Photographs and video were taken at the Francis Marion National Forest, S.C., with assistance from Amphibian and Reptile Conservancy, a national nonprofit.
Photographs and Video by Bobby Altman

Opinion

Why Tiny Ponds and Singing Frogs Matter So Much

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By Margaret Renkl
Ms. Renkl is a contributing Opinion writer who covers flora, fauna, politics and culture in the American South.

March 27, 2023   5 MIN READ

NASHVILLE — I wish you could hear what it sounds like to sleep near an ephemeral pond in early springtime on the Cumberland Plateau, especially on a rainy night. As darkness begins to fall, the small frogs called spring peepers begin to sing. At first their song is the sonic equivalent of the way popcorn pops: each peep a single sound, each sound buffered on either side by silence.

Peep.

Peep.

Peep.

Peep.

Then: *Peep. Peep. Peep. Peep. Peep. Peep.*

Finally it's *PeepPeepPeepPeepPeepPeepPeepPeepPeepPeepPeepPeepPeepPeepPeepPeep.*

Eastern Gray Tree Frog

Listen

As darkness gathers, new songs gather, too. Soon the whole pond is singing, and the night becomes an amphitheater for the chorus. *Scriiiiiiitch*, *scriiiiiiitch*, *scriiiiiiitch*, sing the upland chorus frogs. *Oooeeeeeeeeeeee*, *oooeeeeeeeeeeee*, sing the American toads. Sometimes you can hear the rattly *keeuk*, *keeuk*, *keeuk* of the wood frogs, too, and the raspy *aaa-aaa-aaa-aaa* of the gray tree frogs.

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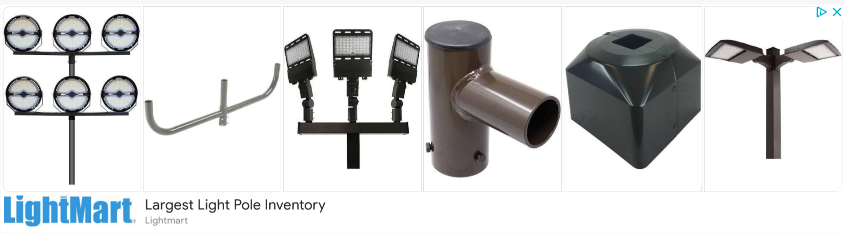

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These miniature wetlands on the stony plateau also draw an array of salamanders. In any given ephemeral pond, there will almost certainly be spotted salamanders and probably marbled salamanders and mole salamanders, too. The deeper into the Southern Appalachians you go, the more salamanders there are. Great Smoky Mountains National Park is known as the Salamander Capital of the World.

Ephemeral ponds — which are also called vernal pools — first appear in winter as water collects in depressions and shallow basins in the forest. Snowmelt and spring rains, not running water, keep the ponds filled, and cold air slows the rate of evaporation. Under these conditions, any low-lying area in the woods that will hold water will also become a magnet for amphibians.

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Because vernal pools are not fed by creeks or streams, they dry up in the heat of summer and therefore cannot support fish, which feed on amphibian eggs and larvae. This absence of fish, along with the pond's abundant insect and crustacean life and the manifold hiding places in a body of water dense with sticks and rotting leaves, makes an ephemeral pond the ideal nursery for tadpoles and larval salamanders.

Salamander larvae navigate life in a seasonal wetland.

Tadpoles collected for sampling and later released.

Conservancy staffers surveying wetlands for frogs.

Annual but temporary wetlands can be found all over the country at this time of year, but the ponds I am most familiar with are the ones that lie on the Cumberland Plateau surrounding the college town of Sewanee. Like nearly all ephemeral ponds, too many lie on private land and are vulnerable to the possibility of development.

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Amphibians are indicator species. Because their porous skin is particularly sensitive to changes in the environment, the health of an ecosystem's amphibian population is one way to measure the health of the ecosystem itself. When frogs and toads and salamanders thrive, everybody thrives.

But amphibian populations are declining by roughly 4 percent every year, according to the Amphibian and Reptile Conservancy, a national nonprofit. "The loss of habitat is by far the biggest threat to amphibian survival and the No. 1 cause of population decline," JJ Apodaca, the executive director of the conservancy, told me last week.

It doesn't take much to disrupt a wetland habitat, especially one as small as a vernal pond: "Just a slight change in the landscape can eliminate an ephemeral pool and eliminate reproduction possibilities for thousands of amphibians," Dr. Apodaca said. Even a simple drainage ditch can be devastating: "As soon as you put in a ditch, it drains the water table and dries out the land."

Dr. Apodaca calls the disappearance of ephemeral ponds "a secret loss," especially when the surrounding forest is still largely intact. "We see trees, we see habitat somewhere, and we think it's all good. What we don't see is that it has lost its vernal pools and ponds, this important component of the landscape." Once the pond is gone, the amphibians and insects, and the creatures that feed on amphibians and insects, are also gone.

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Three-lined salamanders traverse a patch of moss.

As crucial as these micro wetlands are to the immense biodiversity of the Southern Appalachians, ephemeral ponds enjoy no federal protections. Under current interpretations of the Clean Water Act, it's their isolation from other waterways — the very quality that makes them so critical to amphibian reproduction — that puts them in danger. And that's just one example of why the conservancy concentrates much of its efforts on habitat conservation and restoration.

The news from the United Nations' Intergovernmental Panel on Climate Change last week is absorbing all the headlines, and that's as it should be. When the planet's premier climate scientists concur that we have less than 10 years to hold off a cataclysm, we desperately need to hear the urgency in their words.

We are facing nothing less than an existential crisis, and in that context the potential loss of a few amphibians in a few unprotected wetlands might not be the greatest source of grief in the world. These little vernal pools might seem expendable, hardly more than a storybook enchantment for children still enthralled to tales of princesses whose only reason to kiss a frog is to turn it back into a prince.

But the climate crisis and the biodiversity crisis are twinned and intertwined. The earth is a magnificent, breathing organism, and every species contributes to its survival. We might not always know exactly how they do that, but we know they exist as part of a balance that is slipping away. When we work to preserve frogs and salamanders — when we work to preserve *any* species — we are working to preserve life on earth as we know it.

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I have grown deeply attached to a particular spring-singing pond on a bluff outside Sewanee, a disappearing pond so full of nighttime song that I always long to replicate it once I'm back home in Nashville. Such a thing is not possible, of course. I don't live in a forest. Too many of my neighbors drench their yards in the lawn-care poisons that make rainwater runoff lethal for amphibians. I have not seen a toad in this yard for decades, and every year the tree frogs singing in the trees grow fewer and fewer.

A Southern toad. Bobby Altman for The New York Times

Salamander larvae from a vernal pool.

A pig frog.

Last spring I bought a container meant to provide water for livestock. Surrounding it, I installed the kinds of marginal plants that grow on the edges of wetlands — cardinal flower and creeping jenny and blue flag iris. To the tank itself I added anacharis and hornwort and duckweed to oxygenate the water and provide hiding places for tadpoles. And then I waited. Not a single tree frog came to lay her eggs there.

I remain hopeful anyway. After a year in the elements, my stock-tank pond now offers a soft layer of mud at the bottom and plenty of lovely, rotting leaves. It's as tiny as the tiniest ephemeral pond, and there is nary a tadpole-eating fish within its shallows. This year I will add another stock-tank pond nearby, and next year another, and the year after that another still. One day, I believe, the tree frogs will find me and the nursery I built for them.

Meantime, the spring nights have grown warm and rainy, and I listen in the darkness for the love song of tree frogs outside my window. In the mornings, I look for eggs.

Margaret Renkl, a contributing Opinion writer, is the author of the books "Graceland, at Last: Notes on Hope and Heartache From the American South" and "Late Migrations: A Natural History of Love and Loss."

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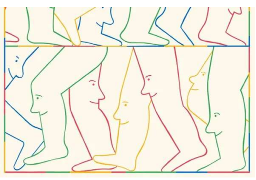

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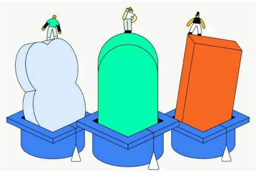

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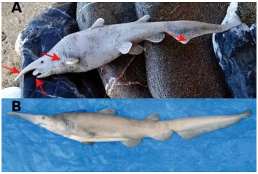

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