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The Vernal Pool A Place of Wonder

By Tom Schneider, Columbus (OH) Chapter



A small vernal pool like this one will likely dry out by mid-summer or early fall.

As a young boy, my brothers and I often visited a pond in the woods just beyond our property. Each spring, just as the warm sun marked our escape from winter's enclosure, it also revealed the arrival of many egg masses in "our pond." Thousands of eggs in clumps, strings, and masses were scattered throughout the pool. These eggs contained small creatures with feathery attachments to their heads. Now, as a biologist, I know that "our pond" was a vernal pool and those eggs were from a special group of salamanders. Not only did "our pond" provide a home and nourishment for many young salamanders and frogs, it also nourished the imagination and sense of discovery in our young minds.

Vernal pools are unique and interesting wetlands, usually found in forested areas. They are essential to the life cycle of many amphibians, which include frogs, toads, and salamanders, as well as invertebrates, including fairy shrimp and dragonflies. Vernal pools go by many names including ephemeral wetlands, seasonal ponds, and playas in some western states. They are wet only for a period of time each year. During this period, many animals are in a race against time. They need to hatch, grow, and in some cases reproduce before these small wetlands dry out.

The pools fall between what has been discussed in this publication as rain gardens and what we all know as ponds. They hold water for a minimum of six weeks a year, some for up to six months, and still others will only dry out every other year or so. Most pools are 3 feet deep or less at the wettest time of the year. Because of the periods of dryness, vernal pools almost never have a permanent fish population. Fishless waters are essential to the successful reproduction of many amphibians. Any fish would quickly eat the young amphibians. *Continued on page 2.*

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Spotted salamanders (*Ambystoma maculatum*), are usually associated with heavily wooded, mature beech-maple forests and mesic oak woodlands. Breeding occurs in vernal ponds, marshes, and swamps within or at least mostly surrounded by woodland.

In vernal pools around the country, a millennia-old ritual occurs during the first warm, rainy night(s) of late winter/early spring. Usually occurring between Valentine's Day and St. Patrick's Day, this first warm rain above 50°F, sparks the mass migration of mole salamanders (spotted, small-mouth, Jefferson, tiger, and others), frogs, and toads. Over the course of this "big night" and the following days and weeks many different salamanders, frogs, and toads may migrate to the pool where they were born. At this natal pool they repeat the mating ritual of their parents.

Mole salamanders are named for the fact that they live under ground most of the year, burrowing or using other animals' burrows. The first of the mole salamanders to arrive at the pool is the spotted salamander. Heeding an instinctive call to return to their natal waters, they travel over snow, rocks, logs, and other obstacles to enter pools that are often partially covered in ice. Eager males await the arrival of females, which results in a "congressing" of individuals, during which eggs are fertilized. Females lay their eggs in masses. Each salamander, frog, or toad species' egg mass is different, and you can generally identify the species they came from. These egg masses mark the beginning of the race against dryness that will face residents of the pool. While the adults leave the pool shortly after reproduction, the young must emerge from their eggs, feed, grow, and transform from aquatic larvae to air-breathing adults capable of surviving on land before the pool dries out.

Wood frogs are the first of the frogs and toads to migrate to their vernal pools. Following a short courtship, male and female wood frogs pair up. Eggs are laid in large communal mats at various locations in the pool. Similar to the salamanders, the tadpoles must develop fully and leave the pool before it dries out. Other organisms in the vernal pool have different adaptations for surviving the drought periods. Some remain as cysts, or dry-tolerant eggs, while others burrow into the mud bottom of the pool to wait for the water to return. A given group of cysts will often hatch at differing times within the same year or even across multiple years, thus increasing the chance some eggs will hatch on a good year.

Regardless of the mechanism, vernal pool species must win the race against dryness, if not every year, then at least frequently enough to ensure successful production of another group of adults.

Vernal pools occur in varying habitats and portions of the country. Vernal pools in northern and eastern portions of the country have a variety of plants associated with them. The type of plants depends upon whether the pools are located in upland woodland areas or as parts of larger wetland/swamp complexes. Some plants familiar to native plant landscapers are components of vernal pools. Herbaceous plants such as cardinal flower, sensitive fern, blue-joint grass, and many sedges grow in these habitats. Shrubs such as buttonbush, winterberry, spicebush, viburnums, and others are often associated with vernal pools.

Vernal pools often go unnoticed because their cyclical nature has them at their most active and full when we are least likely to be out in areas where they exist. Not many have the calling to go out on a cold rainy night in February seeking the elusive "big night" migration. Vernal pools may appear as simple depressions in a woods or field during the summer, and can be defined by water marks on trees, buttressed tree trunks, vegetation types, and other subtle differences from surrounding landscape.

Not just the pool is important. **The adult salamanders and frogs only spend about two weeks of the year in the water – the rest of the year is spent in the surrounding forests and fields.** In fact, the surrounding habitat is essential for adult amphibian survival. Most salamanders reside within 300 meters of their vernal pool the rest of the year. The trees, plants, logs, stones and leaves that surround the pool provide shelter and food. The native plants that we strive to maintain in our yards, gardens, parks, and preserves are another essential link in the life cycle of these fascinating creatures of our youth. Development, roads, drainage, etc. have caused significant habitat reductions and subsequent population declines for amphibians. Not only do roadways result in destroyed habitat but they can also present barriers to movement, leading to mass deaths by vehicles during the spring migrations.

Vernal pools are educational openings for learning skills from measurement, graphing, and observation – to trophic levels, energy transfer, and adaptation. Vernal pools are wonderful windows into the complexity of natural systems. They provide endless opportunities for discovery and astonishment. Even after all these years, spring time in a vernal pool refreshes my sense of wonder and awe. ★



Ice on the water does not stop mating and egg-laying.