

# **Section 3**

# **Vernal Pool Slides**



# Vernal Pool

*By Ava Moore, Izzy Frangules, Aubrie  
Olsen, Kai Neal, and Henry Bex*

# What is a Vernal Pool?

Vernal pools are temporary wetlands that fill up with rainwater, runoff, and rising groundwater every year.

They are critical habitats for many animals, because the lack of fish means that it is a safe place to reproduce and live in safety.

All vernal pools share two characteristics:

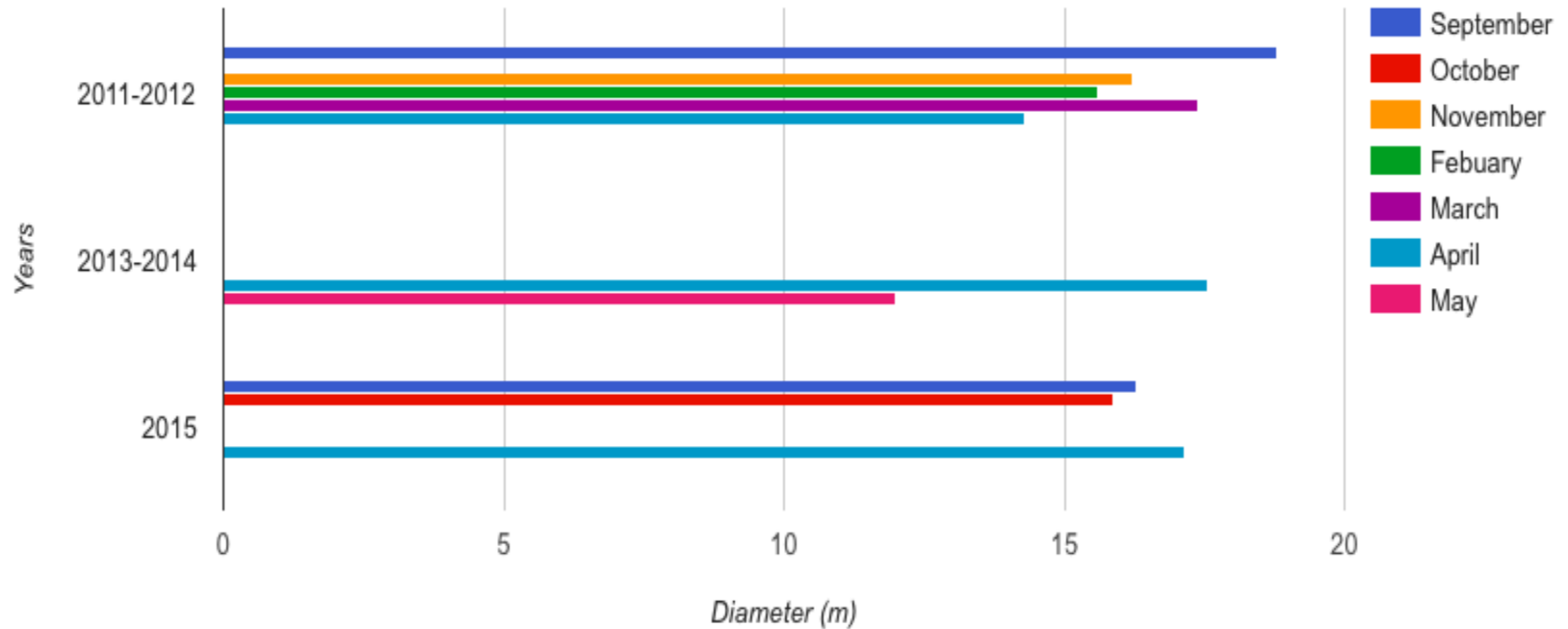
1. They do not hold water permanently and
2. they are free of breeding populations of fish.



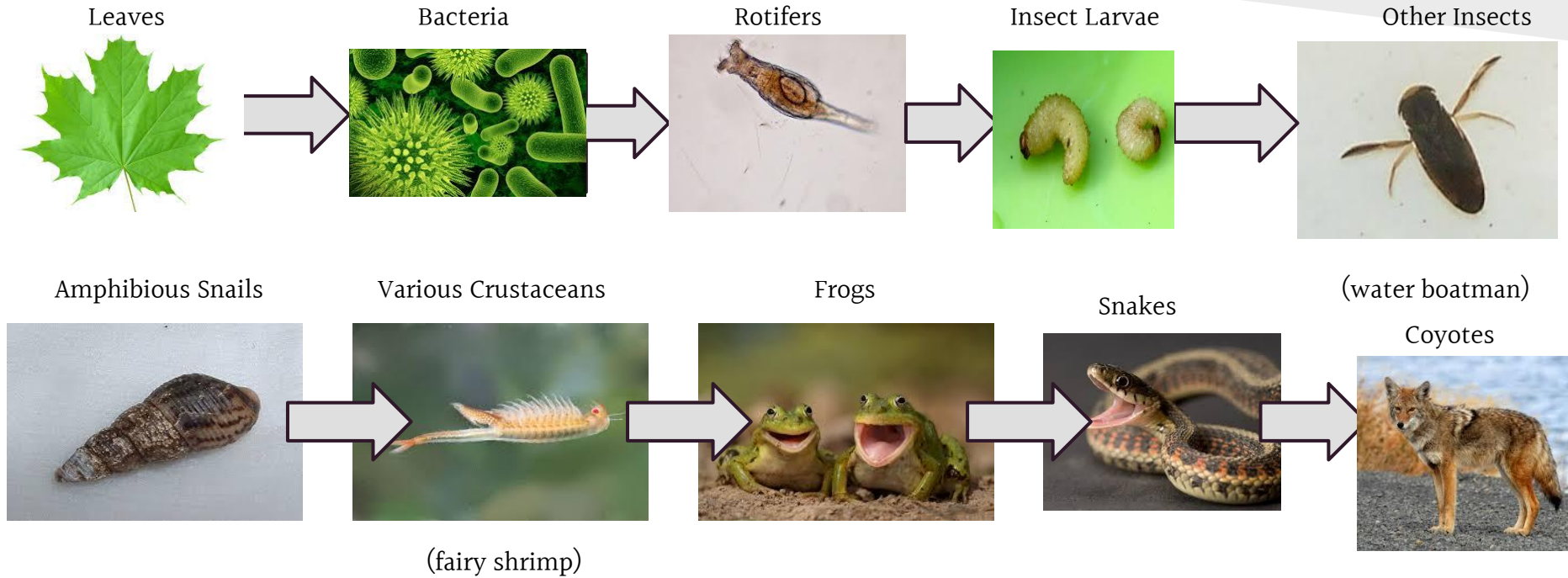
*This is a vernal pool in Connecticut.*

# Graph

Vernal pool diameter over years



# Common Food Chains





# Ava's slide

My question was: *Why is scoria, a igneous rock that comes from cinder cone volcanoes, showing up along the old train tracks in a place with virtually no volcanoes?*

Scoria is used in many different ways, including as an ingredient in cement, and in building construction (less structural steel is used), roofing granules, landscaping projects, drainage stone, low-quality road metal, and many other things. You may have seen it as the red landscaping pebbles at outside a Taco Bell. Because it is so frequently needed, any cargo trains that used to run along the tracks certainly would have brought scoria to various landscaping depots, and in doing so, some of it might have spilled. Over a long period of time when trains were running there, a lot of scoria could have accumulated by the tracks.

# Henry's slide

My question was: How common are vernal pools?

Vernal Pools are not very common, mostly because they're only there during the wet part of the year. Normally this is around the time of April to May, however they can still be there during the summer if it is very rainy as the heat will easily dry the pool up. When the pool is dry, it is just a pit filled with mud and dried leaves.

# Izzy's slide

My question was what causes a vernal pool's size to change so dramatically?

Climatic changes associated with each season cause dramatic changes in the a vernal pools. The pools collect water during winter and spring rains, changing in volume in response to varying weather patterns. During a single season, pools may fill and dry several times. In years of drought, some pools may not fill at all. Rain, snow, and heat also can causes change in a vernal pool size.





# Aubrie's slide

My question was what attracts organisms to the vernal pool?

Spotted salamanders begin migrating to breeding ponds at night, during the first rainfall following the thaw of snow. Males respond faster than females do to the rainfall and therefore get there earlier than the females. The males also stay in the pool longer to increase the chances of fertilizing eggs.

# Credits

- <http://geology.com/rocks/scoria.shtml>
- [http://www.vernalpool.org/vpinfo\\_1.htm](http://www.vernalpool.org/vpinfo_1.htm)
- <http://water.epa.gov/type/wetlands/vernal.cfm>

# Orange Table: Vernal Pool Presentation

By Lukas Johnson, Cam Hegarty, Hugo Vella Vicente, Nathalie Schnadig, and Kate Casey



# What is a Vernal Pool:

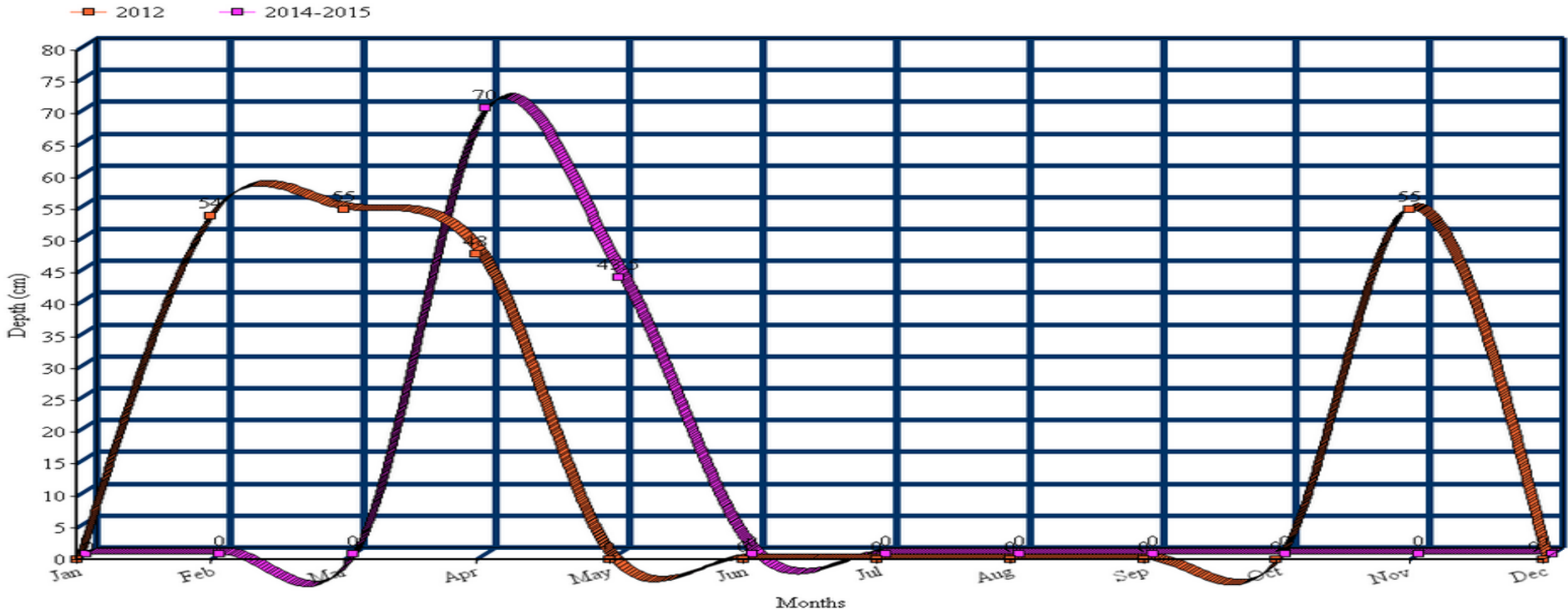
Vernal pools are ephemeral wetlands which are inundated seasonally with precipitation, runoff, and other resources. Vernal pools generally remain moist, but dry up around mid-summer. This wet-dry environment establishes a rich and unique background which supports a diverse collection of organisms. Vernal pools can vary in many factors including; appearance, time of water filling, surroundings, and plant and animal content. Many times vernal pools are overlooked, but they contain numerous factors which are required in maintaining a multitude of organisms.



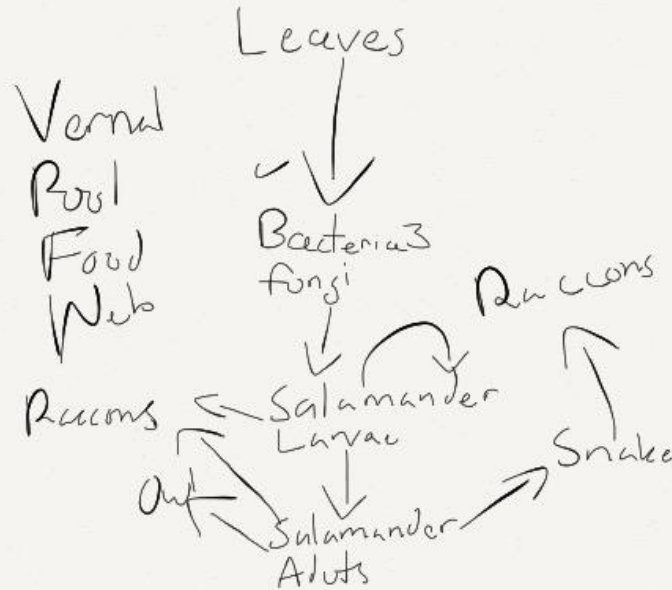
# Vernal Pool Graph:

This graph represents the growth and depressions of the water depths in our local Vernal Pool

Vernal Pool Depth



# Vernal Pool Food Web:



# Question - Nathalie

If the pond will eventually dry up, why do certain forms of wildlife decide to settle there?

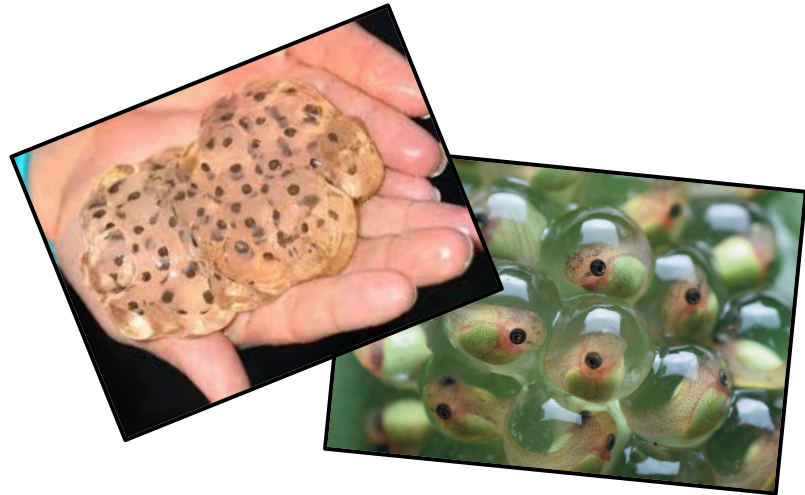
For many of the organisms found in the vernal pool, they rely on the wet-dry environment to successfully breed and survive. Since the vernal pool is only wet during part of the year, it disables fish from becoming part of the wildlife. With this reduced predation, vernal pools are favorable particularly to amphibians. During the hot summer, vernal pools are often a water supply for a spectrum of organisms as well as a route of transportation that amphibians utilize to travel from one wetland to another. For some animals, destruction of only a few pools would jeopardize their entire existence, and therefore numerous organisms are solely reliant upon these small ephemeral pools.



# Question - Lukas

What is the sack that surrounds the tadpole eggs made out of and what is it for?

The jelly provides support and protection while allowing the passage of oxygen. Frogs' embryos are typically surrounded by several layers of gelatinous material.





# Question - Cam

How will the pool be affected by the lack of life?

As shown by the graph, the water level of the Uernal Pool is looking rather dismal this year, as we have had a bad winter, with the final snow melting in April, and little rainfall after, and in fact, as of now the pool is completely dried up, meaning that the water and moss that the frogs and salamanders rely on is not present.

This means that with nothing to eat or drink, and no place to lay their eggs, the animals are in a very dire situation, and will have a bad year without more rain and growth in the pool, unless they migrate to the wetlands.



Dry Uernal Pool



Wet Uernal Pool

# Question - Hugo

In a vernal pool, what are commonly encountered animals, and why do they visit the pool?

Throughout the year, there have been encounters with Spotted Salamanders, Wood Frogs and Fairy Shrimp, or this at least in the local vicinity. But nationwide there have been records of other animals such as the Eastern Spadefoot, Clam Shrimp, and many others. All in all, animals are attracted to the pool because of the food or to lay eggs. Classification of these animals are varied, from reptiles to mammals, and even birds. In fact, the dimensions of the pool often dictates what creatures visit. Larger animals might find a deeper one, and smaller creatures might find a shallower pool.



# Question - Kate

Why does the Spotted salamander have spots and how do they help?

I thought that the spots help to camouflage the salamander when he leaves his home to feed at night. But then i found this that In many salamanders, including the spotted and Jefferson salamanders, poison glands are concentrated in the tail. They can't live without vernal pools so the spots warn other animals to stay away.



# *Bibliography:*

Citations.

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

<http://www.u-s-c.org/html/vernalpools.htm>

[A Field Guide to the Animals of Vernal Pools](#) by Leo Kenney and Matthew Burne



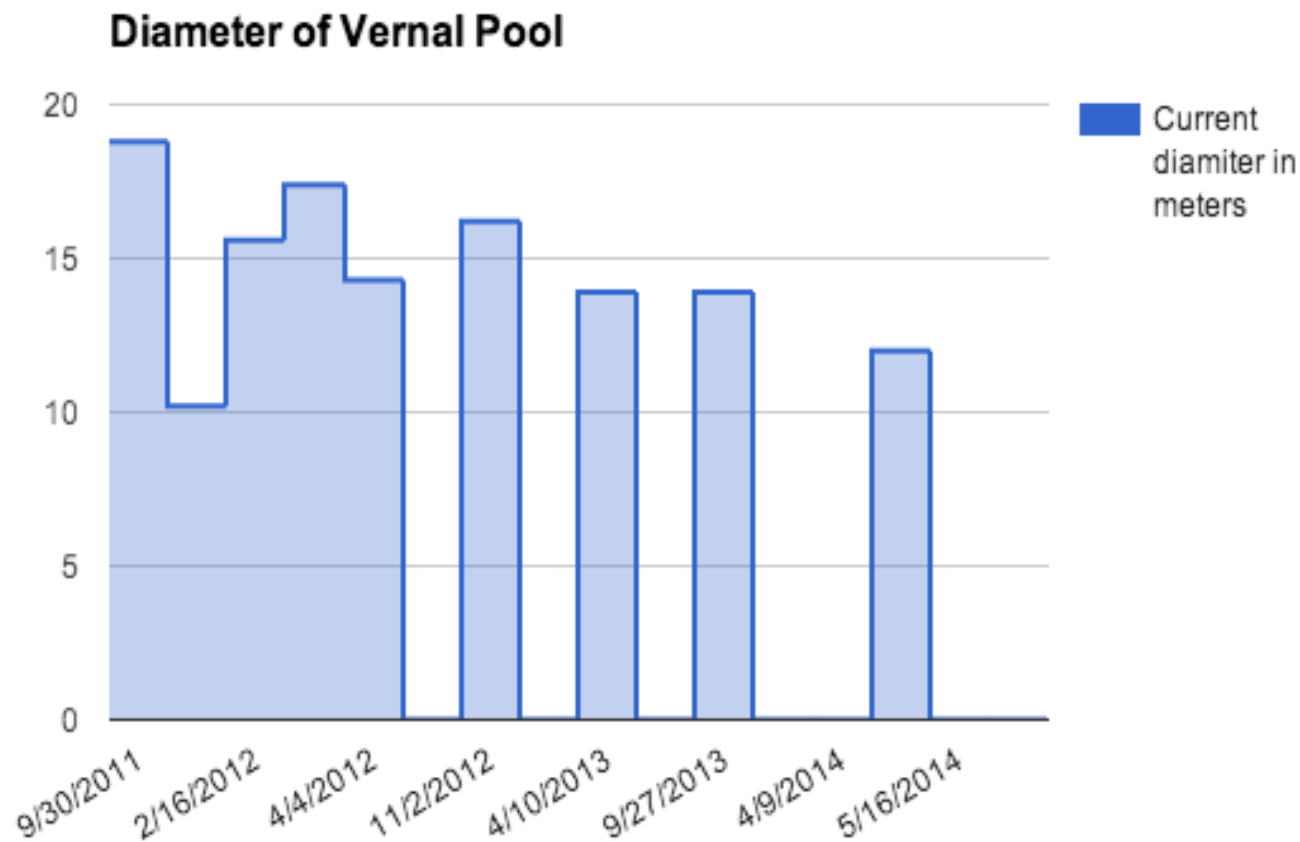
# Vernal Pools

**By Nicholas Avakian, Olivia Palmer, Amy Goodhue, and Nick del Sobral**

# What is a vernal pool?

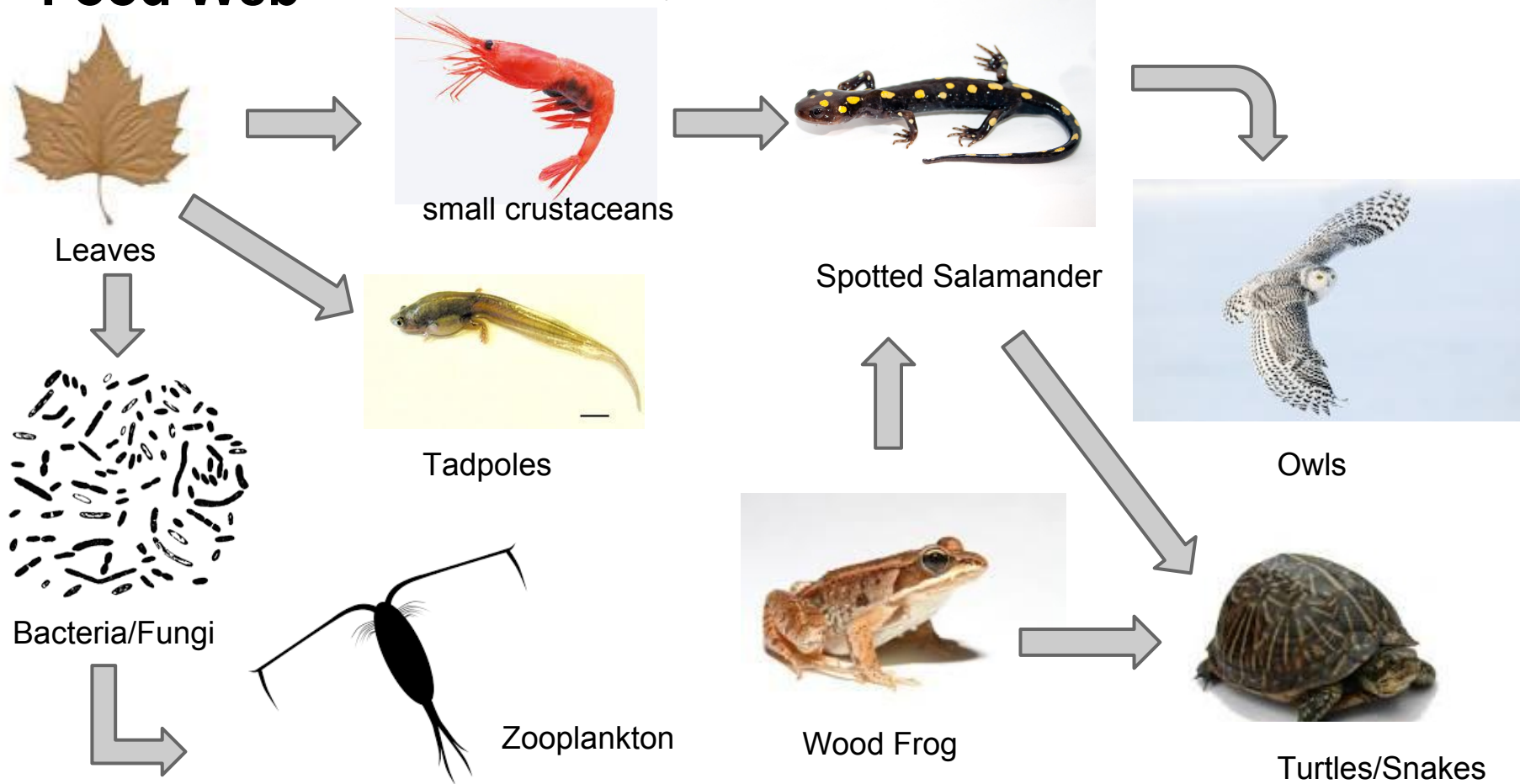
- Vernal pools are short lasting wetlands
- They fill annually with water from precipitation (rain, snow, and hail), runoff, and rising groundwater.
- The wet-dry cycle that the vernal pool goes through prevents fish from becoming established with it.
- Vernal pools provide great temporary habitats for many species like wood frogs, spotted salamanders, and fairy shrimp
- All vernal pools only share two of the same characteristics: They do not hold water permanently and they do not breed populations of fish.
- In New England *vernal pool* refers to a temporary wetland regardless of when they fill or dry.
- Most pools fill in the fall or winter and dry annually.
- Pools that are semipermanent are likely to have wetland vegetation.

# Graph



# Food Web

Key: Ex. Salamander eats Crustaceans





# Olivia: Question

Q: Why don't other types of animals live in the vernal pool other than salamanders, frogs, and insects?

A: Since the vernal pool is dry half of the year animals like fish, who need water year round would not be able to survive. After researching I found that many animals and plants other than salamanders, frogs , and insects do live there. Trees use water from the vernal pool as food and the vernal pool helps them grow. Birds also use the vernal pool as a food source by feeding on some of the vernal pool animals that live there. Bacteria, algae, and zooplankton also live in the vernal pool.



## How Are Vernal Pools Formed? By Amy

**Answer: Vernal Pools are formed from various forms of precipitation like rain, snow, and hail, etc. They also are formed by runoff which is water that has drained away from the surface of an area of land. Vernal pools are also formed from rising groundwater.**



# How do Fairy Shrimp do when the vernal pool dries up

By Nicholas.A

The fairy shrimp grow up and die before the vernal pool dries up. If the shrimp is a female it lays the eggs and then dies. The eggs called cysts can survive the vernal pools dries season.



© arizonafairyshrimp.com

# How do wood frogs hibernate? Nick d.S.

They crawl under leaves and other organic material on the forest floor and fall asleep until the snow around them melts. During hibernation they have a high concentration of urea, which is a byproduct of urine, in their blood. This allows the frogs to deal with changes in salt concentration during freezing and thawing. Urea also helps the frogs slow down their metabolism, so that they won't need food during the winter. During hibernation their cells make cryoprotectants, which also helps them deal with the freezing. There are many animals, like reptiles and insects, that can tolerate freezing, but the wood frog (*Rana sylvatica*) is an expert since they can survive for weeks with  $\frac{2}{3}$  of their body water completely frozen to the point where they are a frog popsicle. During hibernation, wood frogs basically shut down. They stop metabolic activity and waste production and their heart even stops beating and they stop breathing.



# Resources

Nick D.S.

<https://www.units.miamioh.edu/cryolab/projects/woodfrogfreezing.htm>

<http://www.nps.gov/gaar/learn/nature/wood-frog-page-2.htm>

<http://voices.nationalgeographic.com/2013/08/21/how-the-alaska-wood-frog-survives-being-frozen/>

Amy Goodhue:

“A field guide to the animals of the vernal pools” (book)(What is a vernal pool page)

Nicholas A

<http://www.nwf.org/wildlife/wildlife-library/invertebrates/vernal-pool-fairy-shrimp.aspx>

Olivia Palmer:

“A field guide to the animals of the vernal pools pg. 6” (food web page)

<http://extension.psu.edu/natural-resources/wildlife/habitat-management/pa-wildlife-15-vernal-ponds-seasonal-habitats-for-wildlife> (question page)

# Vernal Pool

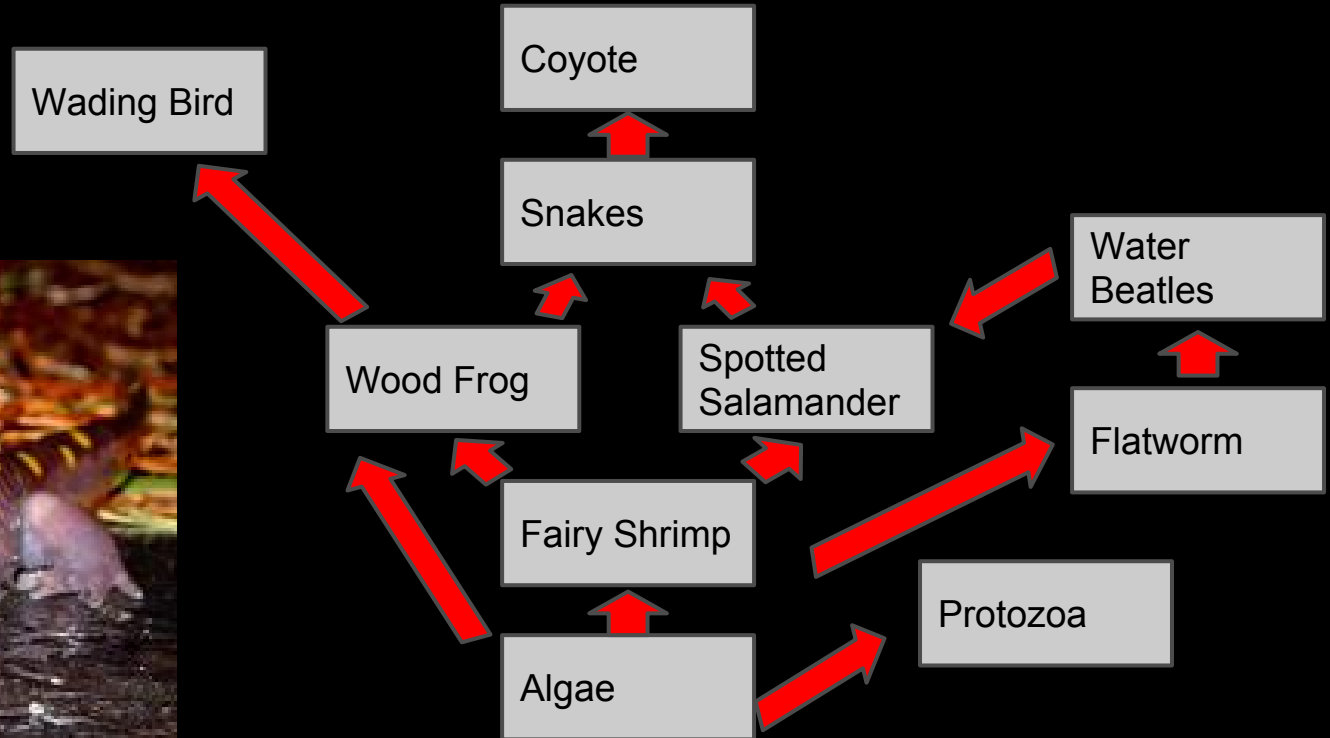
By: Margaret, Grady,  
Sean, and Meghan



# *What is a Vernal Pool?*

- ★ A vernal pool is a pool that may not always be wet.
- ★ The vernal pool also has unique organisms that depend on it to survive and reproduce such as the spotted salamander, wood frogs, and fairy shrimp. They go here to reproduce because there are no fish to eat the eggs.
- ★ Even when it is dry, there is still life bustling underneath the leaves.

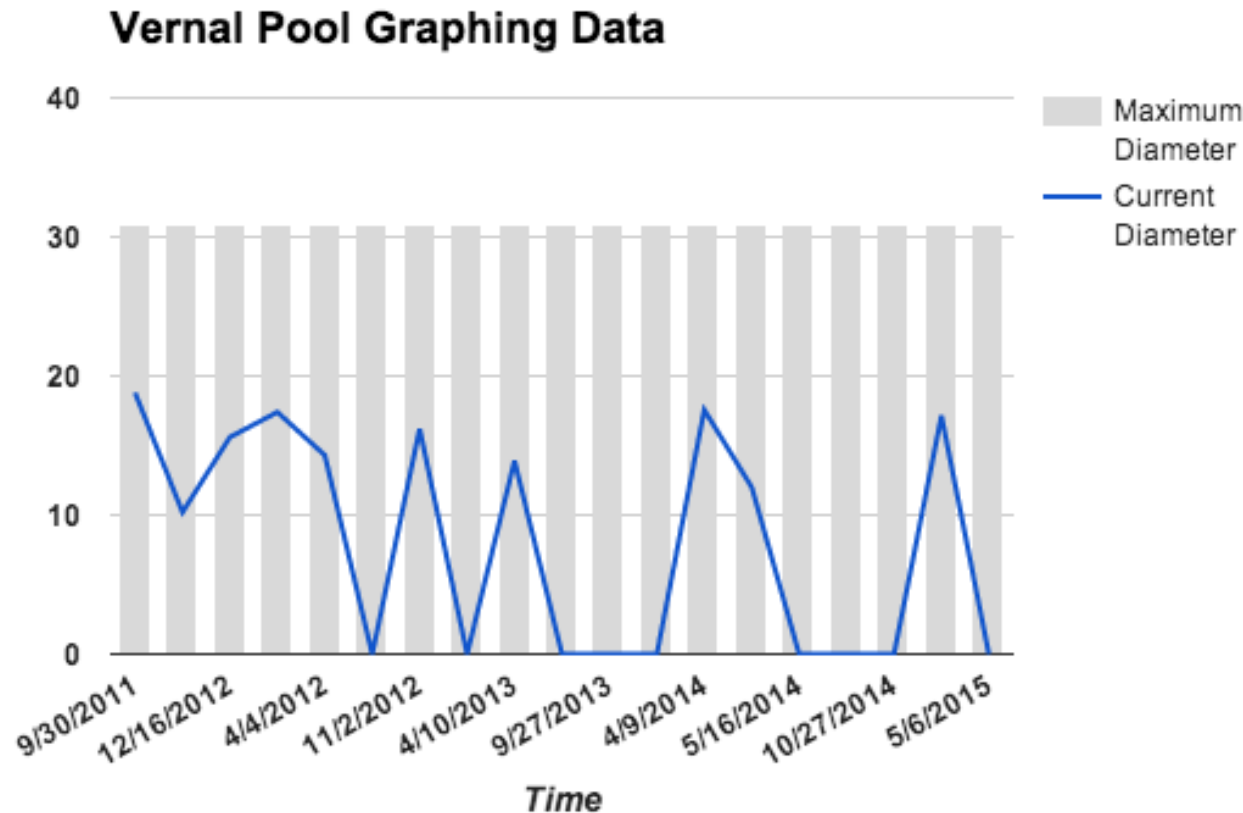
# *Vernal pool food web*





# Vernal Pool Graphing Data

In Meters



Why do we only see a limited amount of the wood frog's in the Vernal Pool, but there are a great amount of eggs from the amphibian.

Studies show that an estimated amount of only 8% of the organisms eggs in the vernal pool survive yearly, therefore if a wood frog was to lay 2000 eggs (an estimated amount a wood frog does lay) only 160 of those eggs would thrive and make it through the year. Why only 8%? This is most likely because of the wood frog's top two predators, wading birds and snakes. Also, this could possibly be because of how unpredictable the Vernal Pool's conditions can be. The last time we visited the Vernal Pool, there was a lack of water, barely any at all. The eggs need water to be raised, it is essential or else they will die.

-Margaret

*What happens to the animals that feed off of the vernal creatures?  
Will they find other animals to survive off of?*

The animals that may feed off of the vernal pool for their main source of food is not affected if the vernal pool does not produce food. They will move on surviving on other diets.

These animals like Garter snakes don't have very strict diets and they may change what they eat daily. Also there is always animals at the vernal pool. An example may be spotted salamander where they eat all sorts of small insects and worms. Their diets are very vast and there are a lot of worms and small insects.

# How does a vernal pool start?

**It starts from surface runoff. Then it's dry for a part of the year and the fills back up from snow and rain. Vernal Pools could start from floodplains, glaciers, sag ponds, pingos, and human activities.**



**Are fairy shrimp, wood frogs and spotted salamanders the only animals that live in vernal pools?**

No, snakes, water beetles, and flatworms live in these pools too. Snakes don't usually live in the pools but they do live around them. The water beetles and flatworms live in the water.



# Bibliography

Google images

WHO EATS WHAT?

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

Margaret's vernal pool record book

[www.naturalheritage.state.pa.us](http://www.naturalheritage.state.pa.us)

A Field Guide to the Animals of Vernal Pools by Leo Kenney and Matthew Burne



# VERNAL POOL

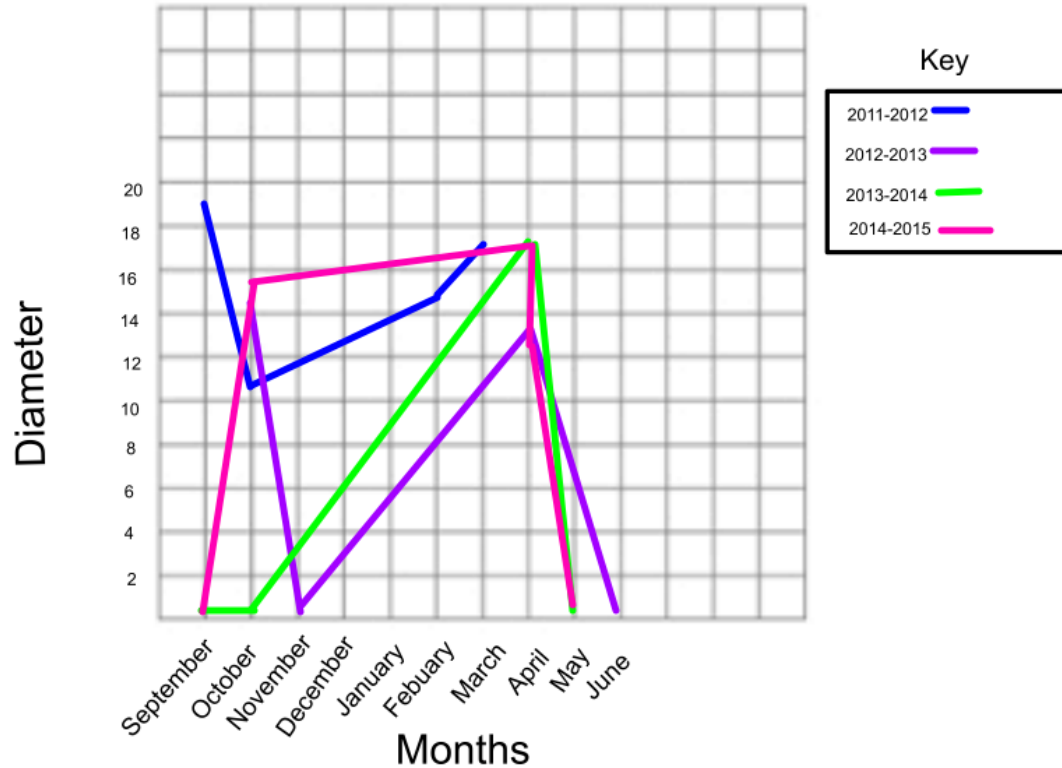
By Allie Webster, Paula Ogalde,  
Miles Inman, Mitiku Hoyt-Rouse, and Jasper  
Chartener

# WHAT IS A VERNAL POOL?

The vernal pool is a wetland, where animals come and lay eggs in the spring. The vernal pool dries up in the winter and in the summer, then fills with water in fall and spring. The trees surrounding it suck up the water, usually after the eggs have hatched. There also might be some vegetation by or in the vernal pool. The animals include fairy shrimp and frogs and salamanders. These living things are common at vernal pools.

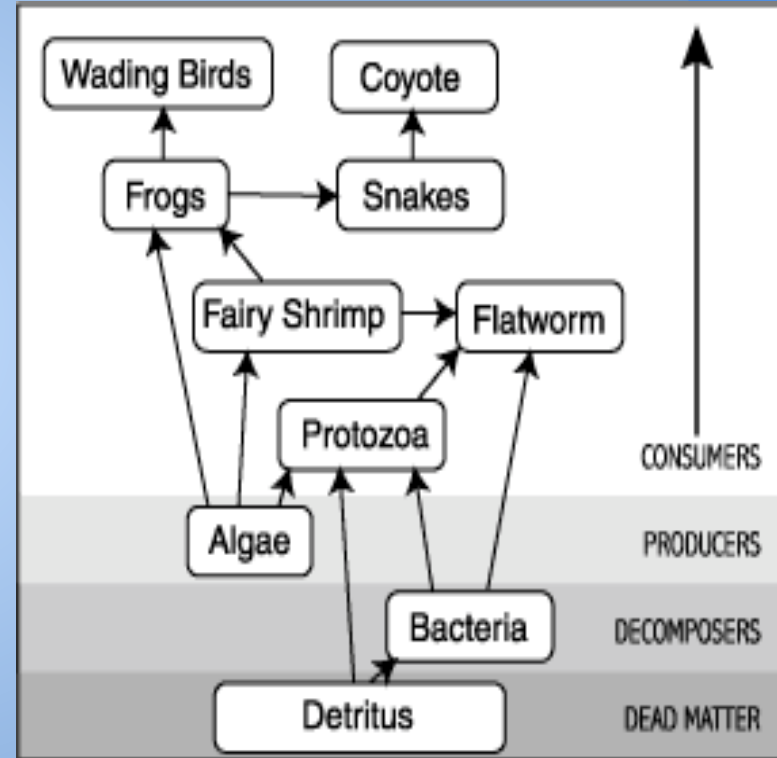


# GRAPH OF DATA



# FOOD WEB

The food web of Vernal Pool consists of wood frogs, salamanders, snakes, bacteria, protists, algae, wading birds, flatworms, protozoa, and fairy shrimp. The food chain starts with the Detritus, and goes to the bacteria eating it, and the bacteria and algae gets eaten by the protozoa. The flatworm eats eats the protozoa, and the fairy shrimp gets eaten by the flatworm. The fairy shrimp then gets eaten by the frogs, which get eaten by the snakes. The wading birds eat the frogs, and the coyotes eat the snakes.



# QUESTION OF INTEREST

## How do organisms survive when there is no water in the pool?

Vernal pools are unique wetland habitats where some of the state's most recognizable reptiles and amphibians can be found. Because their aquatic habitats are temporary, animals that depend on seasonal pools are adapted for both aquatic and terrestrial habitats at different life stages. These animals also benefit from the dry phase, because it prevents year-round water-dependent animals like fish from living in the pools. Fish prey heavily on eggs and larvae, and without seasonal pools some species would not be able to compete and reproduce. Although there are obvious challenges for an animal using an aquatic environment that disappears for part of the year, the benefit is a habitat free from predation by fish.

# QUESTION OF INTEREST

**How are amphibians or other living things able to survive the periodic drying of the vernal pool?**

These amphibians are adapted to the year round drying and when the pool is full of water at their different life stages. The drying part of the pool benefit them because there are no animals that always depend on the water like fish, or other water predators. Some species travel to the pool to lay their eggs after the first spring rain. Others leave the eggs at the bottom of the water so they can survive the frozen winter, or the summer when the water evaporates. They have to quickly grow before the pool dries up as adults so they can survive in land.

-Paula Ogalde-Carmona

# QUESTION OF INTEREST

## What other animals can live in Vernal Pools?

The other animals that live in the Vernal Pool are just different kinds of salamanders, frogs and shrimp. Many different kinds of salamanders live in the pools. Blue-spotted Salamander, Jefferson Salamander, Marbled Salamander, Eastern Spadefoot Toad and Spotted Salamander can live in Vernal Pools. Many different kinds of frogs and toads live in the pools. Eastern Spadefoot Toad and Wood Frogs live in Vernal Pools. Many different kinds of shrimp and turtles live in the pools. Wood Turtle, Blanding's Turtle, Intricate Fairy Shrimp, Agassiz's Clam Shrimp and American Clam Shrimp can also live in the Vernal Pool. I believe that other animals that could live in the Vernal Pool just don't know to go there or where to find it, even after many years. I think that other salamanders, frogs/toads and shrimp/turtles may of followed there other species to Vernal Pools and have stayed there ever since.

# QUESTION OF INTEREST

Where would the salamanders and wood frogs go when the water dries up, and where would they get their food?

The animals leave the vernal pool and go to the nearest wetlands that they see. They also need smaller pools to reproduce with for their younger ones to grow. Adults spend the summer, fall, and winter in the uplands around the pools where they find food, shelter, and overwintering sites. When the vernal pool dries up, the tadpoles of the Wood frogs flop around in the muck, and eventually dry up, where they then become food, or prey to other numerous birds, reptiles, mammals, and insects.

# MILES'S QUESTION OF INTEREST

## What are the most common living things to go to the vernal pool?

The most common living things to come to the pool are salamanders, frogs, and fairy shrimp. Salamanders and wood frogs are particularly more common to find, but fairy shrimp are harder to spot. These living things come to the pool to lay eggs and wait for them to hatch. There are many different type of salamanders like the blue spotted salamanders and there is many different frogs like the wood frog.

There is only two types of fairy shrimp that come to the vernal pool in Massachusetts and they are the *E. Vernalis*, and is common and the rare type of fairy shrimp is called *E. intricatus*. These living things are common in vernal pools.

# SOURCES

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

<http://www.massnature.com/Wildlife/Vernalpoolcreatures/vpinfo.htm>

<https://docs.google.com/a/colonial.net/file/d/0B-4R7IYL86gXamF0VHlzNjRnNjg/edit>

<https://docs.google.com/a/colonial.net/file/d/0B-4R7IYL86gXVldac2IGTWVNT1E/edit>

<https://docs.google.com/a/colonial.net/file/d/0B-4R7IYL86gXaGpFRmU2QzRxUUE/edit>



**THANKS FOR  
WATCHING**

