

## Appendix A: Species Cards

Most of these cards are provided by the North Carolina Wildlife Commission. The American alligator card is from the World Animal Foundation and the marbled salamander card is from the NC Herps website. If you would like to access similar information for additional species, you can do by visiting [www.ncwildlife.org](http://www.ncwildlife.org). Click on Learning, and then click on species.

Included in this packet:

1. Diamondback terrapin
2. Eastern hellbender
3. Brook trout
4. Northern flying squirrel
5. American alligator
6. Marbled Salamander
7. Northern Bobwhite quail
8. Eastern wild turkey
9. Sea turtle
10. Clapper Rail



# Diamondback Terrapin

## North Carolina Wildlife Profiles



### Diamondback Terrapin

#### *Malaclemys terrapin*

Referred to as the “wind turtle,” some old-timers who live along the Gulf ascribe ominous powers to the diamondback terrapin. Fishermen claim that capturing a terrapin will cause the wind to blow into a squall and bad luck to befall them. In North Carolina, a diamondback terrapin shell was found in an American Indian shaman’s burial site as part of his medicine kit, no doubt a sacred object.

There are seven subspecies or, as some taxonomists claim, seven races of diamondback terrapins in North America. Two subspecies, the Northern and the Carolina, are found in North Carolina.

#### Description

Often you will hear a diamondback before observing it in the marsh. The terrapin’s powerful jaws make a popping noise as the terrapin eats the periwinkle snails and other mollusks found in the marsh grass. The hind legs are large, and the toes have extensive webs that are useful for its semi-aquatic existence. They are powerful swimmers and are feisty when picked up. Actively struggling, the diamondback is known to bite a toe or finger.

The diamondback exhibits a spotted pattern on the head and along the scutes, or plates. Even experts have difficulty identifying the seven subspecies. The coloration, patterns and shell characteristics vary greatly among individuals in the wild. Many of the captive terrapins were released in North and South Carolina after the collapse of the commercial market and may have diluted the genetics of native populations.

#### History and Status

Diamondback terrapins were once so abundant in North Carolina that they were considered a nuisance. Fishermen were sometimes unable to haul catches due to the weight of terrapins caught in their nets. But by 1920, the terrapin was a much sought-after gourmet item, costing \$90 per dozen. The market boomed and farms were established (notably in Beaufort, Carteret County) to breed the species in captivity. After World War I the market declined because the wild populations were overharvested.

Though not endangered, the diamondback terrapin today is listed both state and federally as a species of Special Concern. Because of this status within the state, a special permit is required to possess or collect this species. Loss of habitat and mortality from incidental capture in nets and crab pots pose the greatest threats to terrapin populations.

*Diamondback terrapins are beautiful turtles.*



#### Range and Distribution

The diamondback terrapin is found along the states of the Atlantic and Gulf coasts from Cape Cod, Massachusetts, to Corpus Christi Bay, Texas. The Northern diamondback terrapin is found from the northern shore of Cape Cod south to Cape Hatteras, North Carolina. From here south to Volusia County, Florida, intergradation with the Carolina diamondback terrapin occurs.

#### Range Map



### Habitat and Habits

Diamondback terrapins are adapted for life in brackish and salt water. They typically have high site fidelity, meaning they live in one area throughout their lives, and these areas include protected waters behind barrier islands, salt marshes, estuaries and tidal creeks, and flats hidden among the marsh and cord grass. Natural predators include alligators, sharks, raptors, otters, toad fish, and crabs. At high tide, they swim about the marshes in search of food; at low tide, they are found nearly or entirely buried in the mud or hidden under drift. Diamondback terrapins can hold their breath from 45 minutes (during summer) to five hours.

Sometimes groups of this species are found on exposed mudflats, basking in the sun. Mating occurs in the spring when individuals move from open lagoons into small canals and ditches. The larger female will carry her male counterpart upon her back during the courtship ritual. Hatchlings emerge from their eggs in the autumn and sometimes remain buried in the nest over winter or emerge and bury in the mud into the next spring. Adults also hibernate during the winter, submerged in the mud of tidal creeks in deep water where the mud is less likely to freeze. With the onset of warmer weather, hatchlings seek out and remain in dense cover such as marsh grasses and tidal wrack, presumably until they reach a larger size. Diamondback terrapins are mainly carnivorous and while their favorite food is periwinkle, they also eat other mollusks, crustaceans, insects, annelids and the occasional tender shoots or rootlets.

### People Interactions

Diamondback terrapins are beautiful turtles. Because of their special concern status, diamondback terrapins are protected from harvest in North Carolina. Humans affect terrapin populations in very pronounced ways. Terrapins are drowned each year in crab pots, especially derelict traps lost in the water. These death traps remain in the water where terrapins are attracted to the bait or to each other. If an individual enters a crab pot, others will follow and eventually drown. One crab pot, found in North Carolina, contained 29 decomposing terrapins. Adult females are typically too large to enter crab pots so adult males and young females are usually the casualties. Terrapin biologists advocate the use of BRDs (bycatch reduction devices), which prevent smaller terrapins from entering crab pots. The increase in raccoons and other predators associated with human development may increase adult, nest, and hatchling depredation.

### Wild Facts

#### Classification

Class: Reptilia  
Order: Testudines  
Family: Emydidae

#### Average Length

Length: male 4 in.–5 in.; female 6 in.–9 in.  
Weight: 1.5 lbs. (females) 0.5 lbs. (males)

#### Food

Crustaceans, mollusks, fish, insects, occasionally tender shoots and rootlets

#### Breeding

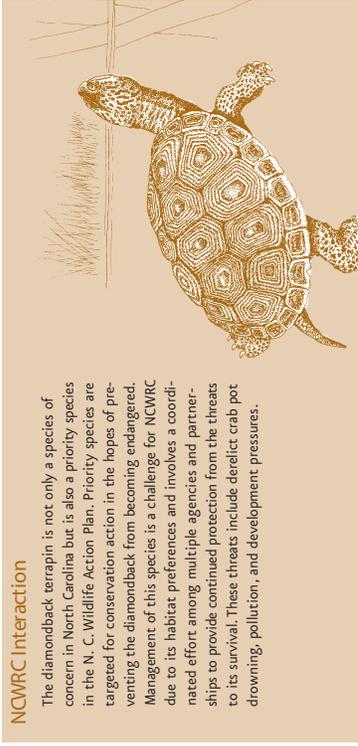
Mating occurs in the water in spring. Eggs are laid in late April–July. Clutch size varies from 4–18 oblong eggs. Eggs laid in chamber dug 6 in.–8 in. below surface; nesting occurs in the daytime during high tides. Incubation periods are dependent on temperature and vary from 65–100 days for certain nests. Age at sexual maturity is estimated at 5–8 years.

#### Young

Length just over one in.;  
weight 6 g.–10 g.

#### Life Expectancy

May exceed 40 years.



### NCWRC Interaction

The diamondback terrapin is not only a species of concern in North Carolina but is also a priority species in the N. C. Wildlife Action Plan. Priority species are targeted for conservation action in the hopes of preventing the diamondback from becoming endangered. Management of this species is a challenge for NCWRC due to its habitat preferences and involves a coordinated effort among multiple agencies and partnerships to provide continued protection from the threats to its survival. These threats include derelict crab pot drowning, pollution, and development pressures.

### Q&A—Resources for Teachers

#### 1. What is the largest threat to diamondback terrapins?

Unattended crab pots.

#### 2. What do diamondback terrapins eat?

Mollusks (especially saltmarsh periwinkle), crustaceans, worms, insects, fish, and occasionally tender roots.

#### 3. Which gender, male or female terrapins, are most affected by crab pots and why?

Males, because they are smaller and can more easily enter traps.

#### References

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Bullmann, Kurt, Tracy Tuberville, and Whit Gibbons. *Turtles of the Southeast*. (University of Georgia Press, 2008)  
Palmer, W. and A. Inneswell. 1995. *Reptiles of North Carolina*. (University of North Carolina Press, 1995).

#### Credits

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Photos by NCWRC and courtesy of Ohio University. Illustrated by J.T. Newman.

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# Eastern Hellbender

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

fact sheet, 2012



Photo by: Lori Williams

The hellbender is one of only three giant salamanders found in the world. North Carolina is home to more than 65 species of salamanders, with 50 species in our mountain region alone. The Eastern hellbender (*Cryptobranchus a. alleganiensis*) is one of the largest salamanders found in North Carolina and the United States. Only the amphiuma, a salamander shaped like an eel, is longer.

## DESCRIPTION

Hellbenders are 16 to 17 inches long on average, but they can grow to be more than 2 feet long and weigh more than 2 pounds. The hellbender's skin on its back ranges in color from grayish brown to reddish brown. Darker spots or mottled patches may also be present on the back. The belly is usually one color and generally lighter than the back.

The hellbender's head and body are flattened with a rounded snout and a pair of small, reduced eyes. Hellbenders are mostly nocturnal and rely heavily on touch and smell to catch food. The hellbender absorbs dissolved oxygen found in fast-running waters into its lungs through its skin. A loose fold of skin called a "frill" runs from the base of the neck down to the tail. The frill increases the surface area of the skin, helping the hellbender get oxygen.

Hatchling hellbenders have external gills. Gill slits located at the base of the throat replace external gills when the young reach 1½ years. The young hellbender is then able to absorb oxygen through its skin. The hellbender is mature at about 6 to 8 years of age, at which time it is about 1 foot long. It will continue to grow for many years to come.



Photo by: TR Russ

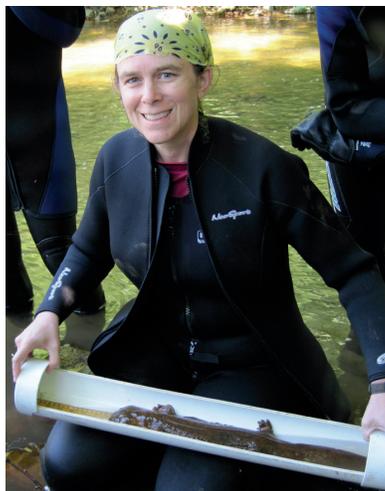


Photo by: Dottie Brown



Photo courtesy of NCWRC

## HABITATS AND HABITS

Hellbenders breed from September to early November. The males defend territories before the breeding season begins. They dig out a large saucer-shaped nest into which females lay from 200 to 500 eggs in strands held together by a sticky substance that hardens when it meets water. This keeps the eggs close together in the nest. The male fertilizes the

1 ♦ eastern hellbender

## Eastern Hellbender

eggs by spraying them with a milky fluid. The male hellbender guards the nest from predators and other hellbenders, although sometimes they may eat the eggs themselves.

The eggs are about 6 millimeters — or a quarter of an inch — in diameter. They are larger than those of any North American salamander. Mortality is high, however. A nest with 400 eggs may produce only about 90 or fewer young hellbenders. The eggs hatch into larvae in 10 or 12 weeks. Young hellbenders grow rapidly, approximately 3 inches in length each year.

Hellbenders live in rivers and large streams with clean, clear water. Fast-moving water creates more dissolved oxygen when it mixes with the air. Hellbenders need large, flat rocks and submerged trees to make nest sites and provide safety from predators. Where rocks are lacking, they sometimes live in holes in stream banks. While hellbenders are present in North Carolina's mountain counties, they usually live below 3,000 feet in elevation.

### HISTORY AND STATUS

Local names for hellbenders include water dog, mud puppy, devil dog, snout otter, grampus and Alleghany alligator. Although they are large and slimy, hellbenders are harmless and not poisonous, toxic, or venomous, contrary to popular belief. Many people are frightened at the sight of a hellbender and consequently often kill them out of fear or ignorance.

A common misconception is that hellbenders negatively impact trout or other fish populations. While a hellbender may occasionally munch on a fish or a baited hook, their main source of food is crayfish. In fact, fish can be bigger predators on young or larval hellbenders than hellbenders are on fish. The N.C. Wildlife Resources Commission has designated the hellbender as a species of Special Concern, and because of this listing, it is illegal to kill, harm, harass, collect or sell them.

2 ♦ eastern hellbender

## Eastern Hellbender

### RANGE AND DISTRIBUTION

Hellbenders were once common to the Great Lake tributaries, but pollution and poor water conditions have made this habitat unsuitable. The current distribution extends from southwestern New York, westward to southern Indiana and Illinois, to a disjunct population in Missouri, and southward through the mid-Atlantic states to northern Alabama and northeastern Mississippi. A subspecies of hellbender, called the Ozark hellbender, is found in a separate population in Missouri and Arkansas.

In North Carolina, the hellbender occurs in fast-moving, clean mountain streams in the drainages of the Ohio and Tennessee rivers. These drainages include five North Carolina river basins: New, Watauga, French Broad, Little Tennessee and Hiwassee.

### N.C. WILDLIFE RESOURCES COMMISSION INTERACTIONS

Since 2007, the N.C. Wildlife Resources Commission mountain region Wildlife Diversity Program, along with project partners from the N.C. Zoo, collaborators from the N.C. Division of Parks and Recreation, and other agencies, volunteers, universities, etc., began a long-term project to inventory, monitor and assess species status in North Carolina. The goals are to study hellbender populations in the state, revisit historical locations, discover new locations, monitor populations and increasing threats to habitats, conduct applied research and educate the public on hellbender conservation.



This grand female is the largest and heaviest hellbender North Carolina biologists have found so far, measuring 23 inches and weighing 2½ pounds. (Photo by Lori Williams)

3 ♦ eastern hellbender



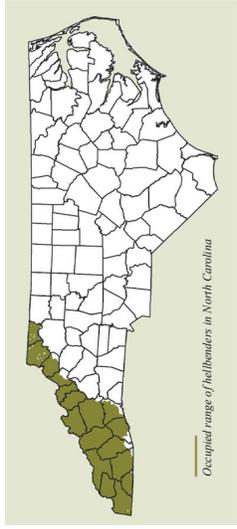
Biologists search for hellbenders in shallow rivers using snorkeling equipment. They measure and weigh them before releasing them back into the water. (Left photo by TR Bass; right photo by Lori Williams)

Once common throughout the mid-eastern United States, this giant salamander has disappeared from many streams because of declining water quality, over-collecting and persecution. Because hellbenders are sensitive to silt, sediment and other pollution in their aquatic habitat, they are considered to be a biological indicator of water quality. So, if you have a healthy population of hellbenders in your stream, you have relatively clean water.

North Carolina is fortunate that national forests protect many of the hellbender's mountain watersheds, but development, road construction and poor land use practices on steep slopes and in riparian zones threaten its habitat. Stream sediment and pollution have caused a persistent decline in water quality in the hellbender's habitat that could negatively impact hellbender populations. Increased dam construction and stream impoundment are other factors that could harm hellbenders. Dams slow down running water and cause dissolved oxygen levels to drop, thus making habitat unsuitable for hellbenders.

*Contrary to popular belief, hellbenders are harmless and are not poisonous or toxic. The N.C. Wildlife Resources Commission has designated the hellbender as a species of Special Concern. Because of this listing, it is illegal to kill, harm, harass, collect or sell hellbenders.*

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION



Occupied range of hellbenders in North Carolina

### HOW YOU CAN HELP

- Anglers catching a hellbender should carefully remove the hook or cut the line as close as possible and release the animal back into the water.
- Share your hellbender observations by contacting Lori Williams at [lori.williams@newwildlife.org](mailto:lori.williams@newwildlife.org).

### ADDITIONAL REFERENCES

#### Books

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Mitchell, J. C. and J. W. Gibbons. 2010. Salamanders of the Southeast. University of Georgia Press, Athens, Georgia. 324pp.

Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington, D.C. 587pp.

#### Websites

[www.hellbenders.org](http://www.hellbenders.org)  
[www.ncwildlife.org](http://www.ncwildlife.org)

### North Carolina Wildlife Resources Commission



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NORTH CAROLINA WILDLIFE RESOURCES COMMISSION



# Brook Trout

*North Carolina Wildlife Profiles*



## Brook Trout

*Salvelinus fontinalis*

The brook trout is regarded as one of North America's most beautiful native fish species. Here in North Carolina, local anglers often call them "specks," "speckled trout," or "brookies." Recent genetic studies suggest that the native brook trout found in the southern Appalachians, including the mountains of western North Carolina, represent a unique strain called Southern Appalachian brook trout.

## History and Status

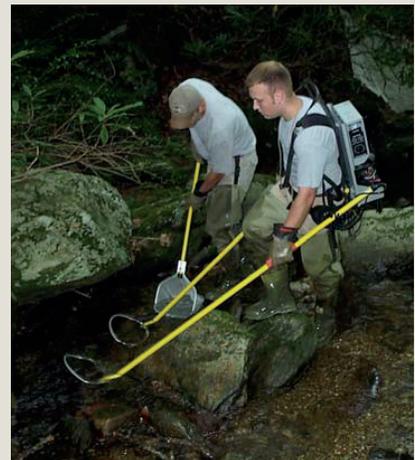
The brook trout is the only trout native to western North Carolina. Several varieties of brook trout exist within its indigenous range from the mountains of Georgia to the coastal rivers of Canada. North Carolina mountain streams once teemed with Southern Appalachian brook trout (the strain of brook trout native to North Carolina) where abundant rainfall, cool climate, cold groundwater and dense forest cover provided optimum living conditions. In the late 1800s, logging companies began to cut the vast stands of virgin timber in the mountains of the state. Early logging practices included the construction of roads and rail lines up river valleys, intensive tree cuttings on steep slopes, and the usage of splash dams to transport logs downstream. These activities caused significant damage to stream habitats. Extensive erosion and siltation from land disturbing activities limited spawning success by smothering eggs and restricting their oxygen supply, and streams that historically supported coldwater fishes were warmed due to lost canopy cover.

Northern strain brook trout (from the northeastern U.S.), rainbow trout (from the western U.S.) and brown trout (from Europe) were stocked around 1900 to replace brook trout populations lost due to logging operations. Resident brook trout were often unable to compete with rainbow and brown trout for available food, habitat and spawning sites within the altered landscape of the southeast. In addition, alterations to native brook trout population genetics have occurred due to interactions with Northern strain brook trout. With continued development of the mountain region and further encroachment on habitat by man and non-native species, the future of the wild brook trout is of concern, and since 1900, the brook trout range is thought to have declined by about 80 percent. State and federal agencies are developing strategies to identify, maintain and expand existing wild brook trout populations to ensure their survival in their native range.

## Description

Brook trout can be distinguished by the olive-green coloration of the upper sides with mottled, dark green "worm-like" markings on their backs and tails.

*One of America's  
most beautiful fish.*



## Range and Distribution

Wild brook trout are often restricted to small headwater streams in the mountains of North Carolina. Genetic studies indicate that brook trout native to North Carolina represent a unique strain called Southern Appalachian brook trout.

## Range Map



## Brook Trout

Wildlife Profiles — North Carolina Wildlife Resources Commission

The lower sides are lighter with yellow spots interspersed with fewer spots of bright red surrounded by blue. The lower fins are orange with a narrow black band next to a leading white edge.

### Habitat and Habits

Wild brook trout are most abundant in isolated, high-altitude headwater streams where the water is free of pollution and rich in oxygen. Brook trout prefer streams with stable water flows, silt-free gravel for spawning and an abundance of pools and riffles with sufficient in-stream cover, such as logs and boulders. Young brook trout feed on small aquatic and terrestrial insects. Adults eat a wide variety of aquatic and terrestrial insects, as well as crustaceans, fish and other small vertebrates.

Decreasing daylight and temperature associated with autumn signify the onset of spawning, which typically occurs between September and November. The female will construct a nest called a "redd" in the gravel substrate. The male courts the female and will chase away intruding males. Both fish then settle into the redd and release eggs (100 to 5,000 depending on the size of the female) and sperm (milt) simultaneously. Fertilized eggs are covered with gravel by the female and remain in the redd until they hatch in the early spring. Once free-swimming fry emerge from the redd it will take them approximately two years to become mature. Generally short-lived, brook trout seldom live longer than four years in the wild, and they rarely exceed ten inches in length.

### People Interactions

In North Carolina, brook trout are legally taken by hook-and-line sport fishing, and management is directed toward enhancing and protecting wild populations, while providing seasonal fisheries via stockings. Anglers prize brook trout for their delicate flesh and superior flavor, and also because of their willingness to take artificial and natural baits. Fishing dry flies, streamers and nymphs that imitate natural food items works well. This method is especially popular in North Carolina's many streams that support wild trout. Fishing baits, such as worms and corn, work well for hatchery-reared brook trout. Spin casting small spinners, spoons and crankbaits can be productive as well. Check the current trout fishing regulations on the type of lures allowed as well as the size limit and creel limit for a particular trout water before fishing.



## Brook Trout

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### NCWRC Interaction: How You Can Help

Work to protect brook trout habitat in North Carolina. Sediment is the number one source of pollution in the state and it is primary cause for the demise of brook trout populations across western North Carolina. By working to reduce erosion by stabilizing stream banks and by maintaining vegetated stream buffers, private landowners can do their part to help protect brook trout habitat. In the end, protection of brook trout habitat is the key to the perpetuation of the species.

### Wild Facts

**Classification**  
Class: Osteichthyes (bony fishes)  
Order: Salmoniformes  
Family: Salmonidae

### Average Size

Length: 6 in. to 8 in.  
Weight: ¼ to ½ lbs.

### Food

Adults eat a wide variety of aquatic and terrestrial insects, as well as crustaceans, fish and other small vertebrates, while young feed on small aquatic and terrestrial insects.

### Spawning

Occurs in fall, generally September through November. Females will construct a nest (redd) in gravel, and incubation period varies depending upon water temperature.

### Young

Called alevins. Remain in nest (redd) until yolk sac is absorbed, then emerge as free-swimming fry. Most reach sexual maturity at approximately two years

### Life Expectancy

Generally short-lived, seldom longer than 4 years in the wild.

### Q&A

#### 1. What does the brook trout's scientific name *Salvelinus fontinalis* mean?

*Salvelinus* = char and *fontinalis* = living in springs; a char living in springs. According to fish taxonomy classifications the brook trout is a char, but due to years of referencing the fish as a trout, we continue to call it the "brook trout" in lieu of the "brook char."

#### 2. My family has a trout stream on our land, but our livestock need to access to the water. What can we do to help the stream, while still providing water for our animals?

The National Resource Conservation Service ([www.nrcs.usda.gov](http://www.nrcs.usda.gov)) offers cost-share programs to assist with riparian restoration projects that still provide livestock access to water.

#### 3. Where can I learn more about efforts to protect brook trout?

The Eastern Brook Trout Joint Venture ([www.easternbrooktrout.org](http://www.easternbrooktrout.org)) is a partnership comprised of state, federal and nongovernmental agencies that is working to protect the brook trout throughout its native range.

### Links

To see a brook trout in action, go to <http://www.view.flyfishingnc.com/gallery>

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Carlander, K. D. *Handbook of Freshwater Fishery Biology*, Volume 1. Ames, Iowa: Iowa State University Press, 1969.  
Johnson, R. E., and N. M. Bondhead. *Freshwater Fishes of Virginia* (Richmond, Maryland: American Fisheries Society, 1993).  
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### Credits

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Illustrated by J.T. Newman.

Photo of brook trout by the author, Mark S. Davis.

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# Carolina Northern Flying Squirrel

## North Carolina Wildlife Profiles



### Carolina Northern Flying Squirrel

*Glaucomys sabrinus coloratus*

#### History and Status

Biologists first discovered the Northern flying squirrel in North Carolina in the early 1950s. The animal was already known from a wide area of northern North America as a common inhabitant of coniferous and mixed coniferous-deciduous forests. The squirrel was found in three areas of the southern Appalachians: Mount Mitchell, Roan Mountain, and the Great Smoky Mountains. While biologists thought the squirrel likely occurred on high mountains throughout the region, it was not until the federal government declared the Northern flying squirrel an endangered species in 1985 that funds became available to study its distribution. Subsequent studies found the species in a total of eight mountain ranges: Long Hope, Roan, Grandfather, and the Black-Craggy Mountains north and east of the French Broad River Basin, and Great Balsam, Plott Balsam, Smoky, and Unicoi Mountains south and west of the French Broad River Basin.

#### Description

Northern flying squirrels have bright cinnamon brown colored fur dorsally, gray fur around the face and the end of the tail, and bicolored fur on the belly that is gray at the base and creamy white at the tip of each hair. This squirrel's most distinctive feature is the cape of loose skin that stretches from its wrists to its ankles and forms the membrane on which it glides. The squirrel has a long, flat, furred tail.

The northern flying squirrel superficially resembles the smaller, more common southern flying squirrel (*Glaucomys volans*). Adult northern flying squirrels are almost twice the weight of adult Southern flying squirrels. While there is some elevational overlap in their range around 4000 to 5000 feet, northern flying squirrels are restricted to the highest elevations while southern flying squirrels are found most commonly at low to mid elevations.

#### Habitats and Habits

The northern flying squirrel inhabits the cool, wet boreal and deciduous forests of North Carolina's highest mountains. It prefers a mix of conifers (red spruce, Fraser fir, Eastern hemlock) and northern hardwood trees (yellow birch, buckeye, sugar maple). Biologists have found that the squirrel forages in the conifers and dens in the hardwoods. Dens are found in live and dead trees and include old woodpecker cavities, rotted knotholes where branches have broken off,

#### A gliding tree squirrel



#### Range and Distribution

The northern flying squirrel is found across Canada and the northern United States, its range extending southward in the great mountain chains of North America. North Carolina is the southern extent of this species in eastern North America, with the Carolina subspecies distributed in western North Carolina, east Tennessee, and southwest Virginia. In North Carolina the squirrel is isolated in small populations on the highest mountains. It had a wider range at these latitudes tens of thousands of years ago during glacial times when boreal forest was much more extensive.

#### Range Map



hollow and split tree trunks, and subterranean rock dens. The squirrel builds a distinctive nest of finely shredded yellow birch bark that may be used for denning or rearing young. It also constructs stick nests, called "dreys", in the dense foliage of conifer limbs during the warmer months. The stick nest is lined with shredded birch bark. Individual squirrels usually have 3 to 8 favorite den sites and move freely between dens, often sharing a nest with other squirrels.

### Gliding to Food

Northern flying squirrels are nocturnal, emerging from their dens just before dusk to forage. They do not store food in their dens, however, and take off from the nest to a favorite feeding area. Traveling quickly, they sail from the tops of trees by pushing off with powerful hindquarters, spreading all four legs, and gliding to the ground or the base of a nearby tree.

The northern flying squirrel eats many different kinds of foods, and some of its favorite foods are fungi. Mycorrhizal fungi grow in association with the roots of plants. The fruiting bodies, called truffles, are found underground and emit a strong odor that attracts squirrels. The squirrels' keen sense of smell and gliding ability allow it to seek out fresh "blooms" of aromatic truffles across its home range. This "tree squirrel" actually spends most of its waking hours on the ground, digging for truffles and searching for other food items. Trees need mycorrhizal fungi to grow, and mycorrhizal fungi need an animal to disperse their spores. In effect, the squirrel perpetuates its own forested habitat through its consumption and dispersal of these fungi.

In spring, female northern flying squirrels give birth to two to four young. Second litters are possible if the female is in good nutritional condition. Young squirrels are helpless at birth and depend completely on their mother's care. Eyes open when the squirrel is a month old. Nursing stops a month later, at which point young squirrels first begin jumping and gliding short distances.

### People Interactions

Most North Carolinians never see the northern flying squirrel because it lives in the high mountains and it is nocturnal. We have affected the squirrels' habitat in several ways. Logging and subsequent fires during the early part of this century changed large areas of high elevation forests in the Great Balsam and Black Mountains. These forests are still recovering from that disturbance. The balsam woolly adelgid, an insect pest, has infested and killed most of the mature Fraser fir stands in North Carolina. The hemlock woolly adelgid is currently decimating hemlock stands. Fortunately, for the squirrel, it can also live in northern hardwood and red spruce forest.

### Wild Facts

#### Classification

Class: Mammalia  
Order: Rodentia

#### Average Size

Length: 10 ¼ to 12 ¼ in.  
Weight: 3 ½ to 4 ¼ oz.

#### Food

Fungi, particularly mycorrhizal fungi, lichens, conifer and hardwood seeds, fruits, insects, tree buds, and some animal matter.

#### Breeding

Gives birth to litters of 2 to 4 young following a gestation of 37 to 42 days. One to two litters per year, with the first litter in May or June and the second in the summer.

#### Young

Weigh about ¼ of an ounce and are about 2 ½ inches long at birth. Eyes open at 1 month, weaning occurs at about 2 months.

#### Life Expectancy

Some northern flying squirrels live for 6 or 7 years, but most do not live that long.

#### How far can they glide?

Flying squirrels drop about a foot for every three feet of forward glide. Glide distance depends on terrain shape and height of the take off tree. They can not gain altitude.



### NCWRC Interaction: How You Can Help

#### Volunteer to check flying squirrel boxes.

Volunteers are needed to help biologists check squirrel boxes for the endangered Carolina northern flying squirrel each winter. Squirrels are captured, measured, marked, and released as part of this monitoring project. This project requires a full day in the field, and the abilities to hike in steep, slippery terrain, work in extreme cold weather, and haul heavy equipment. Contact NCWRC for information.

#### Volunteer to build flying squirrel boxes each year.

NCWRC biologists check several hundred flying squirrel boxes. Boxes require regular repair and replacement as they become worn and weathered. Contact NCWRC for information and box construction plans.

### Q&A

#### 1. Why is the northern flying squirrel listed as Endangered?

Because of habitat destruction, fragmentation, or alteration associated with clearing of forests, introduced pest species such as the balsam woolly adelgid, mineral extraction, recreational development, pollution and the potential for global warming.

#### 2. What does "endangered" mean?

Endangered means that a species is threatened with extinction throughout all, or a significant portion of its range.

#### 3. What is northern flying squirrel habitat?

The northern flying squirrels habitat is the transition zone between conifers and hardwoods at elevations above 4000 feet in cool, wet forests having older or larger trees, rotting logs, and abundant fungi, mosses, and lichens.

### Links

To see Northern flying squirrels in action, go to: [www.flyingsquirrels.com/Video/Wild/index.html](http://www.flyingsquirrels.com/Video/Wild/index.html)

Also [flyingsquirrels.com](http://www.flyingsquirrels.com/) = <http://www.flyingsquirrels.com/>

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### Credits

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## ALLIGATOR FACT SHEET



**KINGDOM:**

Animalia

**PHYLUM:**

Chordata

**CLASS:**

Reptilia

**ORDER:**

Crocodylia

**FAMILY:**

Alligatoridae

**GENUS:**

Alligator

**SPECIES:**

Alligator  
mississippiensis,  
Alligator sinensis

An alligator is a crocodylian in the genus

Alligator of the family Alligatoridae. There are two living alligator species: the American Alligator (*Alligator mississippiensis*) and the Chinese Alligator (*Alligator sinensis*). They are closely related to crocodiles.

**DESCRIPTION:**

Alligators are characterized by a broader snout and eyes more dorsally located than their crocodile cousins. Both living species also tend to be darker in color, often nearly black (although the Chinese alligator has some light patterning.) Also, in alligators only the upper teeth can be seen with the jaws closed (in contrast to true crocodiles, in which upper and lower teeth can be seen), though many individuals bear jaw deformities which complicate this means of identification.

**HABITAT:**

There are only two countries on earth that have alligators: the United States and China. The Chinese alligator is endangered and lives only in the Yangtze River valley. The American Alligator is found in the United States from the Carolinas to Florida and along the Gulf Coast. The majority of American Alligators inhabit Florida and Louisiana. In Florida alone there are an estimated more than 1 million alligators. The United States is the only nation on earth to have both alligators and crocodiles. American Alligators live in freshwater environments, such as ponds, marshes, wetlands, rivers, and swamps. In China, they live only along the fresh water of the Yangtze River.

**BEHAVIOR:**

Alligators are solitary, territorial animals. The largest of the species (both males and females) will defend prime territory; smaller alligators have a higher tolerance of other alligators within a similar size class.

Although alligators have heavy bodies and slow metabolisms, they are capable of short bursts of speed that can exceed 30 miles per hour. Alligators' main prey are smaller animals that they can kill and eat with a single bite. Alligators may kill larger prey by grabbing it and dragging it in the water to drown. Alligators consume food that cannot be eaten in one bite by allowing it to rot or by biting and then spinning or convulsing wildly until bite size pieces are torn off. This is referred to as the "death roll."

**DIET:**

Alligators are opportunistic feeders, eating almost anything they can catch. When they are young they eat fish, insects, snails, and crustaceans. As they grow they take progressively larger prey items, including: larger fish such as gar, turtles, various mammals, birds, and other reptiles, including smaller alligators. They will even consume carrion if they are sufficiently hungry. As humans encroach onto to their habitat, attacks on humans are not unknown, but are few and far between.

**REPRODUCTION:**

Alligators are seasonal breeders. The mating season is in spring when the water warms. The female builds a nest of vegetation that rots, incubating the eggs. The mother will defend the nest from predators and will assist the babies to water once they hatch. She will provide protection to the young for about a year if they remain in the area.

**FACTS:**

There are two species—a large type found in the United States and a small type found in China. Alligators differ from crocodiles in several ways. They have broader, blunter snouts, which give their heads a triangular appearance; also, the lower fourth tooth does not protrude when the mouth is closed, as it does in the crocodile.

The American alligator, *Alligator mississippiensis*, is found in swamps and sluggish streams from North Carolina to Florida and along the Gulf Coast. When young, it is dark brown or black with yellow transverse bands. The bands fade as the animal grows, and the adult is black.

Males commonly reach a length of 9 ft (2.7 m) and a weight of 250 lbs (110 kg); females are smaller. Males 18 ft (5.4 m) long were once fairly common, but intensive hunting for alligator leather eliminated larger individuals (a specimen over 10 ft/3 m long is now unusual) and threatened the species as a whole.

The wild American alligator is now protected by law, but it is also inhumanely raised on farms for commercial uses.

Alligators spend the day floating just below the surface of the water or resting on the bank, lying in holes in hot weather. They hunt by night, in the water and on the bank. Young alligators feed on water insects, crustaceans, frogs, and fish; as they grow they catch proportionally larger animals. Large alligators may occasionally capture deer and cows as they come to drink; they do not commonly attack humans.

Alligators hibernate from October to March. In summer the female builds a nest of rotting vegetation on the bank and deposits in it 20 to 70 eggs, which she guards for 9 to 10 weeks until they hatch.

The Chinese alligator, *A. sinensis*, which grows to about 6 ft (1.8 m) long, is found in the Chang (Yangtze) River valley near Shanghai. This species is nearly extinct.

Caimans are similar, but distinct members of the Alligatoridae family found in Central and South America. There are several species, classified in three genera. The largest grow up to 15 ft (4.8 m) long. Unlike alligators, caimans have bony overlapping scales on their bellies. Baby caimans are often sold in the United States as baby alligators. Caimans and alligators are wild animals and should not be kept as pets for human amusement.

Alligators and caimans are classified in the phylum Chordata, subphylum Vertebrata, class Reptilia, order Crocodylia, family Alligatoridae.