

# The Frogs and Toads OF NORTH CAROLINA



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Field Guide and Recorded Calls

Michael E. Dorcas, Steven J. Price, Jeffrey C. Beane and Sarah Cross Owen

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## Field Guide and Recorded Calls



by Michael E. Dorcas, Steven J. Price, Jeffrey C. Beane and Sarah Cross Owen

North Carolina Wildlife Resources Commission | Raleigh, North Carolina

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Front and back cover photographs by Todd Pusser. Front cover: barking treefrog (top), eastern spadefoot (bottom); Back cover: upland chorus frog (top), bullfrog (center), Fowler's toad (bottom).

p. ii photograph of green treefrog courtesy of U.S. Fish & Wildlife Service

Distribution maps in this book are compiled from a variety of sources and represent estimations of the actual geographic ranges for frogs and toads in North Carolina.

Size scales are provided for each species. The frog silhouette represents a typical-sized adult and the tadpole silhouette represents the maximum tadpole size.



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### INTRODUCTION

Frogs and toads have fascinated humans for centuries. Although most people no longer believe that kissing a frog will produce a prince, many have learned to appreciate frogs and toads as aesthetically pleasing and important parts of our natural world.

Frogs have a unique appearance. Rarely does anyone have difficulty distinguishing an animal as a frog or toad. However, few people know much about this fascinating group of animals or the perils they face in our ever-changing world.

Frogs, toads and other amphibians are an ancient group, dating back to well before dinosaurs roamed the earth (about 350 million years ago). From an evolutionary per-

spective, the appearance of amphibians was one of the most significant events to occur on earth. They were the first vertebrates (animals with backbones) to leave the water and live on land. They developed legs, lungs and voices. Reptiles, birds and mammals all originated from these amphibian ancestors.

Amphibians are an extremely successful group, with over 5,770 known species, and more species are being discovered each year. Unfortunately, many amphibian species are disappearing due to human activities. We should take whatever steps are necessary to ensure that these ancient animals survive.



The southern toad spends most of its daylight hours in hiding, but begins to emerge from its burrow at twilight. Top circle: Bullfrog. Bottom circle: Little grass frog. Opposite page: Barking treefrog.

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### ABOUT FROGS AND TOADS

Frogs and toads comprise a group of tailless amphibians known as "anurans," which have hind legs modified for jumping. The term

"anuran" is commonly used by scientists when they refer to frogs and toads collectively. In addition to the anurans, other amphibians include salamanders and caecilians (a group of tropical, wormlike amphibians). Most anurans have moist skin and webbed, unclawed toes. Some species, such as bullfrogs, have smooth skin and elon-

gated hind limbs; others, such as toads, have warty skin, stout bodies and relatively short hind limbs. Some species can change colors depending on environmental conditions or time of day they are active.

"Amphibian" literally means "both lives" and refers to the fact that most anurans have an early, gill-breathing larval (tadpole) life stage and a later, air-breathing adult life stage. Some species, like bullfrogs and green frogs, spend the majority of their time in water or along the shorelines of permanent bodies of water. Treefrogs, toads and some other frogs often live in forests or meadows away from water. However, most species require water to breed, and all frogs and toads must remain relatively moist.

Frogs and toads play important roles in natural ecosystems. They consume countless insects and other invertebrates. Large species, like bullfrogs, occasionally consume vertebrates, such as other frogs, snakes and turtles. Frogs and toads, in turn, serve as an important food source for many fish, reptiles, birds and mammals. Most anurans avoid predators by fleeing or hiding. Others, such as toads, release toxic secretions from specialized glands in their skin.

Frogs and toads, like all amphibians, are cold-blooded or "ectothermic," which means their body temperature is determined primarily by environmental variables. For many species, this trait limits their activity to warmer seasons, although some species, such as chorus frogs, are most active during winter and early spring. Some anurans spend the winter hiber-Left: Green treefrog nating underwater; others find refuge under leaf litter or woody debris on the forest floor. Right: Green or bronze frog

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The warts of southern toads excrete a distasteful substance that deters most predators; however, eastern hognose snakes are apparently not affected by the toxin and actually prefer to eat toads.

## PINE WOODS TREEFROG Hyla femoralis

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DESCRIPTION: The pine woods treefrog is usually reddish brown, brownish or grayish (occasionally greenish) with dark blotches on its back and small yellow, orange or white spots on the rear of each thigh.

HABITATS AND HABITS: Pine woods treefrogs inhabit pine forests and flatwoods, as well as cypress swamps in the Coastal Plain. They are noted for climbing to the tops of the tallest trees. Breeding occurs in grassy pools, roadside ditches, cypress ponds and other temporary aquatic habitats. Egg masses are loose and sticky and are attached to vegetation at or near the water's surface. Tadpoles hatch within three days after eggs are laid and transform in seven to 11 weeks.

> CALL: Pine woods treefrogs call from March to October. Singing males call from the edge of shallow water or from emergent vegetation with a very distinctive, machinelike *"kek-kek-kek"* call, which is sometimes described as sounding like Morse code.

FROG FACT: Like many species of amphibians that use ephemeral breeding sites, pine woods treefrog tadpoles may fail to reach metamorphosis if the wetland dries prematurely. Fortunately, large numbers of tadpoles often complete metamorphosis during wet years, which can help make up for the losses sustained during dry years.

> Top left: Small yellow spots on the rear of the thigh are an identifying characteristic of the pine woods treefrog. Bottom left: Calling pine woods treefrog



## GREEN TREEFROG

## Hyla cinerea



DESCRIPTION: The green treefrog is relatively large, slender and usually bright green (but sometimes olive or brownish) with large toe pads and a white belly. Most individuals have scattered orange or gold flecks on their backs and a clearly defined ivory or yellow stripe along their upper jaws and their sides.

HABITATS AND HABITS: Although their range is expanding into many parts of the Piedmont, green treefrogs are found primarily in the Coastal Plain, where they can be extremely abundant along wetland margins and in swamps. During the day, green treefrogs hide under waterside vegetation or in other moist, shady areas. At night, they forage for flying insects, often performing acrobatic maneuvers as they jump from branch to branch. Egg masses are attached to vegetation at or near the water's surface. Tadpoles transform in about eight weeks.

CALL: Green treefrogs breed from April to September. During the breeding season, their loud, monotonic, nasal "*queenk*, *queenk*, *queenk*" call can be heard from a wide variety of wetland habitats, from lake and river margins to ephemeral pools. From a distance, large congregations of green treefrogs sound like cowbells ringing. FROG FACT: Herpetologists have found that this species and other tree-

frogs will occupy plastic PVC pipes that are placed around wetlands. This method has been used to monitor populations of treefrogs in North Carolina.

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### FREQUENTLY ASKED QUESTIONS

#### How do you tell the difference between a frog and a toad?

"Frog" and "toad" are common rather than scientific terms and do not represent specific scientific categories. The order Anura, which includes all animals known as frogs and toads (*i.e.*, anurans), includes many families, some of which contain species commonly called "frogs" as well as species commonly called "toads."

In general, "frogs" usually have smooth, moist skin; heavily webbed hind feet; long hind legs; and slender bodies designed for leaping. "Toads" usually have rough, dry skin; stout bodies; sparsely webbed feet; and short hind legs designed for hopping. Members of the family Ranidae most closely fit the typical frog description and are commonly called "true frogs." Members of the family Bufonidae most closely fit the typical toad description and are commonly called "true toads." Most members of the many other anuran families do not perfectly fit either description. It is usually considered acceptable by most herpetologists to refer collectively to all anurans as "frogs," but the term "toads" generally implies a reference to the "true toads," the spadefoots, or the narrowmouth toads. Because the differences between frogs and toads are often hard to discern, many herpetologists simply use "frogs," as a shorthand way to represent the two groups.

#### Can toads cause (or cure) warts?

No. Toads do not cause warts and cannot cure warts. Warts on humans are caused by viruses. The warts on toads are concentrations of poison glands in their skin that form bumps and have nothing to do with human warts.

Are any frogs or toads poisonous or otherwise dangerous or harmful to humans? All amphibians have poison glands in their skin to help protect them from predators. The type and quantity of toxin vary greatly among species. North Carolina frogs are not dangerous to humans. They do not bite or sting. The skin secretions of some can cause nausea if ingested, and irritation or allergic reactions if rubbed in the eyes, nose, mouth or other mucous membranes or in cuts or scratches. Normally, these secretions will not penetrate or harm human skin. Always wash your hands thoroughly after handling amphibians, and do not allow small children to handle them unsupervised.

A few tropical frogs produce skin secretions so toxic that they are dangerous to handle, but all North Carolina species may be safely handled as long as care is taken to keep them away from sensitive areas of the body.

#### Do frogs fall from the sky when it rains?

No (unless in the unlikely event that they might be swept from one spot to another by hurricanes or tornadoes). Frogs often breed or become active during or after rains and may emerge from their hiding places during such times. Sometimes their numbers are so great during these breeding migrations that they may appear to have "dropped from the sky." Treefrogs do occasionally jump or fall from trees.

#### Why do toads urinate on you when you pick them up?

Actually, they don't. A frog or toad often will release excess water stored in its cloaca (rather than urine from its bladder) when handled. This behavior may serve at least two defensive functions: It may startle or irritate a predator into dropping it; and it reduces the animal's body weight, possibly allowing a quicker escape.

#### Can a person get "high" from licking or smoking toads?

The poison secreted from toad skin is called bufotenine. In small doses, the poison of some toads can cause hallucinations if inhaled or ingested. However, such practices can be very dangerous or even fatal.

#### Why are frog and toad populations declining? Should I care?

Around the world, many populations of amphibians, especially frogs and toads, are declining or disappearing. In many cases, the cause is obvious: habitat destruction or pollution. However, in more and more cases, amphibians are disappearing in pristine areas where there is no obvious cause. These declines are particularly disturbing, and mounting evidence suggests that a particular fungus may be the culprit in many cases. Human activities may cause stress to amphibians and reduce their ability to fight disease due to this fungus or other infectious agents.

There are many reasons to care about the well-being of frogs. Aside from the many roles they play in natural communities, their economic importance and the numerous ways that they enrich human lives, frogs serve as important ecological indicators. Because of their sensitivity to environmental disturbances, frogs and toads can directly reflect the health of their environments. When frog populations decline, scientists are alerted to potential problems with the health of the habitat and can work to rectify these issues before more severe environmental problems follow.

What caused the malformations in frogs that I have heard about in the news? In 1995, students in Minnesota found large numbers of malformed frogs in ponds where they were conducting research. Some frogs had missing eyes or limb deformities, and some had extra limbs. News of these deformed frogs received national attention. The causes of the unusually high numbers of deformed frogs are still not entirely known but may be due to water pollution or possibly to parasitic worms.

#### GLOSSARY

- Amphibian (*n*.)—An ectothermic vertebrate of the class Amphibia, such as a frog, toad or salamander, that characteristically hatches as an aquatic larva with gills. The larva then transforms into an adult, most of which have air-breathing lungs.
- Amplexus (*n*.)—An embrace of frogs and toads, during which the male grasps the female around the waist or just behind the front legs. The male then fertilizes the eggs released by the female.
- Anurans (*n*.)—A diverse group of tailless amphibians, including toads and frogs, which have hind legs modified for jumping.
- Bufotenine (n.)—A poisonous hallucinogenic substance obtained from the skin glands of toads.
- Cloaca (*n*.)—The common cavity into which the intestinal, genital and urinary tracts open in many vertebrate animals, including frogs and toads.
- Cranial crests (n.)-Raised ridges between the eyes of some toads.
- Dorsolateral (*adj*.)—Of or involving both the back and the side.
- Ectothermic (adj.)—Having a body temperature determined primarily by external variables.
- Ephemeral (*adj*.)—Temporary; lasting only a short time.
- Herpetologist (n.)—A scientist who studies reptiles and amphibians.
- Metamorphosis (*n*.)—In frogs and toads, the change from a tadpole to a frog.
- Natal (*adj*.)—Of or relating to a place of birth. In frogs and toads, natal areas are aquatic habitats where the eggs are laid and the tadpoles develop.
- Parotoid glands (n.)—Large skin glands that appear as swellings on each side of the back of a toad's head.
- Tympanum (*n*.)—Eardrum; in most frogs and toads, it is often visible externally as a round structure on the side of the head just behind the eye.
- Vertebrate (*n*.)—An animal that has a backbone.





