

ANIMAL INVADERS

BULLFROG



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Susan H. Gray

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A BULLFROG BULLY



Bullfrogs live near ponds and other bodies of water.

The weather is finally warming up. Bullfrogs (*Rana catesbeiana*) are becoming more active around a local pond. Two large males find a spot on the shore and begin to croak loudly—deep, rumbling croaks meant to attract females. One male stops croaking and turns to

look at the other male. Then he moves closer, rises up, and gives him a shove. The other male frog tumbles sideways and into the pond. He'll find another spot soon—a spot where he can croak all night with no interruptions.

Bullfrogs are members of a large group of animals called **amphibians**. Frogs, toads, and salamanders are all amphibians. Most amphibians spend the early part of their lives in water, using gills to breathe. Then they develop lungs, start breathing the air, and move to land. Some amphibians, such as the bullfrog, never move completely away from the water.



In many parts of the world, bullfrogs are said to be an invasive species. What exactly is that? A species is a group of the same kind of animals. For example, bullfrogs and green tree frogs are two different species of frog. Something that is invasive has moved into a new area and has taken over. The Global Invasive Species Database is a source of information on bullfrogs and many other animal invaders. People from around the world can visit www.issg.org/database/welcome/ to start learning more about invasive species and what is being done to control them.

A BULLFROG'S LIFE



A bullfrog's long legs stretch out as it jumps.

Bullfrogs are the largest frogs in North America. An adult can measure up to 8 inches (20 centimeters) from nose to rump. When leaping, the frog stretches to its full length. From the snout to the tip of the toes, it stretches

out to 18 inches (46 cm). Bullfrogs weigh as much as 1.5 pounds (0.68 kilograms) each. Females are a little larger than males.

A bullfrog's legs are long and muscular. They help the frog make leaps as long as 2 yards (1.8 meters). This is more than 10 times the bullfrog's length! The toes are long and joined by thin webs of skin. Webbed feet help make the frog a good swimmer.

The bullfrog's back is light, medium, or dark green. It may be mottled or have dark brown blotches or spots. The frog's belly is usually a cream or yellow color. Its body is soft and its skin is moist.

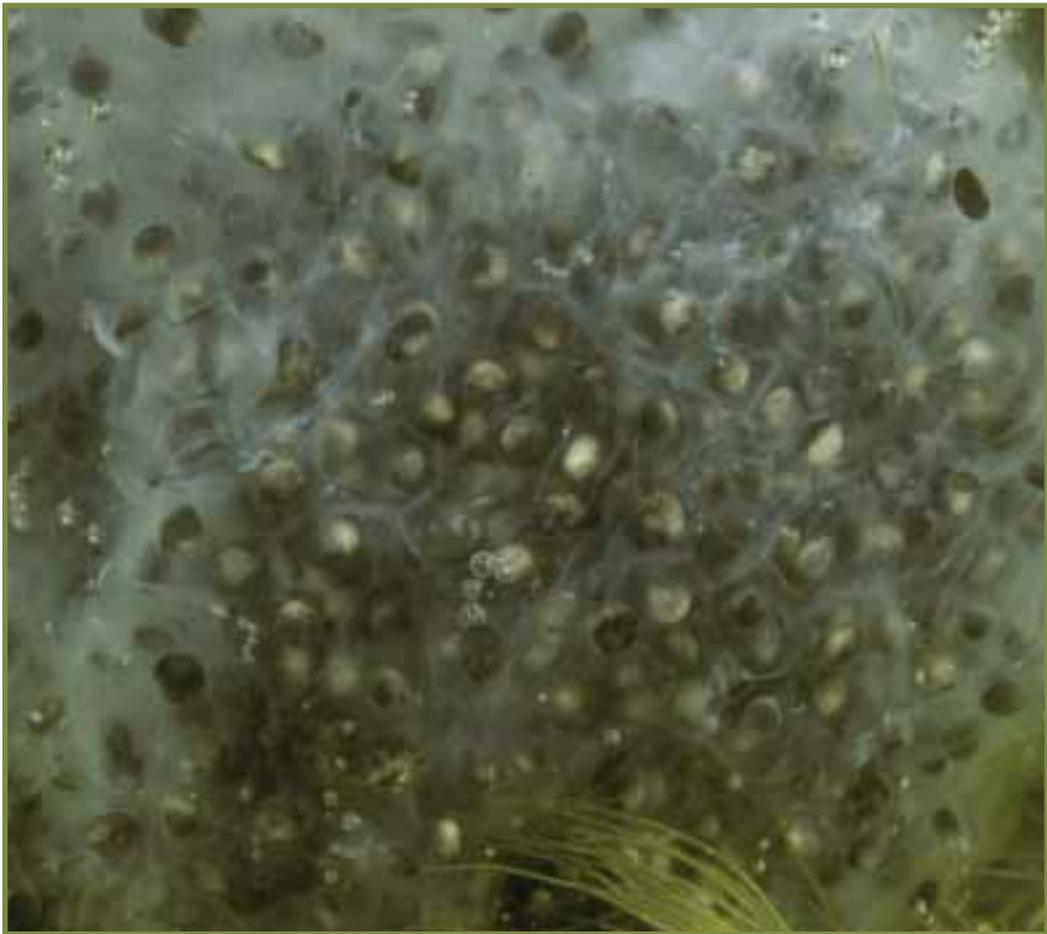
The eyes stick up from a bullfrog's head. This allows the frog to hide just beneath the surface of a pond, with only its eyes above water. Behind each eye is a large, round eardrum. The mouth is also large. This allows the frog to grab and eat surprisingly big **prey**.

A bullfrog never wanders far from water. It prefers the standing water of ponds and lakes over the running water of streams. Pools that never dry up and that have plenty of plants around are the best.

As the weather warms up each year, adult males begin calling for mates. They stake out territories along the shore, sometimes wrestling each other for space. As the sun sets, they begin calling. They join together in a **chorus** of deep *brr-rum* sounds. Their call is a loud bellow that carries a long distance. It gives the impression that the frog is very large, which is an advantage in keeping **predators** away. Females are attracted to the singing, and mating soon begins.

Females lay up to 20,000 eggs in a sheet that floats on the water's surface. After a day or two, the sheet sinks out of sight. About 4 days later, the eggs begin to hatch.

Young bullfrogs look nothing like their parents. Their bodies are tiny and round. They are very dark green



Female bullfrogs lay eggs in a mass. The mass floats for 1 or 2 days and then sinks under the water's surface.

or black in color. They have no legs at all, and swim by wiggling their long tails. At this young stage, they are called tadpoles. Tadpoles cannot live out of water and do not make croaking sounds. Instead, they breathe underwater



Bullfrog tadpoles don't look anything like adult bullfrogs.

by using gills. They spend their days swimming, eating, and resting. At first, tadpoles eat tiny pieces of plant material. But as they grow, they begin to eat small insects and even tadpoles of other frog species.

In time, the tadpoles' bodies begin to change. This change is called **metamorphosis**. As tadpoles go through metamorphosis, their tails shrink and disappear. Four little legs begin to sprout. Their snouts become pointed and their eyes bulge. Their little legs begin to kick. Lungs develop so the young frogs will soon be able to breathe air.

In warm areas, bullfrog tadpoles complete their metamorphosis in the same year they hatch. In cooler regions, they spend one or two years as tadpoles. In the winter, tadpoles find safety in the muck at the bottom of their pond. There, they **hibernate**, slowing their breathing and heartbeats almost to a dead stop. When warm weather returns, they become active again.

After metamorphosis, the young frogs swim using their legs. They hop around on land and breathe the air. They also develop big appetites. Like many other frogs, bullfrogs are ambush predators. A bullfrog will sit very



How does a tadpole's tail disappear? Does it just fall off? What makes it go away? These are the kinds of questions biologists asked to learn more about frog life cycles. Asking questions, observing, and experimenting led scientists to this answer.

When a tadpole loses its tail, it's because of a chemical in the tadpole's body that breaks down **collagen**. Collagen is a material that helps to keep tissues and cells "glued" together. When collagen breaks down in the tadpole's tail, the cells in the tail can no longer hold together. In time, materials in the cells are **resorbed**, or taken back into the tadpole's body, and the tail disappears completely.

still and then pounce on moving prey. Bullfrogs eat dragonflies, crawfish, fish, baby turtles, snakes, birds, and even other frogs. In turn, raccoons, snapping turtles, and large water birds, such as herons, feed on bullfrogs. Bullfrogs that escape all predators and other dangers can live for 8 or 9 years.

CHAPTER THREE

WHAT WENT WRONG



Bullfrogs often blend in with their surroundings. Can you see the bullfrog in this picture?

At one time, bullfrogs lived only in North America and only east of the Rocky Mountains. But in the early 1900s, the frogs began showing up in California and Colorado. How did they get there? Did they hop?

Bullfrogs arrived in the western United States in a few different ways. Some ended up there when people began raising bullfrogs in ponds in California to be able to sell the frogs' legs to restaurants. In the eastern part of the **continent**, people had enjoyed eating native bullfrog legs for years. Restaurant owners in the west heard that frog legs were delicious. They wanted to offer them to their customers. Bullfrogs ended up in other western U. S. states and in Asia, Europe, and South America in the same way.

In Colorado, bullfrogs may have been introduced by accident. Some scientists think that bullfrogs laid eggs in trout **hatcheries** elsewhere in the country. When the young fish were released into Colorado's trout streams and lakes, bullfrog tadpoles were released along with them.

Some people in western states also purchased bullfrogs as pets. The large frogs with the deep, rumbling voices



Frog legs are on the menu at many restaurants.

were unusual and fun to own. Some frog owners enjoyed watching the development of those huge tadpoles. But after the tadpoles went through metamorphosis, they were no longer so interesting. The bullfrogs were often placed in backyard ponds where they ate everything in sight. Then some owners released their frogs into other nearby ponds. Even some of the people who had started frog farms lost interest and released their frogs.



This bullfrog tadpole has grown legs and will soon lose its tail.

That's when the trouble began. Food was plentiful in the bullfrogs' new homes. They settled in and began to mate. Females laid eggs by the thousands. Little tadpoles found safety among the weeds and algae. They ate the tadpoles of other frogs. Fish quickly learned that bullfrog tadpoles tasted terrible compared to the tadpoles of other frogs. So bullfrog tadpoles escaped predators while

other tadpoles did not. As adults, bullfrogs ate almost any creature that fit into their mouths.

Bullfrogs also have some other advantages. They can tolerate higher water temperatures than most other frogs. They also have a longer breeding season, and their tadpoles have a higher rate of survival than the tadpoles of other frogs.

With few enemies, huge appetites, and some natural advantages, bullfrog numbers increased. Meanwhile, populations of other pond animals began to shrink.



An international organization called the Invasive Species Specialist Group (ISSG) keeps track of invasive species around the world. Dr. Mick Clout, a biologist at the University of Auckland in New Zealand, is the director of the ISSG. The group follows the spread of many species. It collects and shares information about how different countries are trying to control the invaders. Such information is very useful to organizations, such as the Nature Conservancy, that manage invasive species such as the bullfrog. Who else might be interested in such information? How is the ISSG helping people to deal with invasive species?

WORLD TRAVELERS



Bullfrogs have large appetites and will even eat other frogs.

Over the last 100 years, bullfrogs have invaded many parts of the world. In addition to the western United States, they have been introduced into Canada, South America, Cuba, and Puerto Rico. They have also been