

# THESE POP UP PONDS ARE MORE THAN JUST BIG PUDDLES

By Anne Paine

**T**hey dapple Tennessee's landscape though most folks might not see them or may consider them unimportant if they do.

"They look like black teardrops on the landscape when viewed from above," said Jon Evans, University of the South – Sewanee, biology professor and assistant provost for environmental stewardship and sustainability. "You might not notice them when passing by."

Ephemeral ponds, they're called. They fill in late fall and then are gone – dried up – a few months later.

During the cool, wet winter and spring months, they are hubs of activity – critical breeding grounds and nurseries for many salamanders and frogs. They also are home to tiny crustaceans, such as fairy shrimp and copepods.

"A lot of the biological diversity of the Southeast is concentrated in these small, spatially discrete, very distinctive ecosystems," said William Wolfe, with the U.S. Geological Survey's Tennessee Water Science Center.

But the ponds – slow to drain depressions found in places such as forests, plains and prairielands – have declined nationwide over the decades with urbanization, agriculture and timbering.

The Cumberland Plateau has not escaped the loss of habitat, according to the Landscape Analysis Lab in Sewanee. From 1981-2010 about 25 percent of the ponds in a six-county area on the plateau lost the forest cover that is crucial to them, Evans said.

The ponds, also referred to as vernal ponds or ephemeral wetland pools, remain somewhat elusive.

While on the radar screen of many wildlife, forestry and environmental officials, they need more attention to stop their continuing decline, experts say.

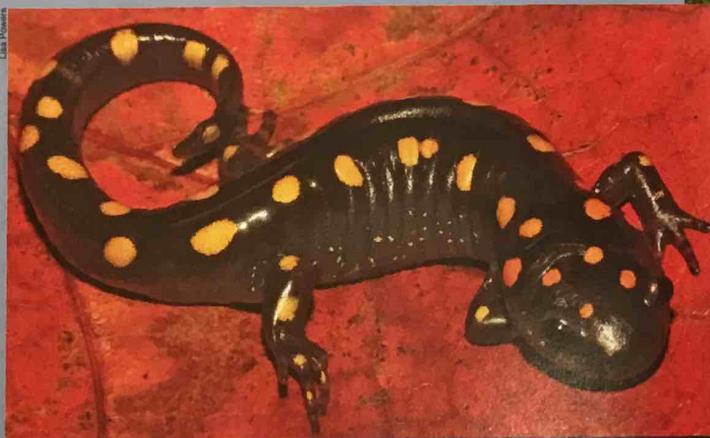
On a chilly, early spring day, Evans was doing his part, leading a group of conservation biology students to one of these "teardrop" shallow ponds. Found near an unpaved road on Sewanee's 13,000-acre, forested campus, the water's calm surface and quiet surroundings belied the frenetic activity of small animals and microscopic creatures below.

Decaying Sweetgum, Chestnut Oak and other fallen leaves gave the water a darkish tint that reflected a clear sky, crisscrossed with overhanging, bare tree branches.

Clad in hip boots, Evans waded to a partially submerged log and pulled up a fist-sized mass of eggs: Spotted Salamander eggs to be specific. The jelly-like glob with dark developing eggs gave evidence of the age-old, annual migration that many amphibians make to breed and start new generations. Students gathered closer and several reached out with curiosity to touch the mass.



Sewanee Biology Professor Jon Evans has lifted a mass of spotted salamander eggs from this ephemeral pond that amphibians rely on to provide their next generation.



Spotted Salamanders in Tennessee and elsewhere emerge by the hundreds and thousands in late fall/early winter to march to their ancestral ephemeral ponds to mate and lay eggs. *Right:* Annual pop up ponds, like this forested one seen in early spring in Sewanee, are critical to the lives of many amphibians and invertebrates.



## HEADED OUT TO BREED

Spotted Salamanders are land animals that spend most of their lives hidden under logs and rocks, but they are among the amphibians that need water to reproduce. They move to their traditional pools when the time is right, with the rains of late fall/early winter.

With their flamboyant yellow spots, the salamanders are, when on their mission, one of nature's impressive sights.

"You can see them marching through the leaves to their pond," Evans said with a smile.

Marbled Salamanders, which are smaller than the spotted variety, are on an earlier schedule. September 30 proved to be the big evening when the ones near Evans's house were spurred to move this past year, and he happened to be outside.

"Marbled Salamanders were walking down the trail with me," he said. "It

uch as plowing, seeding, cultivating, minor drainage, and harvesting are exempted from the state's permitting requirements unless there is an identifiable point of discharge of a pollutant.

To complicate matters further, land clearing for a development or timbering may occur in summer when there's no water present, and a landowner might ignore or not recognize an ephemeral pond site.

"Sometimes people may not realize these features are wetlands," Elam said. "They also may not see them as important because they're not large features or directly connected to a stream, but they're an important little oasis for a lot of species."

These temporary pools and their surroundings are vulnerable.

The numbers of ponds and their buffer lands in California have shrunk 75 percent from what was once four million acres in the 1800s, according to the U.S. Environmental Protection Agency. Agricultural development, building of water supply projects and suburban sprawl were among the reasons.

A steep decrease is seen also on the East Coast, where development of all kinds and timbering has been wiping out the small eco-gems, Mantay said.

It's unclear today in many places how many ephemeral ponds there are and, also, how many is enough to provide the necessary habitat for the species that rely on them. The Southeast is particularly short on research, according to Evans.

The Landscape Analysis Lab has made one of the few efforts here, he said, looking at loss of forest cover relative to the ponds.

The surroundings and connectivity of seemingly isolated ephemeral ponds is pivotal.

Once a pond has all the inhabitants it can handle, the overflow salamanders must seek out other nearby pools. Migrations between ephemeral ponds allows for gene transfer between individuals, which is important for many species resilience and survival, according to Elam.

And, the overall habitat is what the amphibians depend on most of the year to live and eat and as safe corridors to travel to ponds.

"Like a migratory bird going from one habitat to another, they've got to have both," Evans said.

He and Mantay both say more protective laws for the ponds are needed and forward motion has been made with a few timber companies.

Bowater signed an agreement with the Dogwood Alliance and Natural Resources Defense Council in 2005 that would help protect the ephemeral ponds on its lands. Resolute Forest Products (formerly Bowater) today requires wood delivered to its mills to be harvested under best management practices to help protect the water and land, said Kevin Gallagher, company forest analyst.

International Paper and Georgia-Pacific have followed suit in some areas.

Evans believes the best thing for ponds would be for developers, timber officials, land planners and everyone else to see an evening salamander migration to a pond.

"It's such a magical and mystical sight," he said. "They would probably protect these ponds if they got to witness how important they were to the lives of these animals."



Warren Duzak

**Ariana Rupp and Scott Summers, conservation biology students at the University of the South: Sewanee, check for life in the pond's leaf litter.**



(Anne Paine, who lives in Nashville, is the retired environmental writer for *The Tennessean*.)

**Professor Jon Evans, standing in one of the seemingly insignificant ponds that are dry most of the year, talks to his conservation biology students at the University of the South: Sewanee.**



Warren Duzak