

Don't Let Our Magical Vernal Pools Disappear

By MARK SOUTHERLAND

When does a puddle become an important biological entity?

By any other name—seasonal pools, temporary ponds, geographically isolated wetlands—vernal pools are extraordinary ecosystems that can be found as easily in your backyard as in a national park. Vernal pools are depressions in the landscape that hold water only part of the year and do not support fish. These depressions have an impermeable layer of hardened clay or bedrock, which prevents rapid draining of the source water (typically rain or melting snow), but also have no permanent water connections, so that they dry up during the high evaporation of summer months.

This wet-dry cycle leads to vernal pool ecosystems having three life zones:

- **Vernal pool depression:** standing water, where breeding occurs,
- **Vernal pool envelope:** typically a 100-foot radius, which may retain more soil moisture and support wetland plants, and
- **Vernal pool terrestrial habitat:** typically a 1000-foot radius of surrounding terrain that supports adult amphibians, mostly underground, when they are not breeding.

This landscape structure can lead to distinctive rings of vegetation surrounding



A Woodland Vernal Pool at Royce Hanson Conservation Park at Broad Run, Montgomery County. Photo courtesy of Rachel Gauza.

a pool and “hoops” of blooming plants. In addition, the water isolation of vernal pools can lead to unique growing conditions resulting from the fluctuating water levels, little to no water flow, lower concentrations of dissolved minerals, and geographic isolation.

What makes vernal pools so ecologically special?

Without the dominant effects of predatory fish, vernal pools support species that can breed nowhere else—specifically wood frogs, spotted and other mole salamanders, and fairy shrimp. In addition to these “obligate species”, there are many noteworthy “facultative users”

of vernal pools, such as spotted turtles and rusty blackbirds. The 2015 Maryland's State Wildlife Action Plan (SWAP) lists the following “Species of Greatest Conservation Need” (i.e., rare, endemic, and declining species for which Maryland harbors a significant portion of the overall population) associated with vernal pools, including American Mink, 12 bat species, Southeastern Star-nosed Mole, Box Turtles, Spotted Turtles, Eastern Kingsnake and Rainbow Snake, Carpenter Frog, Eastern Narrow-mouthed Toad, Eastern Tiger Salamander, Jefferson Salamander, Mountain Frog, Upland Chorus Frogs, Seth Forest Water Scavenger Beetle, Digger Crayfish, and a whopping 10 species of dragonflies and damselflies.

What about plants?

While providing habitat for unique suites of animals, vernal pools tend to support very few rare plants. An exception is the globally rare Upland Depression Swamp, a subcategory of vernal pools, which does harbor state rare plants. The lack of rare plants at Maryland's more common vernal pools may be because the basin substrate of submerged leaf litter and coarse woody debris is not conducive to herbaceous vegetation. A dense shrub layer may occur along the shoreline or in small patches within the basin, especially on the Coastal Plain, but many pools lack a well-developed shrub layer. The tree layer is typically semi-open to closed forest canopy. While it is difficult



Mark's Pond, a treasured vernal pool at Jug Bay Wetland Sanctuary, Anne Arundel County (courtesy of Rachel Gauza)



An Upland Depression Swamp, a globally rare subset of vernal pools, at Travilah Serpentine Barrens. Photo by Rod Simmons.



Early spring bloomer, *Lindera benzoin*, at a vernal pond near High Banks Audubon Sanctuary in Talbot County. Photo by Cristina Niciporciukas.

to generalize about vernal pool plant communities, typical plant types include club mosses, sphagnum moss, floating or submerged plants, ferns, forbs, grasses, sedges, and rushes. *Carex* species are abundant, and the False Hop Sedge (*Carex lupuliformis*), an S2 state rare plant, might be considered the poster child plant of Maryland's vernal pools, as it occurs at many sites (pers. comm. Rod Simmons). Other common *Carex* species include *C. vesicaria* (S1), *C. straminea*, *C. gigantea* (RTE Plants of Maryland), *C. pelita*, *C. buxbaumii*, *C. descompositae*, *C. straminea*, and *C. vestita*. Other sedges like *Cyperus lancastris* (S2S3) and *Eleocharis wolfii* are also found at vernal pools.

Where do vernal pools occur?

Vernal pools occur across Maryland and are typically situated in low areas in a forest, but they can also occur in floodplain forests as isolated floodwaters, among backwaters of old beaver impoundments, old sinkholes, or as perched spring- or seep-fed basins along mountain slope benches, or at the base of slopes. Vernal pools may persist, but are usually degraded in cleared areas such as cropland, pastures, and clearcuts. Vernal pools are classified as a state rare natural community in the Maryland SWAP.

What other ecological functions do vernal pools serve?

While vernal pools are critical for the continued survival of obligate amphibians and support of many facultative species in specific locations, they also provide ecological stepping stones across the landscape, supporting extensive food webs and metapopulations. At the same time, the abundance and distribution of vernal pools in the landscape provide important services for people, including stormwater retention and pollution removal, groundwater replenishment, natural mosquito control, and the connection to nature that increases human health and well-being.

Why are vernal pools in danger?

Like most natural ecosystems in Maryland, vernal pools are disappearing and being degraded through habitat destruction, pollution, and climate change. What's more, vernal pools lost their federal protection in the 2023 Supreme Court case, *Sackett vs. EPA*, which redefined "Waters of the US" to exclude seasonal ponds. It is now even more urgent that lovers of nature do what they can to preserve, protect, and restore vernal pools. An effective strategy for vernal pool conservation involves:

- *Education* about vernal pools (like this article in *Marilandica*),
- *Inventorying* vernal pools to inform better management,
- *Restoring and creating* vernal pools wherever possible, and
- *Advocating* for regulatory protections of vernal pools.

Advocates for vernal pools

Vernal Pool Partners has led advocacy for the Vernal Pool Protection Act in the last two sessions of the Maryland General Assembly. It is currently working with the Maryland Department of the Environment (MDE) to develop language that will pass in the 2026 session and be implemented by MDE in 2027. This strengthening of protection is needed because many, if not most, vernal pools do not meet the federal criteria for designation as a nontidal wetland (hydrology, hydric soils, wetland vegetation) and therefore are not currently protected in Maryland.

If you are interested in helping with this legislation, visit our website (vernal-poolpartners.org) and look for timely alerts to urge your state delegates and senators to support the Vernal Pool Protection Act of 2026.

REFERENCES

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