

Figure II-1, Jack-in-the-pulpit spreads his message of spring as several species of salamanders begin their search for a mate.



Figure II-5, Longer than its body, the lengthy tail of the longtail salamander continues the color begun at the head. Note the dark marks look more chevron-like on the tail, however.

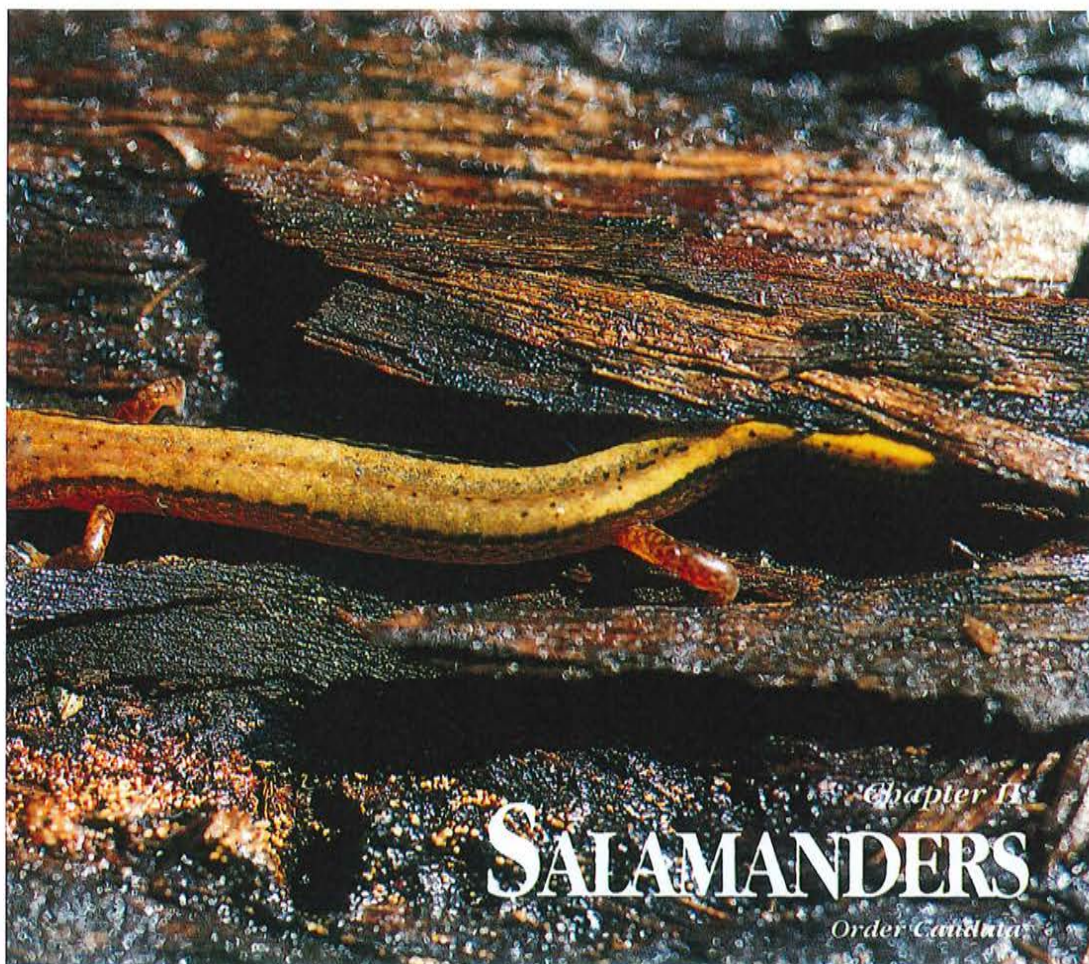


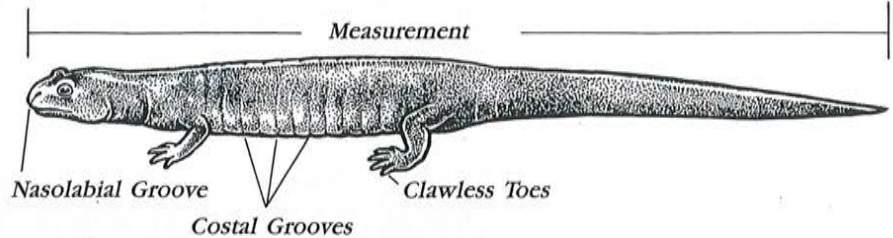
Figure II-2, The northern two-lined salamander is a statewide resident.

## Chapter II—The Salamanders

Pennsylvania has 22 species of salamanders representing five families and 11 genera. There are seven different families of salamanders in North America.

As a group, salamanders are secretive and nocturnal. All need moisture to survive. Their skin is smooth and must remain moist. Even the so-called terrestrial species can live only in areas that are moist or damp. Salamanders sometimes can be confused with lizards because of their slender bodies, long tails and similar body shape. But on close examination, it is obvious that salamanders lack the claws, scales and external ear opening of the lizards (See Figure II-6).

Figure II-6



Help in identifying various species of salamanders is available by counting the costal grooves. These narrow vertical grooves in the skin are found along the sides of certain species (See Figures II-6 and II-7).

Although some salamanders have a tendency to inflict a bite if picked up, they are not poisonous. Like many other amphibians, however, they do secrete a toxic substance from the skin glands that can be irritating even to humans, especially if it should come in contact with the mucous membranes. Always wash the hands carefully after handling salamanders and several of the frogs and toads.



Figure II-7

*Costal grooves are apparent on these spotted salamanders.*

In Pennsylvania, salamanders may breed from spring to autumn, and except for the hellbender, fertilization is internal. Copulation is not used, however. Instead, following courtship, the male deposits a small capsule referred to as a spermatophore. It is a gelatinous substance and its cap contains many, perhaps thousands, of tiny sperm. The female then takes up this packet with her cloacal lips and draws it into her body, where it is retained within the cloaca. The cloaca is a chamber into which the reproductive, digestive and urinary systems empty before they are discharged through the vent. Internal fertilization of the eggs takes place as the jelly-like eggs pass through the cloaca.

Salamanders are carnivores and feed on small living invertebrates.

### Giant salamanders (Family Cryptobranchidae)

**Eastern hellbender—*Cryptobranchus alleganiensis alleganiensis***

Only a single species of this family is found in Pennsylvania. In fact, the hellbender, plus a subspecies, represents the single genus of the giant sala-

mander family occurring in all of North America. It has relatives in the Far East, however, where the Japanese salamander approaches five feet in length and is the largest known living salamander.

The family lives its entire life in the water. Unlike our other salamanders, the giant salamanders fertilize their eggs externally.

## Mudpuppy salamanders (Family Proteidae)

**Mudpuppy**—*Necturus maculosus maculosus*

This family is small with less than 10 recorded worldwide, one of which occurs in Pennsylvania. It is nocturnal most of the time and aquatic. The mudpuppy is a permanent larva, and retains gills throughout its entire life. Fertilization is internal and the female protects the nest until the eggs hatch.

## Mole salamanders (Family Ambystomatidae)

**Jefferson salamander**—*Ambystoma jeffersonianum*

**Spotted salamander**—*Ambystoma maculatum*

**Marbled salamander**—*Ambystoma opacum*

**Eastern tiger salamander**—*Ambystoma tigrinum tigrinum*

The mole salamanders spend most of their lives underground, hence their name is taken from the small mammal that leads the same kind of life. They are terrestrial salamanders that use animal burrows and other natural underground openings or passages. Robust bodies and limbs are common to the family, and all have short, blunt heads. Mole salamanders do not have a nasolabial groove (See Figure II-6) between the lip and nostrils. The lungless salamanders have this groove, and thus it can be used as an aid in distinguishing between members of these two families.



Figure II-8

Counted among our largest salamanders, the eastern tiger salamander is now believed extirpated from Pennsylvania.

Mole salamanders are carnivorous in both the larval and adult stages. Members of this family breed from late winter to early spring, usually in ponds, and fertilization is internal as the male deposits his spermatophore for the female to retrieve. One genus with five species is recorded in Pennsylvania.

One other member of the family originally resided in a small portion of Pennsylvania. Eastern tiger salamander (*Ambystoma tigrinum tigrinum*)—Now thought to be extirpated in Pennsylvania, the eastern tiger salamander originally occurred in the southeast corner of the state (See Figure II-8). Forestland adjacent to woodland pools provides suitable habitat. This salamander uses animal burrows and other underground passages as damp and protected retreats.

The eastern tiger salamander was our largest terrestrial salamander, reaching adult sizes of six to 13 inches. Its small eyes are set within a broad head. Its back and sides are unusually dark brown to dull black and sprinkled with olive spots in a variety of shapes.

Breeding occurs in early spring with egg masses deposited in temporary pools, usually in or near woodland, where they attach to underwater structures or plants. Transformation occurs by late August.

Continuing research into the genetic makeup of our native salamanders may yield some interesting new information. Pennsylvania may actually contain one or two additional species of mole salamanders. The blue-spotted salamander (*Ambystoma laterale*) is very closely related to the Jefferson's salamander. Biologists suspect that hybrids between the two species and/or the blue-spotted salamander may occur in certain areas of the Commonwealth. Some salamanders assumed to be Jefferson's have been found in the northwest corner of Pennsylvania and could be hybrids of, or the full species of, the smallmouth salamander (*Ambystoma texanum*). This species' distribution has been officially recorded to extend to areas just over the border in Ohio. Analysis of DNA from each species and the suspected intergrades should provide additional insights and further refine the Pennsylvania species list.

## **Newts** (Family Salamandridae)

**Red-spotted newt**—*Notophthalmus viridescens viridescens*

The skin of the newts is rougher than that of most other salamanders, and does not have the smooth, slimy feel common to other families. The newts are primarily aquatic animals, although they leave the water after the larval stage to live up to three years as efts, or sub-adults, on land. They return to the water to become full adults and live out the rest of their lives.

## **Lungless salamanders** (Family Plethodontidae)

**Green salamander**—*Aneides aeneus*

**Northern dusky salamander**—*Desmognathus fuscus fuscus*

**Appalachian seal salamander**—*Desmognathus monticola monticola*

**Mountain dusky salamander**—*Desmognathus ochrophaeus*

**Northern two-lined salamander**—*Eurycea bislineata bislineata*

**Longtail salamander**—*Eurycea longicauda longicauda*

**Northern spring salamander**—*Gyrinophilus porphyriticus porphyriticus*

**Four-toed salamander**—*Hemidactylium scutatum*

**Redback salamander**—*Plethodon cinereus*

**Slimy salamander**—*Plethodon glutinosus glutinosus*

**Valley and ridge salamander**—*Plethodon hoffmani*

**Ravine salamander**—*Plethodon richmondi*

**Wehrle's salamander**—*Plethodon wehrlei*

**Eastern mud salamander**—*Pseudotriton montanus montanus*

**Northern red salamander**—*Pseudotriton ruber ruber*

This is the largest salamander family with more than 300 species. Fifteen species occur in Pennsylvania representing seven genera. One member of this family, the green salamander, is on Pennsylvania's List of Threatened Species.

These amphibians do not have lungs, so their common family name is quite descriptive. Instead of breathing with lungs as do most animals, they use a process called "cutaneous respiration." This long, complex phrase, reduced to more simple terms, means that they take in most of the oxygen they need to survive through the skin. For this to work, the skin is thin and well supplied with blood vessels. Also, the skin is moist and permeable to water, and simply stated, behaves similar to the way gills take dissolved oxygen from the water.

The lungless salamanders have the nasolabial grooves that the mole salamanders do not have. This small, narrow, gland-lined slit extends upward from the upper lip to each nostril (See Figure II-6). This organ searches the ground where it picks up water-borne odors and conveys them to the nose.

The costal grooves (Figure II-6) are easily detected on members of this family. Most lungless salamanders are terrestrial, although a few are fully or partially aquatic. Some of these salamanders lay eggs on land, not in the water, as do most other amphibians. In these cases the young do not go through a free-living larval stage, but develop fully within the egg and hatch as miniature replicas of the adults.

There are three other members of the lungless salamander family residing in at least a portion of Pennsylvania. Valley and ridge salamander (*Plethodon hoffmani*)—Found in southcentral Pennsylvania, the valley and ridge salamander's range is in the mountains east of the Allegheny mountains portion of the Susquehanna River Valley, extending south and west to the New River in Virginia. It prefers well-drained soils. It is nocturnal and most active in the spring and fall.

The valley and ridge salamander is a small, slender salamander from about three to five inches in length. Its back is dark brown, speckled with tiny flecks of silver white or bronze; the belly is dark with white markings. There are 21 costal grooves.

Breeding occurs in May or June when three to eight eggs are laid. The eggs hatch in late summer or early fall.

Ravine salamander (*Plethodon richmondi*)—This lungless salamander inhabits several counties in the western and southwestern portion of the state. Wooded ravines and tree-covered hillsides as they slope to the valleys are favorite habitats. The ravine salamander never enters water, but forages throughout its forest home. It is more active during the cooler months of spring and fall than it is during the summer months.

This salamander is 3 to 4½ inches long as an adult. It is slender and has short legs; the head is narrow. Small white or yellow blotches mark the lower sides, and very small brass or silvery irregular dots accent a brown to blackish back. Costal grooves vary in number from 19 to 22.

The ravine salamander lays its eggs in a cavity beneath the ground. Usually about six eggs are deposited in the spring, and they incubate until late summer before they hatch. There is no aquatic larval stage. Eastern mud salamander (*Pseudotriton montanus montanus*)—This is a salamander of muddy springs and swamplands. It also likes the muddy areas commonly found around springs and seeps and finds refuge buried in the muck. It inhabits only a small portion of extreme southcentral Pennsylvania and its range then jumps to states east and south of Pennsylvania. In Pennsylvania, the eastern mud salamander is on the List of Endangered Species.

Reaching adult sizes of three to seven inches, the eastern mud salamander has a short tail and short legs. Its general coloration is bright red, pinkish or salmon and it has scattered black spots on the back, sides and belly. The belly is reddish or yellowish and lighter than the colors on the back and sides. The costal grooves number 16 or 17.

The female lays 75 to nearly 200 eggs in late fall or early winter. The larvae hatch during late winter and transform in one to three years.

## Species Descriptions



### Eastern Hellbender

*Cryptobranchus alleganiensis alleganiensis*

**General characteristics.** The hellbender, a member of the Giant Salamander family, is one of two large salamanders inhabiting Pennsylvania. The other is the mudpuppy, although it belongs to a different family than the hellbender. Hellbenders attain adult sizes of just over 11 inches to as much as 20 inches in length. The hellbender is a harmless amphibian; it does not inflict a poisonous bite as many people believe. In fact, this bizarre-looking creature is seldom seen except by anglers who might catch a hellbender while bottom fishing. It can easily and safely be removed from the hook. It is a completely aquatic animal, nocturnal in its habits and hides under rocks or submerged logs where, again, anglers searching for bait may encounter this large salamander.

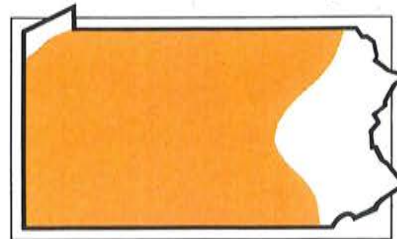
Although something less than attractive in appearance—some would say downright ugly—Indians once used the hellbender for food. Even though it is no longer a food source for man, the hellbender nonetheless continues to fill an important niche in the aquatic ecosystem.

**Identification.** The hellbender is more commonly gray, but some specimens could be an olive brown to almost black above. Some dark mottling over the back and upper sides also is possible. The belly is lighter. Though not always present, irregular, scattered black spots sometimes pepper the back and sides. The body and head of the hellbender are flattened. Several

loose flaps of thick, wrinkled skin hang along the lower sides. Tiny eyes are almost missed in proportion to the large, broad head.

The hellbender loses its external gills by the time it reaches four or five inches in length, although gill openings may be seen on each side of the neck. The legs are short and stout with four toes on the hindlegs. The tail is flat and rudderlike, useful in navigating around the hellbender's aquatic environment.

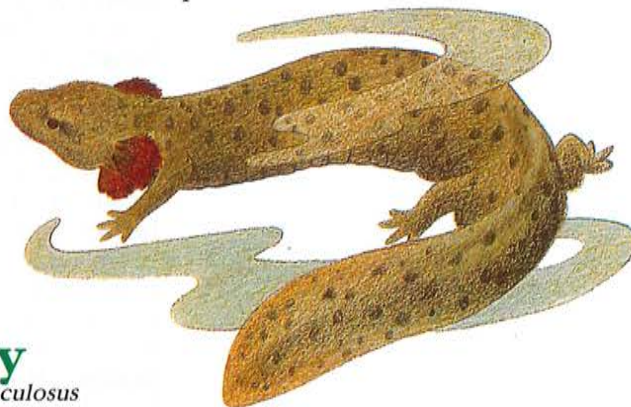
**Range.** The eastern hellbender is found in Pennsylvania's Susquehanna and Ohio River watersheds; it does not reside in the Delaware River drainage. Outside of Pennsylvania, its range extends southwestward to southern Illinois, continuing to the northern edges of Mississippi, Alabama and Georgia.



**Habitat.** The hellbender favors fast-moving, mid-sized streams and the channels of rivers with clear water. The hellbender prefers habitat with plenty of bottom shelter in the form of boulders, large stones, snags and other large, loose debris. It takes refuge beneath this cover by day, coming out to forage for food at night.

**Reproduction.** The hellbender breeds in August or September when the male prepares a saucer-shaped cavity on the stream bottom. Normally dug out under a rock or submerged log, most of the work preparing the nest is done at night. The female settles over the nest and deposits from 200 to 500 eggs. The eggs are fertilized by the male as they emerge from the female and settle into the nest. This external fertilization of the eggs by the hellbender is rare and unique among Pennsylvania's salamanders. The eggs are yellowish and are contained in long strings. The male guards the nest and eggs until the larvae hatch in eight to 10 weeks.

**Food.** The hellbender has a particular fondness for crayfish and snails. It also eats aquatic insects. Worms, when they can be found, add variety to the diet of this large carnivorous amphibian.



## Mudpuppy

*Necturus maculosus maculosus*

**General characteristics.** Only one other salamander in Pennsylvania, the hellbender, grows to a larger size than the mudpuppy. As an adult salamander, the mudpuppy reaches an impressive eight to 13 inches. It is a large, permanent larva, using external gills through its entire life. The mudpuppy is thoroughly aquatic and nocturnal, although it may be active even during the day in muddy or turbid water.

In certain locales this amphibian is also known as the waterdog, a colloquial name that on the surface would appear to lend at least a certain amount of credibility to the mistaken belief that it barks; it does not. Nor is it poisonous as some people suppose. It often is caught on hook and line by anglers and is completely harmless.

**Identification.** The most striking characteristic of this salamander other than its size, or perhaps because of it, is the large, feathery set of reddish gills billowing out from behind each side of the head (See Figure II-9); the entire effect is almost incongruous. The size and physical appearance of the gills vary somewhat with the water in which the particular specimen resides. Cold, clear water with ample dissolved oxygen requires less surface area of the gill material, so the gills may become less conspicuous, are held back and may shrink in length. On



Figure II-9

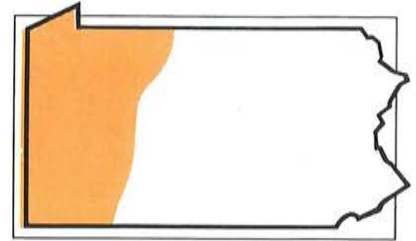
*The mudpuppy retains its reddish gills for life.*

the other hand, a mudpuppy living in water that is warmer and contains less oxygen tends to retain gills that are large and bushy, the thick plume-like breathing apparatus providing a more effective organ for absorbing scarce oxygen from its less-than-ideal aquatic home.

The legs of the mudpuppy are short but strong. The tail is shaped like a lengthy rudder, useful to a life spent in the water. The tail fin is occasionally tinted with orange or reddish pigments. Its small eyes have no eyelids. There are four toes on the front and hind feet; most salamanders have five toes on the rear pair of feet.

The mudpuppy, or waterdog, is gray to rusty brown on the upper surfaces, which also are showered with dark blue-black spots. The spots have irregular edges and are well-separated from one another. The pale belly is usually gray and is accented with dark spots. A dark stripe runs through each eye. Fifteen or 16 costal grooves mark each side.

**Range.** In Pennsylvania, the mudpuppy appears primarily in the Ohio River and adjacent Lake Erie watersheds, both part of its original range. This amphibian may also occur in eastern Pennsylvania, principally the Delaware River basin, possibly having migrated through the systems of manmade canals connecting these widely separated watersheds. Its range extends north to New York and southern Canada and south to Tennessee. It is found as far west as Manitoba and eastern Kansas.



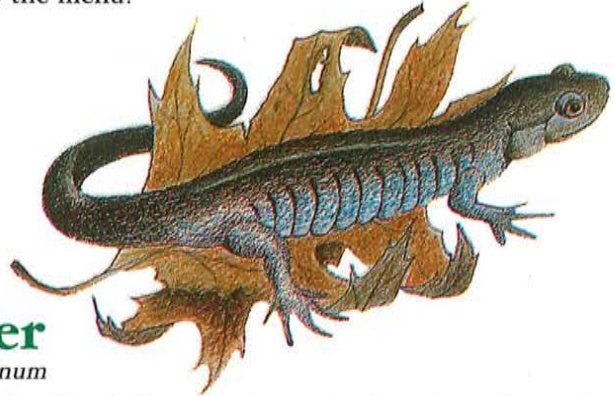
**Habitat.** Mudpuppy populations are found in lakes, rivers and streams. Although it seems to prefer clear, swift water, it can be found in habitats ranging from water that is shallow, muddy, warm and congested with thick stands of aquatic plants, to cool, clear, deep pools and lakes. It likes to spend its day hidden beneath underwater structures, venturing out at night in search of prey.



**Reproduction.** Although courtship and mating occurs in the fall, the female mudpuppy does not deposit her eggs until the following spring, usually in May. As the nest is prepared, it is excavated with the open end on the downstream side, facing away from the flow of the current. The site selected for the nest is usually under a stone or a fallen log sprawled across the stream bed. Mudpuppies residing in a lake or pond normally leave the still water, traveling up a feeder stream to construct a nest in moving water.

As few as 30 to as many as 125 eggs are released by the female and become attached as single units to the underside of the nest's sheltering stone or log. They remain there under the watchful eye of the female until the incubation period is completed some six or eight weeks later. When the yellow eggs open, larvae less than an inch long wriggle free. At hatching, the larvae are striped with dark browns and yellow. Both front and hind legs are evident at this early stage. Toes have yet to develop. Mudpuppies need about five years to reach maturity.

**Food.** The mudpuppy feeds on just about any aquatic animal it can capture. Crayfish are a favorite, but worms, insects, small fish and fish eggs add continuous variety to the menu.



## Jefferson Salamander

*Ambystoma jeffersonianum*

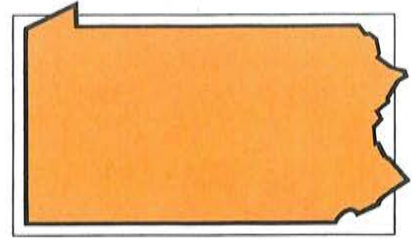
**General characteristics.** The Jefferson salamander has close ties to Pennsylvania, aside from the belief that this area always has been a part of its natural range. This plain-looking amphibian was named for Jefferson College, located in Canonsburg, Washington County. The college, in turn, honors Thomas Jefferson, a noted naturalist who also happened to become president of the United States.

The Jefferson is one of our largest salamanders, attaining adult sizes that range from just over four to seven inches. Aside from its relative, the tiger salamander, only the mudpuppy and hellbender grow to lengths appreciably longer than that.

**Identification.** This salamander is long and slender with a wide snout. Its toes are proportionately longer than those of most other salamanders. The back and sides are brownish gray; the belly is a shade lighter. The area surrounding the vent is usually gray. Small, bluish marks speckle the head, limbs and sides, but these tend to disappear with age. This salamander has 12 costal grooves.

**Range.** The Jefferson salamander is believed to occur in limited numbers in all 67 counties. Elsewhere, its range extends northward to New York and western New England and southward to parts of Virginia, Kentucky and southern Indiana.

**Habitat.** The Jefferson prefers damp forestland, especially a deciduous woods located near swamps or ponds. It finds shelter under fallen trees, rotting vegetation and other debris, often digging into the soil in the process. Like most Pennsylvania amphibians that breed in the water, the Jefferson salamander needs a close and stable source of water during its breeding period. Although these waters may dry up after breeding has been completed, they usually fill up again by the time breeding occurs the following year.



**Reproduction.** Courtship occurs as early as March in Pennsylvania. Male and female emerge from their winter retreat and migrate to a nearby pond where a short time later the female could deposit up to 20 egg masses. Each mass could contain up to 15 eggs that are attached to underwater shoots or small twigs. The eggs hatch into young larvae in 30 to 45 days. Transformation from an aquatic to a land animal takes place sometime during July to September. The newly transformed salamander measures two to three inches in length.

**Food.** Like other salamanders, the Jefferson salamander is carnivorous and preys on a variety of small insects, grubs and worms. Its habitat usually is conducive to providing an abundant variety of food.



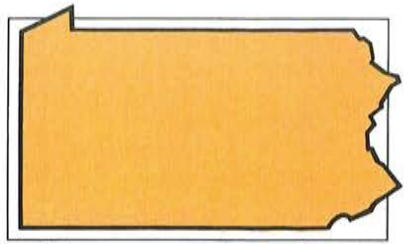
## Spotted Salamander

*Ambystoma maculatum*

**General characteristics.** The spotted salamander is one of our more common salamanders, although it is not often seen because it prefers to live underground. It generally is considered nocturnal. It reaches adult sizes that range from six to nearly eight inches, equaling or slightly exceeding the Jefferson salamander in average size.

**Identification.** As might be imagined, large spots are a predominant means by which to identify this salamander. Two rows of yellow or orange spots run somewhat erratically the length of the body. Beginning on the head and near the eyes, the spots end at the tip of the tail. The spots on the head usually are orange even though the spots on the rest of the body could be yellow. The ground color ranges from black, to blue-black, to dark gray or dark brown. The belly is slate gray. A stout body begins with a round snout that is blunt and punctuated with large, dark eyes. There are 12 costal grooves.

**Range.** In Pennsylvania the range of the spotted salamander extends from border to border in all directions. Except for Florida, southern New Jersey and the Delmarva Peninsula, it extends over the eastern one-third of the country.



**Habitat.** The state's numerous hardwood forests offer a potential home to this amphibian, providing a pond (which could be temporary) or other wetland is nearby. Hillsides and other areas around woodland ponds seem almost irresistible. The spotted salamander spends most of its time beneath ground level, but also conceals itself in moist areas beneath moss-covered rocks or stones and among piles of leaves or other debris.

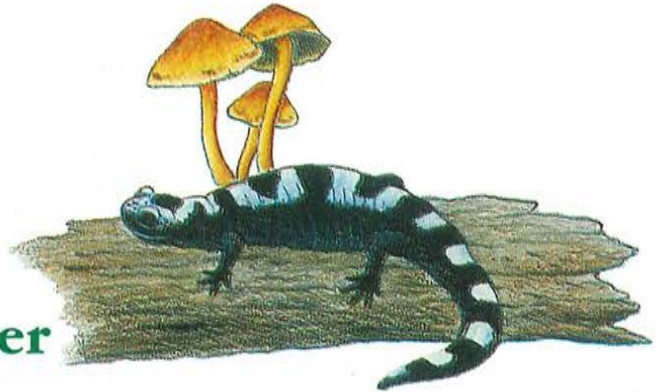
**Reproduction.** Breeding occurs in early spring with the advent of warm rains and rising air temperatures. Rainfall and the yearly warming trend encourages migration to nearby breeding ponds. Here, in shallow water and at night, pairs of spotted salamanders perform a dance of courtship that ultimately results in fertilized eggs being deposited by the female. The eggs are encased in masses that swell to measure from two to four inches in diameter. The masses, up to four of them per female, are compact and can be clear or milky in appearance. Each mass clings to submerged branches and other vegetation and contains an average of about 100 eggs.

Depending on water temperatures, the eggs hatch in one to two months. The larvae are light sandy or greenish yellow and dark spots sprinkle the back. A dorsal fin extends over the back ending just above the front legs. The gills are lost and transformation takes place in two to four months. The spotted salamander returns to water during its second spring as a mature adult, ready to begin the cycle again.

**Food.** Like all salamanders, the spotted salamander is carnivorous. The majority of its hunting is done at night when it seeks to feed on worms, slugs, spiders and insects.

## Marbled Salamander

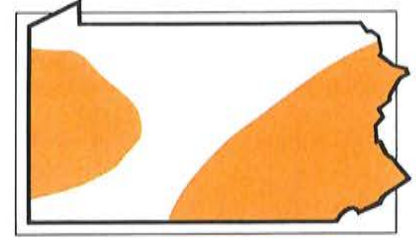
*Ambystoma opacum*



**General characteristics.** Another of the so-called mole salamanders, the marbled salamander is a secretive creature, not often seen even by people who regularly spend time in the outdoors. Most of the reported sightings occur during the breeding season when the male and female leave their well-hidden shelter to mate. This amphibian reaches adult lengths that range from 3½ to just over four inches.

**Identification.** The marbling effect that sets off this chunky salamander is a study in strong contrast. The body is dark gray to black, with bold white or silvery crossbands. On the female, these bands tend to be a bit more gray. Occasionally the crossbands run together on the sides, encasing a black area within a striking outline of white. The belly is black and unmarked. The marbled salamander has 11 or 12 costal grooves.

**Range.** The marbled salamander inhabits the entire East Coast of the United States from New England to Florida. In Pennsylvania, two populations have been identified, with the smaller one in the western part of the state from Westmoreland and Indiana counties to Crawford County. For the most part, the Allegheny Mountains appear to form a western barrier to the species. Residing also in southeastern Pennsylvania, the range extends up to Centre County, then takes a swing to the northeast entering Wyoming and Pike counties. It is more numerous in this southeastern range than in the northwest.



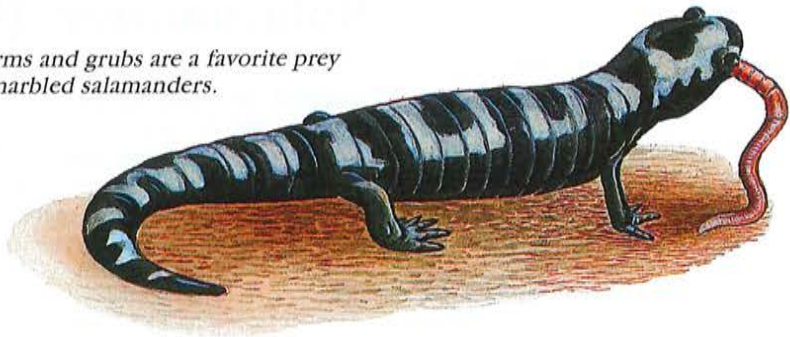
**Habitat.** The marbled salamander adapts to a variety of habitats encompassing woodlands and low, swampy areas to relatively dry hillsides. Sandy, even gravel-laden terrain supports the marbled salamander, which prefers a drier habitat than other members of its genus.

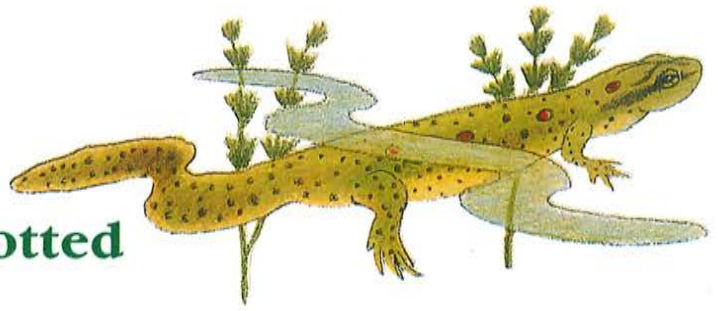
**Reproduction.** The marbled salamander breeds in the autumn, a departure from most other members of its family, and amphibians in general. In September through October in Pennsylvania the male marbled salamander courts the female. Mating and nesting occurs on land, but usually near water. Fifty to 200 eggs are laid in a small, sheltered depression that is flooded later by rainfall. Deposited one at a time, the eggs are guarded by the female, who curls her body around the clutch, remaining there until they are inundated. The eggs hatch a few days later. If the rains of autumn are sparse, the eggs lay dormant over the winter and hatch the following spring. The larvae are dark brown to black, liberally marked with lighter specks. About three-quarters of an inch long when hatched, the larvae transform into land-form salamanders in four to six months. The juvenile salamanders measure just two to three inches in length.

**Food.** The marbled salamander searches dry, sandy soil, wetlands or woodlands for slugs, worms and insects. Its diet is varied, reflecting the insects and other small prey that could be expected in such diverse habitats.

Figure II-10

*Worms and grubs are a favorite prey of marbled salamanders.*





## Red-spotted Newt

*Notophthalmus viridescens viridescens*

**General characteristics.** The red-spotted newt is actually the adult stage of an amphibian that progresses through three different stages of life: the aquatic larval stage, which immediately follows hatching from the egg; the terrestrial sub-adult stage known as the red eft; and finally, the mature adult, the aquatic red-spotted newt. Each stage has its own coloration and patterns and consumes somewhat different prey, although each retains the usual salamander preference for a carnivorous diet.

The adults remain moderately active all year long. Even during the winter months, red-spotted newts can be seen prowling the stream bottom even though ice may cover the surface.

The newts have a built-in protective device, effective in keeping predators at a distance. Even fish avoid the newt, which secretes a toxic substance from glands in its skin. This poisonous matter can at least irritate mucous membranes and is sufficient to discourage would-be predators from making a meal of the newt.

On the average, the red eft is slightly smaller than the newt. The red eft can be  $1\frac{3}{8}$  inches to  $3\frac{3}{8}$  inches long, compared to the adult newt's length of  $2\frac{7}{8}$  up to four inches.

**Identification.** This amphibian is greenish yellow in its larval stage. It has two grayish lines, located just off center on either side of the back; the lines run the length of the body. At hatching, the larva has gills and just a hint of forelegs.

Two to three months into the larval stage, the forelegs and hindlegs have been developed, the gills are lost and the skin becomes granular and textured to the touch. At this point metamorphosis takes place, the land-dwelling red eft stage is entered and the body becomes a brilliant red to orange-red. A row of black-bordered, round red spots appears on either side of the back; the belly is yellow during this sub-adult stage. Not yet an adult but no longer a larva, the red eft remains terrestrial for one to three years before transforming to become a red-spotted newt.

At the end of the eft stage and within a week of entering the water to live out its life as an adult, the skin of the newly transformed red-spotted newt becomes smooth, and the tail fin develops, becoming compressed vertically to look rudder-like. Its color now is drab olive to yellowish brown or dark brown. The belly remains yellow and is sprinkled with numerous small black spots. A row of red spots, bordered with black, also covers the newt's



back on each side. In neither the eft nor newt stages are the costal grooves distinguishable.

**Range.** Its range extends from central Georgia and Alabama, northward to southern Canada, and as far west as the Great Lakes. Each one of the state's 67 counties probably has some population of red-spotted newts.

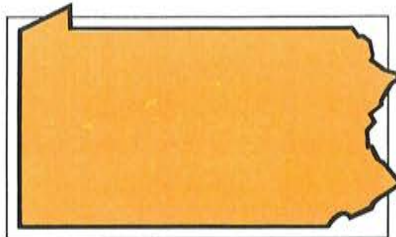
**Habitat.** Considering its broad distribution, the newt is able to select from a variety of water in or near which to make its home. It prefers water that is more or less still—ponds, shallow lakes, marshland and quiet stretches of streams. Clean water is required and if it is covered with a dense stand of submerged vegetation, that's a plus. The newt alternately can be seen scrambling among the stems of aquatic plants in search of food and crawling methodically across the bottom where sometimes it pauses to rest before swimming away to some other rendezvous.

The newt lives in water, but the land-based eft takes up residence in neighboring damp woods. Preferring forested areas, the red eft likes to avoid exposure to direct sunlight. Even so, it may casually, and with an almost fearless air, stroll across the open floor of its forest home, seemingly oblivious to anything else around it. The red eft is especially active on a rainy day.

Like the adult newt, the sub-adult terrestrial eft may remain mobile all year and only occasionally seek relief from the rigors of winter. When it does decide to hibernate, it does so underground where a more moderate and stable temperature is available.

**Reproduction.** The red-spotted newt is a spring breeder when the hind legs of the male become enlarged, and black, horny structures appear on the inner portion of the thighs and on the tips of the toes. At the right time, an elaborate courtship ritual ensues as the male seizes the female and both become involved in a frenzy of swimming, clasping and tail fanning. The female deposits from 200 to 400 eggs, which adhere individually to the stems of submerged plants. The eggs, spherical in shape, are brown and yellowish in color. The incubation period lasts for one to two months after which the three-eighths-inch larvae break free of their eggs to hide among the vegetation. The larval period lasts two to three months before the juvenile leaves the water to live in a nearby woods as the terrestrial eft. One to three years pass before the red eft migrates back to the water in which it was born, where as an adult red-spotted newt, the cycle begins again.

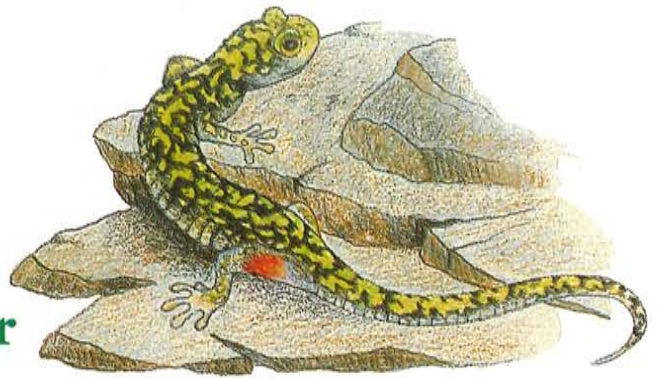
**Food.** The aquatic larva feeds on small invertebrates it is able to find among the stalks of underwater growth or along the streambed or bottom of the pond. Moving ashore as the terrestrial red eft, small insects and snails become its main prey as it searches among the leaves and earth beneath the tall trees. After returning to the water as the adult newt, foraging in the shallows produces numerous opportunities for a meal. It consumes worms, small crustaceans and mollusks, young amphibians and the eggs and larvae of amphibians. The newt is a voracious feeder and relishes fish eggs when it can find them.



## Green Salamander

*Ancides aeneus*

### Threatened Species



**General characteristics.** The green salamander belongs to the lungless salamander family. This salamander family has more known species than any other. As an individual species, however, the green salamander has been placed on Pennsylvania's List of Threatened Species. Found in only a small area of the state, its restricted habitat is such that concern has been expressed for its continued existence. Drastic changes to its restricted, preferred habitat will affect the ability of this attractive salamander to continue to maintain stable populations in Pennsylvania.

Reaching a length of just over three to about five inches, the green salamander spends most of its day in hiding, preferring to move about in the relative safety of the night.

**Identification.** The green salamander is aptly named and is considered our only truly green salamander. Its green or greenish-yellow irregular patches stand out boldly against an otherwise black body. It is a slender salamander with a somewhat flattened body. The head, however, appears to be swollen in the area just behind the eyes. The toes are square-tipped and expanded. As a lungless salamander, the green salamander breathes through thin, moist skin. Its costal grooves number 14 or 15.

**Range.** In Pennsylvania the green salamander is found in only a small portion of Fayette County in southwestern Pennsylvania. Its natural range, however, extends south into Alabama, making the lower part of Pennsylvania just about the northernmost extent of its range.

**Habitat.** The green salamander appears to prefer only sandstone outcroppings of a particular geological formation in Pennsylvania, in areas that are damp, but not necessarily wet. It takes refuge in the sheltered, narrow crevices typically found in these large faces of stone. It would not be unusual either to find the green salamander curled up under a stone or beneath the loose bark of a rotting tree or stump. Although it likes humid areas, it also seeks protection from the sun and rain. It occasionally climbs trees, but most often is seen at or near ground level.

**Reproduction.** The green salamander seeks its mate sometime from May to August. Some 10 to 20 sticky eggs are produced. The female attends the eggs during the 12 or so weeks they take to hatch. There is no aquatic larval



stage and the hatchlings are about seven-eighths-inch long. The incubation process may at times be difficult because the eggs are attached in strands to the upper surfaces of narrow cracks in the salamander's rocky home. Sometimes they may even be deposited in the confined space where bark has separated from the solid inner wood of a tree.

**Food.** Small insects make up most of the green salamander's diet. Sure-footed and hunting at night, the green salamander scales sheer rock walls in search of beetles, ants and even mosquitoes.



## Northern Dusky Salamander

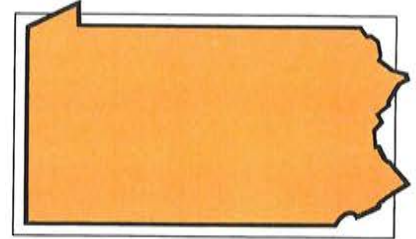
*Desmognathus fuscus fuscus*

**General characteristics.** The northern dusky salamander is a member of a large group of salamanders, the lungless salamanders, and as an individual species is found in abundance in Pennsylvania. The northern dusky salamander also is the more common of our three dusky salamanders. Its average adult size ranges from 2½ inches to 4½ inches.

**Identification.** The northern dusky salamander is gray to tan or dark brown on the back becoming a bit lighter on each side. Although usually plain, a close inspection may sometimes show mottling not much darker than the background color. Larvae and juvenile specimens have pairs of oval blotches on each side that often fuse together to form streaks running the length of the body. Even then, this pattern may be obscured or disappear as the salamander gets older. The underside is pinkish with blue-gray speckles. The tail is triangular and less than one-half the total length of the salamander. It has 14 costal grooves.

**Range.** The northern dusky salamander lives statewide and is an abundant amphibian in most counties. It stretches from New England to the Carolinas and westward to Indiana.

**Habitat.** It seldom is found far from running water and seems to have a special fondness for spring seeps and small rivulets. It likes woodland streams where rock-strewn banks provide ample shelter. More often than not, the summer months find the northern dusky salamander submerged, taking advantage of the cooling waters. It also hibernates under water, escaping the worst of winter's rigorous cold.



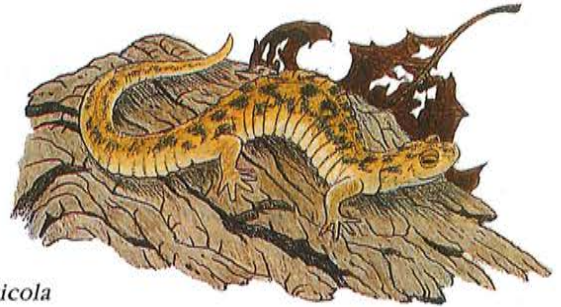


**Reproduction.** The northern dusky salamander conducts a courting ritual that results in successful breeding during June to September. A cluster of one to three dozen eggs is left by the female who guards them until they hatch in six to 13 weeks. The eggs are deposited near water, sheltered beneath rocks or rotting logs commonly strewn along the stream bank. The nest consists of a cavity carved out of the damp soil or decaying matter. After the eggs hatch, the larvae quickly move into the water. It remains aquatic for the balance of the larval period, transforming in six to 13 months to spend its adult life along the stream.

**Food.** Spending much of its time in the water allows the northern dusky salamander to feed on sow bugs and other aquatic organisms. Insect larvae and earthworms make up the balance of the diet.

## Appalachian Seal Salamander

*Desmognathus monticola monticola*

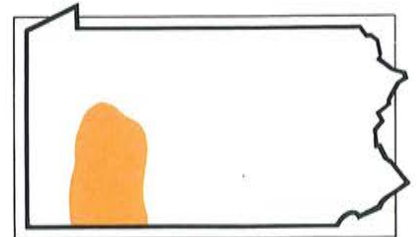


**General characteristics.** The Appalachian seal salamander is a member of the lungless salamander family, which, it is thought, evolved in what is now the eastern portion of North America. This family of salamanders is not equipped with lungs and thus needs to take in oxygen through its thin, moist skin. The Appalachian seal salamander averages 3<sup>1</sup>/<sub>4</sub> to five inches as an adult.

**Identification.** The Appalachian seal salamander has a robust body similar to its cousin, the northern dusky salamander. The tail makes up approximately one-half the total length of this salamander. The tail is compressed, and the tip is knife-edged on the upper side. The very tip of the tail is pointed.

Although the body can be variably patterned, it is mainly light brown or grayish above with dark-brown or black wavy streaks or reticulations that stand out markedly. Sometimes these markings take on the appearance of worm-like blotches and may be surrounded by paler areas. The belly is light and usually plain, although specimens may be found with blotches on the underside. The sides of the Appalachian seal salamander are dark above but lighter and speckled as they approach the belly line. There are 14 costal grooves in the skin on each side.

**Range.** In Pennsylvania the Appalachian seal salamander resides in an area in the southwestern part of the state, west of the Allegheny Mountains. Its range does not reach the Ohio border, however, and Clarion County just about marks its northern limits. It is an animal of mountainous and hilly regions, and its natural



range extends from Pennsylvania south into northern Georgia and Alabama. **Habitat.** The Appalachian seal salamander likes to stay close to water where it quickly dives if disturbed. Otherwise, it hides under rocks, downed trees or in burrows from where it feeds. Its hiding place almost always is on the bank of a mountain stream or small, rocky brook. A boggy ravine, rock-strewn and well-shaded from the rays of the sun by a mature hardwood forest, would present to the Appalachian seal salamander an ideal abode.

**Reproduction.** In Pennsylvania the Appalachian seal salamander deposits its eggs as early as June. The nest is guarded by the female until the eggs break open, usually in September. From one to three dozen eggs are released by the female and are attached to the underside of a rock or other convenient protective device. The area selected for laying the eggs is usually wet. The larvae measure about three-quarter-inch when hatched and transform after they've grown about one inch more.

**Food.** The Appalachian seal salamander often feeds as it rests in its daytime hiding place. Unmoving as it sits peering from the front of its burrow, the salamander can quickly grab an unsuspecting insect as it wanders by the opening. Ants, beetles and even other salamanders are included on this amphibian's menu.



## Mountain Dusky Salamander

*Desmognathus ochrophaeus*

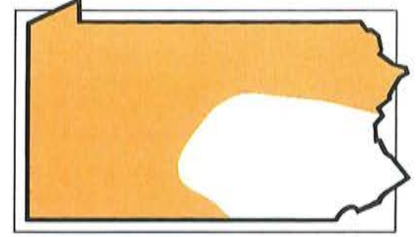
**General characteristics.** The mountain dusky salamander is a lungless salamander, closely related to the Appalachian seal and northern dusky salamanders. It is more terrestrial than other dusky salamanders and during wet weather often wanders far into the surrounding forest and away from its usual habitat near water.

It is not a particularly large salamander, reaching adult lengths of nearly three to about four inches or slightly less than the other dusky salamanders.

**Identification.** It is difficult to define the colors and patterns of the mountain dusky salamander because there is such a wide variation of both. The ground color, covering the sides and part of the back, usually is a dark color and can be almost anything ranging from grays to browns, olive to dark yellow, even darkish orange. A lighter stripe, bordered with a very dark, sometimes black pigment, runs the length of the body and onto the tail. This stripe also can be a variety of colors including orange, yellow, gray, tan or reddish. The stripe is wide, straight-edged and accented with dark vee-shaped marks. The sides of the mountain dusky salamander tend to be

mottled along their lower margins. Its face is marked with a light line extending from the eye to the jaw. The tail is slender and rounded. Costal grooves number 14.

**Range.** The mountain dusky salamander ranges from New York to northern Georgia and Alabama. It is found over about two-thirds of the state, missing the southeastern corner. It is absent from that area south, and along the coast.



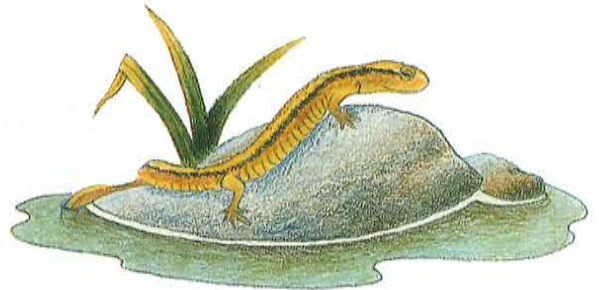
**Habitat.** The mountain dusky salamander is an animal of the uplands where it favors small streams and springs. It stays close to water except to range occasionally over the floor of the forest, which most of the time is a stand of conifers. The mountain dusky salamander takes refuge under stones and old logs and hides among piles of damp leaf litter covering its forest home. During the winter, large populations of mountain dusky salamanders may gather around springs, seeps or other small wet areas. These same sites could later serve as breeding grounds and much needed aquatic habitat for mountain dusky salamander larvae.

**Reproduction.** The mountain dusky salamander appears to be in no particular hurry to breed because mating can occur anytime between spring and fall. The mountain dusky salamander is at least three and perhaps four years old before it is sexually mature. After mating, the female picks a site near water where 11 to 14 eggs are laid in clusters. They are attached to nest cover, which may be decaying logs or any of several species of sphagnum mosses that commonly grow in this salamander's habitat. The female guards the eggs until the larvae emerge. They remain in the larval stage for two to eight months.

**Food.** As is the case with most amphibians, the habitat of the mountain dusky salamander serves to produce a variety of insect life. The mountain dusky eats most insects, including beetles and numerous small flies. Mites, although not insects, and other "bugs" also are captured and included in the diet.

## Northern Two-lined Salamander

*Eurycea bislineata bislineata*



**General characteristics.** The northern two-lined salamander is one of the brook salamanders, preferring wet, moist areas close to small streams or rivulets. It is not a large salamander, reaching adult lengths of 2½ inches to just under four inches.

**Identification.** The primary color of the northern two-lined salamander is yellow, although it may be tinged with brown, green or an orange-bronze. The back is nearly covered with a lighter stripe that runs the length of the

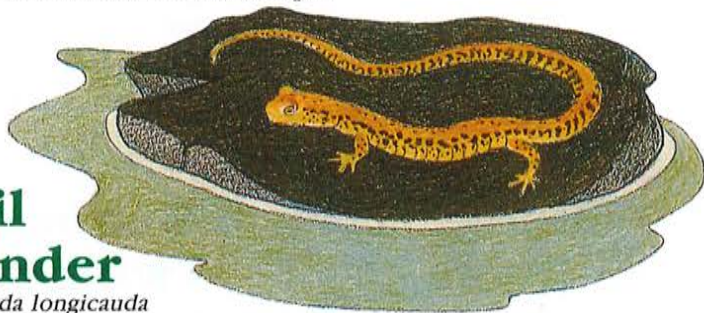
body. This broad stripe is bordered with narrower black or dark brown stripes that begin at the eyes and end on the tail where occasionally they break up into small spots. The sides are mottled, and although they may tend to be tan, they still show the characteristic yellow. The belly is bright yellow. There are 13 to 16 costal grooves.

**Range.** The northern two-lined salamander is distributed statewide. Its range extends from Quebec to Virginia and the Tennessee River Valley, westward to Illinois.

**Habitat.** The northern two-lined salamander is often found in abundant numbers, depending to a large extent on the habitat. It likes rock-bottomed brooks, preferring small streams to larger waters, although swampland and flood plains have their share of this colorful creature as well. When not in the water, this amphibian takes refuge among the rocks and tree roots lining the water's edge. During wet weather, the northern two-lined salamander may strike out, heading well into the damp forest surrounding its home, exploring, foraging, but always returning to its small, rock-strewn brook.

**Reproduction.** Courting by the northern two-lined salamander commences in late winter to April and is carried on in the water. The female lays an average of 30 eggs which she may guard. The eggs are sticky and adhere to the underside of submerged rocks and logs or cling to the stems of aquatic plants. They hatch in May or June and the larvae are about a half-inch long. They remain in the larval stage for one to three years, transforming when they are nearly two inches in length.

**Food.** Following the same pattern of most other salamanders, the northern two-lined salamander prefers a diet comprised mainly of invertebrates. Insects and their relatives are the main staple.



## Longtail Salamander

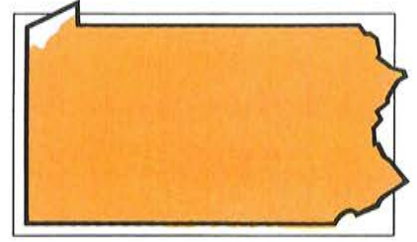
*Eurycea longicauda longicauda*

**General characteristics.** The longtail salamander is one of the so-called "brook" salamanders, usually residing in or near small waters where fish are at a minimum at best. This lungless salamander attains adult sizes of four to just over six inches. Most of this length is "tail," because it accounts for much more than half the total length. The longtail salamander is nocturnal, although it may be seen moving about during the day following a heavy rainfall.

**Identification.** The descriptive common name provides a clue to identifying this colorful amphibian. Much longer than the body, the tail is slender but continues the coloration and pattern that begin on the head. This salamander is yellow to bright red-orange and is marked with contrasting black

spots. The spots are heavier on the sides than they are across the back, and on the tail the spots may combine to form vertical bars. The salamander has 13 or 14 costal grooves.

**Range.** The longtail salamander is a state-wide resident except for the small area of the Commonwealth that drains into Lake Erie. There have been no reported sightings of the longtail salamander from Pennsylvania's 42 miles of Lake Erie shoreline or the inland Lake Erie Plain. Its range includes southern New York to northern Alabama and west to the southern tip of Illinois.



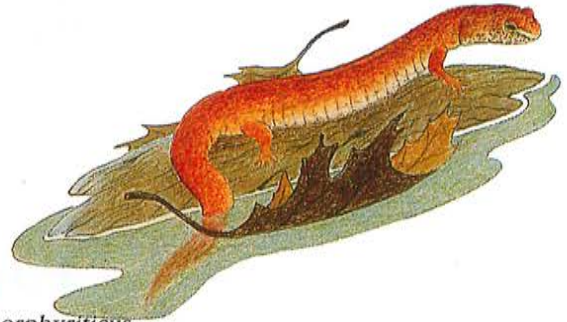
**Habitat.** This amphibian is known to inhabit caves and abandoned mine tunnels, but more often is at home near small streams, seeps and springs. The longtail salamander waits for nightfall, hidden under rotting logs, stones and streamside boulders. It is also known to reside in banks of shale that overlook a watery environment, where it darts among the numerous cracks and crannies in search of food.

**Reproduction.** The longtail salamander locates a mate to begin courtship from mid-autumn to early spring. Breeding occurs in or near the water sometime between October and March when the female lays up to nearly 100 eggs. The eggs may be deposited directly in shallow water, or sometimes near the water's edge under stones or in small openings in the ground. The eggs produce aquatic larvae in six to eight weeks and transformation follows after four to as much as seven months. The longtail salamander is sexually mature at one to two years of age.

**Food.** Most of its hunting is done at night when this agile salamander preys on resident invertebrates. It especially likes to spend evenings during a warm rain looking for a meal that could include grubs and any number of insects.

## Northern Spring Salamander

*Gyrinophilus porphyriticus porphyriticus*

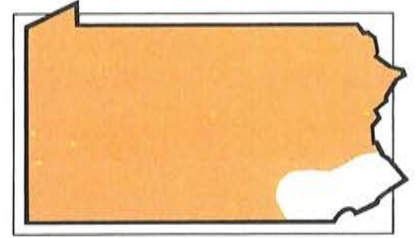


**General characteristics.** The northern spring salamander is the largest of several lungless salamanders that occur in Pennsylvania. Adult lengths range from nearly five inches to 7½ inches. It is sturdily built and nimble. This amphibian is at least partly nocturnal.

**Identification.** The basic coloration of the northern spring salamander is salmon although variations occur through tints of reddish brown, yellowish brown or light orange. The back and sides sometimes have markings, and even then are often nearly obscured, appearing as a very subdued mottling.

These spots also are scattered about the throat. The belly is lighter. A light line edged with black begins at the eye and extends downward to the nostril and can help identify this colorful creature. There are 17 to 19 costal grooves.

**Range.** The northern spring salamander extends from most of New England southwestward to Alabama. It is found statewide except for portions of the extreme southeast. It apparently has not made its presence known at least in Philadelphia County and parts of Delaware, Chester, Bucks and Montgomery counties.



**Habitat.** As could be expected, the northern spring salamander is found in and along areas where water suddenly springs from the earth, but it also lives along fast-moving streams and even in wet caves. Mountain streams of the type that might hold wild brook trout could also contain populations of this amphibian. However, moving water appears not to be a strict requirement because it also is found in wet depressions beneath logs or stones. Forested areas seem to be a favorite.

**Reproduction.** The northern spring salamander may begin its elaborate courtship ritual in which the male rubs and prods the female anytime between June and November. The eggs are deposited in the water one at a time and are attached to the underside of stones on the stream bottom. Cool water is preferred. The eggs hatch sometime from April to July and the larvae measure less than one inch. Two to three years pass before transformation takes place and by then the salamander may be four inches long.

**Food.** This amphibian feeds on a broad spectrum of insect life and other invertebrates common to its habitat. Other salamanders even fall prey to a hungry northern spring salamander. Heavy rain on a warm summer evening might cause this critter to wander away from its usual aquatic haunts in search of a meal.



## Four-toed Salamander

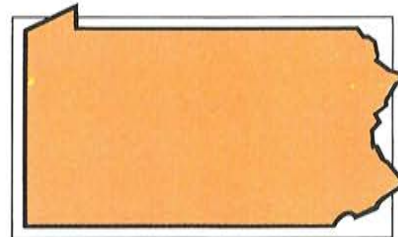
*Hemidactylium scutatum*

**General characteristics.** The four-toed salamander is a secretive amphibian in its adult terrestrial life as well as during its aquatic larval stage. It has a novel defensive mechanism that enables it to flee from an attacker, with some sacrifice. If grabbed by a predator, the tail easily breaks from the body, the four-toed salamander slips away, and the hunter is left holding the small, twitching appendage. After escaping to a safe retreat, this delicate

creature bides its time, waiting for a new tail to be regenerated. The four-toed salamander is small, with adult lengths reaching only two to 3½ inches.

**Identification.** There are two distinguishing characteristics that help identify the four-toed salamander. One is the basis for its common name; only four toes appear on each hind foot, where most other salamanders have five toes. The other important and distinctive feature is the belly. It is marked with large, bold, black spots that stand out predominately against an almost pure white. The back of the four-toed salamander is reddish brown to yellowish tan; its sides tend to be gray. The thick tail is marked near its base with a constrictive ring, indicating the point at which it would separate. The number of costal grooves varies from 12 to 14.

**Range.** Although scattered populations occur in many states, the basic range of this salamander extends from Nova Scotia to Wisconsin and south to Alabama. The four-toed salamander may range statewide in Pennsylvania although its numbers are spotty.



**Habitat.** The sparse population of this interesting creature no doubt reflects its special habitat requirements. It prefers boggy areas with an abundance of sphagnum mosses, and in Pennsylvania that somewhat restricts its range. Leaf litter in damp, forested areas might also be acceptable habitat, but a woodland pond would have to be close by. This small amphibian, with its special needs, has quickly felt the negative impact of agriculture and expanding urbanization.

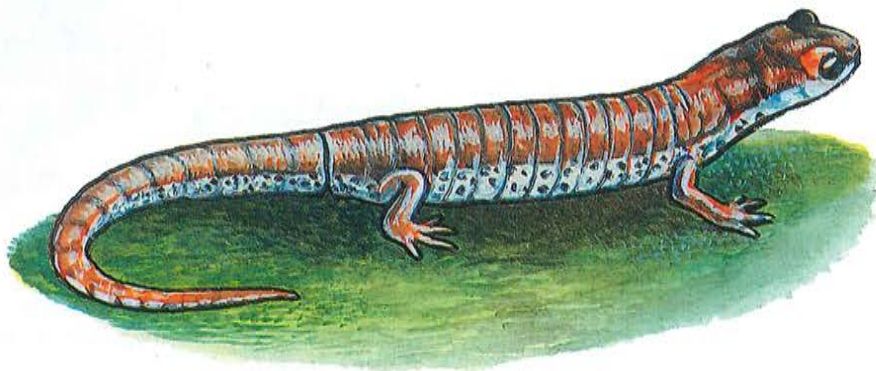
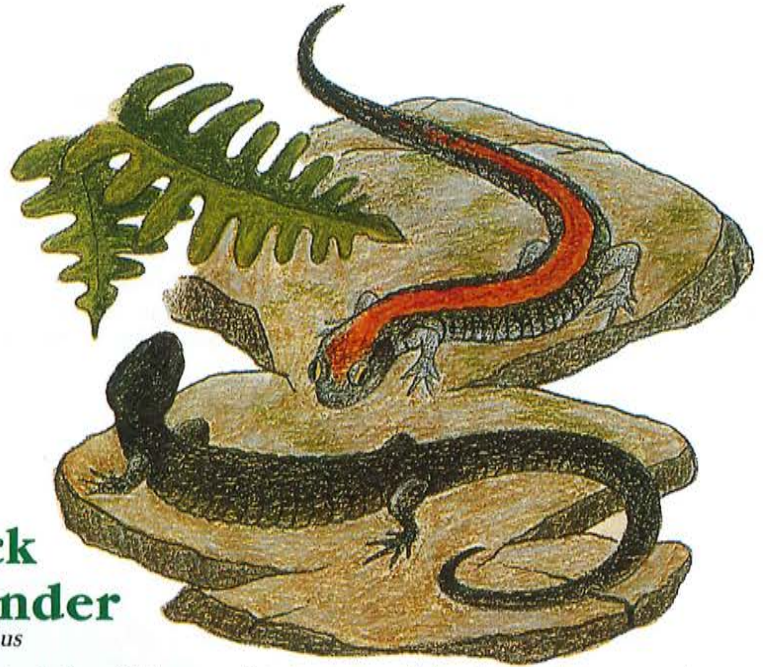


Figure II-11

*Four toes on the hind feet help tell the four-toed salamander from most others.*

**Reproduction.** Courtship and mating occur in late summer to fall. An average of 50 eggs are laid the following April or May. Fertilization is internal after the female has picked up the male's spermatophore. The eggs of the four-toed salamander are deposited individually, not in clusters as they are by many other salamanders. Once laid, however, they may stick together in clusters. The eggs are allowed to settle among the thick, greenish mats of moss or are attached to other plants. Usually, the eggs are laid in a small cavity but always above and near the water's edge. The female protects the nest and eggs until they hatch in 52 to 60 days. The inch-long larvae, sporting large, bushy gills, quickly enter the water. Transformation takes place six to eight weeks later when they leave the water to begin their adult life on land. The four-toed salamander is sexually mature at about 2½ years.

**Food.** The four-toed salamander feeds on a variety of small insects and other invertebrates. An easy source of food is usually available within its range.



## Redback Salamander

*Plethodon cinereus*

**General characteristics.** This completely terrestrial salamander occurs in three different color phases; they are described later. Other than in color, however, they are identical. The redback or "lead-backed" salamander is probably observed more frequently than any of the other salamanders within its range.

Regardless of color phase, this amphibian grows to adult sizes of just over two to 3⅞ inches.

**Identification.** This lungless salamander is long and slender. The redback is marked with a broad stripe that begins at the head and flows down the back and over the upper part of the tail, where the stripe shrinks in width. The stripe is usually red, although it sometimes may appear orangish, yellow, pink or light gray. The sides of the redback salamander are black, and this color extends upward to form a straight-edged border on each side of the stripe.



The lead-backed color phase ranges from a light gray to almost black. The solid color is shaded uniformly and it does not have the colorful stripe along the back.

A third color phase is found only occasionally. Marked with an unusual redness, it is referred to as an erythristic phase. The entire body, except for the belly, is red.

Regardless of the color phase the belly is always mottled in a distinctive pattern of black and white. Costal grooves vary a bit through this salamander's range and could number from 18 to 20 depending on the area.

**Range.** The redback salamander inhabits a large chunk of the northeastern United States, extending west to Minnesota and into Quebec. This amphibian is found statewide in Pennsylvania and could show up in places far from water.

**Habitat.** It favors cool, moist forests that could include timber stands of hardwoods or conifers or a combination of the two. The redback salamander is fond of hiding under stones, old logs and other objects where it remains sheltered during the daytime hours. In dry weather, this amphibian seeks even more protection by burrowing underground and only emerges after a rainfall. Beneath ground level is also where it seeks relief from the strongest winters. An unusually warm spell during the winter could bring the redback salamander temporarily from the protection of its den. The various color phases could establish residence in the same habitat, although one phase may predominate. In some areas, the entire population may be made up of all-red specimens.

**Reproduction.** The redback salamander mates from October through April following the rituals of courtship common to the lungless salamanders. By June or July, the female, which lays eggs only every other year, selects a site in which six to 12 eggs are deposited. Formed in a cluster, the eggs hang from the "ceiling" of a cavity that is likely a depression dug out directly beneath a stone or other stable, relatively flat object (See Figure II-12). Sometimes, forsaking the protection of a sheltered cavity, a decaying log may be used as a nesting site. The eggs take about two months to hatch, during which time the female, her body often curled protectively around them, waits for the inch-long juveniles to emerge. There is no aquatic larval stage, and the juvenile redback salamander is a replica in miniature of the adult. Two years pass before maturity is reached.

**Food.** The redback salamander is a nighttime forager. Leaving its favorite hideaway where it spent the daylight hours, the redback salamander prowls among the leafy debris of its forest home for very small invertebrates. Minute insects and their larvae are the mainstay of this amphibian's diet.

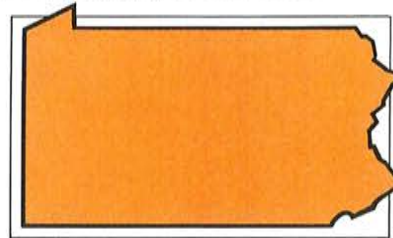
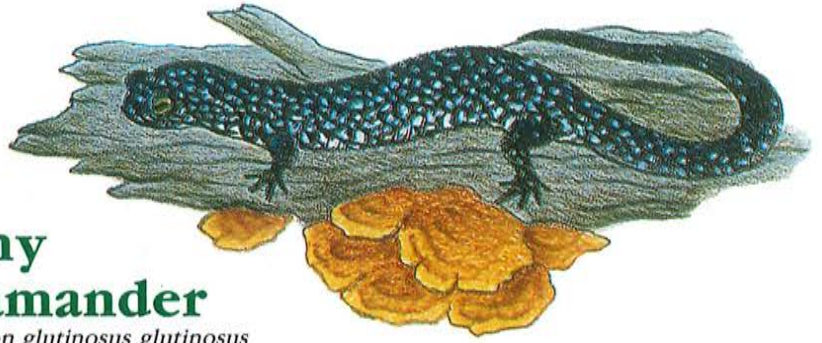


Figure II-12  
A cluster of eggs deposited by a redback salamander clings from the overhang of a cavity.



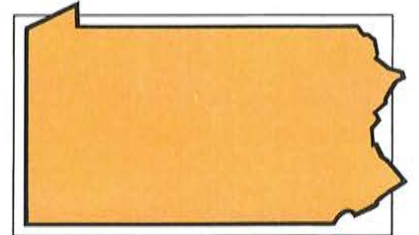
## Slimy Salamander

*Plethodon glutinosus glutinosus*

**General characteristics.** The slimy salamander is a medium-sized creature of the forest and considered one of the woodland salamanders. Adult sizes range from barely five to nearly seven inches. This amphibian has skin glands that secrete a thick, gluey substance. Extremely sticky, it is very difficult to remove. In the event it gets on your skin, it probably will have to wear off. The slimy salamander wanders about mostly at night, spending its days in hiding.

**Identification.** The slimy salamander is black, sporting a shiny coat that is marked with whitish or silver-colored spots. The spots are larger on the sides, smaller and scattered over the back and tail. The belly is slate-colored and unmarked. The chin and throat areas are dark gray. There are 16 costal grooves.

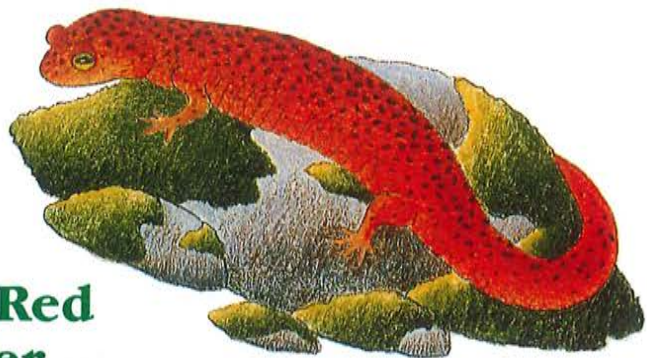
**Range.** The slimy salamander resides along the entire eastern seaboard from New York to central Florida. It ranges as far west as Missouri and Oklahoma. In Pennsylvania, this member of the lungless salamander family is indigenous to the entire state.



**Habitat.** Its favorite habitat consists of deep, moist and shaded ravines. Wooded slopes and banks of shale also offer refuge, and it is common to find the slimy salamander beneath large, flat rocks or rotting logs. During the hottest days of summer and in dry weather, it finds a cool retreat beneath a pile of damp leaves. The slimy salamander remains active until autumn's subfreezing temperatures force it to find shelter for the winter. It is among the first salamanders to appear at or near the surface in early spring.

**Reproduction.** The slimy salamander can mate in spring or fall. The eggs, numbering from less than 10 to as many as 40, are laid in late spring. The egg masses are deposited deep beneath the ground or under a fallen tree that is well-rotted. The female protects the eggs during the incubation period, which extends until late summer. The slimy salamander does not have a free-living larval stage and the newly hatched juveniles are tiny duplicates of the adults.

**Food.** Foraging is done at night over the forest floor where the slimy salamander seeks worms and insects. It especially likes to wander about following a rain when its prey is perhaps more readily available.



## Northern Red Salamander

*Pseudotriton ruber ruber*

**General characteristics.** The northern red salamander is medium-sized and another of the lungless salamanders. Adults reach sizes ranging from  $4\frac{3}{4}$  inches to six inches. It is found only in the eastern portion of North America.

**Identification.** For the most part, this amphibian remains true to its name—red is the primary body color. Even so, variations occur and it can be reddish brown to orange-brown. The adults tend to be darker than the young. The sides shade toward a lighter tone as they approach an even lighter belly. The back and the upper portion of the sides are dotted with numerous and irregularly shaped jet-black spots. Small dark spots may appear on the belly. The body is stocky and the legs and tail are proportionately shorter in comparison with other salamanders. Sixteen to 17 costal grooves mark the sides.

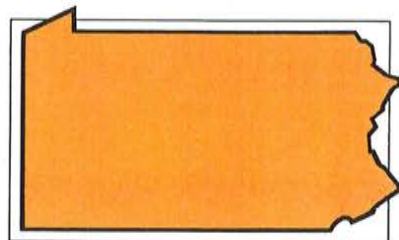
**Range.** The northern red salamander can be found in all of the state's 67 counties. It extends from southern New York and Ohio to northern Alabama.

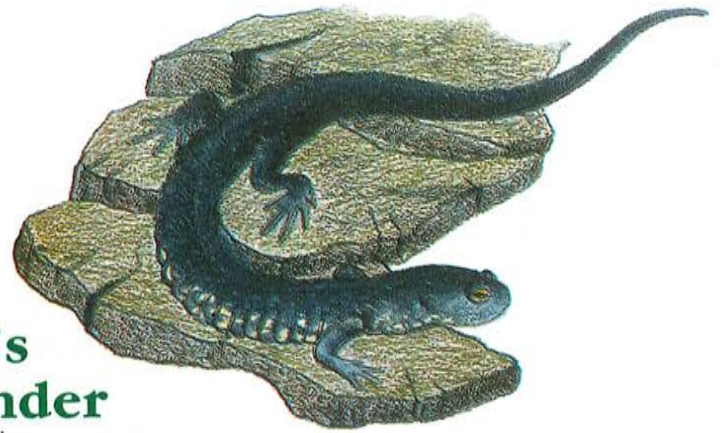
**Habitat.** Preferring small streams and spring runs with bottoms of sand or gravel and rock, the northern red salamander likes water that is clear and cool.

It avoids stagnant ponds or pools while seeking out bubbly springs and seepages. In part a terrestrial animal, the adult northern red salamander may roam some distance from the water. Woodlands, swamps and meadows offer refuge to this amphibian. It likes to dwell beneath logs, stones and clumps of moss.

**Reproduction.** Mating occurs in early fall when the female seeks a suitable nesting site. Laid in the water, the eggs are attached to the underside of stones. From 50 to 70 eggs are laid. They hatch in late autumn or early winter and the aquatic larvae measure less than an inch in length. The larvae are dark gray, turning red at the time of metamorphosis. Transformation takes place in two to three years. They are five years old before attaining sexual maturity.

**Food.** The northern red salamander preys on a wide selection of invertebrates. Its somewhat larger size allows it to take food that some other salamanders would be unable to handle. It shows a special preference for earthworms.





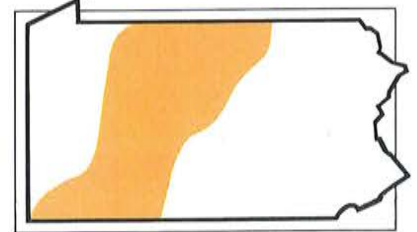
## Wehrle's Salamander

*Plethodon wehrlei*

**General characteristics.** This salamander is named for R. W. Wehrle, who, while residing in Indiana, Pennsylvania, collected specimens that eventually allowed this amphibian to be described as a distinct species. The Wehrle's salamander ranges in length from four to just over five inches as an adult.

**Identification.** The body of the Wehrle's salamander is bluish gray to dark brown or almost black. Irregular spots, often looking more like dash marks, appear on the sides. They are white or bluish white in most cases, but sometimes can appear yellowish. The back occasionally is marked with very small flecks of a lighter color. The belly and the underside of the tail are evenly tinted in gray. The throat is white or at least blotched with white. Costal grooves along each side number about 17.

**Range.** Wehrle's salamander inhabits an area extending from southwestern New York to Virginia and North Carolina. In Pennsylvania, Wehrle's salamander inhabits a little less than one-third of the state. This area generally includes the Allegheny Mountains as they range from the southwestern corner to the north central.



**Habitat.** Wehrle's salamander prefers woodlands of beech, sugar maple and eastern hemlock, the official state tree. Stands of sugar maple are found in at least a portion of its range encompassing a section of Somerset County. Second-growth timber attracts this salamander, which tends to confine itself to unglaciated uplands. It takes refuge in deep crevices and hides under large, flat rocks and decaying timber scattered prone throughout the forest.

**Reproduction.** Detailed information about the breeding habits of Wehrle's salamander are lacking, although it is thought to breed during the milder winter months. The female deposits about 12 eggs, usually selecting a site that is inaccessible to all but her. The eggs are protected by the female through the incubation period and until they hatch. This amphibian is mature at four to five years of age.

**Food.** Like others of its genus, Wehrle's salamander feeds on invertebrates. It prefers spiders, centipedes and the larvae of insects.