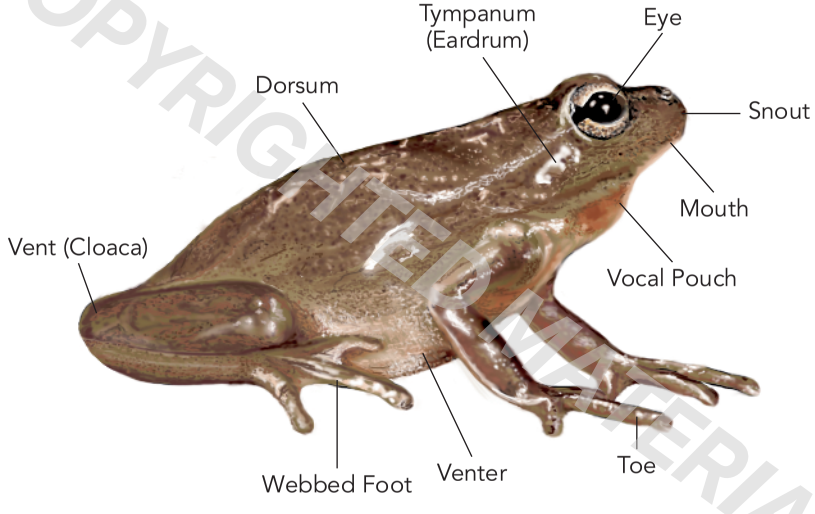
A Typical Frog



Chapter 1

What Are Frogs and Toads?

Frogs and toads are four-legged, tailless, air-breathing vertebrates that represent the link between the fish and reptiles and all other air-breathing species, including humans. They are members of a class or group of vertebrates known as the *Amphibia,* a word that means "dual life" and refers to the fact that amphibian life occurs in two phases—one in the water and the other on land. It also alludes to the fact that many amphibians are, well, amphibious, and are as fully at home in the water as they are on land (although there are many notable exceptions, including species that never leave the water and others that stay on land or in trees and never enter the water at all).

The first amphibians, the labryinthodonts, took the great leap from water to land during the Devonian period some 400 million years ago. However, fossils of frogs appear much later, in the Jurassic period of North America, some 280 million years ago.

The other amphibian groups or orders include the Caudates or Urodeles, which are known familiarly as salamanders and newts, and an obscure order known as the *Apoda* (legless amphibians), or caecilians. These segmented, wormlike creatures are found primarily in tropical regions and remain burrowed in moist soil most of the time. Little is known of their habits or life history.

Clearly, of all the amphibians, frogs and toads are the most familiar and best studied. Frogs and toads are members of the order *Anura,* a term that means "tailless," which is exactly what they are—bereft of a true tail, unlike their salamander cousins.

At the basic level, frogs and toads are tailless amphibians.

So Many Frogs and Toads

There are more than an estimated 5,200 species and subspecies of frogs and toads in the world, but nobody knows exactly how many there really are because new species and subspecies are being discovered by scientists at the rate of more than a dozen a year. Amazingly, it is predicted that such discoveries may go on indefinitely, as long as the precious habitats of these animals is protected from destruction. Environmental insults and habitat destruction have already caused the extinction of countless species over the last few decades; it is theorized that some rare species became extinct before scientists learned of their existence. Since 1980, at least 120 species of amphibians are believed to have become extinct, although there may be many more.

The number of different species of frogs and toads increases as the climate gets warmer, and the neotropical and tropical regions of the world tend to have more species than the temperate, and therefore colder, climates. In one small valley (San Cecilia) in Ecuador's Amazon basin, scientists discovered a total of eighty-one species of frogs and toads, finding fifty-six in just one night! This is all the more remarkable when you consider that there are about ninety frog and toad species in the whole United States.

Frogs and toads are an essential part of our ecosystem. Each individual animal consumes untold quantities of insect pests in a single day and helps to keep noxious insect populations in check. Without frogs and toads, the Earth would be overrun with crop-eating and disease-spreading bugs.

On the Brink

In February 2007, a group of amphibian biologists convened an extraordinary meeting in Atlanta, Georgia, to map a worldwide effort to save amphibian species from extinction. The scientists calculated that about a third of the world's 6,000 species of frogs and salamanders are at risk of extinction and at least 168 known species have already disappeared. The major threat that's killing amphibians worldwide is the disease chytridiomycosis, caused by the chytrid fungus (see chapter 8 for more on this deadly disease). Other threats include global warming, habitat lost to development, chemical pollution, and introduced fish species.

With the backing of the United Nations International Union for the Conservation of Nature, the scientists who make up the Conservation Breeding Specialist Group hope to establish a $500 million Amphibian Ark using zoos, public aquariums, and botanical gardens throughout the world to house and breed amphibians that are in danger of extinction.

Serious amphibian hobbyists can contribute to the effort not only by donating money to this project, but by publishing what they learn about *captive husbandry*—feeding, breeding, and raising frogs and salamanders in captivity. You can read about the findings and activities of Amphibian Ark at www.amphibianark.org.

Their existence also provides food for larger carnivores, including humans. Their *larvae,* or tadpoles, consume aquatic weeds that might otherwise clog up waterways. Clearly, frogs and toads play a vital role in the environment, and there is no telling what would happen if they suddenly all disappeared.

But disappearing they are. It is feared that frogs are declining in overall numbers, and some populations have completely vanished for reasons we do not yet understand. Even casual observers walking in wetlands they've visited for years are now finding that the frogs or toads that were once there are no longer present.

The decline in wild frog populations is alarming to environmentalists and frog lovers.

More alarming still is that this loss of wildlife is occurring even in seemingly pristine and untouched habitats. These declines baffle environmentalists, who hope that by studying frogs in captivity as well as in the wild they may one day solve these mysterious absences.

Classifying Frogs and Toads

The most basic units of any animal or plant classification system are the species and subspecies. And although there have been many efforts to precisely define what a species is, it is impossible to establish any firm rules that apply in every case. Members of a single species all look alike, live in a similar habitat, eat the same foods, and reproduce in the same manner, usually with one another. The exception is when two different species accidentally mate and produce a hybrid. Over time, if these hybrids survive and breed with one another, a new species is eventually created.

The American bullfrog's species name, *catesbeiana*, honors the pioneering British naturalist Mark Catesby (1683–1749). Catesby traveled to the New World to study the flora and fauna of the Americas. He wrote and published *The Natural History of Carolina, Florida and the Bahama Islands* in 1743.

Some animals are similar enough to be considered members of the same species, but there may be slight differences in different populations. This results in a subspecies category.

Above the species level, all animals that are very similar in general appearance are members of a genus, and above that they belong to a larger group called a family. These classifications are generally based on anatomical similarities.

Naming Species and Subspecies

Every species has a two-part Latin or Greek name and subspecies have a three-part name. The first part of the name is its genus, and the second part is its species. If there is a third part, it's the subspecies designation. Thus, the American bullfrog,

with no known subspecies, is a member of the genus *Rana* and species *catesbeiana*. Its scientific name is written: *Rana catesbeiana.*

In the printed literature, scientific names are always italicized. The full classification of the American bullfrog is written as follows:

Phylum	*Chordata* (animals with a spinal cord)
Subphylum	*Vertebrata* (animals with a backbone or vertebral column)
Class	*Amphibia* (amphibians)
Family	*Ranidae* (the family of true frogs and riparian frogs)
Genus	*Rana* (the true frogs)
Species	*catesbeiana*

There are about forty-one families of frogs and toads, but only some of the best known, most interesting, and more commonly studied groups will be included in this book—although others will be briefly mentioned in chapter 7, which lists many species that may be kept as pets.

The Gifts of Frogs and Toads

Over the centuries there have been innumerable scientific discoveries made with the assistance of frogs and toads. They are among the first vertebrate species studied by future doctors and other scientists, and the sum total of all knowledge that people have garnered from the mere existence of frogs and toads is beyond calculation.

Recently, many species have been studied as a source of valuable new drugs, such as peptide antibiotics, painkillers, and even cancer-fighting agents. Scientists have only just touched the tip of the proverbial iceberg where this research is concerned.

There is much more to learn about frogs and toads, and, if they survive, they will undoubtedly continue to be a never-ending source of benefits to humans.

What's the Difference Between a Frog and a Toad?

The difference between a frog and a toad is actually more illusory than real. Both terms have been used interchangeably in different parts of the world. There are some generalizations that can be made about the way the terminology is used in the United States though.

First and foremost, all toads are frogs, but all frogs are not necessarily toads—although a few are. So regardless of whether you call a particular species a toad, it is still technically a frog.

In the United States, we tend to classify toads as mainly terrestrial or land-dwelling amphibians that enter the water only to breed and lay their eggs. We tend to think of frogs as aquatic or semiaquatic animals—equally at home in the water and on damp ground.

The problem with this definition is that there are frogs that never or rarely enter the water except to breed, such as the tree frogs—frogs that, as a rule, spend as much time as possible up in the trees and about as far away from water as you can imagine. On the other hand, there are species, such as the Surinam toad (*Pipa pipa*), that spend all their lives in the water and would quickly die if stranded on land. Yet, despite their strictly aquatic lifestyle, they somehow earned the name "toad."

Therefore, all you can say about this subject is to ask another question: "What's in a name?" The only rule about giving common names to frogs and toads is that there are no rules.

That's a southern toad on the left and a Florida gopher frog on the right. The difference between a frog and a toad is not always clear.