

Vernal Pools

By Greg Sykes (greg@grsykes.com)

While walking through a natural area, folks might come upon a water feature that is bigger than a puddle yet smaller than a pond. To the layman, such wet spots are dismissed as worthless muddy pits that harbor mosquitos and need to be backfilled. Let's debunk these misconceptions and dive into the world of vernal pools!

An aspect distinguishing vernal pools from other bodies of water is they are isolated from any waterways. These pools hold diverse life but no fish. A brief exception occurs when a vernal pool is in a floodplain, a deluge inundates the pool, and receding waters trap fish here, but those fish cannot survive for long. Under normal conditions, autumn rains begin filling the pools. Winter and spring precipitation sustain water levels. Since the pools are in shallow depressions, they may dry out during hot summer months.

Most vernal pools are natural features, formed many centuries ago. Each season, pollen lands on the surface and settles to the bottom. Scientists can take core samples, identify the pollen species and abundance in each year's sediment layer, and get an idea about the region's historical plant populations.

Though devoid of fish, a huge number of aquatic organisms depend on vernal pools. In late winter, wood frogs (*Lithobates sylvaticu*) are the first amphibians to spawn here. Wood frogs cannot breed in running water or where fish occur, making healthy vernal pools critical to this frog's existence. Other amphibians that reproduce in vernal pools include spring peepers (*Pseudacris crucifer*), American toads (*Anaxyrus americanus*), and different salamander species. Northern green frogs (*Lithobates clamitans melanota*) mate throughout summer and late spawners can procreate in newly filling pools; their late-hatching tadpoles overwinter in the silty, leaf-covered bottoms, then continue maturing when spring arrives. Adult red-spotted newts (*Notophthalmus viridescens*) may reside in deep pools that retain water throughout the year. Vernal pools support a huge range of aquatic invertebrates, from tiny copepods and *Daphnia* to predatory dragonfly and damselfly larvae. The murkier pools are especially exciting because they mean



Figure 1. This vernal pool's turbid waters signify that active animals live here. Photographed in May, the pool is starting to dry up, leaving the muddy foreground.

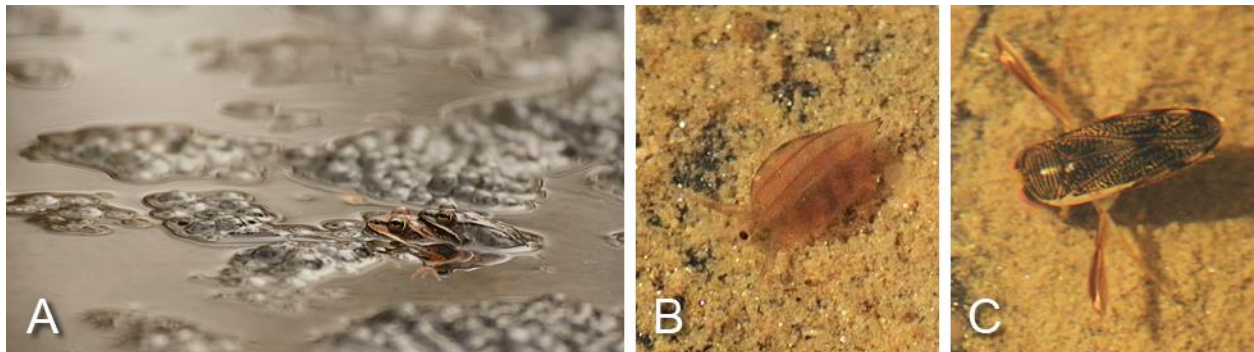


Figure 2. Wood frogs (A), surrounded by egg masses, use vernal pools in their large spawning events. Over the years, they may group together at the same or different pools in the immediate area. Other animals found in vernal pools include (B) copepods and (C) water boatman bugs (family: Corixidae).

more life is stirring up the sediment (Figure 1). With so much biological activity, mosquito larvae in a vernal pool are more likely to be eaten than reach adulthood. In fact, very few mosquitoes fly around the average vernal pool. However, mosquitoes frequent human habitation where empty containers, clogged gutters, old tires, and other water-trappers encourage them to breed. Ways to defeat these backyard vampires are in the article, [How to Battle Mosquitoes and Win](#) (April 2014).

Vernal pools are such crucial components to healthy ecosystems that artificial ones are sometimes added to habitat restoration sites. Since these pools are relatively small, they are highly vulnerable. The water must be free from pollution and other human disturbances. Unlike flowing bodies of water where human-derived contaminants flush out, toxins concentrate in pools. Wood frogs and other species that have massive spawning events congregated in a few places once per year might use only a fraction of the vernal pools in an area but fill those few pools to capacity. In doing so, they are sure to find mates, but if anything happens to that pool prior to the tadpoles maturing and leaving, a generation is lost. Like so much of nature, vernal pools are more than they first seem and play important ecological roles.

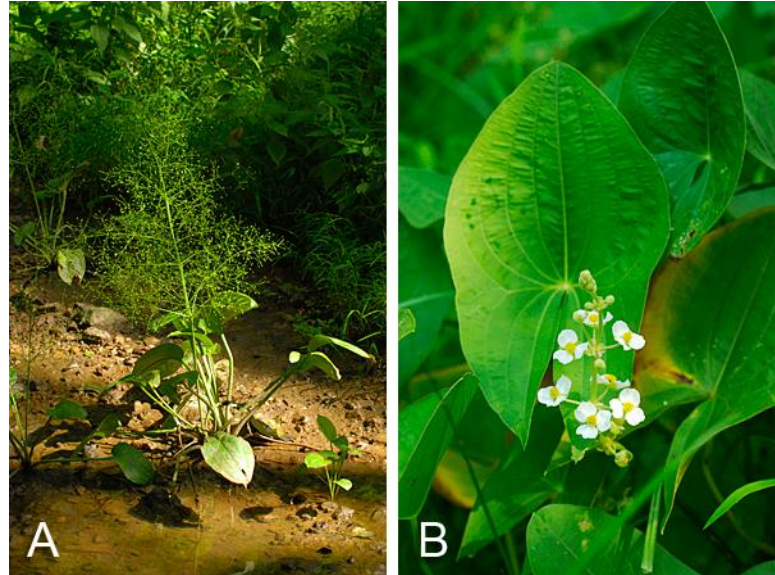


Figure 3. Even as summer heat evaporates vernal pools, the moist soil may continue supporting wetland plants, such as (A) small water plantains (*Alisma subcordatum*) and (B) common arrowheads (*Sagittaria latifolia*).

Delve further into vernal pools:

Lentini, Joanna. April 2022. Why did the salamander cross the road? To reproduce, of course. *Smithsonian* 53(01):50-61. <https://www.smithsonianmag.com/science-nature/why-did-the-salamander-cross-the-road-180979788/>
<http://www.lyncburgbiz.com/virginiasvernalpools/educate.htm>
<https://www.wildlife.state.nh.us/nongame/documents/vernal-pool-manual.pdf>
<https://www.epa.gov/wetlands/vernal-pools>

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