

The Amphibians of Connecticut

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Twan Leenders and Gregory J. Watkins-Colwell
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The 22 amphibian and 23 reptile species (not including sea turtles) living wild in Connecticut represent a diversity of habitat needs in addition to diversity of species. Although Connecticut is a small state, the available habitat is diverse. Amphibian and reptile species in Connecticut include species dependant on vernal pools and fragile trap-rock habitat. Some species live in tidal salt marshes, while others require cool, clean mountain streams. Some migrate each fall to ancestral hibernation dens, while others burrow deep into mud in the bottom of a pond to survive the cold New England winters. Connecticut's amphibians and reptiles can be found high in trees and deep underground.

Sadly, because some of these species require very specific habitats, they are subject to extinction through habitat loss. Many species have been given some protection, with a few being classified as endangered or threatened by the State of Connecticut. Hopefully, through public education and continued research and understanding, conservation efforts will succeed and those few species truly in danger of extinction will continue to be valued members of the herpetofaunal diversity of Connecticut.

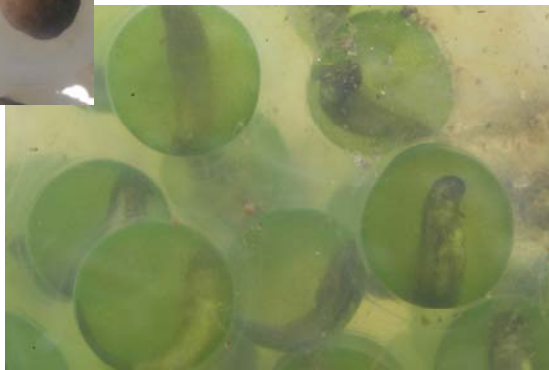
Amphibia

Amphibians include three major groups of vertebrates including frogs (Anura), salamanders (Caudata) and caecilians (Apoda). These groups include more than 5700 species and are found world-wide in temperate and tropical climates. Amphibians typically have smooth skin and usually live in moist habitats. Reproduction occurs via both external and internal fertilization with many species having aquatic larval stages such as tadpoles. The development of larva is a process called metamorphosis and it follows specific patterns that are often slightly different for each group of amphibians. However, most amphibians in the world lack this life stage and hatch from eggs as miniature versions of the adults or at least late-staged larvae. Many species do not lay eggs in water, but instead lay them on land or in trees. Some amphibians are viviparous or ovoviviparous, and do not lay eggs.

Ten of the twelve salamander species and all of the ten species of frog that occurs within Connecticut have aquatic larval stages. The remaining two salamander species lay eggs on land and have direct development into small versions of the adults.

Salamanders (Amphibia: Caudata)

Salamanders are often very secretive in the wild. Many of the more than 120 species of this group of amphibians in the United States are only seen during the breeding season. Salamanders have a wider array of life history traits than do frogs. While most salamanders spawn in the water and have a larval stage that metamorphoses into a terrestrial adult, some develop directly from eggs into small salamanders, thus bypassing the aquatic larval stage entirely (genus *Plethodon*). Some species are viviparous, giving birth to young lacking an aquatic life stage. Still others have a larval stage that lasts for the entire life of the animal, with aquatic adults with gills (genus *Necturus*). While none of the twelve species of Connecticut salamanders is live-bearing, each of the other life history strategies can be seen. The term “Caudata” means “With tail”.



Spotted Salamander life cycle



Key to Connecticut's salamanders (non-larval)

- 1 a.** external gills present in adult; large (8-12") and fully aquatic, with paddle shaped and muscular tail. Uniform gray with darker spots. Head flat with large feathery gills above the back of the jaws on each side. ***Necturus maculosus* (Mudpuppy)**
- b.** no external gills in adult, not as above2
- 2 a.** costal grooves absent. Rough skinned with a series of dark circles along the sides. Body may be greenish above or bright red or orange (specimens that are orange or red have rougher skin). Belly speckled and either yellow or yellowish-orange..... ***Notophthalmus viridescens* (Red-spotted Newt)**
- b.** costal grooves present, not as above..... 3
- 3 a.** Large (adults >2.5-3" in SVL) and robust. When limbs are pressed against side of the body, toes of front and back limbs overlap or (almost) touch..... **Ambystomatidae (Mole Salamanders)**.....4
- b.** generally small (usually <2" in SVL), slender and elongate. Toes widely separated when limbs are adpressed against side of body..... **Plethodontidae (Lungless Salamanders)**.....7
- 4 a.** Dark gray, brown or purplish in color with 2 parallel rows of light (yellow, cream) spots on the dorsal surface. Belly is grayish to grayish white..... ***Ambystoma maculatum* (Spotted Salamander)**
- b.** Lacks parallel rows of spots or is otherwise marked.....5
- 5 a.** Black with a pattern of squarish or ladder-like dorsal blotches. Blotches white, silvery gray or light blue. Belly dark..... ***Ambystoma opacum* (Marbled Salamander)**
- b.** Not as above.....6
- 6 a.** Salamander uniform gray, grayish-blue or silvery gray, generally with a purplish-blue wash but without distinct blue blotches. Toes appear long and slender relative to body size. ***Ambystoma jeffersonianum* (Jefferson's Salamander)**
- b.** A relatively small black salamander with discreet blue blotches. Toes not distinctly elongate and slender ***Ambystoma laterale* (Blue-spotted Salamander)**
- 7 a.** With 4 toes on each hind foot. Belly white or silvery in color with many dark ***Hemidactylium scutatum* (Four-toed Salamander)**
- b.** With 5 toes on each hind foot. Belly typically uniform in color or dark with light mottling8
- 8 a.** Robust. Hind leg clearly larger than front leg. Tail wedge or tear drop-shaped in cross section. Head proportionally large, with bulging jaw muscles. Usually uniform dark grey to brown, with or without dorsal blotches; a light line extends from the eye to the posterior margin of the mouth. Generally found under rocks or logs along stream sides..... ***Desmognathus fuscus* (Dusky Salamander)**
- b.** Hind leg and front leg roughly the same size. Not as above9
- 9 a.** A large, robust (semi) aquatic salamander with muscular limbs, a powerful paddle-shaped tail and large head. Generally tan, pink or brown with distinct sharp ridge between eye and nostril, marked by a light line. ***Gyrinophilus porphyriticus* (Northern Spring Salamander)**
- b.** Not as above10

- 10 a.** A small streamside salamander with a yellowish belly. Back may be greenish, yellowish or tan generally with either 2 dark stripes lateral to midline or a series of dark dots or dashes that form a similar pair of lines. Slender body and tail. Tail not wedge-shaped. Dark line may be present from eye to corner of mouth.....***Eurycea bislineata* (Two-lined Salamander)**
- b.** not as above11

- 11 a.** A medium-sized, black woodland salamander with a dense pattern of silvery-white spots on the dorsum. Belly usually grayish. A small groove runs between the nostril and the front of the mouth. Excretes very sticky secretion when handled***Plethodon glutinosus* (Slimy Salamander)**
- b.** A small, slender woodland salamander. Grayish, reddish, or tan with dark sides and broad mid-dorsal light band (“red-back” phase), or entirely dark gray with dusting of light specks (“lead-back” phase). Occasionally, sides and body are entirely red with tail-tip dark or black (“erythristic” phase). Belly grayish with lighter dusting of white or silvery gray.....***Plethodon cinereus* (Red-backed Salamander)**

Blue-spotted Salamander (*Ambystoma laterale*)

Description: A medium-sized salamander (8 inches; 20.3 cm) that is generally stocky in overall body shape. The background color is black with blue or metallic blue flecking. The degree of flecking varies widely. This, coupled with the amount of hybridization that occurs between this and other species throughout its range, can make it difficult to identify readily in the field.

Reproduction: Lays 10 to 20 egg masses of 15 eggs each in vernal pools in the spring. Eggs hatch 30 to 45 days later and larvae usually complete metamorphosis by September.

Habitat: Spends most of its life underground, but surfaces to breed. During the breeding season it can be found under logs and rocks in woodland habitat, or at woodland edges near vernal pools.

Food: Feeds on a variety of invertebrates, including earthworms and insects.

Range: A band ranging from Indiana east to central Massachusetts; from the southern coast of Lake Erie south to Virginia. In Connecticut the range is spotty and complicated by the fact that this species hybridizes with others in its range.

Conservation Status: Diploid populations are threatened in Connecticut, while hybrid "complex" populations, and pure populations of Jefferson Salamander, are of special concern. Recognizing diploid from hybrid animals, however, is nearly impossible without the aid of laboratory techniques. Some differences in body size and coloration can help provide clues that a particular individual might be a hybrid as opposed to a pure form of either Jefferson Salamander or Blue-spotted Salamander. However, distinguishing pure forms from hybrids is difficult for even the most seasoned salamander biologist.



Blue-spotted Salamanders generally are black or dark gray, marked with bold blue to gray blotches. The animal shown here is a hybrid type from the northwestern hills

Jefferson's Salamander (*Ambystoma jeffersonianum*)

Description: This is a moderately sized (5.8 inches, 14.9 cm; see Klemens 1993) salamander that is usually gray or silvery gray, or sometimes brown. Some individuals have some light blue speckling or foxing (Klemens 1993). It is typically more slender than many other *Ambystoma*, with a wide head. This species is known to hybridize with other *Ambystoma* and produce offspring with multiple sets of chromosomes. Recognizing pure *A. jeffersonianum* is often difficult and frequently requires genetic testing for certainty.

Reproduction: This species breeds in vernal pools, frequently in ledge areas (Klemens 1993), typically in March through April. Eggs hatch in 30 to 45 days (Bishop 1941) and metamorphosis is usually complete in late summer. **Habitat:** In Connecticut typically found in undisturbed deciduous forest with rocky slopes. Elsewhere in its range it may be more tolerant of disturbance. The author has found this species in woodland pockets surrounded on all sides by agriculture in Ohio, though the status of those populations is unknown.

Food: Feeds on a variety of invertebrates. Larvae feed on aquatic insects, worms and other invertebrates.

Range: Southern Indiana through Ohio and Pennsylvania and into New York and the western edge of New England. In Connecticut it is known from only a few counties. Many of the known populations could be hybrids



Jefferson's Salamanders tend towards a uniform gray or brownish-gray coloration, often with some light dusting of tiny bluish specks. However, hybrids of the laterale × jeffersonianum complex are difficult to identify.

Marbled Salamander (*Ambystoma opacum*)

Description: A medium-sized salamander with a length of 5 inches (12.7 cm) (see Klemens 1993). The body is generally stocky with a tail usually barely the length of the body. Coloration is black with a white marbling pattern on adults. The pattern color contrast is greater in males than females. Contrast also increases with age.

Reproduction: From 50 to 200 eggs are laid one at a time in the fall. Eggs are scattered around the bottom of vernal pools, or in depressions in the ground that later fill with water. Metamorphosis is generally completed in 4 to 6 months. Juveniles tend to have less contrasting coloration than adults. Larval specimens are dark with some greenish or grayish mottling.

Habitat: Generally found under rocks or logs in woodlands. It is often found in habitat that includes oaks. Most of the year it is buried underground, emerging in the late summer and fall to breed in vernal pools.

Food: Feeds primarily on insects and other invertebrates.

Range: Widespread throughout the eastern United States.

Conservation Status: Neither threatened nor endangered. However, there is a possession limit for the species in Connecticut. Destruction of vernal pools may be a primary threat.



Juvenile Marbled Salamander lack the distinct markings seen in adults

Spotted Salamander (*Ambystoma maculatum*)

Description: The largest terrestrial salamander in Connecticut, the spotted salamander measures 6 to 9 inches (15.2 to 22.8 cm). Adults are typically black with yellow spots. The belly is gray to a silvery gray. Occasionally, some animals are entirely black with a grayish belly, lacking any spots on the back. In some parts of the animal's range, the spots, especially those near the head, are orange or red, not yellow.

Reproduction: This species depends on vernal pools to spawn. Adults arrive at the ponds in early spring, often before the last of the ice has thawed. Sperm capsules are deposited by males on submerged leaves. The females collect the sperm capsules and then lay clusters of eggs, each containing about 100 individual eggs. The egg masses typically start clear, but many will become cloudy. In fact, in any vernal pool usually both types of egg masses can be seen. The cloudy coloration may help protect the embryos from ultraviolet (UV) radiation.

Additionally, some egg masses will have algae growing within the jelly of the egg mass. This species of algae is found only in the jelly of amphibian egg masses. Newly metamorphosed individuals closely resemble adults, although the spots may not appear immediately on metamorphosis, or at least not as bright as in adults.

Habitat: Found in woodland habitats with mixed hardwoods and vernal pools. In Connecticut they are frequently found in woodland habitats with large rocks. They spend most of their lives underground, typically only appearing above ground during breeding season.

Food: Adults eat a wide variety of invertebrate food and occasionally smaller salamanders. Larvae eat aquatic invertebrates, including mosquito larvae.

Range: Southcentral Ontario to Nova Scotia south to Georgia and central Texas (Behler and King 1979). In Connecticut it is known from every county, but not every township (see Klemens 1993).

Status: Although not specifically protected in Connecticut, there are possession limits on the species. Given its dependence on specific habitat types and vernal pools, this species is among those that suffer from human development in wetland areas.

Conservation Status: This species is vulnerable to habitat fragmentation and loss of vernal pool habitat to development. Though it is presently not specifically protected in the state it is probable that in the relatively near future this situation will change as new studies reveal more about the population ecology of the species and the affect of areas of suitable habitat being increasingly isolated from one another.



Adult Spotted Salamanders are unmistakable, but juveniles (and occasionally some adults) lack the bold yellow spots

Four-toed Salamander (*Hemidactylium scutatum*)

Description: A small salamander 2 to 4 inches (5 to 10 cm) in length. The hind feet have only 4 toes, unlike other species of salamander in Connecticut, which have 5. The base of the tail has a constriction separating the body from the tail. Coloration of the belly is whitish gray with black speckles. The dorsal coloration is reddish brown.

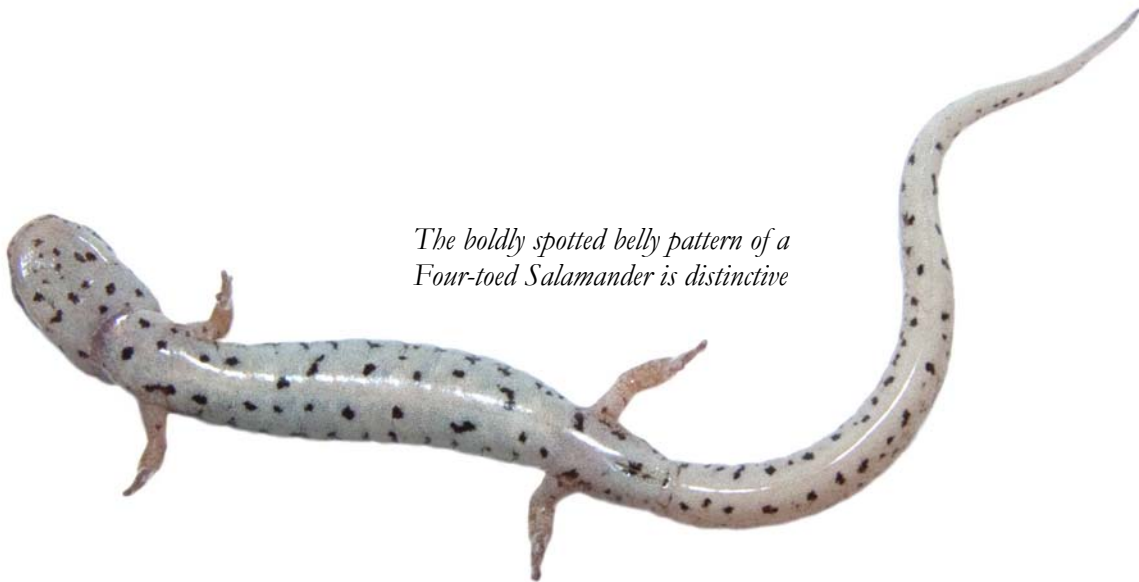
Reproduction: As many as 3 dozen eggs are laid individually on sphagnum near water in the early spring. The female guards them until the larvae hatch. The larvae are aquatic and complete metamorphosis within a couple of months.

Habitat: Sphagnum bogs, red maple swamps and associated upland habitats.

Food: Eats a variety of small invertebrates.

Range: Found in most states east of the Mississippi River. In Connecticut its distribution is more sporadic; this species is mostly found in low-lying areas. Though known from all counties in the state, it is not known from every township (see Klemens 1993).

Conservation Status: Not protected in Connecticut.



The boldly spotted belly pattern of a Four-toed Salamander is distinctive

Northern Dusky Salamander (*Desmognathus fuscus*)

Description: This is a medium-sized salamander among those found in Connecticut. It reaches an adult size of 3 to 5 inches (7.6 to 12.7 cm). Dorsal coloration of adults is usually brown or tan with darker brown markings usually forming a stripe down the middle of the back. Most diagnostic is the dark line extending from the eye to the corner of the mouth. The head is somewhat flattened and rounded with the jaws appearing to be muscular. The tail is "teardrop-shaped" in cross section, with a dorsal fin. The hind legs are more muscular than the front legs enabling this species to jump well, which it will do in attempts to escape.

Reproduction: Eggs are laid in clusters beneath rocks near water in middle to late summer. The larvae look essentially like the adults, although the pattern may not develop immediately. Larval development occurs in streams and some individuals will remain in larval form for many years. Paedomorphic individuals are known.

Habitat: Usually found in or near clear streams or shallow rivers. It can be found under flat rocks at the edges of such streams. Larvae are often in deeper water.

Food: Eats a wide variety of invertebrates.

Range: South New Brunswick and Quebec southwest to Louisiana (Behler and King 1979). In Connecticut it is found in every county, but it is not known from every town (Klemens 1993).

Status: Has no protected status in Connecticut.



Note the powerful limbs, broad head and distinctly flattened tail that help distinguish Northern Dusky Salamanders from dark Northern Two-lined Salamanders

Northern Spring Salamander (*Gyrinophilus poryphoriticus*)

Description: A large (8 inches; 20 cm), stout salamander with a blunt snout. The tail is compressed laterally and thick at the base. Coloration of adults is reddish orange or rusty brown, occasionally with a purple hue and usually with some darker brown marbling. Belly is white. A dark line extends from the eye to the nostril.

Reproduction: Eggs are laid in early spring. Larvae may take several years to complete metamorphosis. Aquatic larvae, which are less stocky than adults and often pale in color. The dorsal pattern is more marbled than adults (see Klemens 1993). The larvae have well-developed gills.

Habitat: As the common name implies, this is a species of freshwater springs and streams. Flowing water that is clean and cold is preferred. Klemens (1992) indicates that they are often found in forested hemlock ravines.

Food: Various invertebrates and smaller amphibians.

Range: The general range of the species is rather large, extending from Canada to northern Georgia. However, its specific habitat requirements mean that the actual distribution is spotty throughout its range. In Connecticut it is limited to a handful of sites in Litchfield, Hartford and Tolland counties (Klemens 1993).

Conservation Status: Because it requires pristine water conditions, the Northern Spring Salamander is easily threatened by land use, including water and thermal pollution. It is listed as threatened in Connecticut.



Northern Spring Salamanders are big and powerful predators of other salamanders, especially other stream dwelling species such as Northern Two-lined and Dusky Salamanders

Northern Two-lined Salamander (*Eurycea bislineata*)

Description: A small (4 inches; 10 cm), slender salamander with a long tail. The body coloration is usually yellow or yellowish orange with 2 distinct dark lateral lines extending from eye to tail. The mid-dorsal region is often peppered with small black dots. Color variants occur in nature and include specimens that are more yellow than normal or have reduced black lines.

Reproduction: Eggs are attached to the underside of rocks on stream bottoms. Larvae may take several years to complete metamorphosis. Multiple females often deposit eggs under the same rock so that many eggs may be found in one place, representing different developmental stages. Aquatic larvae are dark brown with a series of light dots extending down the side beginning just behind the shoulder. The back may also have lighter coloration than the sides. The tail fin is reddish tan with black peppering. A dark line extends from the eye to the gills, which are well developed.

Habitat: Streams and brooks with rocky bottoms may be preferred. However, the species can be found in a variety of habitats. The author has found adults under flat stones near swampy habitat without running water, and in river flood plains. Running water does not seem to be a necessity.

Food: A variety of invertebrates.

Range: A wide range throughout the eastern United States. The distribution of this species in Connecticut is quite extensive, with many known populations in every county. Only the Red-backed Salamander has a wider distribution in the state.

Conservation Status: Not protected by Connecticut.



Northern Two-lined Salamanders are fast-moving and rapidly scurry away when their covering rock or log is flipped up.



Red-backed Salamander (*Plethodon cinereus*)

Description: A small, slender salamander with a maximum length of 5 inches (12.7 cm) (see Klemens 1993). The body is slender and the legs are small to the point that, at first glance, the species can be confused with an earthworm. Coloration varies widely, but 2 distinct color morphs are known: the red-back and the lead-back phase. The 2 phases are not geographically isolated from each other and can, in fact, be found under the same log.

Reproduction: Clutches of 4 to 12 soft eggs are laid under logs or rocks. The female often guards the eggs until hatching; there is direct development of the embryos. There is no aquatic larval stage. Juveniles are very small.

Habitat: Generally found under rocks or logs in woodland habitat, often on hillsides, but also frequently found under debris in disturbed areas or in urban or suburban yards.

Food: Feeds mainly on termites, ants and other small invertebrates.

Range: Widespread throughout the northeastern United States.

Conservation Status: Not specifically protected. This is the most common amphibian species in Connecticut.



Un-striped color phase "Lead-back"



Striped color phase "Red-back"

Slimy Salamander (*Plethodon glutinosus*)

Description: A large (7 inches; 17.8 cm) and stocky salamander. Black in color and speckled with white or yellowish white spots. When disturbed it secretes a wonderful glue that promptly sticks to anything that touches the animal, including your fingers, or the mouth of a garter snake. While the predator is attempting to remove the glue (and sticks and leaves stuck in the glue) the salamander escapes.

Reproduction: Direct development occurs in this species. Females deposit eggs under a log or rock in late spring. It can take at least 5 years for juveniles to mature and females may only breed every second year (see Klemens 1992). Similar are to adults, but with fewer spots.

Habitat: Occurs in forested habitat with much ground cover in the form of rotting logs and flat rocks. It is usually found on hillsides. The author has found this species in Ohio under rocks on steep hillsides along mountain streams where Northern Spring Salamanders occur.

Food: Various invertebrates.

Range: Though it has a wide range in the eastern United States, Connecticut appears to be at the edge of that range. In Connecticut its distribution is restricted to northwestern Fairfield County.

Conservation Status: This species is threatened in Connecticut.



The distinctive white “polka-dot” pattern of Slimy Salamanders is unmistakable



Mudpuppy (*Necturus maculosus*)

Description: At a maximum adult size of 19 inches (48.3 cm), this is the largest salamander in Connecticut. The species is completely aquatic. Adults have large feather gills elevated on stalks just behind the eyes. Coloration is gray with darker gray to black dorsal spots and a black stripe passing from the nose, through the small eyes, to the gill stalks.

Reproduction: Mates in the fall, but eggs are not laid until the following spring. Eggs are deposited under submerged rocks or logs. As many as 100 eggs are laid in one clutch and may hatch in just over one month. Larvae do not become sexually mature until their sixth year (see Klemens 1992). Larvae look much like the adults, but generally with lighter coloration and a black stripe along the side.

Habitat: Occurs in a wide range of water conditions, including rivers and drainage ditches.

Food: Eats invertebrates, smaller salamanders, and fish.

Range: The species can be found from Canada to Tennessee and as far west as Kansas. In Connecticut it is thought to be an introduced species, found only in the Connecticut and Housatonic River.

Conservation Status: Not protected in Connecticut.



Mudpuppies are fully aquatic and retain their gills throughout their entire life

Red-spotted Newt (*Notophthalmus viridescens*)

Description: Adults are 4 inches (10 cm) in total length and are generally greenish in color with small red spots on the dorsolateral surface of the body. The belly is yellow with black peppering. In breeding season, males have a pronounced dorsal crest on the tail. Adults are aquatic.

Reproduction: Eggs are laid singly on submerged vegetation after an elaborate underwater courtship "dance" where the male holds his tail above his body and waves it in the water. During this dance the male will often hold the female's head with his hind legs and will even nuzzle her with his nose. Eggs hatch into aquatic larvae. After a larval state of generally a few months, metamorphosis occurs. The resultant stage is the "eft" stage, which resembles the adults in many ways but is orange or red in color. During this stage, which may last a year or more, the animal is often found walking in the open in early morning or after summer rains. The skin is warty.

Habitat: Adults are found in a variety of bodies of water, usually those that are permanent or semi-permanent. The author has caught adults in large ponds, vernal pools, freshwater marshes and even in mud puddles in the middle of dirt roads. Active adults are sometimes seen under ice in the early spring and can dive quite deep.

Food: Eats a variety of invertebrates. Adults also eat small fish and tadpoles.

Range: Extensive range throughout the eastern United States with many subspecies, especially in the south. In Connecticut the species is known to occur throughout the state.

Conservation Status: Adults are not protected. However, juvenile life stages may not be possessed in the state.



Terrestrial sub-adult life stage, or "Red Eft"



Aquatic adult life stage, or "Red-spotted Newt"

Frogs and Toads (Amphibia: Anura)

The tail-less amphibians ("Anura" means "without tail") comprise more than 4,800 species of amphibian. Of these, most occur in the tropics and many have some form of direct development (lacking aquatic larval stages). A total of 276 species occur in the continental United States, but only 12 in New England. All 10 Connecticut species have an aquatic larval stage of life; these larvae are commonly known as tadpoles. The tadpole gradually grows legs and lungs to complete its metamorphosis into an adult frog or toad. Some tadpoles complete metamorphosis in only a few weeks, while others take a few years.



Bullfrog metamorphosis may take several years in Connecticut



Key to Connecticut's frogs (non-larval)

- 1 a. Toes have adhesive toe pads.....**Hylidae (Treefrogs and Chorus frogs)**.....2
- b. toes lack adhesive pads, not as above3
- 2 a. over-all body size small, color brownish or tan with an "x" mark on the back***Pseudacris crucifer* (Spring Peeper)**
- b. body size over 1 inch, skin rough. Hind legs with bright orange or yellow markings on the inner thigh and groin area.....***Hyla versicolor* (Gray Treefrog)**
- 3 a. Back is covered with enlarged bumps or warts. Two large glands (Paratoid glands) clearly visible behind the eye and above the ear.....**Bufonidae (true toads)**.....4
- b. not as above.....5
- 4 a. Fewer than three "warts" per dark spot on the back, belly with any dark markings or mottling.....***Bufo americanus* (American Toad)**
- b. Three or more "warts" in many of the dark spots on the back. Belly uniform white or cream.....***Bufo fowleri* (Fowler's Toad)**
- 5 a. Skin slightly bumpy. No paratoid glands visible. Pupils vertical. Hind foot with keratinized spade. Toes not webbed.....***Scaphiopus holbrookii* (Eastern Spadefoot Toad: Pelobatidae)**
- b. Not as above.....**Ranidae (True Frogs)**.....6
- 6 a. A fold of skin runs from the ear region down the side of the body toward the hind legs (dorso-lateral ridge).....7
- b. No dorsolateral fold, but rather a ridge of skin wraps around the posterior of the ear drum. Body may be quite large. Throat of males may be yellow.....***Rana catesbeiana* (Bull Frog)**
- 7 a. Back has large spots (round or square). Spots may merge into wide stripes that run the length of the body rather than forming a series of blotches.....8
- b. Body may have markings, but not uniform spots or squares.....9
- 8 a. Spots on back are more or less square in shape (or rectangular, but not clearly oval or round), or may form stripes. Hind legs have yellow on the inner thigh and groin.....***Rana palustris* (Pickerel Frog)**
- b. Spots are rounded. Hind legs do not have yellow markings.....***Rana pipiens* (Leopard Frog)**
- 9 a. Upper lip and side of face light in color or bright green. Back may have some marbled pattern, but is typically dark green.....***Rana clamitans* (Green Frog)**
- b. Upper lip white or cream in color. Side of face is dark, usually brown and "mask-like". Body color may be any shade of brown, or yellow, sometimes even pinkish.....***Rana sylvatica* (Wood Frog)**

American Toad (*Bufo americanus*)

Description

A brown or brownish gray toad of 3 to 4 inches (7.6 to 10 cm) in length. The brown spots on the back generally contain 1 or 2 wart-like protuberances. The belly is creamy white with a peppering of dark spots.

Reproduction

Breeds in vernal pools and more permanent pools providing habitat is otherwise suitable with a lot of submerged vegetation. Egg masses are string-like, rather than clumped.

Vocalization

American toad calls are high pitched trills that may last several seconds. Males use a “release call” when other males grab them. This is a series of short chirps.

Habitat

Highly variable. The species can be found in mixed hardwood forests, or suburban backyards. Typical requirements include sandy soil with leaf litter or other substrate to hide under, and some source of moisture.

Food

Invertebrates, including insects and earthworms.

Range

Widespread throughout the state.

Status

Common.



The belly is cream, mottled with dark markings



American Toads generally have 1-3 “warts” in each dark dorsal spot

Fowler's Toad (*Bufo fowleri*)

Description

A medium-sized toad reaching 2 to 3 inches (5 to 7.6 cm) in length. Dorsal coloration is brown or brownish gray with brown or black markings surrounding the warty protuberances on the skin. Generally, three or more “warts” occur with each dark spot on the back. The belly is creamy white usually lacking dark speckles.

Reproduction

Mating occurs in vernal pools and small ponds in late spring, where string-like masses of eggs are laid loosely attached to submerged vegetation.

Vocalization

A nasal bleat

Habitat

Found in sandy soil areas near rivers, streams, ponds and lakes.

Food

Invertebrates, including earthworms and insects.

Range

Scattered throughout Connecticut with at least one population known from each county. Populations are fragmented and primarily found in river valleys. Not as widespread as *Bufo americanus*.

Status

Common.



Fowler's Toads generally have more than three “warts” in each dark dorsal spot



The belly is uniform white, often with a single dark mark on the chest

Gray Treefrog (*Hyla versicolor*)

Description

A granular-skinned tree frog reaching 2 inches (5.0 cm) snout to vent length. The coloration is highly variable, though most specimens are grayish with black markings on the back. Some specimens are green, occasionally completely lacking dorsal patterning. Individuals change color readily, though some seem to do so more readily than others. All color phases have yellowish orange on the inner thigh, and a white line connecting the eye to the corner of the mouth.

Reproduction

The species breeds in late spring to early summer, generally in vernal pools or other temporary waters. In farming areas it will often breed in horse troughs or even buckets of water left standing overnight. Eggs are laid on vegetation at the water's surface in clumps of 15 to 35 eggs (see Klemens 1993). The larvae have yellowish orange tails.

Juveniles

Tadpoles often display a bright orange or red tail. Metamorphs are often bright green in color. In some areas of the U.S. this juvenile color is retained into adulthood, but in Connecticut the green fades to the typical gray coloration.

Vocalization

The call is a musical trill similar to the call of a red-bellied woodpecker. Males will often call toward late afternoon from resting points high in trees.

Habitat

Uses many habitats, but especially moist deciduous forests. It can also be found in upland habitats, even resting on rocky cliff faces by day. Its coloration camouflages it well against either tree bark or lichen-covered rock.

Food

Feeds primarily on insects and other invertebrates.

Range

Found throughout much of the eastern United States. In Connecticut it is found sporadically throughout the state with populations known in every county.

Status

Though not listed as a threatened species, its dependency on vernal pools and shrubby wetlands has resulted in apparent decline in populations. Klemens (1993) warns that land development and habitat destruction may be causing serious damage to populations of this species by reducing the number and quality of suitable breeding grounds.

Comment

The only true tree frog in the state of Connecticut.



Juvenile and some adult Gray Tree Frogs are green – the scientific name “versicolor” hints at the variability of this species

Spring Peeper (*Pseudacris crucifer*)

Description

The smallest species of frog in Connecticut. It reaches a maximum body length of 1.5 inches (3.7 cm) as an adult. The toes have adhesive disks similar to those of tree frogs. The dorsal coloration is brown or brownish red, nearly always with a dark "X" pattern in the middle.

Reproduction

Breeds very early in the spring, often when snow is still on the ground. Eggs are laid in vernal pools and quickly hatch within a few days. Metamorphosis into tiny froglets occurs within a few weeks.

Vocalization

Males calling in the spring will emit a high pitched peep. Often a large chorus of males will erupt which can be very loud. Individuals are hard to locate because of the short duration of each call. Territorial calls of males often sound like high pitched trills, similar to rubbing a thumb across the teeth of a comb.

Habitat

Reclusive outside the breeding season, but is found in woodland areas with marshy, vernal ponds or bogs.

Food

Small insects, including termites.

Range

Widespread throughout the state with several populations known from each county.

Status

Common.



The X-shaped dorsal mark is a diagnostic feature of Spring Peepers

American Bullfrog (*Rana catesbeiana*)

Description

A large, bulky frog measuring up to 8 inches (20 cm) snout to vent. Its color is primarily green to dark green, generally with a white belly. The feet are large and strongly webbed. Males have larger tympanic membranes than females.

Reproduction

Breeding occurs from late spring to early summer. Egg masses containing many eggs are laid floating on the surface of the water. Metamorphosis takes as long as 3 years (see Klemens 1993). The larvae are large and green with little or no dark mottling on the tail.

Vocalization

A deep, often booming, call in middle to late summer. Commonly described as “chug-a-rum.”

Habitat

Fresh water ponds, streams and rivers.

Food

A carnivore with a wide range of suitable prey. It will eat virtually anything small enough to catch, including insects, smaller frogs, small mammals, and even small snakes.

Range

Native to the eastern United States, now introduced nearly worldwide. It is found throughout Connecticut.

Status

Common.

Comment. This is the largest species of frog in our state. However, it takes several years for an individual to reach an impressive size. Most bullfrogs encountered are about the size of large adult green frogs. Size should not be used as the only character to distinguish the two species.



Bullfrogs are variable in color and pattern but always lack the paired dorsolateral skin folds seen in the similar-looking Green Frog

Green Frog (*Rana clamitans*)

Description

A medium-sized frog reaching 3 to 4 inches (7.6 to 10 cm) in length. The Green Frog, as its name implies, is often green, however, dorsal coloration can also be brown, black or even grayish. The upper lip is usually bright green, but not always. A dorsolateral ridge extends from the tympanum to pelvis. This characteristic readily distinguishes the Green Frog from a small bullfrog. Larvae resemble American Bullfrog larvae, but are usually smaller and have dark spots on the webbing to the tail.

Reproduction

Eggs are laid in nearly any body of water; 3 to 4 clutches can be laid each season. Metamorphosis, however, often takes over one year in Connecticut.

Vocalization

The call resembles the plucking of a banjo string or maybe the sound of rubber ball bouncing on a kettle drum. When alarmed, juvenile greenfrogs jump into the water while emitting a high pitched squeek.

Habitat

Found in or near permanent bodies of water. Ponds, rivers, streams and lakes all are used.

Food

Eats a wide variety of prey items, including insects, crayfish, earthworms, smaller frogs and possibly fish.

Range

Found throughout Connecticut.

Status

Common.

Comment

Often confused with the American Bullfrog, which lacks the complete dorsolateral ridge and has a yellow-green belly.



Juvenile Green Frogs are often brown with green on the sides of the head. The eardrum in this frog is roughly the same diameter as its eye, indicating it is a female.



Northern Leopard Frog (*Rana pipiens*)

Description

A member of the true-frog family, this frog reaches an adult size of 3 to 4 inches (7.6 to 10 cm). As the name implies, it has dark spots on the dorsal surface. The irregularly shaped spots are usually brown or brownish green on a background color of green or silvery green. A well-defined dorsolateral ridge extends from the tympanum to the pelvis, and is often lighter in color than the background color. Belly and groin color is white or cream.

Reproduction

Spawns in flooded meadow habitat and grassy vernal pools, where egg masses are laid attached to submerged vegetation.

Vocalization

A soft, low-pitched grunt not unlike the sound made by rubbing a finger on a balloon

Habitat

Wet grasslands with streams or ponds.

Food

Primarily eats insects, but other invertebrates are also taken. As with all frogs, anything small enough can be considered prey, including other frogs.

Range

Known from a few scattered populations in Connecticut, mostly along the Connecticut River and in northern Litchfield County.

Status

Declining throughout its range. In Connecticut it is a species of concern. The taking and possession of this species is regulated in the state.



Note the bright green coloration, rounded spots and longitudinal ridges on the back of a Northern Leopard Frog.

Pickerel Frog (*Rana palustris*)

Description

Greatly resembles a leopard frog. This 3-inch (7.62-cm) true frog is greenish-gray above with dark spots forming nearly perfect rectangles arranged in two longitudinal rows on the back. The dorsolateral ridge is often white or cream in color and extends from the ear to the pelvis. The belly coloration is white, while the color of the groin and the underside of the hind legs is yellow or orange.

Reproduction

Spawns in marshy ponds in the spring. Males call from underwater.

Vocalization

The call of the pickerel frog is often described as a snore. It is especially interesting because the frog often calls while under water, unlike other frogs in our area.

Habitat

Often found in high grass near temporary pools of water. Favors shallow water in open-canopy areas (see Klemens 1993). Can also be found in bogs, fens, rivers, streams and ponds.

Food

Invertebrates.

Range

Widely distributed throughout the state with populations known in almost every town.

Status

Common.

Comment

The skin secretes a toxin to protect the frog from predators. Care should be taken not to get this into the eyes as it can cause irritation.

Note the generally brown coloration, yellow markings in the groin, squared-off spots and lack of longitudinal ridges on the back of a Pickerel Frog.



Wood Frog (*Rana sylvatica*)

Description

The coloration of this 2- to 3-inch (5- to 7.6-cm) frog is an adaptation for blending with the leaves on the forest floor. Dorsal coloration ranges from gray, to pinkish, to nearly rusty orange. A brown patch extends from the eye to the tympanum. A dorsolateral ridge extends from the tympanum to the pelvis.

Reproduction

Among the first frogs to breed in the spring. They lay their egg masses attached to submerged twigs in vernal pools in woodlands. The eggs hatch within a few days. Metamorphosis is relatively fast.

Vocalization

Wood frog calls sound like the clucking of ducks or fingers rubbed on the surface of a balloon.

Habitat

Moist woodlands, usually with oak, beech and maple trees.

Food

Small invertebrates.

Range

Found throughout Connecticut.

Status

Common, though habitat loss and pollution may prove detrimental.



Wood Frogs are the only species of unmarked, brownish frog in Connecticut. Juveniles can be mistaken for Spring Peepers, but invariably lack the X-shaped marking of the latter

Eastern Spadefoot Toad (*Scaphiopus holbrookii*)

Description

An unusual frog with vertical pupils. Spadefoots reach an adult size of 2 to 2.5 inches (5 to 6.3 cm) and are brownish gray, or blackish with yellow, gold or whitish stripes or mottling. The hind foot has a keratinized “spade” used for digging into the sand.

Reproduction

Breeds in vernal pools in sandy areas mid-April to July. Egg masses are laid in bands along submerged grass and vegetation. They hatch in 2 days and metamorphose rapidly, within 60 days (see Klemens 1993).

Vocalization

A drawn-out sheep-like bleat

Habitat

Sandy and well-drained soils.

Food

Various invertebrates.

Range

Very few populations are known in Connecticut. Klemens (1993) lists 7 current populations and 6 historic populations now presumed extinct. Current populations are scattered in eastern Connecticut.

Status

Declining throughout its range from habitat loss. In Connecticut it is listed as an endangered species with most of the historical populations now extinct.

During the breeding season, male Eastern Spadefoot Toads become quite colorful and develop black nuptial pads on the top of the inner two fingers



Females are generally a shade of brown year-round and never have nuptial pads. Note the black shovel-like tubercle on the hind feet used for digging.

IMPORTANT TERMS

Amphibian: An ectothermic vertebrate animal lacking scales. Adults are often terrestrial. Many species have larval stages.

Anura: The group of amphibians that includes frogs and toads.

Caudata: The group of amphibians that includes salamanders and newts.

Chromosomes: Structures containing DNA within the nucleus of a cell.

Development: The process of growing from a single-celled egg to an adult organism.

Diploid: Having two sets of chromosomes. This is the most common and is what humans are.

Direct Development: Development that occurs without aquatic larval life stages.

Ectotherm: An animal whose body temperature depends upon the temperature of its surroundings.

Extinct: No individuals of this species occur in the wild.

Herpetology: The field of science devoted to the study of amphibians and/or reptiles.

Home range: The space an individual animal may occupy within its normal activities.

Hybrid: The result of a cross-breeding between two different species of plant or animal.

Indicator Species: A species whose presence or absence in an area may serve to indicate the condition or quality of the environment there.

Larva: Aquatic life stage of amphibians. The larval stage of frogs is often called “tadpole” or “pollywog”.

Metamorphosis: The transformation from larval to adult.

Oviparous: Reproductive method that involves laying eggs.

Terrestrial: Living on land.

Triploid: Having three sets of chromosomes.

Vernal Pool: A temporary body of water that holds water in spring months.

Vertebrate: An animal having a back-bone.

Viviparous: The reproductive method that involves giving birth to live young, rather than laying eggs.

ADDITIONAL RESOURCES

AmphibiaWeb is an online system enabling anyone with a Web browser to quickly search and retrieve information relating to amphibian biology and conservation. www.amphibiaweb.org/aw/index.html

The Global Amphibian Assessment (GAA) is the first-ever comprehensive assessment of the conservation status of the world's 5,743 known species of frogs, toads, salamanders, and caecilians. www.globalamphibians.org/

The Connecticut Amphibian Monitoring Project (CAMP) is a 15-year study to assess amphibian populations throughout the State. www.scinax.com/camp/

The Herpetologists' League, established in 1936, is an international organization of people devoted to studying the biology of amphibians and reptiles. <http://www.herpetologistsleague.org>

The Society for the Study of Amphibians and Reptiles, a not-for-profit organization established to advance research, conservation, and education concerning amphibians and reptiles, was founded in 1958. www.ssarherps.org

American Society of Ichthyologists and Herpetologists is a professional organization for those who study amphibians and/or reptiles and/or fish. www.asih.org

Yale Peabody Museum of Natural History. Yale University's Natural History Museum. www.peabody.yale.edu

Connecticut Audubon Society is the oldest, continuously operating conservation organization in Connecticut, working to protect the state's birds and their habitat for more than a century. www.ctaudubon.org

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