

Wild Things in Your Woodlands

Spotted Salamander



The spotted salamander (*Ambystoma maculatum*) is large and stout, with a broad, blunt head. It is recognized easily by the round yellow spots on its back, arranged in two irregular rows running down the length of its black or dark gray body. There can be as many as 50 spots, and these usually extend from the head to the tip of the tail. The belly tends to be a slate-gray color with gray flecks along the sides. Adults generally measure from 4 - 7 inches and can be as large as 10 inches. Males reach maturity usually when they are 2 to 3 years old, whereas females take usually 1 to 2 years longer to breed. A spotted salamander can live for more than 20 years.

The aquatic larvae of spotted salamanders are dull green with white or light bellies, and generally lack any particular markings.

The spotted salamander is relatively common and widespread in New York State. Spotted salamanders are most noticeable in the early spring when they congregate in large numbers to breed over a short period of time. During this period of explosive breeding, which usually occurs in March or early April, spotted salamanders can be seen at night making mass migrations toward nearby pools and ponds. The breeding migration generally is triggered by the first warm, steady spring rains, even if there is snow remaining on the ground. The males, who often arrive first, begin swimming about in a highly active state that becomes nearly a frenzy when females arrive in the pond to mate.

During courtship and mating, adult male spotted salamanders deposit gelatinous white sperm packets on sticks or on the bottom of the pond. These packets are very easy to spot and serve as the first clue that spotted salamanders are present in a pool or pond. A female will swim over the packet and take up the sperm into her cloaca. Within one to a few days, the female lays eggs in gelatinous masses of usually 100 to 200 eggs, attaching the egg clusters to aquatic vegetation or sticks. Eggs usually take from 30 to 50 days to hatch, depending on the temperature of the water. The new hatchling starts out as an elongate tadpole, with gills near its neck region, and short buds in place of front limbs.

As the tadpole develops, toes form on the front feet, rear legs sprout near the base of the tail, and it ultimately loses its gills and tail fin, all in preparation for life on land.

Temperature, water level, and food availability combine to influence the length of the tadpole stage. The minimum time it takes for a spotted salamander to metamorphose into its terrestrial form is two months; usually newly transformed animals begin leaving the water in late summer and early fall. In the water, the larvae eat small crustaceans, mollusks, and insect larvae. On land, spotted salamanders eat beetles, earthworms, snails, slugs, insects, and spiders. Once transformed, they will remain on land for the rest of their lives, except briefly during spring breeding periods.

While congregated together in their breeding pools, spotted salamanders can be seen readily, even by a casual observer. During the rest of the year, however, the spotted salamander is largely fossorial, retreating to underground burrows. In moist environments or damp weather, individuals occasionally can be encountered under logs, stones, or boards during the day, or out foraging at night. In winter, they hibernate underground in burrows sometimes more than three feet deep.

The spotted salamander is an important component in both aquatic and terrestrial communities. Eggs and larvae provide food for a wide variety of aquatic animals, and predatory fish, birds, snakes, and turtles eat adults. Because of their complex habitat requirements, spotted salamanders are sensitive to the loss of both wooded and aquatic habitats. Furthermore, their tendency to migrate between these habitats during the breeding season makes them highly vulnerable to mass mortality. Cars crush a substantial numbers of adults each spring, on roads that separate upland sites from breeding ponds.

Spotted salamanders may move more than 1/2 mile from bodies of water where they breed, but will return to the same pond to breed year after year, often using the same exact path each year to travel from upland to aquatic sites. To provide habitat for spotted salamanders, landowners can enhance and protect both their aquatic breeding sites and the surrounding woods. Shallow woodland pools that dry up during late summer or fall (and do not support predatory fish) provide particularly valuable breeding habitat. Protecting these and other breeding sites from pollution (chemicals, sediments from erosion) and disturbance is essential for these animals. By marking the boundaries of breeding pools during the wet season, landowners can help prevent disturbances within the boundaries of the pools during drier times.

In surrounding woodlands, maintaining a mostly closed forest canopy (> 75 percent within 100 feet, and > 50 percent within 400 feet of the pool or pond) will provide optimum habitat for the spotted salamander and many other amphibians. A closed canopy shades the forest floor, keeping soils moist and leaf litter abundant. Coarse woody debris (logs, tree tops, etc.) can also be left on, or added to, the forest floor to provide safe havens for the spotted salamander throughout much of the year.

Maintaining minimal disturbance between breeding pools and adjacent woodlands allows spotted salamanders to move freely between the two. Disturbances such as road

construction, skid trails, or large ruts can create barriers to travel if they occur close to breeding pools and ponds. Locating skid trails away from (400 feet) breeding pools, and harvesting timber when the ground is either frozen or completely dry, provides extra consideration for the spotted salamander.

Portions of this article were adapted from Stephen J. Morreale's Spotted Salamander Species Account in "Hands-On Herpetology: Exploring Ecology and Conservation" by R. L. Schneider, M. E. Krasny, and S. J. Morreale.

For more information on timber harvesting guidelines for vernal pool animals, ordering information for *Forestry Habitat Management Guidelines for Vernal Pool Wildlife* can be found at <http://www.wcs.org/international/northamerica/mca/publications>

Kristi Sullivan coordinates the Conservation Education Program at Cornell's Arnot Forest. More information on managing habitat for wildlife, as well as upcoming educational programs at the Arnot Forest can be found by visiting the Arnot Conservation Education Program web site at arnotconservation.info

Spotted Salamander photo courtesy of
Department of Natural Resources, Cornell University Cooperative Extension