

# **Section 5**

# **Vernal Pool Slides**

# CMS Vernal Pool Study

*By Aliya Hosford, Alec Ernst, Macie Werntz, Luis  
Burgos*

## *Why is one pool dryer than the other pool?*

I think that there are three main reasons why one pool is dryer than the other. One main reason could be the shape of the pool. I think that this could be a cause because if the shape of the pool is more like a gully like one of our pools the water isn't as spread out so it doesn't evaporate as fast as the other pool that is much more spread out. Another reason that may be causing one pool to dry up faster than the other is how they are getting their water. The snow may have had more of a chance to gather in the pool that is shaped like a

Aliya Hosford

# *Why is one pool dryer than the other pool?*

*cntd.*

gully. The circular pool has less of a depth from the trail so that snow couldn't come down the banks and into the pool. The gully however has a giant bank so a lot of water went into it. This could contribute to the reason of there being more water in the gully pool. The third and final reason that one pool may have more water than the other is the way that the sun hits the vernal pools. One vernal pool may get more sun than the other so that there is a higher chance that the water will evaporate much faster. For these reasons this is why one vernal pool dried up faster than the other.

*What type of Snakes can be dangerous at vernal pools and what type of snakes can be found at vernal pools that are common?*

Most snakes are not at all dangerous they can play dead or maybe try and scare you, but they do not bite humans. Most eat frogs though so a good trap is a frog. The most common snake is the eastern garter snake. Other common snakes include the northern water snake and the eastern timber snake.



Alec Ernst

# *About how many wood frog eggs actually hatch?*

*Most wood frog eggs don't ever hatch at all. Eggs are usually laid in late March to mid April, when the weather starts to warm up. Because of the temperature rising, the vernal pools start to dry up, making it difficult for the eggs to hatch. In the end, less than 20% of all the eggs end up hatching.*



*Macie Werntz*

# Sources

## Aliya

[http://www.naturalheritage.state.pa.us/VernalPool\\_DryPhase.aspx](http://www.naturalheritage.state.pa.us/VernalPool_DryPhase.aspx)

<http://www.sacsplash.org/post/three-phases-vernal-pool-ecosystem>

## Alec

A field guide to the animals of Vernal Pool by Leo p. Kenney and Mathew R. Burne and tracking guide.

[http://www.naturalheritage.state.pa.us/VernalPool\\_Reptiles.aspx](http://www.naturalheritage.state.pa.us/VernalPool_Reptiles.aspx)

I also searched every animal privately on different websites to see if they were common or dangerous.

## Luis

<http://www.animalfactguide.com/animal-facts/spotted-salamander/>

[http://en.wikipedia.org/wiki/Spotted\\_salamander](http://en.wikipedia.org/wiki/Spotted_salamander)

## Macie

[http://en.wikipedia.org/wiki/Wood\\_frog](http://en.wikipedia.org/wiki/Wood_frog)

<http://www.nps.gov/gaar/learn/nature/wood-frog-page-4.htm>



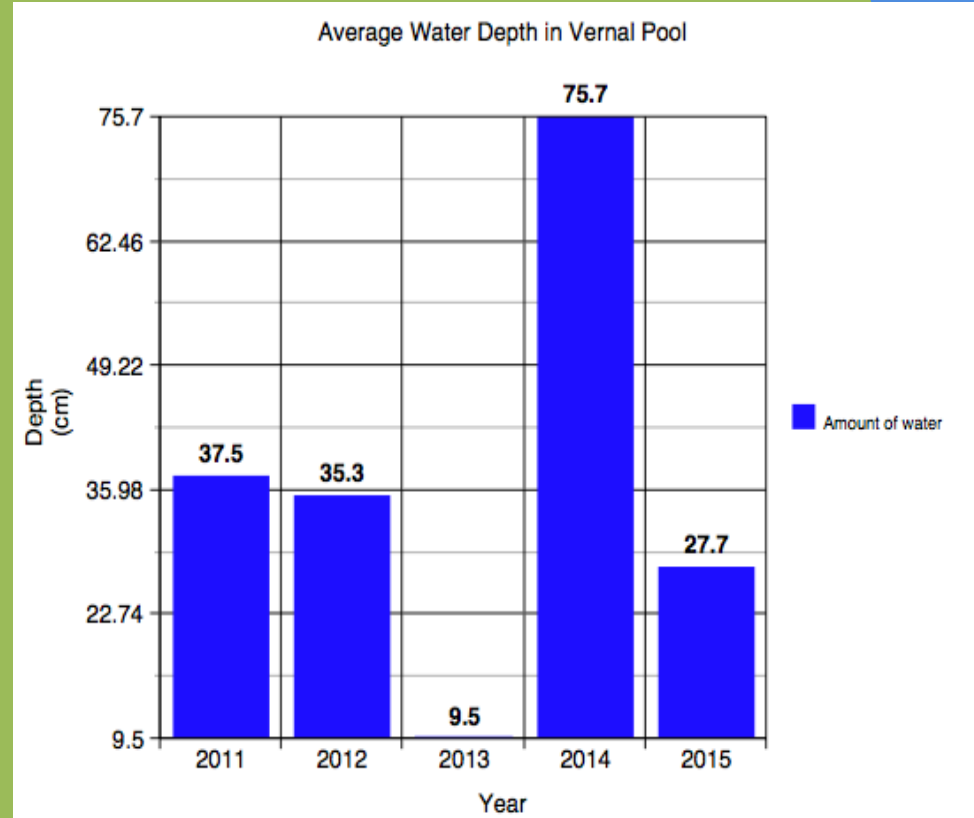
# Concord Middle School Vernal Pool

By Elsa Couvillon, Caitlin Benn, Xavier Weathers  
and Carter Ridick



# What is a vernal pool?

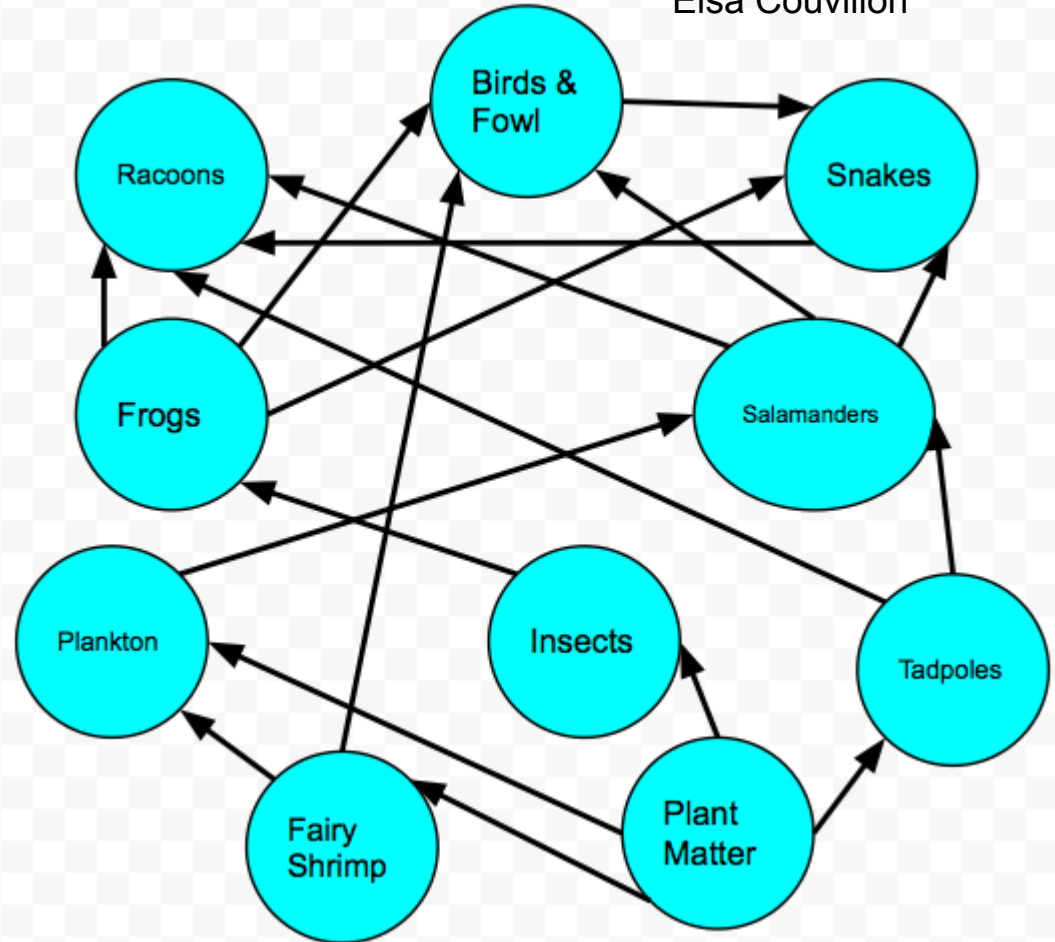
A vernal pool is a depression in a woodland area that is seasonally flooded to create a pond like environment that frogs, salamanders, and other animals depend on. A vernal pool is like a huge puddle, and is only considered a vernal pool if certain animals live there, such as fairy shrimp, wood frogs and spotted salamanders.



# Food Web



= pointing  
from organism  
to direction of  
energy



# Can adult salamanders breathe underwater?

Elsa Couvillon

When the gills disappear when a salamander hits the metamorphic stage, can the salamander still breath/stay underwater for long time? Salamanders have gills when they first hatch, since they are born in the water. When they go through their metamorphosis, their gills turn into lungs for full land dwelling. Some salamanders keep their gills, and live permanently under water, but spotted salamanders do not keep their gills, and can not breathe underwater. They can still swim, though.

*A yellow spotted salamander, like the ones in our vernal pool*



Sources: the Vernal Pool, [animals.sandiegozoo.org](http://animals.sandiegozoo.org)

# What are the benefits of salamanders staying in the wild rather than being kept in captivity?

By Caitlin Benn

What are the benefits of salamanders, a creature whose native habitat is the vernal pool, to live in the wild their whole life rather than being put in captivity? In science class, we took trips out to the vernal pool to get both quantitative and qualitative data. Data such as diameter of pool, temperature of pool, how many frog egg masses we found, and what the pool looks like. We also read about certain creatures in a wildlife book for homework. With all of the following data, and the inferences I was able to make, I came to a couple of possible conclusions. First of all, salamanders have much development to endure as their lives continue. Also, reptiles such as the spotted salamander are cold blooded, meaning they require lots of natural sunlight to function and survive. Salamander development goes more rapidly as the vernal pool dries up. However, if the salamanders are not in the pool, the development might not go as well. Also, with not enough natural sunlight, the salamanders will get much too cold and die. Another inference I made is that salamanders need a certain amount of nutrients from their chosen prey, like worms. If they are fed other proteins or some kinds of supplements, they will most likely face serious consequences. Developmental issues, lack of sunlight, and natural nutrients are the main benefits of spotted salamanders staying in the vernal pool rather than being held in captivity. In conclusion, although staying in the wild leaves the creatures exposed to harsh weather and predators, you should still observe the salamanders at the vernal pool, and not in a tank at home!



*^^^ This salamander is in captivity. Notice that it is fairly thin compared to many salamanders living in their natural habitat. vvv*



Resources: Vernal Pool, Life in The Vernal Pool, and my own inferences

# Why don't the salamanders lay their eggs in our Vernal Pool?

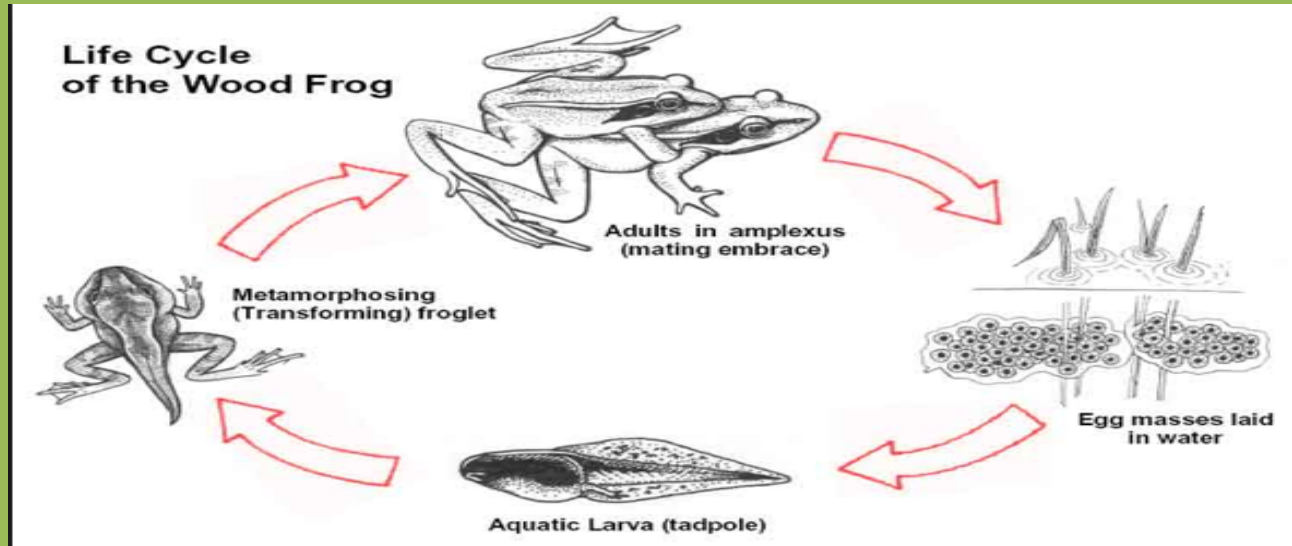
Carter Ridick

One piece of information that I found was that the pool near our Vernal Pool lasts longer. When we went on our walk, we saw zero salamander egg masses. But when we walked over to the other pool, we saw 2 egg masses. I think that this could be because the salamanders couldn't find much food at our Vernal Pool but they could find some in the other pool. Also we saw hundreds of tadpoles in the other pool and we didn't see any in our Vernal Pool. So this means that the salamanders found out that there wasn't any tadpoles in our pool, so they decided to migrate to the other pool, where there was hundreds of tadpoles. So, in conclusion the salamanders want their eggs to have food so they lay them in the other pool.



# What is the life cycle of a wood frog?

The life cycle of a wood frog first starts as an egg mass laid in water, then it turns into an aquatic larva. after that it transforms into a metamorphosing froglet. last it becomes adults in amplexus and the whole cycle repeats.





# Our Vernal Pool Questions and Answers

By Ryan, Cam, and Aidan



# pool?

## Aidan

Raccoons tend to live inside vernal pools, so they eat there. Raccoons are the top of the food chain. They tend to build homes inside poison ivy. They eat insects, crayfish, frogs, salamanders, worms, turtles, mussels, eggs of turtles and birds, fish, and young waterfowl. Their effect is that they eat everything, and are at the top of the food chain.

Bibliography: [http://www.fcps.edu/islandcreekes/ecology/american\\_toad.htm](http://www.fcps.edu/islandcreekes/ecology/american_toad.htm), <http://westboroughlandtrust.org/nn/nn147.php>





# Eggs at vernal pool

Question- Where are the favorite spots for the animals living in the vernal pool to lay eggs and why?  
Based on my own studying:

Out of all the different places we looked at the favorite spot for animals to lay eggs was the long skinny pool on the right side of the path near our vernal pool. I think this was the favorite spot for multiple reasons. One is that the water is deeper and lasts longer than the other ones, because of this the eggs get more needed time in the water especially the salamanders. Another reason is the pool gets a lot of sun and the sun helps the eggs hatch especially the wood frog. We noticed that this slightly larger vernal pool was home to a lot more life than ours. By Cam Ladd



# ***WHY DON'T SALAMANDERS LAY EGGS IN OUR VERNAL POOL***

When I went out to the other vernal pool I found that it wasn't dried out but ours was. There were a lot of salamander eggs patches in the other vernal pool. I think this is because ours dries out faster and the salamanders need more time to hatch than our pool can give. That is why they can't live in our vernal pool



***BY RYAN WAXLER***

# Vernal Pool Slides ~ Blue



by Aaron F., Damon D., and Duncan S.

## Where do the salamanders lay their eggs? Duncan Stephenson

After venturing outside to our vernal pool, and when we arrived there we found zero eggmasses. But we found several (25) eggmasses in the other pool, and they were in abundance. I think there are more eggs in the other pool because there is more shade there, and I think that may have something to do with it because maybe the egg masses hatch more successfully in the shade.

# Why were there salamander eggs in the vernal pool that we didn't study in and not in the one that we did?

~Aaron

In the vernal pool that our class went to study in, the water was very shallow. The other vernal pool looked much deeper. Our vernal pool was 55 centimeters deep while the other pool looked to be about 3 feet deep. This could increase the chance of the salamanders laying their eggs in the deeper one because if the pool is deeper, it has less of a chance of drying up and killing the eggs.



<http://www.dgif.virginia.gov/habitat/vernal-pools-and-salamanders.asp>

# What different kinds of salamanders live in MA?

: [http://eol.org/data\\_objects/32098680](http://eol.org/data_objects/32098680)

The most common salamander at our vernal pool is the yellow spotted salamander. Another kind of salamander that lives in Ma, is the Marbled salamander. This salamander is a short and stocky with a lines that are white and sliver on it's back. They are 3 to 5 inches long.

The next salamander is the Blue spotted salamander. This salamander is actually a hybrid of the Marbled and Jefferson salamander. This salamander lives underground rather than above ground.

The last salamander is the Jefferson salamander. This salamander was named after Jefferson College. This salamander is the smallest all of the mole salamanders. But the n



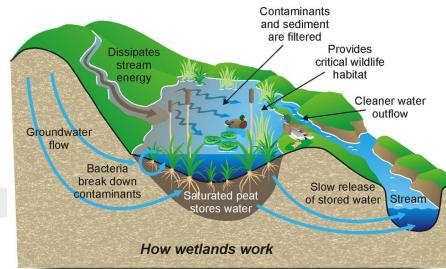
Marbled

blue spotted

Jefferson

spotted

# Vernal Pool Study



*by Emily Sheehan, Una Oljaca and Lila Hempel-Edgars*

# What is a Vernal pool?

- a **vernal pool** is a **temporary** pool of water that is home to many **plants, insects, and amphibians**, but **NO fish**. What makes them special is that they are formed by **runoff** (melted snow/ rain) and dries up by July.





# Why is the vernal pool an ideal environment for wood frogs?

- Wood frogs migrate to vernal pools to mate and lay eggs
- The egg masses survive on the tussock sedges and woody stems in sunny locations, so the vernal pool is necessary to give the eggs a place to hatch
- The symbiotic algae in the vernal pool are needed to provide food for the wood frogs just after hatching
- The young wood frogs feed on algae and leaf material on the pool bottom and grow rapidly so they can undergo metamorphosis
- Wood frogs live outside the vernal pool and only arrive for mating season, so it is critical that the environment is perfect for mating during the short period of time the wood frogs are at the vernal pool
- The main reason wood frogs need the vernal pool is for the eggs to hatch, so the environment is important to sustain the early life of these eggs and tadpole

Based on my own study and: [http://www.vernalpool.org/inf\\_wf.htm](http://www.vernalpool.org/inf_wf.htm)



# What Are The Temperatures That Can Hurt Fairy Shrimp Eggs?

- Eggs will die in temperatures lower than  $-190^{\circ}$
- Eggs will die in temperatures higher than  $99^{\circ}\text{C}$
- Eggs produced in the winter have thicker shells
- Eggs produced in the summer have thinner shells
- Eggs produced in the summer hatch rapidly, and produce many shrimp
- Eggs produced in the winter hatch slowly, and many shrimp end up dead
- Eggs produced in the summer can take up to 15 years to hatch
- Eggs produced in the winter usually hatch after 30 hours
- Young hatched from winter eggs develop very slowly
- Young hatched from summer eggs develop very quickly

# What are the Fairy Shrimp Egg Predators?

- Birds
- Bugs
- Beetles
- Vernal Pool “Tadpole Shrimp”

# What better conditions does the vernal pool need to be in, in order for Spotted Salamanders to survive?

**Habitat:** Spotted Salamander's habitat is typically a vernal pool; hardwood forests around flooded depressions formed from melted snow. The vernal pool in the back of our school seems to be an ideal habitat for this species.

**Predators:** Predators of the Spotted Salamander include raccoons, turtles, snakes, birds and frogs. There are many birds, snakes and frogs near and around our pool, but Salamanders have special tools and techniques to survive in the wild.



**Weather/Climate:** Starting in late March, vernal pools start to form and dry up by late June to early July. Spotted Salamanders need **AT LEAST** 6-8 weeks to develop and hatch. Based on our data and observations, the pool in back of Sanborn, as of April 29th had dried up. This is nearly 2 months early, leaving hardly enough time for the larvae to develop. According to the United States Drought Monitor, this spring, New England has experienced abnormally dry weather.

**Conclusion:** After researching Spotted Salamanders habitat, predators and necessary weather for Vernal pools to survive, the lack of rain and hot, dry weather has been put a damper on the successful laying of salamander eggs.

# Sources

-The Audubon Society Field Guide to North American Reptiles and Amphibians

-[http://www.biokids.umich.edu/critters/Ambystoma\\_maculatum/](http://www.biokids.umich.edu/critters/Ambystoma_maculatum/)

-Our trips to the vernal pools

-<http://droughtmonitor.unl.edu/>

-<http://www.bio.umass.edu/biology/conn.river/vernal.html>

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