

## Vernal Pool Indicator Species ID Sheet

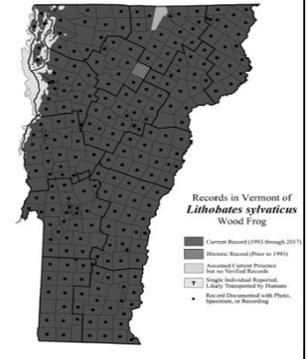
### Wood Frog (*Lithobates sylvatica*)

**Description:** Has dark patch, usually brown, extending back from each eye. Dark line of the same color usually runs from the front of the eye to the snout. Background color varies from light tan (usually in summer), to dark brown, to rust (especially in spring). Dorsolateral ridges (two pronounced lines) are present on each side of the back. Widely distributed in Vermont.



**Size:** Adults range in size from 1.5 to 3 inches. Females are larger than males. Newly transformed juveniles are about ½" in length and are faithful miniatures of the adults regarding color and markings.

**Call:** Courting males make a hoarse, duck-like quack. Explosive breeders, they may only call for 2-5 days, depending on weather.

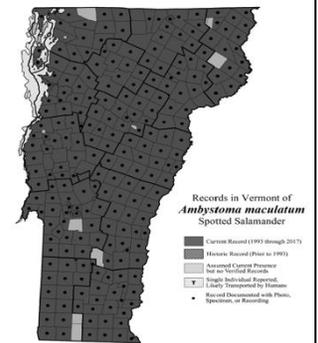


### Spotted Salamander (*Ambystoma maculatum*)

**Description:** Gray brown to blue-black with two irregular rows of bright yellow spots on each side. Underside is lighter, typically slate gray. Mostly found below ground (hence the name "mole salamanders"), often in shrew or other small mammal burrows. They also seek refuge under leaf litter, rocks, logs, and other coarse woody debris. Move to breeding pools (along with Wood Frogs) during evening rains, often before snow has completely melted. Widely distributed in Vermont.



**Size:** The largest of our 3 mole salamanders, adults are up to 6 to 9 inches long, sometimes larger. Females are usually larger than males.



The Spotted Salamander has been designated as a "Medium Priority Species of Greatest Conservation Need" in VT.

### Jefferson Salamander (*Ambystoma jeffersonianum*)

**Description:** A chunky, charcoal-gray to brown salamander with tiny blueish-white flecks on the belly and lower sides. The head and snout are wider and longer in this species than in the Blue-spotted Salamander. Unisexuals (see bottom) may have more flecking. Usually the first amphibian to arrive at breeding pools, sometimes a week before Wood Frogs and Spotted Salamanders.

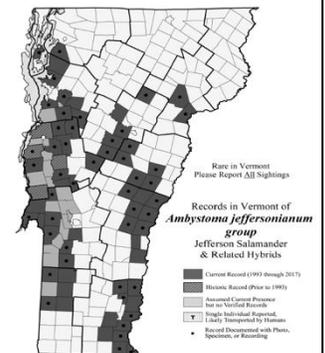


Found locally in low- to mid-elevation foothill regions of the state. Breed primarily in ridgetop vernal pools. **Size:** Adults range from 5-7 inches.

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The Jefferson Salamander has been designated as a "High Priority Species of Greatest Conservation Need" in VT.

### Blue-spotted Salamander (*Ambystoma laterale*)

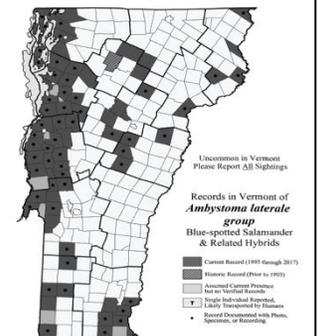
**Description:** Dark-colored, slender salamander marked with irregular blue or bluish-white flecks on the sides of the body and tail. Coloration is reminiscent of old enamelware pots. The head is narrow and tapers to a rounded snout. Unisexuals (see bottom) tend to be chunkier and browner.

Found at lower elevations, primarily in the Champlain lowlands, with scattered populations elsewhere. Will breed in marshes, swamps, beaver ponds, as well as vernal pools.

**Size:** Breeding adults range from 3½ -5 inches. Unisexuals may reach 7 in.



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The Blue-spotted Salamander has been designated as a "Medium Priority Species of Greatest Conservation Need" in VT.

**Jefferson/Blue-spotted Complex** – Unisexual (all female) populations of hybrid lineage exist between these 2 species, and appear widespread in Vermont. Physical appearance is highly variable along a gradient from pure Blue-spotted to pure Jefferson, depending on the species to which they are more closely related. This often makes identification difficult; however, a male specimen of either species can be reliably identified as the pure form, not a unisexual hybrid.

## Amphibian Egg Masses

**Wood Frog** – Each female frog deposits a single egg mass with 800-2,000 embryos. The egg mass lacks a surrounding gelatinous matrix, giving it a lumpy appearance (right). The embryos are dark on top (to absorb heat) and light below (to reduce predation). Those in the middle of the mass are warmest and hatch first. Soon after being deposited, the clear jelly capsules surrounding each embryo absorb water and the ping-pong ball-size clutch expands to the size of a baseball. Egg masses may become greenish from a symbiotic algae.



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**Where:** Free-floating or attached to twigs just below the surface. Isolated individual clutches are occasionally seen, but most are deposited in large communal masses which are often confined to a single area of the pool and may consist of more than 100 masses. As the eggs develop, communal deposits look like a lumpy sheet.

Eggs hatch in 2-6 weeks, depending on water temperature (warmer water speeds development).



S. Egan

**Spotted Salamander** – Egg masses are oval, elongate, or kidney-shaped. Unlike other egg masses, the outer jelly matrix is very firm, like set gelatin, and is either clear, opaque white, or may become green from a symbiotic algae. Embryos are 2½ -3 mm in diameter, and the vitelline membrane (the cloudy halo around each embryo) is the width of the embryo. Egg masses may contain from 30 to 250 individual embryos, and range from 2 inches in diameter up to softball-size.

**Where:** Egg masses are usually attached to sticks, weeds, grasses, or reeds within 8-10 inches of the surface, occasionally much deeper, and hatch in 4-8 weeks depending on water temperature.

**Larvae:** The ½” long larvae have feathery, external gills, and take 5-10 weeks before leaving the pool as a 1-2” salamander.



Mike Dunn



**Jefferson Salamander Complex** – Egg masses of Jefferson Salamanders and their associated hybrids tend to be cylindrical or cigar-shaped, and much smaller than those of the Spotted Salamander. The outer jelly matrix (which is looser than jello), is clear, making the egg masses difficult to see in the water. The vitelline membrane (the cloudy halo surrounding each embryo) is very thin, while in the Spotted Salamander the vitelline membrane is the width of the embryo.

**Where:** Eggs are typically attached to sticks or grasses, and the approximately 1- to 3-inch long egg mass may contain from 5 to 30 embryos. Incubation length and larval stage are similar to Spotted Salamander.



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(Above and left) Jefferson Salamander eggs.

**Blue-spotted Salamanders** and their hybrids typically lay eggs singly in loose sheets on the pool bottom, or in small, “drippy” masses of 2-5 eggs, sometimes attached to sticks. They can be very difficult to see. As with the physical characteristics of the hybrid salamanders, their egg masses may also vary in appearance, depending on the proportion of Jefferson vs. Blue-spotted genes present.



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(Above) Blue-spotted salamander eggs are laid singly or in small, loose masses.

### **Fairy Shrimp** (*Eubranchipus* species are most common)

Among invertebrate vernal pool indicator species, fairy shrimp are the most easily observed and identified. While several hundred species are known world-wide, at least two species are found inhabiting New England vernal pools. Across Vermont and northern New England, the Knob-lipped Fairy Shrimp (*Eubranchipus bundyi*) appears to be most common, while to our south the Vernal Fairy Shrimp (*E. vernalis*) is more widespread.

Although little is known about the distribution of the Knob-lipped Fairy Shrimp in Vermont, it appears to be most common in clear, clean woodland pools, and rarely found in roadside pools impacted from run-off, or those located in fields or other open habitats.

**Description:** While the different species of fairy shrimp vary somewhat in size, color, and shape, all are easily recognized by their combination of stalked eyes, “upside-down” swimming behavior, and orange, reddish, or bronze coloration. The reddish-orange Knob-lipped Fairy Shrimp is most often seen in early spring, shortly after ice-out. Females can be recognized by paired egg sacs located just behind their feathery legs, while mature males appear to have enlarged heads due to the presence of claspers—modified antennae used to grasp females during mating.

These small crustaceans typically swim slowly, propelled by their rhythmically beating abdominal appendages. From a distance they may look like tiny fish.

**Size:** Length ½ to 1 inch.



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(Above) Male Knob-lipped Fairy Shrimp viewed from above, Strafford, VT



Fairy Shrimp male (top) and female (bottom).

Photos courtesy of the Vernal Pool Assoc., [www.vernalpool.org](http://www.vernalpool.org)