in moist areas. These two points together tell us a lot about this snake. First, it is very hard to find it. It hides for the most part, being nocturnal during most of its non-hibernating time, as is its food, and being rarely seen in the summer months. During the day, it will hide under a warming rock, like shale, or leaf litter that is in the sun, mostly remaining hidden. It will hide under any sort of cover, most especially moist ones.

Examples of covers are: rotting logs, moist forest floors, stone walls, stones, brush piles, mats of vegetation, meadows, forest edges, and loose bark on dead trees. The bottom line is that even if it is common, it is not common to see them outside in the open. Their hiding nature may also lead this snake to abandoned homes, barns and dark basements.

Because of its hiding strategy, this snake is most active at night. It adapted with the salamander, which is also active at night, so food acquisition is not a problem at that time. Likewise, it is most active after some rain, in search of salamanders.

Moisture is needed for two reasons. First, its food supply is dependent on water. Second, the snake nests in moist areas, so it needs rotting matter to survive. As a result this snake will move only within a couple of hundred square yards for a year, depending on moisture, food, and concealment found in that one location.

This snake is social, often hiding in pairs, nesting in groups, and living in colonies, all sharing the same area.

FEEDING

The Ring-Necked Snake likes to hunt in moist woodlands. There, it finds its most common food, the salamander. The salamander is the main staple of the snake. Along with that, it will also eat other smaller prey, most commonly earthworms, small lizards, small or juvenile snakes, as well as frogs and slugs. They occasionally eat newborn mice.

They swallow their food whole, but may subdue the prey by constriction. This is because, though the snake is small, it is very strong.

Black Rat Snake

There are five subspecies of Rat Snakes, though *Elaphe obsolete obsolete* is the only one found in Massachusetts.

LATIN NAME

Elaphe obseleta obseleta

NAME

Black Rat Snake or ***Blacksnake***, is also sometimes called the **Pilot Snake**. This is because it is known to hibernate with venomous snakes and was said to lead them out of danger. This, however, is not true.

HOW COMMON

The Black Rat Snake is incredibly large, one of the longest species of any animal in the Pioneer Valley, definitely the longest snake. Its size is the cause of a common death, killed by people who are frightened by its largeness. The killing has made the snake a rare species in Massachusetts. It is now considered a threatened or endangered species. It is illegal to hunt, bother, collect, or kill this snake. Also, ***if you see a Black Rat Snake, please contact the Fish and Wildlife Service and alert them to the snake's location.***

CAUTION: Approaching and handling

Even though the snake is very large, it is essentially harmless. The fact is, it is a very useful snake to have around. It mainly preys on rodents; this species actually helps keep the mice population down. Knowing that, one would think that we would encourage the growth and spread of this snake. However, the truth is the opposite. Because the snake is so large, it really scares people and they kill it as soon as they see it.

This is a passive snake by nature when it comes to humans. When and if you near it, it will usually not move, using its coloration to camouflage itself among the background shadows. I got to within a foot and a half of a six-foot Black Rat Snake, who was basking in the sun. It never moved.

At times, if you find a snake on the ground and you walk near it, it will vibrate its tail on dry leaves, making a sound like the rattling of a Rattlesnake. This *sound mimicry* helps them defend against would-be predators, but in the spur of the moment, people get confused, which gives them all the more reason to kill the snake.

If you actually try to hold one, it may thrash back and forth, releasing musk, just like Water Snakes. It may even bite you and the bite will hurt. This is especially true of the younger snakes. So, don't try to pick them up.

IDENTIFICATION

Size and shape

Black Rat Snakes are about eleven to thirteen inches at birth.

Black Rat Snakes are large. They are the largest snakes living in Massachusetts. Adults can measure anywhere from three and a half to six and a half feet long. The largest known specimen on record was eight and a half feet long! A snake of that size can be scary to look at, but remember that they are a very safe snake to humans, as long as you are not trying to pick them up.

The species has a slightly squarish shape, where the sides come down to meet the belly, looking to most authors on the subject like a cross-section of a loaf of bread (I).

Color

The name Black Rat Snake is an accurate description of this snake. The snakes are black (A), but hardly any of them are totally pitch black (B). They may have a few lightish, yellow, white, orange (B) dots of color between the normal dark scales. After eating a larger meal, these flecks are easier to see.

Adult heads are generally unmarked; being almost solid shiny black or dark brown dorsally (C).

The chin, throat, and neck are colored bright white. In other words, the jaw bordering the mouth is white, as if the snake just drank milk (E).

The belly is a very light white, gray, or light tan. It is incredibly light, when you compare it to the dark, dark back, or dorsum, of the snake (F). The belly is also mottled with blotches of white, gray

and dark colors (G). As the belly extends backwards, near the middle of the snake, the color begins to darken to eventually becoming dark gray or black, like the rest of the snake (H).

The young are patterned with blotches of black, dark gray, gray-brown or dark brown running down the middle of the back (J) and sides (K) on a white or light gray background (L). The young also have yellow, orange, or red tiny spots on the scale tip (M). The head has blotches of black and white. The belly has a grayish background and is mottled with darker gray smudges, like a chessboard. Over time, this pattern fades; the young reach adult coloration by the time they are two or almost three years old, or about three feet long.

The sheen is very shiny; it looks like the snake is wet (D). This is an important point of differentiation with Black Racer Snakes. It is also weakly keeled.

Black Rat Snakes are easily and often confused with Black Racer Snakes. The Black Racer Snakes are smaller, thinner, and have a non-shiny, satiny look to the scales, as opposed to the shiny look of the Black Rat Snake.

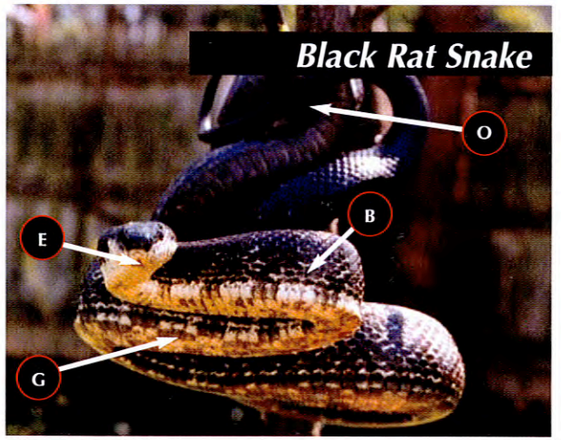
LIFE CYCLE

Courtship, Mating

The breeding season for the Black Rat Snake is in the springtime, anytime from April through early June. The female can lay five to thirty eggs, though usually it is around twelve eggs, in July or August. The mother deposits the eggs in rotting wood, such as decomposing stumps, decaying leaf litter, or mulch piles. The eggs are elongated, white and about two inches long. It takes about two to three months for the eggs to hatch.

Birth

The eggs hatch sometime in September. Black Rat Snakes are about eleven to thirteen inches long at birth. The young are brightly patterned with blotches of black, dark gray, gray-brown or dark brown running down the middle of the back (J) and sides (K) on a white or light gray background (L). The young also have yellow, orange, or red tiny spots on the scale tip (M). The head has blotches of black and white. There is a brown-black line that starts in the center of the forehead and goes backwards, surrounding the eyes, continuing backwards (N). The belly has a grayish background and is mottled with darker gray smudges, like a chessboard. Over time, this pattern fades; the young reach adult coloration by the time they are two or almost three years old, or about three feet long.



Overwintering

Black Rat Snakes emerge from their rocky, crevice overwintering spots sometime in

the middle of April or early May. By late September or early October, they migrate back to their dens, and remain there until April. These snakes are communal hibernators, brumating in rocky crevices, overwintering with other Rat Snakes, Racers, Copperheads or Timber Rattlesnakes.

Death

When the snake is young, it is prey to many mammals, such as the fox, raccoon, and bobcat. Birds of prey also hunt this snake, birds like the red-tailed hawk as well as owls. The most dangerous threat to adult snakes is people who become scared of their size and kill them. The life expectancy of the snake can be up to twenty years.

BEHAVIOR AND LOCATION

The snake starts off in spring by emerging from its rocky crevice den. Nevertheless it likes the woods most, and will work its way to some hilly stand of trees. This means that the most common places to find the snake in the springtime will be a rocky ledge, especially rocky forested hillsides. They can be on either side of hills, not just the southern warm side, where most other snakes are found. However, as the year progresses from spring to summer, the snake moves to farmlands and pastures, liking old deserted fields and deserted buildings best. When they are not found in the woods, they may hide under rocks or boards, as do other snakes.

Their favorite place, however, is the deep woods. There are two great reasons for this. First, their dark color camouflages them in the shadows that the big trees cast. The second has to do with their incredible climbing abilities.

This is one of the snakes you have to look for, not just on the ground, but above you, in the trees. The Black Rat Snake is arboreal. It likes being in the trees as much as being on the ground. Its climbing ability is so good, that it prefers the forest environment. It can climb, not just a little way up a tree but very high up (o), invading nests of birds. Likewise, the snake could be found resting on the wooden rafters in abandoned barns.

The snake is diurnal, being active during the day, during the spring and fall. It can be found basking at that time. However, during the hot nights of summer, it becomes almost nocturnal, moving very little during the day. From this, we can tell that the snake can feel too hot. This may

explain why the snake moves to occupy both sides of hills, not just the warm southern side but the cooler northern side, too.

It is hard to find the snake in the summer, because of the forest and height reasons. In the summer, it is easier to look for it at night, just after a light rain. Also in the summer, though the Black Rat Snake likes the woods, it is at times near water such as a marsh or swamp edge. I saw a large specimen of this snake in the summer of 2003, resting ten feet from a lake. It was a beautiful thing to look at.

These snakes pick a specific location or territory to live in for a long time. Knowing this, and the fact that the snake can live for twenty years, means that once you find a Black Rat Snake, you could expect to find the same snake annually in nearly the same spot.

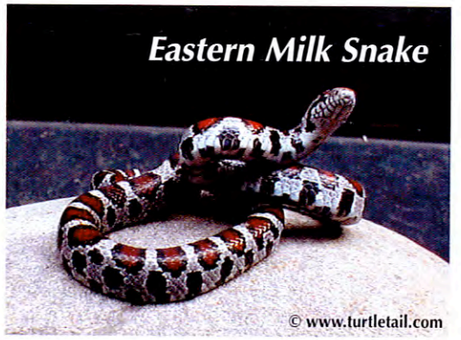
FEEDING

The younger Black Rat Snake eats mostly lizards, frogs, and young mice. As they grow older, rodents become their main food, as their name suggests. While on the ground, the adult may also eat smaller mammals such as rabbits, chipmunks, voles, shrews and squirrels.

The snake is a great climber, so it is able to really increase its potential type of prey, invading bird nests, eating bird eggs as well as young birds. In fact, this may make up a major portion of the juvenile's diet.

They eat about once a week. This snake kills its food mostly by suffocating the prey by constriction; it wraps or coils its body around the prey, squeezing it tighter and tighter, until the prey cannot breathe.

Eastern Milk Snake



Milk Snakes are pretty much the same as King Snakes, though they are named differently in different regions of the country, for no real reason. There are eight subspecies to the *Lampropeltis triangulum* with only the *Lampropeltis triangulum triangulum* found here.

LATIN NAME

Lampropeltis triangulum triangulum

HOW COMMON

The Eastern Milk Snake is considered a relatively common snake in this region, as it is in the whole United States. Even though it is very colorful, it leads a secretive life and so is not commonly seen.

CAUTION-Approaching and handling

The Milk Snake got its name from a folk tale. The tale is something about the snake

sucking the milk of nursing mothers and from cows. This is not actually possible. Snakes do not drink milk. All snakes are carnivorous by nature. This snake is more or less harmless to people and cattle.

The Eastern Milk Snake is apt to coil, getting into an 'S' striking stance, and may bite you when handled. They strike and then try to slither away under cover when they get the chance, so do not try to catch them. If picked up, they may bite the hand of the person holding it. They are calmer if they are cool and more irritable when hot.

There is one other interesting behavior. If disturbed, the Milk Snakes may vibrate their tails on leaves, producing a whirring sound, which may be confused with the noise that a Rattlesnake makes. This gets them killed by mistake by people who are frightened.

Do both you and the snake a favor, and do not pick it up. Though not dangerous, why harass it, or get it aggravated so that it scratches you and then you throw it down, hurt or perhaps kill it.

IDENTIFICATION

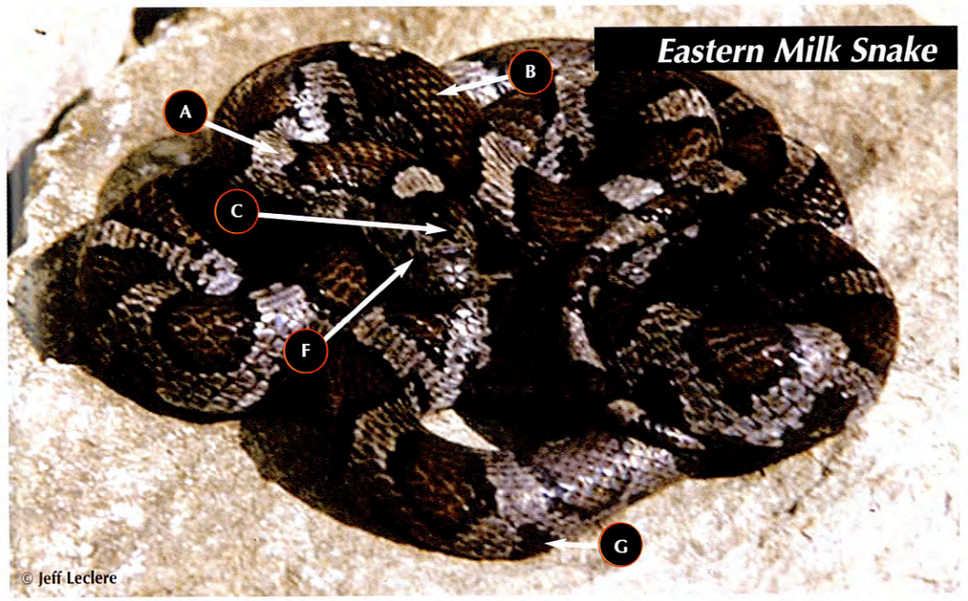
Size and shape

The newborns and juveniles are anywhere from seven to eleven inches long.

Adults range from twenty-four to thirty-six inches in length.

Color

The Eastern Milk Snake is most often a uniform shade of dark gray (A), or almost brown ground color. This is covered with thirty to forty whitish saddles or crossbands, which are around the



same number of brown/reddish dark-edged saddles (B). These are a little squarish, running the whole length of the body.

The head color pattern is a pale brown, arrowhead "Y" or "V" on the top of the head, surrounded by a reddish border (C), on a light gray background.

The end of the nose or snout is gray or white (E). There is a thick dark band that is surrounded by the grayness of the head, going backwards from the eye to the back corner of the mouth (F).

Sometimes there are also blotches running down the length of the body along the sides, where the sides meet the belly (G). These blotches are black bordered. These form a chain pattern which is characteristic of the snake.

The whitish belly is checkered with dark smudges.

The hatchlings are seven to eleven inches long and have the brightest coloration they will ever have in their life. They have a white or gray background (H) with blotches or saddles of bright-red (B), with dark edges (I). These alternate with lateral spots (G), a key feature of the snake. This intense color and patterning stays mostly during their juvenile stage; the color dulls as the snake matures.

There are no color differences between male and female.

The scales are smooth, not keeled.

Milk Snakes are sometimes mistaken for Copperhead Snakes. However, the Copperhead does not have round eyes, but slits, like a cat. Also the bands on the Copperhead are classically shaped like an hourglass, with the band being widest on the sides and most narrow over the spine.

LIFE CYCLE

Courtship, Mating

Mating takes place in spring or early summer, possibly in June. It is possible that they may mate while in group hibernation. The male nears the female and crawls all over her to get her to lift her tail to mate. When she is ready, she lifts her tail and they mate.

The eggs are deposited in later June to July, often in a communal nest site. The location of the egg deposit is in an area selected for its high dampness and warmth; they are deposited in piles of loose soil, or decomposing rotting logs, stumps, humus, in mats of rotting leaves, manure or sawdust.

Each female lays six to twenty-two eggs, although typically ten to twelve. The eggs are oval or oblong, about one inch by one and a half inches long, smooth, and white. The eggs incubate in the nest for six to nine weeks.

They reach full sexual maturity at the age of three or four years.

Birth

The eggs hatch in August or early September.

The hatchlings are seven to eleven inches long and have the brightest coloration they will ever have in their life. They have a white or gray background (H) with blotches or saddles of bright-red **(B)**, with dark edges **(I)**. These alternate with lateral spots (G), a key feature of

the snake. This intense color and patterning stays mostly during their juvenile stage; the color dulls as the snake matures.

Overwintering

The Eastern Milk Snake spends its time in solitude. The most common time they live with other Milk Snakes is during hibernation and right before and right after hibernating, while basking in groups.

They hibernate from late September or October to April, and are active from April to September. They hibernate in rocky outcroppings or mammal burrows.

Death

Predators include birds and mammals. Animal hunters as small as skunks and raccoons, as well as larger ones like foxes and coyotes hunt this snake. Birds of prey like hawks also prey on this snake.

As mentioned before, there are two adaptations that help this snake survive in the wild, but when people get involved both adaptations get the snake killed. When it feels threatened, the snake vibrates its tail, sounding like a Rattlesnake. While this may scare away predators, it also gets the Milk Snake killed by frightened people who mistake it for a venomous Rattlesnake. The second adaptation involves its coloration patterns. They look like, or mimic, Copperhead Snakes. This saves it by confusing predators, but it scares people, who then kill it.

The lifespan may be around ten years.

BEHAVIOR AND LOCATION

Soon after emerging, the snakes bask in groups, by their overwintering sites. Once they are warm, and their original site dries up, they move to farms or grasslands, which have both food and cover. A few may remain near their dens for some reason.

The Milk Snake has a very wide variety of habitats that it likes. It is surprising therefore that they are rarely seen. They are secretive; they spend a lot of time hiding under objects. The snake is slow moving in general, which explains their desire for secrecy.

Lets face it, where there are people there are houses and where there are houses there are rodents. As a result there is a long relationship between the Milk Snake and people, leading in part to its name. If we look at them in that light, we would see that they are a benefit to us, as their diet limits the size of the mouse population.

Coming back to the myth of snakes drinking cow milk. The Milk Snake can actually be found around barns and buildings, especially deserted buildings, outbuildings, and under garbage dumps and trash piles. It is not the milk that draws them but the fact that where people are, or were, there too are mice and small rodents found, a great source of food for them.

Other common places to find these snakes are in or under rotting logs or rocks, and under all kinds of surface debris. In terms of moist places, we find streams, rivers, marshes, and other waterways common habitat for the Milk Snake. They can also be found in many types of woods and farm fields, usually found under woody cover. They can also be seen in grasslands bordering woodlands, in and around meadows, under stones, mostly covered during the day. In terms of rocks, the snake can also be found in rocky outcroppings and hillsides. The one key feature of all the locations is that they are near rodent runways, or highways.

Milk Snakes are diurnal in the spring and fall, becoming largely nocturnal in hot dry summer season.

FEEDING

Milk Snakes are constrictors, which means that when prey is captured, it is squeezed, or constricted, until it suffocates. The snake coils itself around the prey to do this. The prey is then swallowed whole.

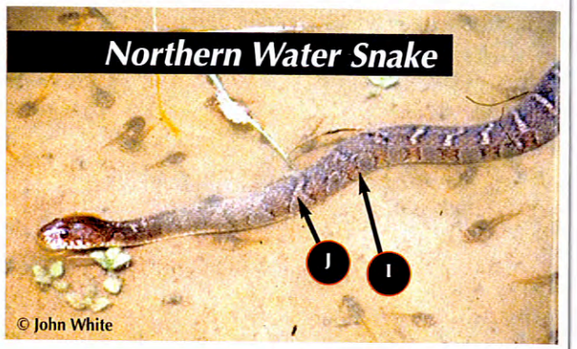
Mice, other small rodents and smallish mammals comprise the vast majority of the diet. It is for this reason that the snakes are found in barns. What they are looking for are the mice that nest in the barns. Nesting rodents, like mice, are the favorite food, but voles, chipmunks, and rats also make the list. They also eat lizards, most other snakes, birds and their eggs, slugs, frogs, and reptile eggs.

Young snakes may be a common food for baby Milk Snakes, though this desire changes to mice as the Milk Snake gets older and larger.

One last interesting point about our Milk Snakes is that they can prey upon and eat venomous snakes like Copperheads and Rattlesnakes. They are immune to the pit viper venom, at least a little bit, and so the venomous snake loses its main defensive tool against this snake. Since there are not many individual specimens of venomous snakes here, this does not comprise a major part of the diet, but it is an interesting fact.

NORTHERN WATER SNAKE

There are seven different types of Water Snakes, but of them we have only one, the Northern Water Snake.



LATIN NAME

Nerodia sipedon sipedon

HOW COMMON

The Northern Water Snake is one of the most common species of snakes in Western Massachusetts.

CAUTION-Approaching and handling

People should know a few things about snakes they may encounter, for everyone's safety.

The Northern Water Snake is often completely harmless. The most likely thing that will happen if you are near them, even irritating them, is that they will slide into the water and swim away. Occasionally, they flatten their bodies in reaction to being frightened.

Another defense mechanism is the releasing of a bad smelling, yellowish, liquid musk, from glands at the base of the tail. This discharge is not dangerous. This musk works the same way as the common skunk releasing its scent. Garter Snakes and Ribbon Snakes, being closely related to the Northern Water Snake also do this. The idea behind this is probably that it makes the snake smell and taste bad and thereby may make it seem less appetizing to eat; a great adaptation.

Only if they feel cornered do they strike, and have a false reputation of being ferocious, dangerous biters. They do bite, but they are not any more aggressive than other animals, which would probably do the same thing if cornered. They will not attack you if you do not annoy them.

If they do bite, they have half a dozen rows of really sharp teeth, and may draw blood and

cause a great deal of pain, but the bite is not truly harmful or venomous. The only real danger is if the site of the bite becomes infected.

All snakes can swim. It is wrong to think that every snake you see in the water is a Water Snake. Even poisonous snakes such as Copperheads and Rattlesnakes can be found in water at various times.

It's easy to confuse the Water Moccasin (Cottonmouth) with the Northern Water Snake, but don't worry, the Water Moccasin lives in Virginia and parts south. You will never see one of those living wild in the Pioneer Valley.

IDENTIFICATION

Size and Shape

Newborns are anywhere from six to twelve inches long.

Adults range from twenty-four to forty-eight inches long, and are very thick.

Surprising to some, the female's body is much larger and heavier than the male, and may be more common as well. The females have a shorter tail than the male; this is true of other snakes as well.

One easy way to tell the difference between the Northern Water Snakes and either of the two poisonous snakes that we have in the Pioneer Valley, the Copperhead and Timber Rattlesnake, is that the Northern Water Snake's head is the same circumference as its body, whereas the venomous ones have a head wider than their neck.

Color

There is a very large variety in color and pattern in Northern Water Snakes. The most characteristic coloring in adults is a dark gray, tan, brown ground color (A) with a multicolored design on the belly (B). The dark pattern continues to the tip of the underside of the tail. To be more accurate, you can find dark cross bands, which are incomplete, on the neck and forepart of the body (D), but alternating dorsal and lateral blotches on the rest of the body (E). There are some dark markings on the back, these are wider than the spaces between them (F).

The belly has black, yellow, or reddish well-defined blotches, half moons or irregular triangles (G), with the tip of the triangle or the tip of the semicircle aiming backwards. The markings on the belly may be arranged in regular patterns, irregular patterns, be simply dusky areas, or be totally missing.

The newborn and juvenile have a very bright pattern of brown, red or yellow saddles (I) on light brown or pale gray, tan background (J). The bands are more clearly visible on the young than on old snakes.

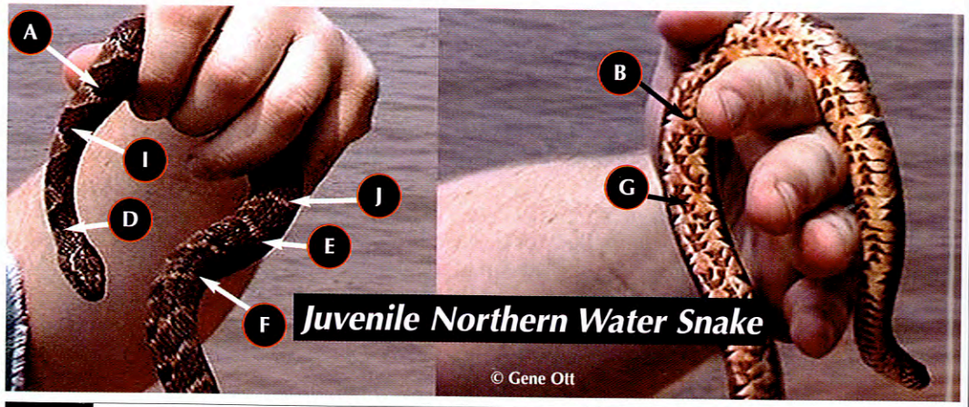
These snakes darken as they age, so that in larger snakes, the pattern becomes almost totally hidden, the snake looking plain black or darkish brown. However, if you watch the snake go into water, the water will bring out the pattern details when before the snake looked plain colored.

The heavily keeled scales on this snake's back and sides make the skin look rougher and bumpier than it actually is.

LIFE CYCLE

Courtship, Mating

The mating season in this species begins in late April and continues into early June. The process starts with the male crawling along the back of the female, rubbing his body against hers. Strangely enough, although only one male can copulate at a time, more than one male may be rubbing against her. Many may be "courting" her at the same time. While walking on the



Norwottuck Rail bicycle trail in South Amherst, I came across a 'ball' of snakes, with one female and how many males I could not tell, all intertwined together.

The male will then lie on top of the larger female body, coiling his tail around her, aligning their cloacae. This process may even happen in water, swimming about. They may even go in and come out of the water without changing positions. A male is capable of copulating several times a season. After copulation, the snakes separate, leaving in separate directions.

The female snake reaches full sexual maturity at three years of age.

Birth

The Northern Water Snake is viviparous, giving birth to between twelve and sixty young. This species of snake does not care for their young at all. The female lifts her tail, the neonates slide out and as soon as she is done, she leaves.

The newborns measure six to twelve inches long, and juveniles have a very bright pattern of brown, red or yellow saddles on light brown or pale gray, tan background. The bands are more clearly visible on the young than on older snakes. These snakes grow very fast, adding two inches before winter.

Overwintering

To survive the winter, Water Snakes spend their time in many different sheltered places. The main areas are in the bottom of ponds in the mud, or inside muskrat or beaver lodges. But some leave the water to over-winter in rocky outcroppings where they can fit into rocky fissures. Some experts say that almost half of these snakes may not survive the winter.

Death

Northern Water Snakes have so many predators, that it is hard to believe they have survived. For one thing, many animals such as raccoons, skunks, and foxes eat them. Birds, such as egrets, gulls, hawks, and herons also consider them part of their diet. Other reptiles and amphibians, like Black Racers, snapping turtles and large frogs, such as bullfrogs, can eat the young as well.

However, people are the main threat to their survival. As more people settle and destroy the water flow, the Water Snake loses more and more of its wetlands habitat.

During mating season, males die more than females, because they are much more active and do not eat as much as they usually do. Females die more often in summer giving birth to all the young.

The lifespan of this water snake is six to seven years.

BEHAVIOR AND LOCATION

The Northern Water Snake lives partially in the water and partially on land. One of the most important identifying characteristics is that it is always found near bodies of water. This can be a variety of areas but as long as the water is still, it provides a possible habitat. Such places include beaver ponds, like the one along the Norwottuck Rail bicycle trail, swamps, marshes, and bogs. It is only during the winter that they may go up to higher rocky locations in search of shelter. If their home water source begins to dry up they will spread in search of new water.

Like most other snakes, this one likes to bask, especially in the springtime. They stretch out on logs, beaver lodges, branches or brush. Basking is an essential activity early in the season, since they are cold blooded and need to absorb heat to raise and maintain their healthy body temperature. Because of this, in the cool days of springtime, they bask the whole day, turning slightly to heat up their whole body equally. At this time, they are not eating or moving much. One thing that they do to gather additional heat is to clump together into large groups of up to dozens of individual snakes! There is no real territorial behavior preventing this. As the weather starts to warm up, the snakes do as well. They need to bask less and less, only in the mornings and evenings. With more spare time they shift their focus to hunting and mating.

The Northern Water Snake will probably lie basking until approached. Once it feels that it is in danger it will dive into the water, later coming back to the original area you spotted it. Many times you can find an individual snake within several hundred feet of the last place you saw it. They are active day and night. At night, you may see them amongst plants or brush, hunting nocturnally.

FEEDING

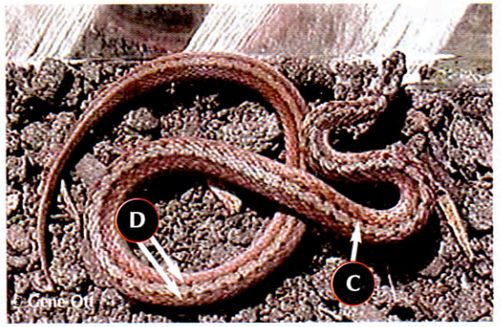
They hunt day and/or night. Northern Water Snakes eat many different types of prey. Their most common prey will be small fish, but they also eat frogs, toads, insects, crayfish, and salamanders.

They float on the surface, with their head dropping into and out of the water, searching for

© Gene Ott

food under plants or rocks. They sometimes herd small fish (H) or tadpoles to the water's edge to have a better chance of catching them. They swallow their prey whole, or bring it back to land and eat it there.

Northern Brown Snake



© Gene Ott

The Genus *Storeria* is related to both Water and Garter Snakes. This particular Genus's two largest species can be found only in the United States. The two larger types, the Northern Red-Bellied Snake or *Storeria occipitomaculata* and the Brown (also known as Dekay's) Snake *Storeria dekayi* have keeled scales and are very gentle. *Storeria dekayi*, the Northern Brown Snake species, includes four subspecies, although the only type found in the Pioneer Valley is the *Storeria dekayi dekayi*.

LATIN NAME

Storeria dekayi dekayi

HOW COMMON

Because of the pesticides and chemicals used in farming, the Northern Brown Snake is becoming harder to find in our valley. The species used to be very common and could

be found under debris just about anywhere, in the country and in the cities. Now with the increased use of pesticides, they are becoming less common, because there is less food and the food that it can find contains toxins, the snake is concentrating chemicals in its body.

CAUTION-Approaching and handling

The gentle, non-venomous Northern Brown Snake is shy. They are too small to actually bite you, but if threatened, they bluff by making fake attacks. You can tell that the strike is fake because their mouths are closed, so they do not pose any danger. They might try to bite you if you pick them up, but the snake and its teeth are so small that they will usually not be able to break your skin. The snake also stiffens and flattens its body showing white skin under its scales, if they feel threatened.

If held, the snake may release musk, out of gland near its anal opening. This discharge is not dangerous, although the smell is offensive. This defensive scent is similar to that used by almost all snakes belonging to the Columbridae family. Another way this snake will try and escape if being held, is by defecating. It does both these things as a way to make itself unappetizing to the predator threatening it.

IDENTIFICATION

Size and Shape

Newborns are usually between three and four inches long.

Full-grown adults range from nine to fourteen inches in length. The snake is thin, about as thick as a pencil.

Color

When examining the Northern Brown Snake you find a brownish color that may vary from yellowish, reddish brown, to gray background color (A). Under the scales, the skin is white and it may be visible when the snake flattens or inflates itself when frightened (B). There is a light stripe running the length of the vertebral column (C). There are also black spots on either side of the light vertebral stripe (D). These dots are not connected and run the length of the snake. Behind each eye, there is usually a diagonal blackish streak down the side of the head (E). There is also a thicker streak on each side of the neck (F). These are at the angle of the jaw.

The belly coloring is light; yellow to whitish/pink (G) and may have dark black dots on the side edges of the belly (H).

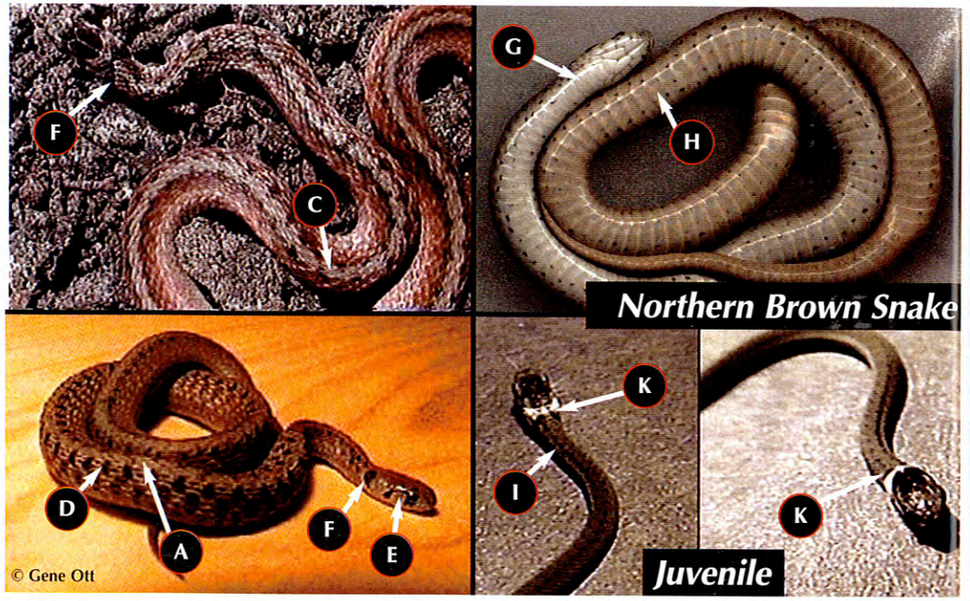
The younger snakes may be darker than the adults (I) and the black lateral spots may be missing. The juvenile Northern Brown Snakes have another interesting color difference with the adults. There is an easily seen bright yellow collar around the neck, behind the head (K).

The scales of this snake are heavily keeled, making the skin look rough.

The Northern Brown Snake may be easily confused with the Red-Bellied Snake but there are a few differences:

1. One of the differences is that the Red-Bellied Snake has three yellowish spots on the back of the head. The Brown Snake does not.

2. The Red-Bellied Snake also has a redder and more colorful reddish belly. The Brown Snake has a light colored belly.



3. The Northern Brown Snake also differs from the Red-Bellied Snake by having 17 rows of scales, whereas the Red-Bellied only has 15 rows of scales.

4. The fourth difference is that the Red-Bellied Snake does not have the diagonal stripe behind the eye, that Brown Snakes do have.

LIFE CYCLE

Courtship, Mating

Once the female is two years old she is mature enough to reproduce. Mating occurs in early spring, typically in April.

Birth

The female snake is pregnant with her young for three to four months. The young are born in late July or August. This species is viviparous, giving birth to live young, in litters of three to twenty-five, though typically around a dozen.

The young snakes are three to four inches in length at birth.

Young Northern Brown Snakes have interesting coloration. On a plain coloration, there is a bright whitish/yellow neck ring, looking like a collar behind the head. This can sometimes confuse people into thinking that they are looking at a young Ring-Necked Snake.

Overwintering

The snake is active from early April to October in the Pioneer Valley. To survive the winter, the

Northern Brown Snake hibernates from October until April. They are small enough to hibernate in larger anthills or even in some abandoned small mammal burrows.

Death

Northern Brown Snakes are very small. As a result of this they have many predators. Many animals, mammals and birds, such as hawks can eat them. The house cat catches many of these. Midsized mammals such as raccoons, opossums, and skunks, eat these snakes. Snakes, such as Racers and Milk Snakes also prey on this snake. Even something as small as a rodent or even a medium size bird, like a robin, can eat them.

BEHAVIOR AND LOCATION

The Northern Brown Snake had a very wide habitat and was widely found. People, through pollution, pesticides, and habitat destruction have really helped to decrease their population. Historically, it could be found hiding under almost any object that could cover it up; in rural or urban areas, in highland or lowland area, and in dry areas as well as moist ones. They were found in all of those places.

They could be found in the city, though in fewer numbers, in vacant lots, fields, cemeteries, piles of trash, and parks. In rural areas, they are found under flat rocks or other debris, open fields, roadsides, gardens, fences and rock walls, in farm areas as well as railroad tracks. They may be found near moist areas, such as in damp woods, fresh water, marshes, and swamps. I saw one in an overgrown field that was just plowed. The snake was near a moist area of the field. The last one I saw was at a friend's field, not forty feet from her house.

They may be found at the edges of forests or woods, where they are found under leaf litter, logs, or brush piles. These snakes dig into the loose dirt, hiding, but they may also just go into surface debris. Sometimes they could be found in stumps of rotting trees that have loose bark still around the trunk.

The Northern Brown Snake is very shy, and spends a great deal of time hidings under surface debris. When it hides under the brownish colored leaves, its color camouflage, and small size makes it difficult to find.

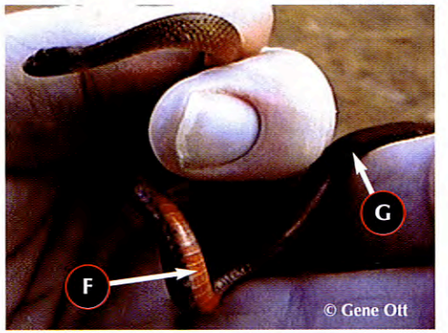
This snake moves only within a small range of ten feet per day. Throughout the year, these snakes can be found in large groups, even when hibernating, which indicates that they are not particularly territorial. In the summer months of July and August, when it is too hot, they burrow more deeply into loose soil, searching for cooler temperatures. As a result, they are even less commonly found at those times. The males are most active in the spring night, when they are in search for mates.

They are most active in early evening to early morning, one of the few New England snakes active at night. To avoid the predators of the day, the daytime heat, and in order to find their food, they seek out the cool times of the evening and night. This works well with their shy tendencies and with the fact that the snakes are so small. Hiding during the day is a great survival adaptation.

FEEDING

The Northern Brown Snake is a small snake, so it does not have big teeth. This means it can not eat even small mammals. Its main diet is earthworms and caterpillars. They also eat snails and slugs and in general, other soft-bodied insects and smallish critters. They could occasionally eat minnows and tiny toads.

NORTHERN RED-BELLIED SNAKE



The Genus *Storeria* is related to both Water and Garter Snakes. This particular Genus's two largest species can be found only in the United States. The two larger types, the Northern Red-Bellied Snake or *Storeria occipitomaculata* and the Brown Snake *Storeria dekayi* have keeled scales and are very gentle.

LATIN NAME

Storeria occipitomaculata occipitomaculata

HOW COMMON

The Northern Red-Bellied Snake used to be commonly found in many areas. The population has declined, but is more common than Brown Snakes.

CAUTION-Approaching and handling

The Northern Red-Bellied Snakes are both small and non-venomous. They are shy and

retiring. However, if they feel threatened they will make a 'bluffing display.' In that display, they raise their heads and 'threaten you' by showing you their teeth. This is all a bluff, since they are non-venomous. This snake will hardly ever bite, even if you pick it up and hold it in your hand. If they do attempt to bite, their teeth are too small to even break the skin.

The Northern Red-Bellied Snake may show you that it is frightened at your approach. They turn over, flatten their body, and open their mouth, to make their prey think that they are dead. This mimicry, or death bluff, is most dramatically seen in the Hog-Nosed Snake. Many times predators only eat living things, and will pass on a dead, lifeless, corpse. This type of adaptation is useful, if you are small and can not defend yourself against most predators.

Another fascinating thing is that if you hold the snake, they may release musk from glands at the base of the tail. It is not dangerous. This musk works the same way as in the common skunk. Garter Snakes, Water Snakes, and Brown Snakes, which are close relatives to the Northern Red-Bellied Snake, all release musk from similar glands at such times. Lastly, the snake may defecate, if feeling threatened. Again, both these behaviors are aimed at making the snake seem less appetizing to a predator.

IDENTIFICATION

Size And Shape

Newborns are three to four inches long, and around the thickness of a pencil.

Adults measure eight to ten inches on average, at times growing as large as fifteen or sixteen inches. As such, they are smaller than the other Storeria, the Brown Snake.

Color

The Red-Bellied Snake is found in a few different phases (colors), though some coloration will be constant among all of the phases. The dorsal, back, phases vary from light tan to gray to earth color (A). The head and the lateral sides are darkest (B). A very dark, almost black phase is possible as well. A wide, pale, vertebral stripe, over the spine is present (C), being most clear in the front half of the snake (D). Dark lines surround this.

There are three light colored blotches found on the neck, one right over the spine and one on either side of it (E). These three blotches are important characteristics of the snake. The easiest way to identify the snake is by the red belly and the three pale blotches on the nape. There is a fourth and fifth light spot on either side, below and posterior to the eye.

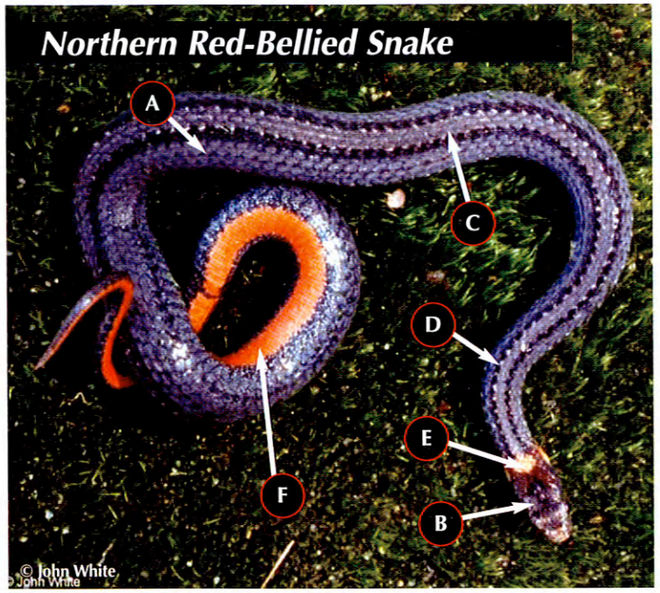
The belly is intensely colored reddish (F). This can vary from red to pink or orange. There can be an irregular dark stripe running along the outer edge of the belly.

The young may be darker than the adults and have less marking (G).

The scales on this snake are heavily keeled, making the skin look rough.

The Red-Bellied Snakes may be confused with Northern Brown Snakes but there are a few important differences:

1. The Red-Bellied Snake has three light colored spots on the back of the head.
2. The Red-Bellied Snake also has a redder colored belly, having red-orange scales. The Brown Snake has a lighter, yellow belly.
3. The Northern Brown Snake also differs from the Red-Bellied Snake by having 17 rows of



scales, whereas the red-bellied have only 15 rows of scales.

4. The fourth difference is that the Red-Bellied Snakes lack the diagonal stripe behind the eye, that Brown Snakes have.

LIFE CYCLE

Mating

This snake is viviparous, which means it is live-bearing, instead of producing eggs. Once the snake is about two or three years of age, the female is mature enough to reproduce. Breeding occurs in spring and autumn. The female snake is pregnant with their young for three to four months. They give birth in mid June to August.

Birth

Litters are typically five to twelve snakes born at one time. Neonates are three to four inches in length and darker and less marked than adults. A light phase snake may give birth to a dark snake. Likewise, a dark phase snake may give birth a light phase neonate.

Overwintering

To survive the winter, the Northern Red-Bellied Snake hibernates from October until April, and is active early April to October in these areas.

Death

Northern Red-Bellied Snakes are very small. As a result of this, they have many predators. Many animals, mammals and birds can eat them. Though large birds such as hawks can eat them, even something as small as a rodent or even a medium size bird can eat them.

BEHAVIOR AND LOCATION

This is a shy snake, hiding most of the day. It can be found coiled, hiding under flat rocks or under leaf litter, moist mulch, or hay thrown down in a garden. Their range is very small which means that they can only live in a moist area; there has to be enough moisture for their food to live on. This means that living in wet woods, such as pine forests, or in wet meadows is preferable.

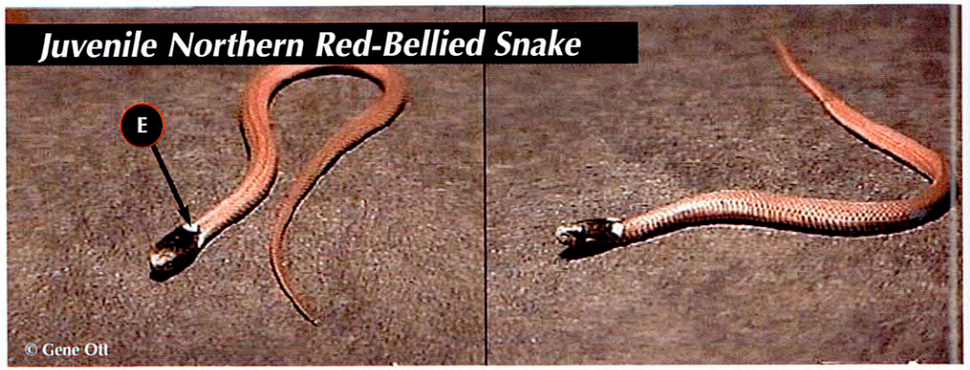
The Northern Red-Bellied Snake is more common than the Northern Brown Snake in high dense woodlands but also loves to live amongst all sort of rocks or logs in clearings, places where you

may find Northern Brown Snakes as well.

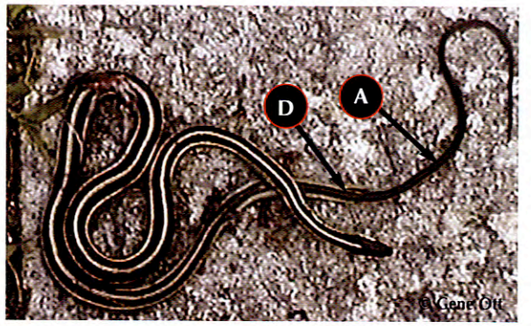
The Northern Red-Bellied Snake may show you that it is frightened at your approach. They turn over, flatten their body, and open their mouth, to make predators think that they are dead.

FEEDING

Because this snake is small in size, the food they eat is smaller in nature, as well. Also because of the slight musculature, the food tends to be soft. They eat mainly slugs, but also earthworms and sometimes snails.



EASTERN RIBBON SNAKE



The genus *Thamnophis,* which includes the Ribbon Snake and the Garter Snake, is contained in the subfamily *Natricinae,* Greek for bush serpent. The genus name tells us something important about the snakes. The snakes in this genus are so named because they love to live within bushes around water. Ribbon and Garter Snakes have three long lines, or stripes, one over the spine and two side stripes. These stripes are the major characteristic of the genus and once you see them, you will be down to two snakes in the valley, the Eastern Ribbon Snake and the Eastern Garter Snake.

The name *Thamnophis* stands for pretty snake, which tells us something about the snakes, considered elegant due to the stylish stripes, like ones found on stylish cars. There are four subspecies of this snake in the United States, but only one that lives in the Pioneer Valley.

This genus is related to the Water Snake. This means that the way they live their lives is going to seem similar.

LATIN NAME

Thamnophis sauritis sauritus

HOW COMMON

The Eastern Ribbon Snake is one of the most common snakes in this region.

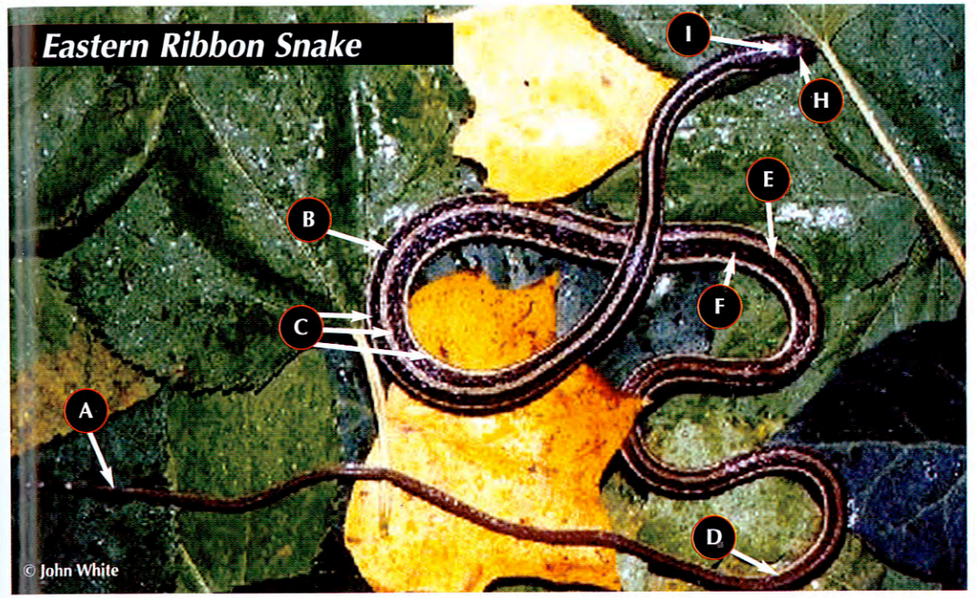
CAUTION-Approaching and handling

The Eastern Ribbon Snake is almost completely harmless. If you get close to it, it will most likely try to escape very quickly into tall grass, making it hard to catch in the first place. If you do succeed in catching it, the snake will thrash around, but most often will not bite. The most common defense it uses if you hold it, is to release a foul smelling greenish yellow discharge, called musk, from glands at the base of the tail. It is not dangerous at all. This scent works the same way as it does for the common skunk. Garter Snakes and Northern Water Snake also release musk. The idea is that the snake makes itself smell unappealing as a food to any predator.

IDENTIFICATION

Size and Shape

Newborns are seven to eight inches long, twice the length of Brown or Red-Bellied Snakes. Adults range from eighteen to thirty inches in length, though rarely more than thirty inches. The



female is larger than the male.

Ribbon Snakes are very slender, so slender that a full size snake weighs about a quarter of a pound. A fully-grown snake is the thickness between a pencil and magic marker, thicker than a Brown Snake, but thinner than a Garter Snake.

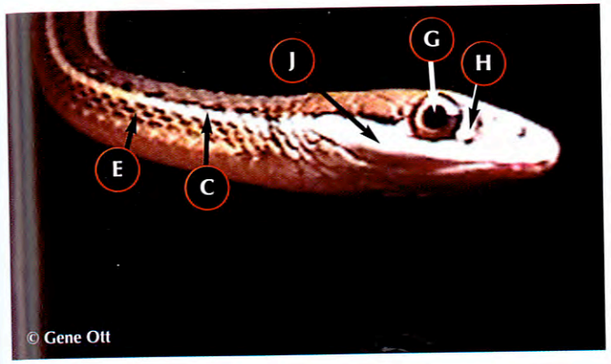
The Ribbon Snake is similar in looks to the Garter Snake but with a much longer tail (A). The tail length of the Ribbon Snake is about one third or more of total snake length. The tail in snakes begins at the anal opening.

Color

The body is a dark-green, dark-olive or dark-brown or black color above, as a background (B). Similar to Garter Snakes, this snake has three light colored stripes (C). The lateral, side-stripes are found on the 3rd and 4th rows of scales, if you count up from the belly. The stripes are light tan, golden, yellow, or slightly greenish, running down the length of the body. The vertebral stripe may be greener than the lateral ones. The two lateral stripes do not reach the tip of the tail (D). Each of the side stripes is bordered below by a brown stripe (E). There are two rows of spots between the spinal stripe and the side stripes, which are easier to see if you stretch the skin (F).

The eyes look large for the size of the snake (G), when you compare them to the Garter Snake. This is true for the Smooth Green Snake as well. In front of the eye there is a large white or light-yellow spot (H). There are sometimes two little dots that are white or creamy-yellow at the top of the head, set behind the eyes (I).

The scales just below and above the mouth opening are clean, bright yellow or white with no



markings or patterns (J). This is a differentiating point from Garter Snakes, which often have many little dark lines showing between each scale.

The belly of this snake is pale yellow-blue, yellow-green, or green without other markings (K).

Juveniles have a similar pattern to adults, although they are slightly lighter, darkening as they age.

The scales are keeled.

LIFE CYCLE

Courtship, Mating

Ribbon Snakes reach sexual maturity at about twenty to twenty-one inches. Mating occurs in April and May. The main active period for Ribbon Snakes generally runs from late March/April through September, with males active in May, while looking for a mate, and females active in August, while birthing young.

Birth

Ribbon Snakes are viviparous, giving birth in July or August. The snake gives birth to between five to twenty, with an average of ten born at a time. Newborns measure seven to eight inches long, which is twice as long as the Brown Snake or Red-Bellied Snake. Juveniles are similarly patterned as the adults, though they are slightly lighter, darkening as they age.

Overwintering

This snake overwinters from October to late March or early April. Brumation occurs in a variety of locations, including rocky hillsides, rodent burrows, and ant mounds.

Death

The Ribbon Snake has many predators. Raccoons, minks, skunks, herons, the midsize common predators prey on this snake. So too do other larger reptiles and amphibians, such as Black Racers, snapping turtles and bullfrogs. Because the snake lives so close to bodies of water

and because it is small, and because it lacks a good defensive measure, it is prey to these amphibians. Their main defense is their speed. When it senses danger from you, from the land, it quickly makes its way towards the shoreline with its tall grasses or bushes.

The most devastating thing to the snake, though, is not these predators, but the drying up of wetlands, or turning lands into farmland, that removes potential living space. With the habitat shrinking, so too will the total population of the snake.

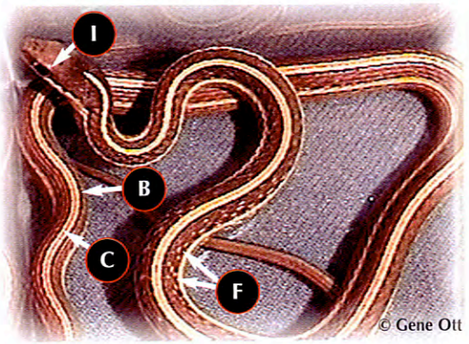
BEHAVIOR AND LOCATION

The Ribbon Snake is semi-aquatic, and semi-arboreal. The aquatic part means that it lives near water, the water being either permanent or semi permanent. It lives at the shore within grasses, cattails, wet meadows, creeks, swamps, ponds, ditches, and marshes. The water does not have to be permanent or deep, so, in that respect it is different from the much larger Water Snake, which needs both permanent water, as well as deep water to survive. The Ribbon Snake uses water for two reasons, for a supply of food and for escape. This snake basks at the water's edge. If something frightens it, it can quickly slide into the water or slither into nearby grasses or cattails. The snake swims very well, staying on the surface, again showing a difference with the Water Snake that dives to escape. The more Ribbon Snakes found in any area, the more it is likely that the wetland is healthy. The reason is that only a healthy supply of food could keep these alive; the more food, the more potential snakes. As a result, South Amherst may be the best place to see these snakes.

The snake is most active during wetter times, such as the springtime. When the dry time of

summer arrives, they become lazier during the day.

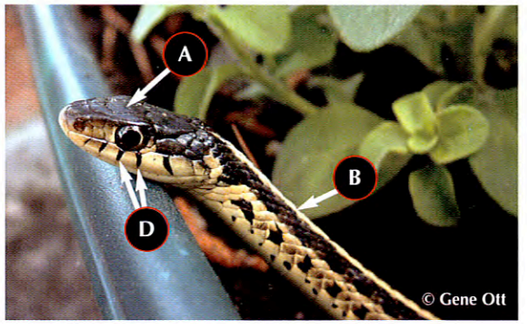
The Ribbon Snake is also semi-arboreal, meaning it is an okay climber, basking on lower bushes that overhang or are very near the water's edge, where it can easily drop into the water, if threatened.



FEEDING

The Ribbon Snake hunts mostly at night, stalking small prey. They eat mostly amphibians: frogs, tadpoles, toads, and salamanders. They also eat small fish, beetles, leeches, and spiders. One expert reported that he does not think they eat as many earthworms as other small snakes do.

EASTERN GARTER SNAKE



The genus *Thamnophis*, which includes the Garter Snake and the Ribbon Snake, is contained in the subfamily *Natricinae*, Greek for bush serpent. The genus name tells us something important about the snakes. The snakes in this genus love to live within bushes around water. Garter and Ribbon Snakes have three long lines, or stripes, one over the spine and two side stripes. These stripes are the major characteristic of the genus and once you see them, you will be down to two snakes in the valley, the Eastern Ribbon Snake and the Eastern Garter Snake.

The name *Thamnophis* stands for pretty snake, which again tells us something about the snakes, considered elegant due to the stylish stripes, like stripes found on stylish cars. There are twelve subspecies of Garter Snakes found in the United States, though only the Eastern Garter Snake is found here.

This genus is related to the Water Snake. This means that the way they live their

lives is going to seem similar. It is possible that the Water Snakes evolved from Garter Snakes long ago.

NAME

Eastern Garter Snake, also known as the "Garden Snake." The stripes on the snake gave it the name because they resembled garters used to hold up socks!

LATIN NAME

Thamnophis sertalis sertalis

HOW COMMON

The Garter Snake is the most common snake in this region. It may even be the most common snake in North America, found most commonly wherever there are moist grassy areas and found least in dry, arid, desert areas.

CAUTION-Approaching and handling

This snake is the most common snake around here, so it is obviously the snake that is most common for people to come upon. People have a long history of interaction with this snake. While it has been picked up and played with by more people, especially children, than any other snake, there are a few things to consider, because the snake is not totally harmless. At times they are calm and able to be picked up, but at other times, they do not like it and resist a lot. I remember a group of Garter Snakes that fought intensely to escape my friend's capture.

The most common thing this snake tries to do is hide from people, if they are pursued. It will quickly slither away to hide. If you wait in that general location, though, they will often come back. I once was at a lakeside, where several Garter Snakes lived amongst rocks near the cabin. When we would come near them the snakes would hide, but after only a few minutes, they returned.

One interesting thing to see is that if you scare them, they may thrash about intensely, or raise their head and move it side to side faking a posture as if they are going to strike, but only hitting you with their head. With all the movies about snakebites, this could be scary!

The most common defense mechanism it uses if you hold it, is the release of a foul smelling greenish yellow discharge, called musk, that is not dangerous, from glands at the base of the tail. This is similar to what a skunk does when scared. Ribbon Snakes and Northern Water Snakes also release musk. The idea in snakes is that the snake makes itself smell unappealing as a food to any predator.

These snakes do not have fangs, and are non-venomous, but they do have sharp teeth. If they bite you, it may be a solid bite, and it may be hard to get them off of you; they differ in this way from the weak-jawed Ribbon Snake. Some people, on rare occasions have a severe toxic reaction to the bite. This is not a venom reaction but rather a hypersensitivity to the bite, just like what some people get with bee stings.

IDENTIFICATION

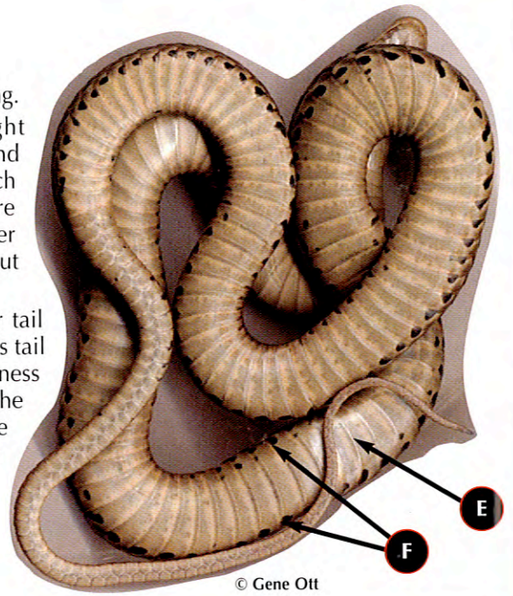
Size and Shape

Newborns and juveniles are seven inches long.

Adults range from twenty to twenty-eight inches long, averaging around two feet and are much thicker than Ribbon Snakes, which are thinner, and Brown Snakes, which are extremely thin, but much thinner than Water Snakes, which are in the same family but thicker.

Females are much larger, but have a shorter tail than males. The male shape from the tip of his tail to head is very smooth, getting larger in thickness in the middle and then thinner again. On the other hand, the female has glands where the tail and body meet, which causes a bulge around the glands.

Garter Snakes have heavily keeled scales on their backs and sides giving this snake a rough looking skin.

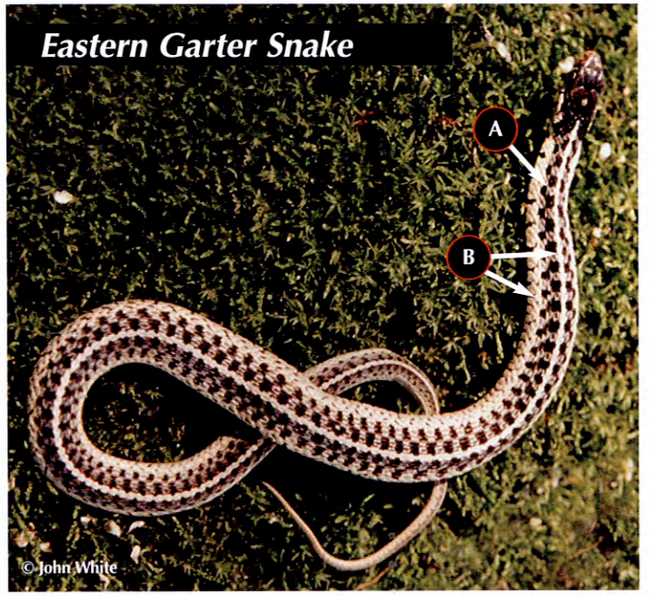


© Gene Ott

Color

The top, or dorsum, of this snake has a very large color range, with some snakes being dark or even black, while others are olive green, green, or dark brown (A).

There are three yellowish, tan or light-green stripes (B), one running down the vertebra, or back of the snake, and the other two running laterally down either side. The lateral stripes are on the 2nd and 3rd rows of lateral scales, counting up from the large scales of the belly (C). In other words, there are two rows of the darker, dorsal, regular back color between each lateral stripe and the belly, as well as the one on top of the back.



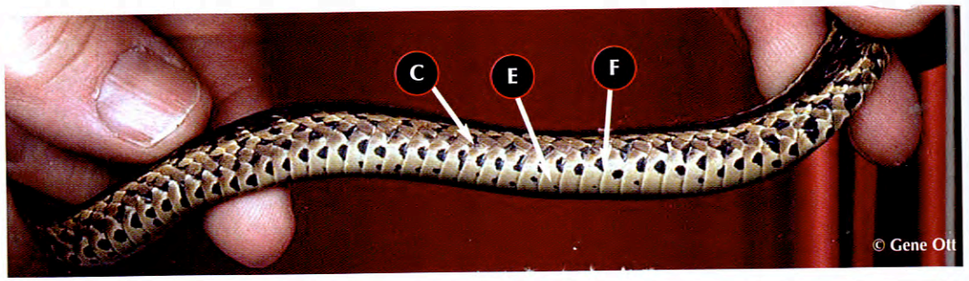
This snake's lips are barred, with dark stripes (D). This is very different from the plain lips of the Ribbon Snake. Their tongues are bright red with black-colored tips.

The belly is light green or yellow-green (E), with two rows of black spots that run down the length of the body (F).

The color of young snake is the same as the adult.

The Garter Snake is similar to the Ribbon Snake but there are a few major differences:

1. The Ribbon Snake is skinnier than the thicker Garter Snake.
2. The Ribbon Snake has a much longer tail, accounting for a third of its total length.
3. The stripes are on the 2nd and 3rd rows in Garter Snakes but are on the 3rd and 4th on the Ribbon Snake.



4. The Ribbon Snake has a clear, unbarred or plain look around the mouth, whereas the Garter Snake has barred or striped lips.

LIFE CYCLE

Courtship, Mating

Courtship begins in April or May.

Sexual maturity is reached when the snake is two years old or about a foot long.

Courtship begins soon after the snake emerges from hibernation. In the early spring, adult males come out first, with several hundred individuals emerging at a time. They wait near the den opening. Then the females come out, in a long line, this lasting some time. As the female come out, many males pursue each female, all competing for mating rights.

A "ball" of snakes can be seen, with many male snakes intertwined, competing to mate with the same single female. I have seen pictures of one hundred males intertwined into a single mating ball.

Some males actually use mimicry in mating. They produce some kind of female pheromone, which distracts other males, leaving the way clearer to mate with the "real" female. It is also possible that the "ball" observation is not to mimic mating behavior but to put all those bodies together. It turns out that they are able to raise their body temperature much faster in the ball formation than if they were basking alone. This may get them out of the hibernation low temperature, and get them ready for the rest of the growing season.

The males rub their chins all over the female, at the same time flicking their tongues out a lot, and align their body with the female's body.

When the female is ready, she stops moving, raises her body at the beginning of the tail. The male puts his sex organs near hers and they mate. Females mate only once a year, but males can mate with other females. As soon as the female mates, all the unsuccessful males leave looking for other females. It could be that some chemical is released at the time of copulation that tells the males that they will not be able to mate with that particular female anymore.

Birth

Young snakes are born in July or August, five months after mating. This is a viviparous snake. Each baby is born alive in a clear membranous sac. There are many snakes born in one litter, which can be as few as twenty and as many as forty-five. The larger and older the female, the more babies she has. One, two or three snakes are expelled at a time. The births usually take place under some cover, like leaf litter, for cover and protection. At birth they are similarly colored as adults and are about seven inches long.

After birth, the female stays nearby for a day or two but then leaves the young alone. The young may stay close to each other at first, but eventually separate as well, going their own ways.

Overwintering

They are most visible from April or May until October. At others times they are hibernating. To survive winter, Garter Snakes spend their time brumating inside smallish mammal dens, espe-

cially in fissures of rocks, or within caves. I have seen pictures and reports showing dens in rocks. On warmer days, they may move about a little, showing that they do not fully hibernate.

Dens are used over again, and the snake hibernates communally with hundreds in one den. You can especially see this in the spring time when many come out, emerging at the same time.

Death

The Garter Snake is prey to raccoons, minks, opossums, skunks, herons, kites, hawks, and other midsize common predators. So too do other larger reptiles and amphibians, such as Black Racers, and Milk Snakes.

By far, one of the biggest killers of this snake is the common cat. As you look at the habitat of the snake, you can see that it is often found where people live. That is the reason why we see so many of this species. Where there are people, there are pets, and where there are pets, there are cats. Cats tear this snake apart, and easily wipe out many of this species.

Garter Snakes live up to eight years in the wild and up to a dozen years in captivity.

BEHAVIOR AND LOCATION

The Garter Snake is the most common snake meaning that they are found in almost any habitat. You are most likely to find them around moist areas, marshes, moist woods, fields, the grassy areas near stream edges, wet meadows, garbage dumps, stone walls, gardens and hillsides. They may also be found in evergreen forests.

The Garter Snake lives in a relatively small territory of a few hundred feet, year after year. If you

spot this snake and want to show it to a friend, then come back at the same time the next day and sit without moving and you or your friend will likely see it. You are also likely to see more than one snake, because they are not territorial. While visiting a friend's cabin by a lake, I was able to see three Garter Snakes every day for nearly a week.

This snake is diurnal by nature, being most active during the day. When the snake first emerges, it spends most of its time around the opening of its den, basking, to warm itself and waiting for a mating opportunity, for the females to emerge. As the season progresses, they move away from the den to hunt. They set up a kind of makeshift 'hunting' den, away from their hibernating den, where they will spend their resting time in the summer. During the summer, they begin the day by basking to get their temperature up. After they are warmed up, they enter their predatory phase, looking for food. Once they find food, they eat it whole, and then hide beneath moist cover, resting a few hours.

The best time to look for them is not when they are hunting, because they could be anywhere, but when they are hiding and resting. These cool places are under logs, boards, and within leaf litter. This is especially true of the young, who will hide together under logs or other moist protection for a while before going their own way.

FEEDING

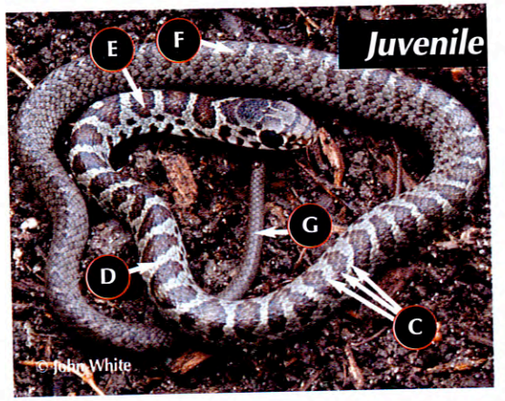
It is unclear if females eat when pregnant. Garter Snakes hunt mostly during the day and are able to change their diet as the food changes from month to month. This is a great adaptive strategy, allowing the snake to eat a large variety of things. The Garter Snake grabs the prey whole and

works it into its mouth. As a result the prey has to be small. Small toads, frogs, tadpoles, salamanders, fish, small mammals, large insects, and nestling birds are the staples of their diet.

In water, they use their vision, weaving their heads from side to side, scaring anything that is alive, making it want to flee, but when it moves, the snake grabs it and swallows it whole. On land, they use their sense of smell instead. One of the snake's favorite foods is the earthworm. It turns out that when earthworms move they leave behind a chemical 'trail' made from their skin. The Garter Snake smells the chemical, and can then easily find the earthworm, even if the earthworm is under the ground, dig it up, and eat it.

NORTHERN BLACK RACER

There are twelve subspecies of Racers, but only one lives in our area. The Northern Black Racer is a non-venomous snake.



LATIN NAME

Coluber constrictora constrictor

NAME

The genus name, *Coluber*, in Latin means "serpent." The species name, constrictor, is derived from Latin "con" meaning "together" and "strictus" meaning "drawn". In this case, the name is used incorrectly because this snake is not really a constrictor snake.

HOW COMMON

The snake is considered common. Two possible reasons are that it has a large variety of habitats where it can live, as well as a many different types of foods, which it can prey

upon. Because of its large size, it often scares people, who may kill it, making the snake rarer, like all the snakes in our area.

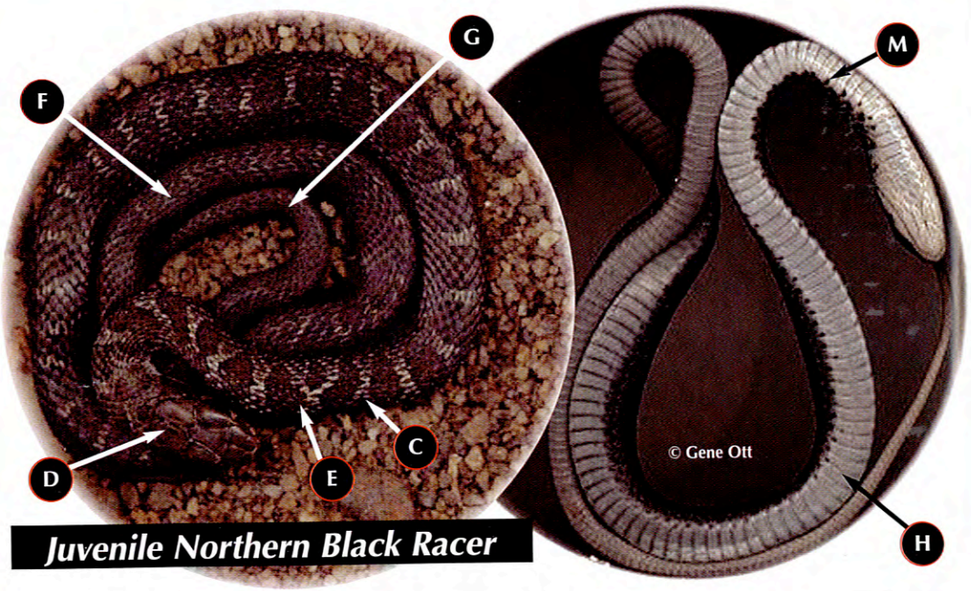
CAUTION-Approaching and handling

The Northern Black Racer is non-venomous, but you should still approach it with caution. It is a moody snake, sometimes it acts peaceful, but at other times, it may bite if provoked.

When the snake is startled, the most likely behavior tells us right away why the snake got its name. It races away from threatening creatures into the safety of grasses or into brush. It's incredible how fast it moves under cover. It is because of that speed that the snake got the name "Racer." Most of the time it slips away quickly on the ground.

Every so often, especially in the springtime, when it is mating season, a Racer will not try to escape. Instead of quickly retreating, it holds its front half up, looking straight at you, and moves slowly towards you (A). To add to the threat, it begins to vibrate its tail on dried leaves, creating a sound that resembles the rattle of the Rattlesnake. This is sound mimicry that the snake developed for defense. To further add to this threat, it bluff strikes, or pretends to want to strike you, as if it is trying to bite. To say the least, this is all very frightening to see in a big black snake that you came upon.

During a more aggressive time, if you trap it and try to pick it up, the snake will writhe, trying to escape, and may repeatedly bite you. The teeth are small and the jaw weak, so you will not get really badly hurt. But in general, do not try to pick it up. That is safer for the snake and for you.



Juvenile Northern Black Racer

IDENTIFICATION

Size and shape

The hatchlings are ten to twelve inches long.

The Northern Black Racer adult snake is thin and long; many are three to six feet long.

Black Racers show little sexual dimorphism, with the female being slightly larger, though with a shorter tail.

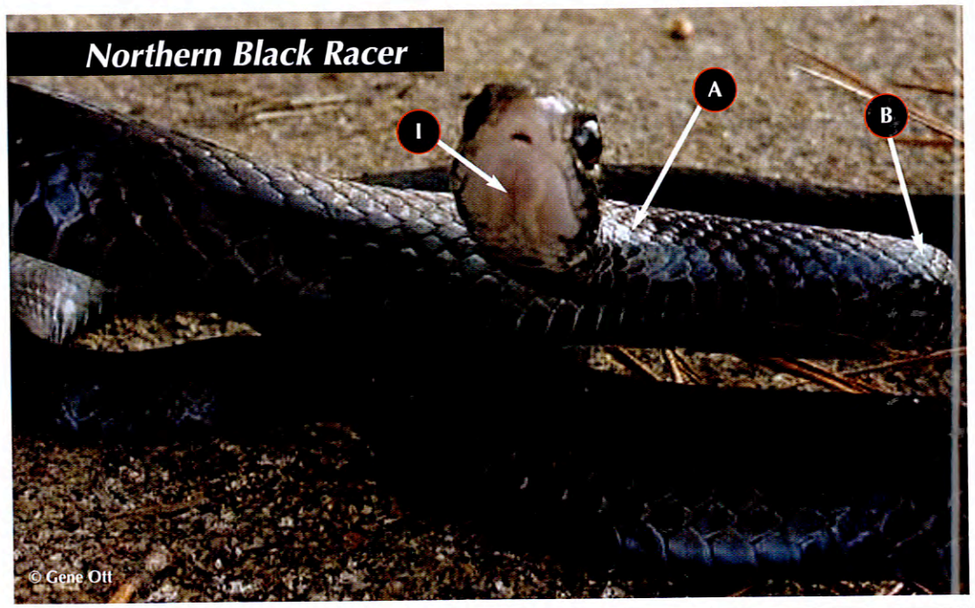
Color

This snake has smooth skin, with scales that are not keeled. This gives the skin a smooth satiny, silky look **(B)**.

The snake is dark to black in color.

Because of the color and the size, Black Rat Snakes are often confused with Northern Black Racers. The Black Rat Snake has keeled scales and a shiny skin, and the Racer has satiny skin and the scales are not keeled. Remember also that the Black Rat Snake often sits there when approached, but the Racer races away.

Hatchlings and juveniles are strongly patterned **(C)**. The ground color is gray, tan, or light brown **(D)**. Right over the spine, dorsally, there is one row of big, dark gray, brown or red-brown blotches or cross-bars **(E)** beginning behind the head, running right down the back. The blotches on the front half of the snake **(E)** are more clearly defined than the back part of the snake **(F)**. By the time you get to the tail, it is hard to see any pattern **(G)**. The belly is gray **(H)** with little dark spots **(M)** on either side.



As they age, the juvenile's ground color darkens and loses its entire pattern. By adulthood, all of the light gray color as well as the pattern disappear, except for the chin, which stays pale gray. This change happens at about three years of age, or at about twenty-five to thirty inches. As they reach adulthood, they are uniformly black, gray, or blue-black dorsally **(B)**. This also helps us tell the difference between the Rat Snake and the Racer, as the adult Rat Snake keeps traces of its dorsal blotching; the adult Racer does not.

The belly is gray or yellowish but the chin is gray to white **(I)**.

LIFE CYCLE

Courtship, Mating

Racers emerge from hibernation in April, and breed in late April or early May. Males crawl over the female as a courtship dance finally lifting her tail to mate.

Racers are oviparous, or live bearing, producing five to twenty-five eggs, though the average is around fifteen. The number of eggs is related to the size of the female. The eggs are about one to one and a half inch oval, white, and have a leathery and roughly surfaced shell, with a starburst pattern on their end.

The eggs are deposited in June or early July, with several females laying eggs in the same nesting location.

The eggs are deposited in moist wood, such as stumps of cut trees that are rotting, decaying leaves, or mulch piles. Rodent or small mammal tunnels are also possible as nesting sites, and also under rocks or logs. The females are seen coiled on top of the clutch.

They reach sexual maturity around two years, or two feet in length.

Birth

The eggs incubate for a period between one and a half and two and a half months, depending on how warm the eggs have been. They hatch between mid August to September. The hatchlings are ten to twelve inches long.

Hatchlings and juveniles are strongly patterned (C). The ground color is gray, tan, or light brown (D). Right over the spine, dorsally, there is one row of big, dark gray, brown or red-brown blotches or crossbars (E) beginning behind the head, running right down the back. The blotches on the front half of the snake (E) are more clearly defined than the back part of the snake (F). By the time you get to the tail, it is hard to see any pattern (G). The belly is gray (H) with little dark spots (M) on either side.

As they age, the juvenile's ground color darkens and loses its entire pattern. By adulthood, all of the light gray color as well as the pattern disappear, except for the chin, which stays pale gray. This change happens at about three years of age, or at about twenty-five to thirty inches long.

Overwintering

Racers return to their previously used dens each fall, and hibernate in large groups, often sharing the den with other snake species, such as Copperheads and Rattlesnakes. The dens are in deep cracks or crevices in rocks, or abandoned mammal holes.

The Racer is one of the first snakes to emerge from hibernation, in early April. They begin brumation, or hibernation, in September.

Death

The hunting birds, like hawks, prey on the snake, as do smaller mammal hunters such as the bobcat. However, humans are the most dangerous threat. Being scared by its size and its threatening, bluffing, feigning strikes, people kill the snake unnecessarily.

To offer some protection during vulnerable times, the snake may hide in rodent tunnels.

Their lifespan may be around fifteen years.

BEHAVIOR AND LOCATION

The Black Racer may be found in many different habitats, anywhere there is plant life. Best areas are overgrown fields, gardens, meadows, pastures, and forests. They are found in the woods, especially where the woods are close to grassy areas, hilltops, or other rocky hillsides. When not in the woods or fields they may be found along fence rows, roadsides, or stone walls. Lastly, they may be found near the edges of bodies of water, ponds, marsh, or swamps.

While they are most often found on the ground, the Racer can climb low branches or dense shrubs, climbing to either escape danger or to hunt. They, however, do not climb as often, or as well, as the Black Rat Snake.

Even though we can find Black Racers in many locations, each individual snake is territorial, having a home range of several acres.

The snake likes to get really hot; in fact, they tolerant temperatures that other snakes can not. As a result, they are active mostly during the day, basking on shrubs or trees, or on other hot surfaces

like rocks and roads. They like heat so much that they stay completely diurnal, and to stay warm on those cool days and at night, they hide under logs, boards, or other surface debris. Once warm enough, they hunt for prey.

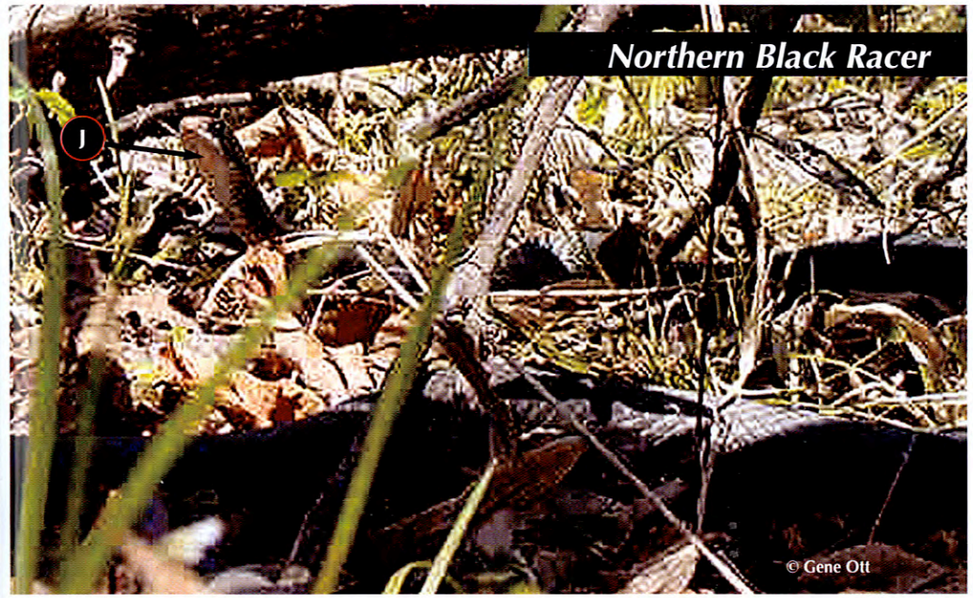
There are some other interesting behaviors that are listed in the caution section above and the feeding section below.

FEEDING

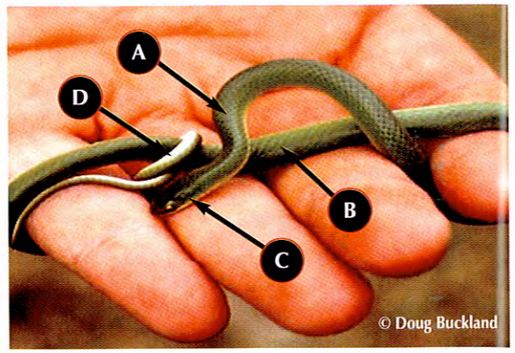
When hunting for food, the Black Racer uses the same tactic as mentioned under caution; it raises its head, neck and upper body above the level of the grass (J). They look like Cobras do in the movies when they do that. This is an interesting strategy for them. On the one hand the tall grass protects them, so that they do not have to deal with so many predators. On the other hand they get to lift above their protection and get a good look around them, spotting prey on the ground or in a tree.

When it spots prey on the ground, the Racer uses a similar tactic to the one they used in defense. First, they speed towards it at an incredible pace. Remember that the snake is misnamed a constrictor; it is not. The snake pins the prey down with its body and then repeatedly bites the prey until it gives up fighting. It then swallows the still living prey, whole.

The young snakes more often eat invertebrates and insects, such as cricket, grasshopper, moth and butterfly larvae. The adult diet is more diverse, including larger prey; small mammals, such as mice, chipmunks, and young squirrels, as well as lizards and reptiles, such as frogs and toads, small snakes; and birds, such as sparrows, blackbirds, and nestling birds and their eggs.



Eastern Smooth Green Snake



There is only one beautiful snake that has an intense green color living in our Valley. The picture of this snake wrapping itself on the hand shows its sweet elegance.

LATIN NAME

Liochlorophis (formerly placed in the Genus *Opheodrys*) *vernalis vernalis*

HOW COMMON

The Eastern Smooth Green Snake is one of the rarest snakes in this region.

CAUTION-Approaching and handling

This is a very gentle snake, harmless to people. This is a small snake that almost never bites if held; its mouth is too small to put your finger in. Even if it does try to bite, it can not cut your skin, it is that small. If held, the snake will wind around your hand (A). Instead of aggressive defense, where they attack if threatened, the main strategy this snake uses to survive is its green color, used as camouflage. The color helps the snake blend easily with plants that are around it. When frightened, the snake will often stop moving and get away looking like another green part of the plant. It might even move back and forth in time with grass, looking a lot like another blade of grass. If you get very close to it, the snake opens its dark mouth trying to startle you. It also releases musk or feces from its anal gland as a last resort, to make it unappealing to eat.

IDENTIFICATION

Size and shape

Newborns are anywhere from five to six inches long.

Adults may range in size from eleven to twenty inches long.

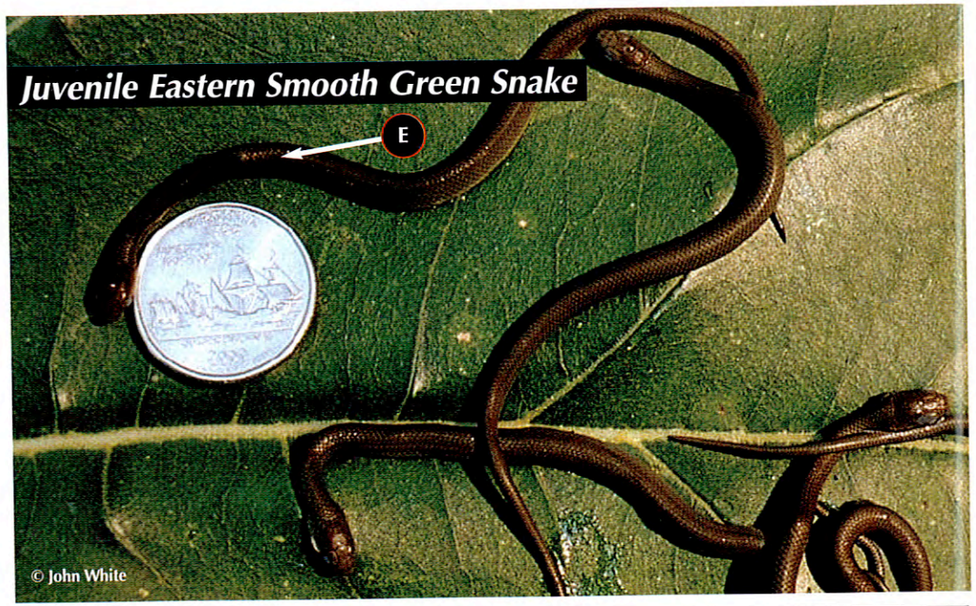
This is a slender snake with a long tail.

Females are slightly larger and heavier than males.

Color

The quickest way of identifying this snake is by its very green dorsal colored scales (B). This is the only snake in the Pioneer Valley that has this solid green coloration. The lips and chin are a paler green, toward a whitish color (C). Its belly is white or yellowish white (D).

The green color in the snake is made up of the two colors, blue and yellow. After death the yel-



low pigment breaks up quickly, leaving the body bluish in color. In other words, if you find a one to two-foot dead snake with the coloration of an adult Black Rat or Racer Snake, it is probably a Green Snake. The adult Rat and Racer Snakes are large. When they are only a foot or two long, they are juveniles, and as juveniles those two snakes have an intense blotched patterned skin.

Juveniles have darker coloration than adults do. They may be tan, brown, gray, or olive colored (**E**). They develop their green color later in life.

The scales are smooth, or not keeled.

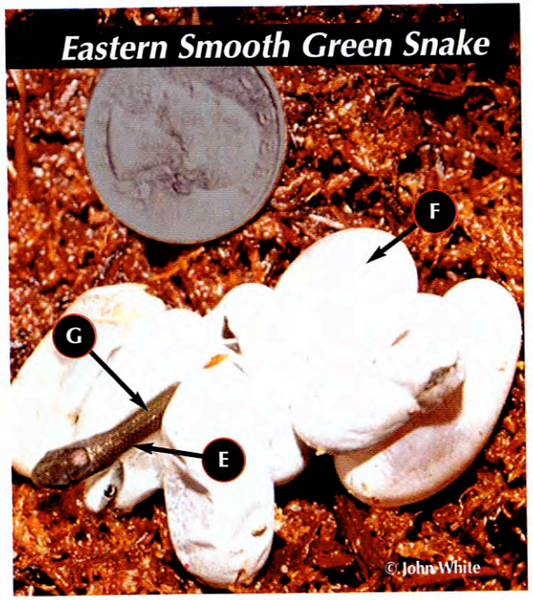
LIFE CYCLE

Courtship, Mating

This snake reaches sexual maturity at two years of age. They mate in late spring or early summer.

Birth

The snake is egg laying, laying three to seven thin, oval eggs at a time (**F**). This usually occurs during the summer. Females sometimes incubate the eggs inside their bodies, sometimes for a long time before laying them in nests. The reason people think this is true is that there are reports that some of these snakes are fully incubated and hatch out of their eggs within four or five days of being deposited. If she had not incubated them for a long period of time, then it could be nearly a month before they emerged. The usual places the eggs are deposited are in rodent burrows, and mounds of rotting vegetation, or rotting logs. Sometimes several Green Snakes will deposit their eggs in the same nest.



The young emerge in late summer or early fall (G). There may be between three and seven born at one time, unless more than one female deposited her eggs in the same location, in which case there are more.

Newborns are anywhere from five to six inches long. Juveniles have darker coloration than adults do. They may be tan, brown, gray, or olive colored (E). At this early stage, they may be confused with juvenile Black Racers, but the Racer has a blotched pattern while the Smooth Green Snake does not. They develop their green color later in life.

Overwintering

The snake usually overwinters by itself, but may become communal at times, hibernating with other Green Snakes. They overwinter from fall to April or May. They hibernate in rock crevices, and mammal burrows.

Death

The Smooth Green Snake is becoming rarer in this Pioneer Valley, possibly even becoming extirpated. The most likely reason has to do with their food supply. The snake eats insects. Like most predators that eat insects, problems occur because of people. We use a great deal of pesticides to control insect populations, be it for crops, or West Nile Virus, or for other reasons. But the bottom line is that, while we are trying to get rid of some insects, all insects suffer. As the total number of insects lessen, there is less food possible for the snake. When it is harder to find food, the snakes do not prosper. Related to this point is a problem that involves the food chain. As the snake eats insects that have pesticides, it is actually concentrating the pesticides that are found in each insect in its body. The snake will get sick from all the pesticide.

The main natural predators are birds of prey, as well as some mammals such as opossums and skunks, and sometimes, other larger snakes, like Milk Snakes.

As mentioned before, the color green in the snake is made up of the two colors, blue and yellow. After death, the yellow pigment disappears quickly, leaving the body now bluish in color.

The lifespan of the Green Snake is up to six years.

BEHAVIOR AND LOCATION

Green Snakes emerge in April or May and mate in late spring to early summer.

You can find this snake hiding or shedding under cover, like logs, rocks, or abandoned farms, where there are all kinds of surface boards lying about. While the snake is able to climb, it is most often found on the ground, looking like grass. The snake looks for and hunts insects but it uses

camouflage, so it is found in grassy fields, abandoned orchards, meadows, in tall grasses and near the edge of the woods, or where shrubs have been cleared. Insects are found near water, so these predatory snakes follow, found in damp woods and marshes. They especially like hillsides with open grassy areas.

The snake establishes a small territory to live in. You may find the same snake within the same fifty yards during its active season.

The sensory organ the Green Snake uses primarily is its eyesight. It uses its great sense of sight to see potential threats before the threatening predator sees it, as well as for finding insects. The snake has developed an overlap in its line of vision between the two eyes, giving it a great depth of vision, which makes it an accurate hunter. Because the sense of sight is so important for this snake, it hunts and is active mostly during daylight hours.

Where some species of snakes are aggressive, biting if attacked, or other species mimic threatening behavior or death, the Smooth Green Snake survives chiefly by camouflage. It is found during the day among other green vegetation, and the snake stops moving and attempts to blend with the grass if frightened.

FEEDING

The Smooth Green Snake hunts using primarily its sight, and only during the day, Other snakes use scent or the vibration that its prey makes while scurrying. Green Snakes principally prey and live off of insects. They eat moth larvae, caterpillars, flies, grasshoppers, crickets, ants, centipedes, millipedes, and spiders. Sometimes, they will also eat snails, slugs and salamanders. All of their food is eaten whole.

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Website References

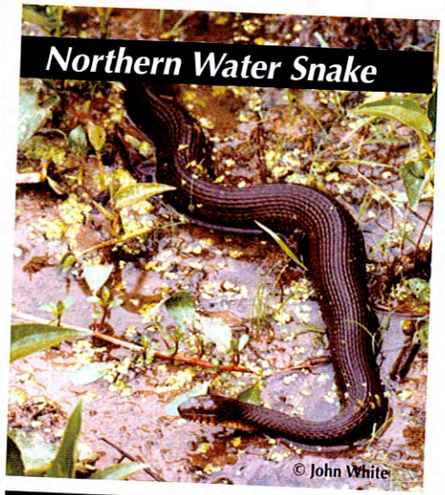
1. Iowa Herpetology website at **http://www.herpnet.net/Iowa-Herpetology/index.html** is the site that contains many pictures and a lot of information about snakes residing in Iowa, much of it by Jeff Leclere. As mentioned before, Mr. Leclere donated some of his photographs for this book. However, there is a great deal of information on the rest of his site

and it should be visited. There is a similar site for the snakes of Minnesota, with Mr. Leclere's information and photographs at **http://www.herpnet.net/Minnesota-Herpetology/.**

2. In fact, many states have a website dedicated to reptiles found in their state. If you typed in the state and the words snake and reptile in a search engine you would come up with the sites. For example:
3. **http://www.conservation.state.mo.us/nathis/herpetol/** for reptiles of Missouri,
4. **http://www.dnr.state.oh.us/publications/reptiles/default.htm** for reptiles of Ohio,
5. h**ttp://herpcenter.ipfw.edu/index.htm?http://herpcenter.ipfw.edu/outreach/INSnakeList.htm** for Indiana snakes,
6. **http://chicagoherp.org/herps/species.htm#snakes** for Illinois snakes, or
7. **http://www.mpm.edu/collect/vertzo/herp/atlas/welcome.html** for Wisconsin reptiles page.All of these sites have great pictures and a lot to say about each of the snakes described in this book. Type in your state and the word snake and reptile and you will find the specific website for your state.
8. Massachusetts has several such websites, one can be found at: **http://www.umass.edu/umext/nrec/snake_pit/index.html.**
9. **http://animaldiversity.ummz.umich.edu/chordata/reptilia/squamata.html.** University of Michigan has a great site for all snakes in our region, very well done.

10. **http://www.fcps.k12.va.us/StratfordLandingES/Ecology/home.htm.** is the site for Study of Northern Virginia Ecology, run by Mark Moran. It is a great site with a lot of great pictures and articles on snakes.
11. **http://fwie.fw.vt.edu/VHS/snakes_of_virginia.htm** is the address for Snakes of Virginia, which has great pictures, many by John White, who is a great photographer of snakes. This site has a great deal of information on each of the snakes.
12. **http://www.hognose.com/pages/photos/east.htm.** is one address for a any information you would want on hognosed snakes. Most pictures and information comes from Dennis Desmond, who has organized a great site on this snake.
13. **http://www.public.iastate.edu/~curteck/hognose.htm.** is the other great site for hognosed snakes information, with a lot of pictures and written information. It is posted, with pictures and words by Curtis Eckerman.
14. **http://members.aol.com/TheWyvernsLair/snakes/SnakeAlbum.html.** is a site with many pictures and descriptions of snakes.
15. **http://www.coastalreptiles.com/venomous_snake_pictures.htm.** Is the address for a site of venomous snakes, maintained by Mardi Snipes.
16. **http://www.snakesandfrogs.com/scra/species.htm.** is the site for South Carolina Reptiles, with a lot of information and great picturs, many by Gene Ott.
17. **http://fwie.fw.vt.edu/VHS/timber_Rattlesnake2.htm.** is a great article on Timber Rattlesnake by W. H. Martin, with photos by John White.

18. **http://www.state.sd.us/gfp/DivisionWildlife/Diversity/Digest%20Articles/sgsnake.htm.** is the site of a nice article on Smooth Green Snakes, with photos, by Doug Buckland, as part of the South Dakota Department of Game, Fish and Parks.



19. **www.turtletails.com,** a great website with lots of pictures.

FAMILY: *Viperidae*
Subfamily: *Crotalinae*
Genus: *Agkistrodon*
Species: *Agkistrodon contortrix mokasen*
Northern Copperhead
Genus: *Crotalus*
Species: *Crotalus horridus horridus*
Timber Rattlesnake

FAMILY: *Colubridae*
Subfamily: *Xenodontinae*
Genus: *Heterodon*
Species: *Heterodon platirhinos*
Eastern Hog-Nosed
Genus: *Diadophis*
Species: *Diadophis punctatus edwardsii*
Northern Ring-Necked
Subfamily: *Lampropeltinae*
Genus: *Elaphe*
Species: *Elaphe obseleta obseleta*
Black Rat
Genus: *Lampropeltis*
Species: *Lampropeltis triangulum triangulum*
Eastern Milk

FAMILY: *Colubridae* (cont.)
Subfamily: *Natricinae*
Genus: *Nerodia*
Species: *Nerodia sipedon sipedon*
Northern Water
Genus: *Storeria*
Species: *Storeria dekayi dekayi*
Northern Brown or Dekay's
Species: *Storeria occipitomaculata occipitomaculata*
Northern Red-Bellied
Genus: *Thamnophis*
Species: *Thamnophis sauritis sauritus*
Eastern Ribbon
Species: *Thamnophis sertalis sertalis*
Eastern Garter
Subfamily: *Colubrinae*
Genus: *Coluber*
Species: Coluber constrictor constrictor
Northern Black Racer
Genus: *Liochlorophis*
Species: *Liochlorophis vernalis vernalis*
Eastern Smooth Green

About the Author

Misha

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