







# Vernal Pools

*Spring to life!*

*By Aram J.K. Calhoun*

In this time of global upheaval, when floods, fires, and yes, even locusts and plague make headlines, people are worn down and having to reach ever deeper into their core to tap into a well of optimism. Fortunately, humans are resilient and gain energy and comfort from things that are predictable and familiar. Spring will follow the winter darkness and tickle all the senses: songs from birds and amphibians turn our heads to the woods; our eyes, accustomed to the white and muted winter landscapes, feast on the colors in spring blooms; spring mists and warm sun tease our winter-weary faces; and wild strawberries and fiddleheads bring spring to our palates. Life continues and the beauty afforded by nature prevails—even in the worst of times.

**A**n “Ode to the Vernal Pool” seems in order to celebrate this return to light. Pools start to melt and burst with amphibian breeding activity even before the phoebes sing and the bluets emerge from the snow. From the melting forest floor emerge Wood Frogs and salamanders, summoned to breeding pools by warm, gentle spring rains washing over their smooth skin, alerting them to begin their breeding migration. This event is a signature wildlife spectacle we call Big Night. If weather conditions are just right, you can witness Wood Frogs

breeding period (generally a period of three to five weeks), the adults seem to melt back into the forest, not to be seen again until the following spring. Fairy Shrimp hatch from eggs deposited on the pool floor the previous spring, go through a period of desiccation and freezing (not unlike mushrooms and some spring bulbs), hatch, and start the cycle of adults depositing eggs for the following spring all in the course of six weeks or less. Disappearing acts and fairies—no wonder these pools are easily overlooked.

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and Spotted and Blue-spotted Salamanders moving into their breeding pools by the hundreds. To witness a Big Night, pick one of the first warm and rainy spring evenings and make your way through the woods to your neighborhood vernal pool. It is Maine’s version of the great migration of wildebeest in East Africa—and you don’t even need to leave your neighborhood to participate.

Vernal pools have a magical quality, likely owing to their small size and ephemeral nature: they fill with water from snow melt and spring rains and generally “disappear” by summer’s end. Like ephemeral spring blooms, you have to know where and when to look to witness the spectacle. The mysterious life of the amphibians tied to vernal pools adds to the pools’ overall mystique. How small, delicate, and hairless creatures can weather Maine winters on the forest floor in and of itself seems like a miracle. After a dramatic appearance for the brief migration and

Wood Frogs, Spotted Salamanders, and Blue-spotted Salamanders embodied the spirit of forest bathing long before it became a popular fad here. These animals literally derive all their sustenance and well-being from forests. Forests provide winter and summer shelter (leaf litter and coarse woody material for cover, small mammal burrows for travel), food (small invertebrates in the soil and leaf litter) and breeding sites (in secluded, cool, shaded ephemeral pools). If you want to witness little nights, wait for warm, rainy summer evenings and you may see Wood Frogs and salamanders venturing out of hiding to move around the forest floor (some feeding, some changing locations).

As in every fairy tale, there are dark forces that need to be subdued before everyone can live happily ever after. Human activity may jeopardize both pools and the animals they support. Pool-breeding amphibians depend on breeding pools, plus the



Wood Frog



Spotted & Blue-spotted Salamanders



Fairy Shrimp

summer, fall, and winter post-breeding habitats that must all be linked by relatively undisturbed forests. A subset of juvenile amphibians requires intact travel routes to colonize distant vernal pools in order to avoid the effects of inbreeding. It doesn't take long to realize that conservation of vital populations of these animals is tricky: they need breeding pools plus other wetlands, adjacent intact upland forests, and connections to other pools. In addition, more global phenomenon, such as climate change, threaten weather patterns in New England that pool-breeding amphibians are adapted to. Pool-breeding amphibians are dependent on ample snow cover to insulate them from frigid temperatures and rains to fill and maintain pools long enough for larvae to turn into juveniles, leave the pool, and settle in the nearby forest. As climate patterns change, these animals are more stressed and more susceptible to disease and disturbances.

And again, as in the best fairy tales, there are heroes in shining armor to save the kingdom. In this case, the heroes are a collection of researchers who focus on learning what needs to be conserved—when, where, and how—and the lovely inhabitants of the kingdom who care enough to learn about the special qualities of these critters and habitats and steward them accordingly. When both the local community and caring professionals harness the power of science, the dark forces are transformed into energy for powering creative conservation outcomes.

What have scientists learned about Wood Frogs and salamanders that could be relevant to you, to municipalities, to landowners, stewards, to concerned community members? We know that all vernal pool amphibians need both other wetlands



Spotted Turtle



# How can I help?

- 1 Participate in annual Big Night events (*see p. 21*) to help track amphibian movement and reduce road mortality. Full details at [vernalpools.me/big-night](http://vernalpools.me/big-night)
- 2 Encourage your town to adopt conservation subdivisions, where development is sited away from vernal pools and adjacent critical terrestrial habitat.
- 3 Ensure any harvesting that takes place on your land, town land, or land trust land follows forestry habitat management guidelines.
- 4 Earn a *Vernal Pool Stewardship Award* for conserving vernal pool wildlife on your property.



and adjacent uplands to meet all their life needs. We know breeding pools must be well-shaded and relatively undisturbed to reduce competition and predation from sun-tolerant amphibians such as Green and Bull Frogs. We know that adult amphibians often travel *hundreds* of feet from breeding pools to their preferred terrestrial habitats. We know that enemies of these animals are pesticides, cats, lawn mowers, and unnatural changes in hydrology of their breeding pools.

And we have learned that just as in real estate, the value of a property to an amphibian is *location, location, location*. Wood Frogs in particular will use different post-breeding habitats depending on where they are located. For example, Wood Frogs in central and mid-coast Maine often summer in forested wetlands. Frogs in the mountainous regions of western Maine, on the other hand, will travel up hillsides and summer around the wet edges of large boulders and may depend on ephemeral beaver pools for breeding. In short, local knowledge is necessary and both pools and post-breeding habitat must be stewarded to ensure vital, long-term populations of the forest amphibians. As we accomplish this, we also support other wildlife that use pools including signature Maine species such as moose, bear, deer, and a variety of small mammals and birds. Because vernal pool amphibians require multiple different connected habitats—including other pools and wetlands and upland forests—pool conservation in general leads to landscape-scale conservation of our woods, wildlife, and waters.

What do we know about the people who share living space with amphibians? We know they are also attracted to wildlife, waters, and trees. Many depend on their land for personal inspiration and economic security. We also have learned that most people would prefer to live next to wildlife and see natural landscapes as part of their towns, but need space to build their homes and live their lives as well. So how do we protect both?

Current federal and state regulations for regulating vernal pools are designed to balance the needs of wildlife and people. Yet often smaller wetlands, such as vernal pools, fall through the regulatory net. In addition, we recognize that wetland regulations can be daunting to any given landowner and that the one-size-fits-all approach often feels like no-size-fits-anyone. To ensure peace in the kingdom, social

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scientists and vernal pool ecologists, together with partners, have developed another option: a local pool conservation mechanism called a vernal pool Special Area Management Plan (*see page 9*). Tailor-made local approaches like this will likely provide more local pride and positive outcomes than traditional regulations alone can do. Either way, we are confident that pools and people can happily coexist.

Hope springs eternal, spring brings hope, and we begin a new season confident that we will make progress on conserving nature in a way that supports both the natural world and the emotional and economic well-being of its human community.

**Aram Calhoun** is active in wetland and vernal pool conservation at landscape scales through localist approaches that improve both local economies and the integrity of our forests and wildlife.



# Of Pools AND People

[www.vernalpools.me](http://www.vernalpools.me)

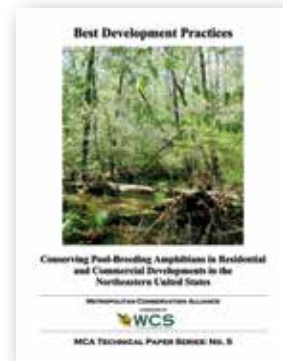
The website, “Of Pools and People,” created by Aram Calhoun’s research group at the University of Maine, is designed to answer your questions on vernal pool ecology, management, regulations, and conservation. Partnering with environmental organizations such as Maine Audubon, government agencies at the federal and state levels, Maine municipalities, land trusts, and members of the development community, they have developed and coordinated community science programs for mapping and assessing vernal pools; developed educational materials including videos and digital presentations, manuals, and children’s coloring books; and provided outreach presentations—all of which you can find on this dynamic website.

## Research

The University of Maine’s Department of Wildlife, Fisheries, and Conservation Biology has been researching vernal pool amphibian ecology—particularly post-breeding movement patterns in our forests, the effect of forest management practices on pool ecology, and most recently, in collaboration with social scientists, the socio-economic implications of vernal pool management on private lands—for over a quarter of a century. They use their research (as well as that of other colleagues throughout the eastern U.S.) to inform management strategies that will conserve vernal pool functions at the landscape scale while benefiting human communities. Learn more: [vernalpools.me/research-2](http://vernalpools.me/research-2)

## Special Area Management Plan (SAMP)

The University of Maine partnered with the Army Corps of Engineers and the Maine Department of Environmental Protection to develop a voluntary vernal pool mitigation tool that puts the regulation of vernal pools into the hands of local communities, called the Vernal Pool Special Area Management Plan. The SAMP eliminates the need for a developer in a portion of the town’s growth zone to apply for federal and state permits for impacting a vernal pool. Instead, they pay a fee to a third-party holder (often the local land trust) for every vernal pool impacted in the designated area of the growth zone. The land trust may use these fees to pay a local landowner in the rural zone to conserve vernal pools and adjacent forest through a land purchase or conservation easement. Learn more: [vernalpools.me/samp](http://vernalpools.me/samp)



# Maine Audubon Publications & Resources

[maineaudubon.org/vernalpools](http://maineaudubon.org/vernalpools)

