

Two
Pennsylvania

Hoppers and Jumpers

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Two of Pennsylvania's most common toad and frog species are the eastern American toad (*Bufo americanus americanus*) and the pickerel frog (*Rana palustris*). These two species exemplify the physical, behavioral, ecological and habitat similarities and differences in the frogs and toads of Pennsylvania.

Frogs and toads defined

Frogs and toads are in the class "Amphibia." Amphibians have backbones like mammals, but unlike mammals they cannot internally regulate their body temperature and are therefore called "cold-blooded" (ectothermic) animals. This means

that the animal has to move to warm or cool places to change its body temperature to the appropriate comfort level.

Another major difference between amphibians and other animals is that amphibians can breathe through the skin on



land and absorb oxygen through the skin while underwater. Unlike reptiles, amphibians lack claws and nails on their toes and fingers, and they have moist, permeable and glandular skin. Their skin lacks scales or feathers.

Frogs and toads belong to the amphibian order Anura. Anurans are tailless amphibians. They have a short backbone with modified pelvis and legs designed for jumping and hopping. Unlike salamanders, anurans possess a well-developed external eardrum, or tympanum, which they use to detect predators, prey and mates.

weeks in some species to 60 days in others. Frogs can become fully developed in 60 days, but many species like the green frog and bullfrog can “overwinter” as tadpoles in the bottom of ponds and take up to two years to transform fully into adult frogs. As the tadpoles metamorphose (develop) into frogs or toads, their back legs first “grow” from their small bodies. Soon thereafter their front

(plant-eating) beginning, they have now developed into insectivores (insect-eaters). Then they leave the water in search of food such as small insects, spiders and other invertebrates.

Where they go in search of this food is often what separates the different frog and toad species. Some anurans remain close to their aquatic birthplace and live their entire lives closely associated with an aquatic habitat, such as a pond, lake, stream or wetland. Other anurans take on more of a terrestrial existence,



*Eastern
American
Toad*

photo-Tom Diez

Anuran life cycle

Anurans, like most other amphibians, have two distinct life phases—aquatic and terrestrial. They hatch from jelly-covered eggs into an aquatic environment as long-tailed, legless and lungless larvae, or tadpoles (also known as “pollywogs”), which breathe with gills like fish. In this life phase the tadpole develops quickly by feeding mainly on algae, plankton and dead animal matter found on the bottom of ponds, lakes and streams. Toads tend to have a brief larval stage, lasting from as little as two

weeks “pop” out of their bodies and their tails slowly begin to absorb into their bodies.

At the beginning of this second life phase, the young frogs or toads (called froglets or toadlets) develop lungs and begin to breathe air. At this stage, their diet changes dramatically. From their humble, mainly herbivorous

occupying drier places such as upland woodlands, grassy meadows and rocky hillsides. In these environments frogs and toads spend the remainder of their lives foraging, brumating (winter dormancy), estivating (summer dormancy) and breeding.

Frogs and toads are typically nocturnal (active at night). Unlike other reptiles and amphibians, adult frogs and toads have vocal chords. They vocalize, or “sing,” during the mating season. Males have a species-

specific call that attracts females to a small area in an aquatic habitat that they defend from other males.

Mating occurs externally; as each female may lay thousands of eggs, males in amplexus secrete sperm that forms a protective jelly around the eggs.

The cycle continues. However, tadpole predators are abundant and include newts, diving beetles and hellgrammites. Juveniles and adult anurans also attract a diverse group of predators including raccoon, mink, opossum, skunks, foxes and herons. Only a small percentage of the several thousand eggs that were laid by the female survive to adulthood.

Frogs and toads are surprisingly long-lived creatures—living up to 20 years in the wild. Toads have been known to live more than 30 years in captivity.

Frog and toad differences

Frogs differ from toads by having smooth skin as compared to the “bumpy” or warty skin of toads. Frogs need to keep their skin moist. They tend to prefer more aquatic or wet habitats. Toad skin tends to be drier and better suited to drier habitats. This skin difference affects where frogs and toads live. Frogs never stray too far from water or a damp environment, and toads are not restricted to damp environments. In fact, toads have been observed in about every habitat type in Pennsylvania.

All of our Pennsylvania toads are ground-dwelling animals. Although



photo-Andrew L. Shiels

*Pickerel
Frog*

most of our frogs also live at the ground level, several species dwell in trees and shrubs and come down to the ground only to breed. The color and camouflage pattern on frog and toad skin helps them blend in to the habitat they occupy. Frogs tend to be mainly shades of green and brown, similar to the green edges of ponds, lakes, rivers and streams. Toads tend to be colored by more earthy tones such as gray, brown, red and yellow—similar to the leaf litter in woodlands and dry grasses along wetland borders.

Frogs and toads move differently. Their movement differs because they have adapted differently to feeding and to avoiding predators. Frogs have long legs adapted for leaping long distances when detected by a predator. Frogs also have large webbed hind feet that assist them with swimming and avoiding predators in the water. Conversely, toads have short, stumpy legs used for hopping.

Avoiding predators is not as much an issue with toads because they secrete a poison from glands in the skin on the back when an animal bites them. Given the quick reaction to the poison when a predator bites a toad (bad taste, nausea, dizziness), most animals immediately

spit out the toad. Predators quickly learn to avoid toads.

Unless toads are handled roughly, they will not secrete the poison from the skin. In addition, toads won't give you warts, but wash your hands after handling them anyway, as you would after

handling any wild animal or herptile. Toads are active

hunters that move about in search of prey. Their short legs assist them with hunting insects.

When a toad spots an insect, it crawls on all four feet within striking distance of the insect and then quickly flicks out its long, sticky tongue (attached to the front of its mouth). Then it pulls the insect back to its mouth. Frogs' tongues are also sticky, but they are attached to the back of the mouth, so frogs cannot extend their tongues as far as toads can. Frogs tend to make up the distance by ambushing prey with an abrupt leap from a distance. They accurately catch an unsuspecting insect with their sticky tongue and quickly consume it.

Frogs and toads also hibernate in different habitats. Frogs usually hibernate in water under mud or leafy debris at the bottom of streams or ponds. Toads hibernate in uplands by using their back legs to dig deep burrows in leaf litter or soft soil safely below the frost line.

Eastern American toad

The eastern American toad belongs to the family Bufonidae. It is the largest of our three Pennsylvania toad species, reaching 4 inches in snout-vent length. The eastern American toad is stout and squat in appearance, with short, thick legs compared to the

long legs of frogs. Although they vary greatly in color and pattern, they tend to be mainly rusty or brown in color, with warts on the back and legs. One or two warts occur in each of the largest dark spots. The eastern American toad has a cranial ridge behind its eyes, which is a prominent linear protrusion behind each eye that is either connected by one spur or not touching the parotoid glands. The parotoid glands are large elongate bumps located on its back behind the eyes. If a predator bites the toad, these glands secrete a distasteful poisonous white fluid that contains a steroid, which can affect a predator's mouth, heart and blood pressure.

Eastern American toads range from Canada (Manitoba) through the New England states and south to central Georgia, west to eastern Oklahoma, Kansas and Wisconsin. The eastern American toad is by far the most common of the Commonwealth's three toad species. It occurs in every Pennsylvania county and is thought to be the most stable of the three toad species. Eastern American toads are found in just about every habitat type in the Commonwealth where insects abound.

Eastern American toads are active both day and night, but they are most active at night in the summer. They feed on earthworms, caterpillars, moths, beetles, spiders and a variety of flying insects.

In Pennsylvania, eastern American toads hibernate deep beneath the soil or leaf litter from October to March. They emerge early in spring and move to woodland (vernal) pools and borders of streams, ponds, lakes and rivers to breed.

As a toad matures, it uses several defense tactics to avoid being eaten. Eastern American toads often "freeze" in place, not moving for some time when they detect a potential predator. Their camouflage helps them blend in to their terrestrial background. When a toad is threatened by a predator, it "bows" its head and shows the pred-

tor its large paratoid glands. Another defensive posture is to inflate itself to make it look too large for the predator to swallow.

Although the majority of potential predators avoid an adult eastern American toad because of learned behavior, many predators have adapted to their poisonous skin or have learned how to avoid it.

Pickerel frog

The pickerel frog (*Rana palustris*) is classified in the family Ranidae, or true frogs. Adult pickerel frogs reach about 3 inches in snout-vent length. The pickerel frog is characterized by a dominant brown or tan color with rectangular-shaped dark-brown spots that run down the length of the back in two rows, and rows of spots that run along the body. It also has dark crossbars on the limbs and long hind legs.

Pickerel frogs are known to occur from Canada south through northern and eastern Georgia, west to the eastern portion of Texas, and north to the Great Lakes. These frogs occupy a variety of habitats, but they tend to prefer damp meadows and slow-moving streams, marshes or wetlands with low vegetation. Pickerel frogs emerge from hibernation early in spring (late March).

Even though this frog spends most of its time near stream or pond edges, pickerel frogs are known to stray far from aquatic habitat in search of insects in grassy upland meadows. For this reason, they are often referred to as "meadow frogs."

Pickerel frogs have the same predators as toads. And like the American toad, but unlike its other true frog relatives, the skin of the pickerel frog secretes a substance that leaves the frog distasteful to many predators. To avoid predators, the pickerel frog takes several long leaps, often zigzagging its way to a nearby stream or other waterway, where it jumps into the water and hides under debris at the waterway bottom. □

Resources



Patches

The Commission continues its series of nongame species limited-edition patches with an eastern American toad patch and a pickerel frog patch. Each patch sells for \$4.71 plus 29 cents PA state sales tax for a total of \$5.00. Include \$2.00 shipping and handling for each order.

Pennsylvania Amphibians & Reptiles

Another excellent resource on frogs, toads and Pennsylvania's other reptiles and amphibians is the Commission's book, *Pennsylvania Amphibians & Reptiles*. The book sells for \$9.43 plus 57 cents PA state sales tax and \$2.00 for shipping and handling (total of \$12 for books sent to PA addresses).

Wall charts

The Commission's four reptile and amphibian wall charts (frogs, turtles, salamanders and snakes) are \$3.77 for the set of four plus 23 cents PA state sales tax and \$2.00 for shipping and handling.

For all these items, contact: Educational Media Services, PA Fish & Boat Commission, P.O. Box 67000, Harrisburg, PA 17106-7000. Or from the Commission's web site, www.fish.state.pa.us, click on "The Outdoor Shop" and view or purchase patches and other resources online. You may also use the products & publications order form on page 63 of this issue.