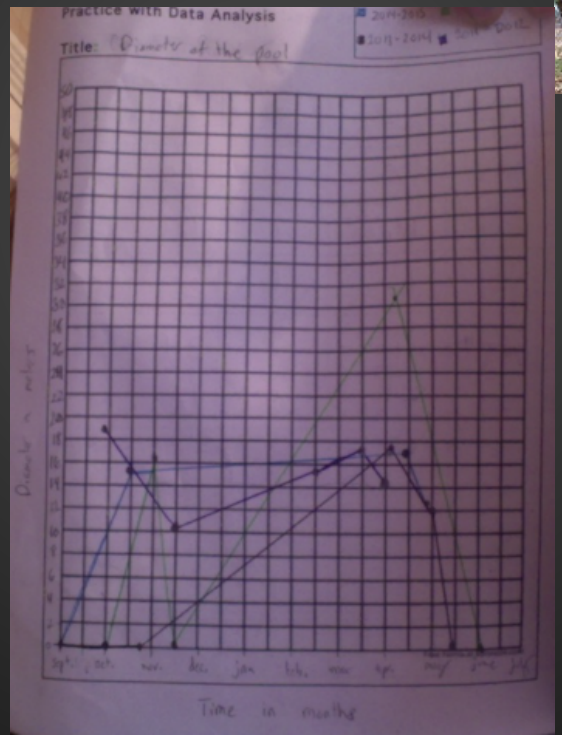
Vernal Pool Slides
Section 1

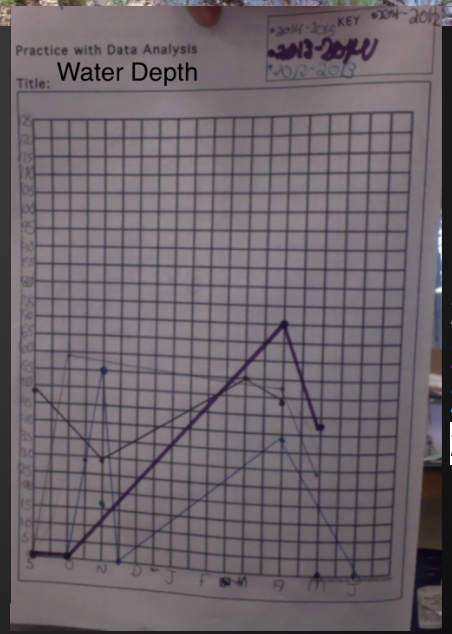
Our Vernal Pool

Mackenzie Pavlik , Callie Nairus, Sandy Buxton, and Graham Robinson

What is a Vernal Pool?

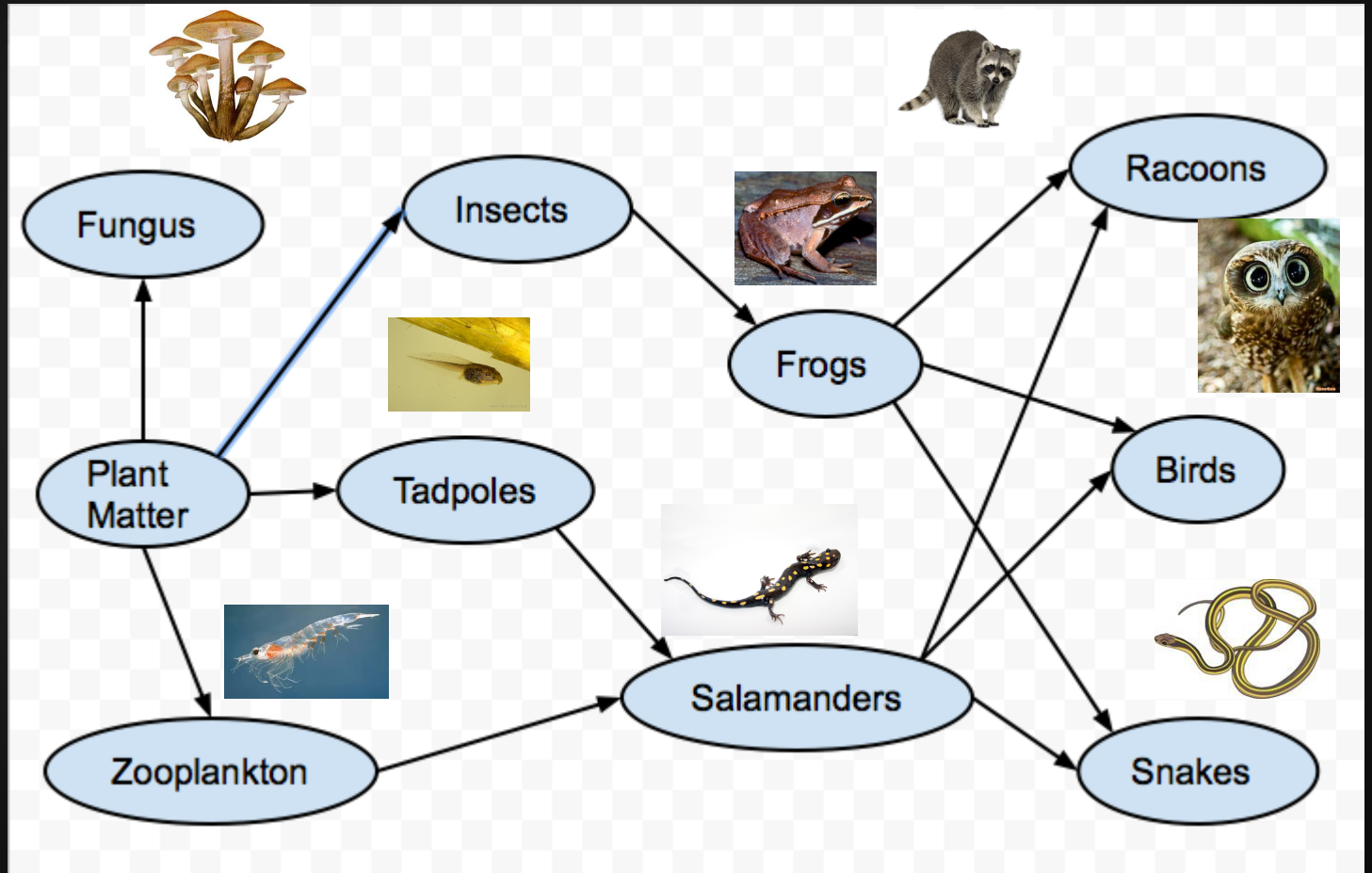
A Vernal Pool is a small body of water that is home to animals like frogs and salamanders. They are similar to the size of a large puddle. Also they are seasonally-flooded depressions found on soils that flood in the spring.





Key
2014-2015
2013-2014
2012-2013
2011-2012

Food Web

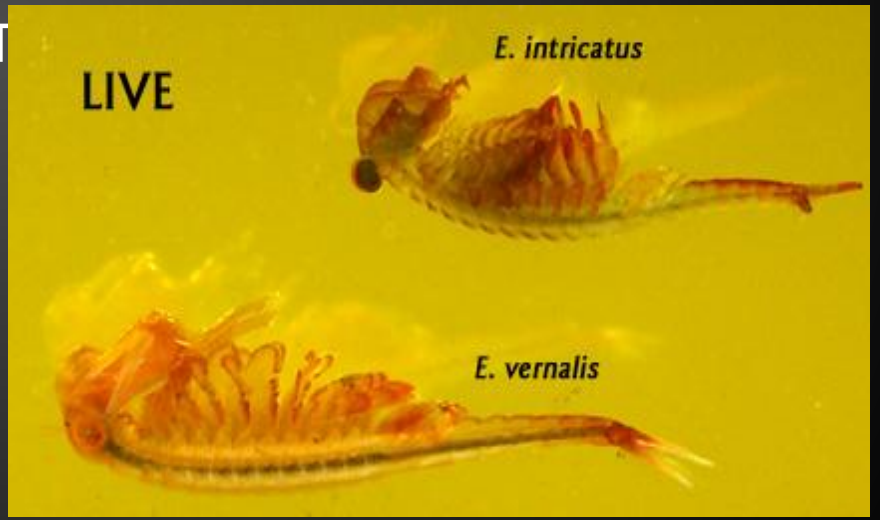

Fungus
Insects
Racoons
Frogs
Plant Matter
Tadpoles
Birds
Salamanders
Zooplankton
Snakes

What species of Fairy Shrimp live at our vernal pool?

By looking at a sample of water from our vernal pool, I discovered that we only have one species of fairy shrimp at our pool; the E. vernalis species. There are three types of fairy shrimp in Massachusetts; E. intricatus, E. bundyi, and E. vernalis. There is one rare species of fairy shrimp in Massachusetts, which is E. intricatus. T

between the different fairy shrimp species is that E. intricatus and E. bundyi have longer antennal appendages than E. vernalis.

- Callie



Are there more animals in our Vernal Pool that we don't see all the time? ~ Sandy

- There are some adult Green Frogs. They were very large and slimy
- There were some Fishfly. They have small little legs and a long body.
- There were some adult Wood Frogs. They were smaller than the Green Frogs.
- There were also some Wood Frog tadpoles. They were small and black.




Are there more eggs in our vernal pool or the the long deep pool nearby?

By looking at the Vernal Pool I found that the other vernal pool had 18 more eggs than at our vernal pool. The other vernal pool had a total of 24 eggs, whereas our vernal pool had a total of 6 eggs. I believe that the reason there are more eggs in the other vernal pool is because it is larger than our pool and it is also deeper. This allows more room for eggs to be laid and more room for tadpoles and salamander larvae to grow up. It also allows the salamander eggs to have enough time to hatch and for later laid wood frog eggs to hatch. ~Mackenzie

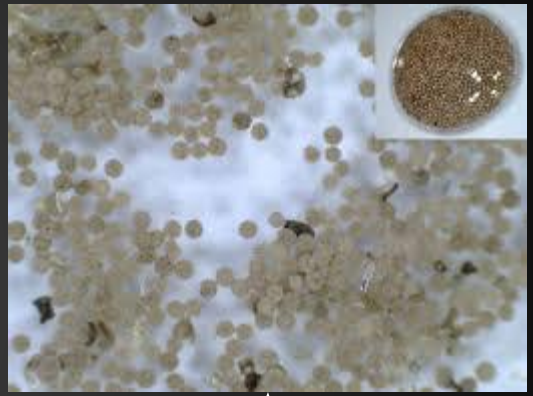
How long does it take for the fairy shrimp eggs to hatch and how long do they live? Graham

Domestic:

For domestic fairy shrimp, it takes about 24 hours for them to hatch. They hatch best in bottled spring water and needs to be kept at room temperature.

Wild:

Some scientists believe that winter fairy shrimp eggs need a cold winter to be able to hatch. Without a cold winter, they won't be able to develop. After exposed to water, it takes wild winter fairy shrimp about 30 hours to hatch. The fairy shrimp life cycle is around 16 days in the wild.



Fairy Shrimp eggs

Sources

- Vernal Pools
- A Field Guide to the animals of Vernal Pools by Leo P. Kenney and Matthew R. Burne
- http://www.mass.gov/eea/docs/dfg/nhesp/species-and-conservation/nhfacts/eubranchipus-intricatus.pdf
- http://www.myaquariumclub.com/live-food-fairy-shrimp-2395.html
- http://www.vernalpool.org/inf_fs.htm
- https://academics.skidmore.edu/wikis/NorthWoods/index.php/Rana_sylvatica_-_Wood_Frog
- http://www.animalspot.net/wood-frog.html
- http://www.rayswords.com/bugs/pages/13a.htm
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Vernal Pool Research

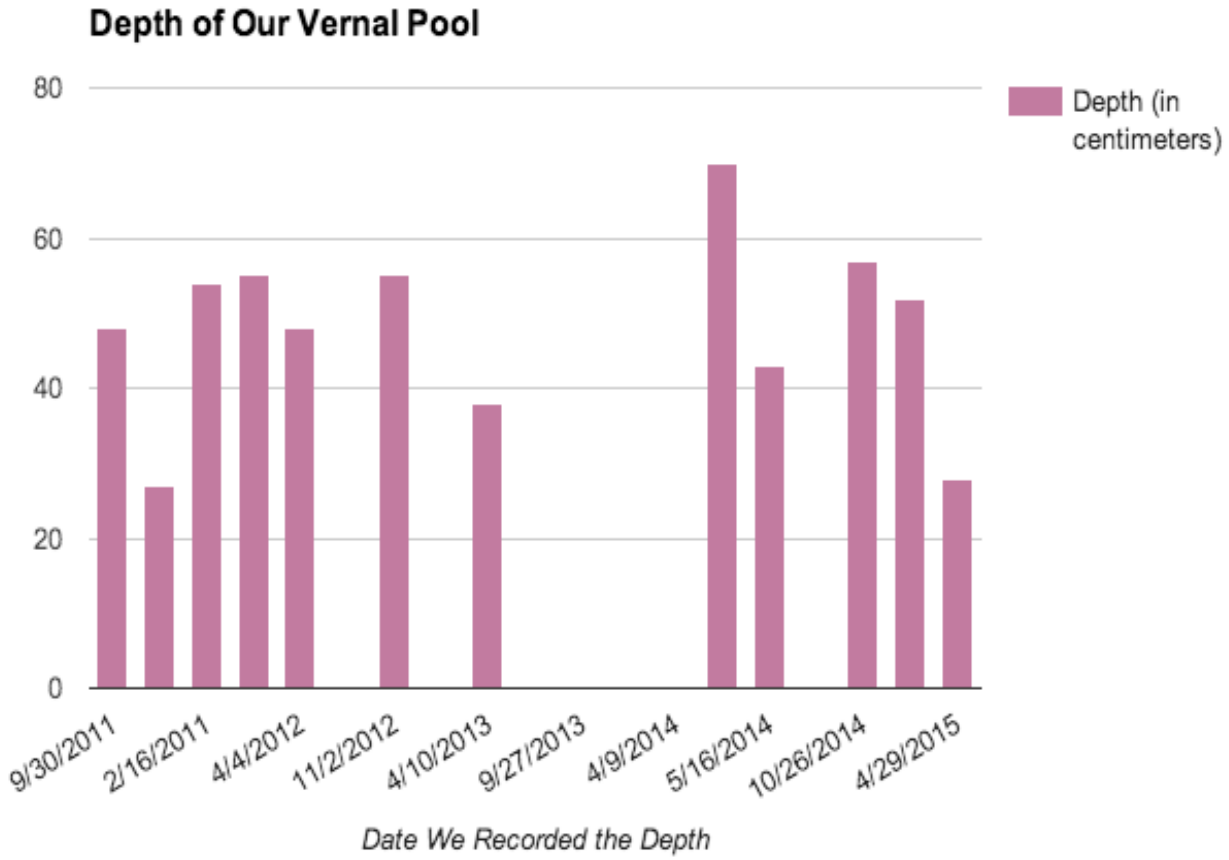
By Maisie, Emily ,
Aliana, and Emma T.

What is a Vernal Pool

A vernal pool is in a way a big puddle that fills with precipitation runoff, and groundwater. This is a great habitat for smaller animals that are not always dependent on water. Yearly, they will dry up because of evaporation and transpiration. This means that fish or other water dependent predators can't live there.

http://phanimaladaptations.weebly.com/spotted-salamanders.html

Graph:


Depth of Our Vernal Pool
80
60
40
20
0
Depth (in centimeters)
9/30/2011
2/16/2011
4/4/2012
11/2/2012
4/10/2013
9/27/2013
4/9/2014
5/16/2014
10/26/2014
4/29/2015
Date We Recorded the Depth

Various Food Chains in the vernal Pool

-forest leaves→ bacteria/fungi→ zooplankton

-daphnia and tadpoles→ salamander

-egg masses, insects, larvae→ turtles

-larvae, frogs, tadpoles→ snakes

-insects, adult frogs, tadpoles→ racoons

Maisie's Question

How and why do wood frogs freeze themselves?

Wood frogs have special proteins in the blood called nucleating proteins, which cause the water in the blood to freeze first. Frogs have glycogen, a substance found in bodily tissues, in their liver which is converted into glucose, a simple sugar that is important energy. The glucose and nucleating proteins are cryoprotectants, things that protect the freezing of body tissues and prevent how much ice forms. The ice sucks most of the water out of the frog's cells, so the glucose goes in to replace the water and helps prevent extra water from getting out, which could destroy the cell. Wood frogs freeze themselves to survive freezing events during winter. They are capable of surviving the full season if no more than 65% of their total body water freezes.

http://news.nationalgeographic.com/news/2007/02/070220-frog-antifreeze_2.html
http://en.wikipedia.org/wiki/Wood_frog

Emma's Question

What is the body structure of Fairy Shrimp?

Fairy shrimp are also known as Anostraca. They live in vernal pools and hypersaline lakes all over the world. The Fairy Shrimp also swim upside down collecting food through the water and filtering it into their system. Their body structure consists of multiple parts. There is a thorax which contains 13 segments, the last two segments are fused together. The Fairy Shrimp have 11 appendages, these are specialized for reproduction. The abdomen consists of 6 segments and does not include any appendages. Fairy Shrimp grow to about1-2½ inches and are translucent.

Head thorax abdomen, abdomen

Head thorax abdomen, abdomen

Eyes, and glands,antenna, labrum

Head thorax abdomen, abdomen

http://en.wikipedia.org/wiki/Anostraca

Aliana's Question

Why do spotted salamanders come back to vernal pools each year to lay their eggs?

Spotted Salamanders typically come back to the pool where they were born to lay their own eggs, this is similar to turtles. The salamanders will cross obstacles and even pass perfectly good vernal pools to return to the one they were born in. While I couldn't find much information on why they do this, I did make some inferences. I think that maybe this happens because they have a natural instinct to return to where they were born and the reason they pass by other vernal pools is because they are familiar with that certain pool.

http://www.naturalheritage.state.pa.us/VernalPool_Animal.aspx

Emily's Question

What are some adaptations of the spotted salamander? And what are the purposes of these adaptation?

- The salamander's back and tail is poisonous. This adaptation keeps other animals from eating it.
- Salamanders can detach from their tails. If a predator grabs the tail of the salamander, this adaptation lets it escape and then grow a new one.
- Spotted salamanders hibernate in the winter.
- When it hatches from its egg, it does not look like an adult. It breathes through gills like fish do therefore it can swim for a greater length in time.

http://phanimaladaptations.weebly.com/spotted-salamanders.html

Thanks For Watching

any questions?



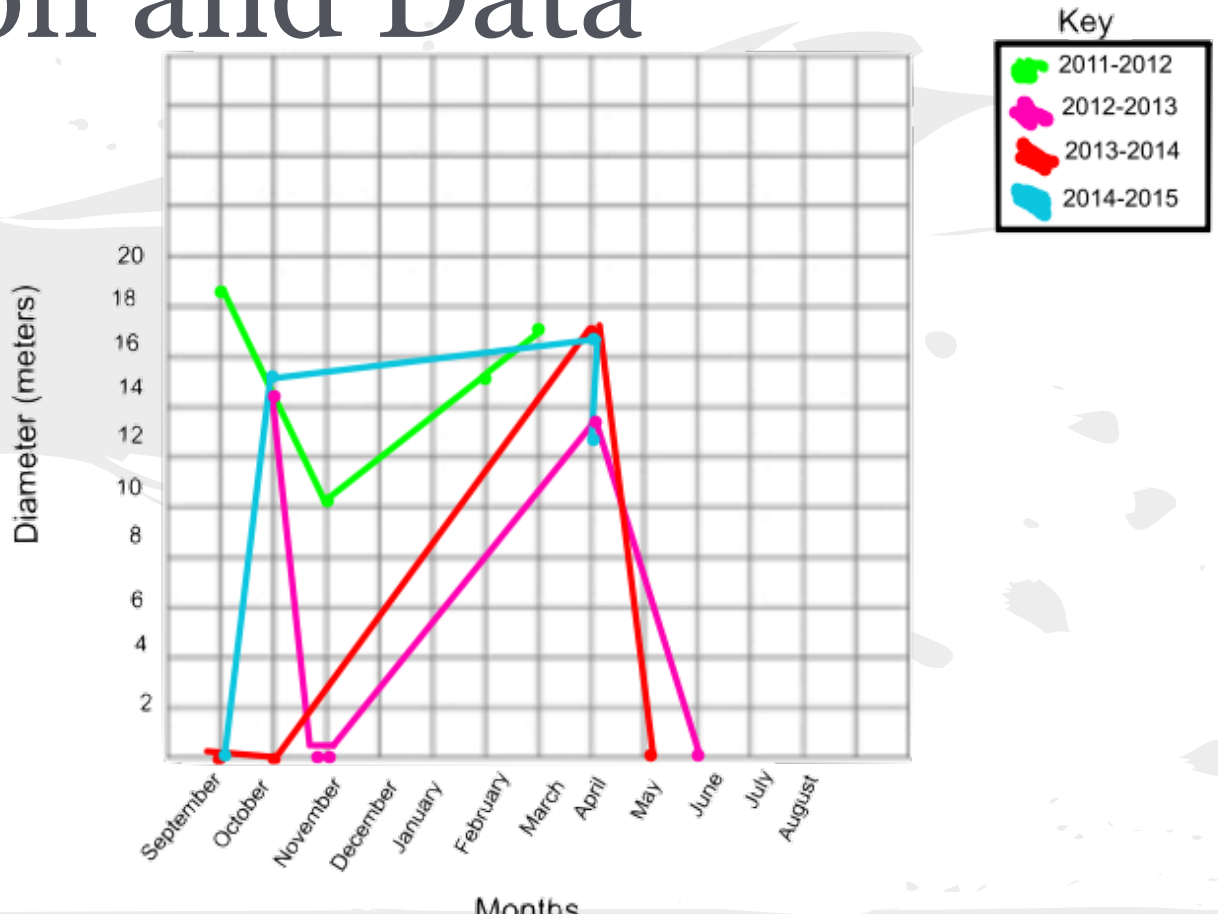
Vernal Pool 2014-2015

By Gabrielle Shih, Bella Cownie, Skylar Rice, and Caroline Gregory

What is a vernal pool?

A vernal pool is a wetland that fills annually from precipitation, melting snow from the winter months ,and rising groundwater. Most of the year it is dry. During the harsh, cold winter months, the vernal pool is covered in snow, and there are no signs of life. In the summer the vernal pool dries up.

Graph and Data



Food chain

Leaf Fragments Small Sticks

Water Boatman Amphibious Snails

Insects

Forrest Leaves Dropping

Bacteria & Fungi

Zooplankton

Daphnia Copepods Rotifers

Gabby: What happens to a wood frog's organs when they freeze themselves in the winter?

Heart:
When the frog freezes themselves they could be considered as dead. Their heart actually stops. When your heart is pumping blood throughout your body it is beating, but when the frogs freeze themselves their heart stops.

Brain:
Just like the heart, the brain also stops. The brain flatlines, and starts back up again when the frog thaws out. The brian unlike ours can control the heart beating, unlike us. Our heart beating is an involuntary action meaning that we cannot control it.

Legs & Arms:
Because the is no blood flowing from the frog's heart, their limbs freeze in the position that they froze in. If someone or something tried to move the libs they would break off like snapping a frozen stick and the frog would not feel it until it woke up.

Bella : Does the weather affect the breeding of the animals?

How does the weather affect the salamanders?

The migration of salamanders to the vernal pool is in response to environmental cue. The salamander migrates when evening rains occurred with moderate temperatures over 44.6 F during the day and over 40 F at night.

How does the weather affect the wood frog?

The male wood frog migrates to the vernal pool on the first rain of spring.

How does the weather affect the fairy shrimp?

Females can lay two types of eggs, a thin shelled summer egg and a thick shelled winter egg. Summer eggs hatch rapidly. The winter eggs stay in the mud at the bottom of the pool. When the pool dries out the eggs dry out with the pool. The eggs will hatch in the spring when the pools refills.

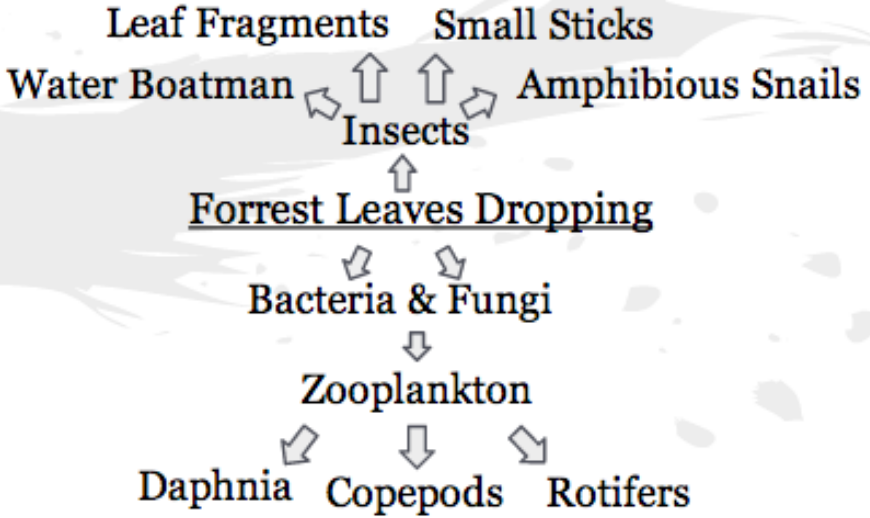
Caroline: During which season is the food chain most active?

Fall: During the fall, the vernal pool is slowly freezing and the organisms are preparing for hibernation. This is most likely the point or season where the food chain is most active.

Winter: The season is not Winter because in Winter, all the organisms and animals are in the midst of hibernation. Also, the pool is either frozen or absent.

Spring: In spring, the vernal pool is barely visible, so the food chain is barely active.

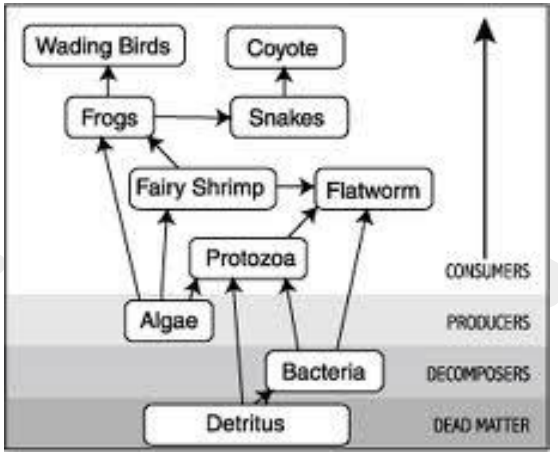
Summer: In the summertime, the vernal pool is completely gone due to the extreme warm climate and lack of precipitation.



Sky: How does the food chain affect the vernal pool and the animals in it?

The food chain in a vernal pool affects the animals by helping some survive, but some will also die. The bigger animals can survive on the small animals and the smaller animals survive on even smaller animals and so on.

The food chain also makes sure that there isn't an over-population for any of the animals. Over-population could result in a lack of food and space and even more animals would die.



Our Vernal Pool

By Garrett, Adam, Aaron, and Jonah

What is a Vernal Pool?

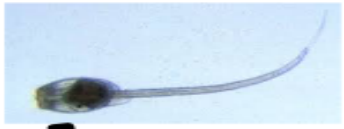
Vernal pools, are temporary pools of water that provide habitat for various plants and animals. A vernal pool has many forms of life. Such as, bacteria, fungi, frogs, larvae, and many more organisms.

Food Web

Owls

Amphibians

Tadpoles/Larvae hunt each other.



Turtles

Leaves

Snakes

Raccoon

Zooplankton

Fungi/Bac

Questions

Jonah: What plant life does the vernal pool support?

Aaron: What conditions to salamanders like to reproduce?

Adam: How do leaves play a huge role in the food chain?

Garrett: How does the environment help how wood frogs grow?

Adam: How does the leaf play a huge role in the food chain?

Leaves play the biggest role in the food chain of the vernal pool. It is the base of the chain because most, if not all organisms at the pool eat these plants. Trees are always making leaves, so until the trees are gone, the leaves will have the highest quantity of food. They also serve as a hiding place for eggs, so more organisms can live. Leaves serve a home to bacteria and fungi as well.

Aaron: Under what conditions do salamanders reproduce?

Most salamanders will lay their eggs in deeper water than other eggs. This is because salamander eggs take longer to hatch than some eggs and will need to lay their eggs deeper because the water levels would lower before the eggs would hatch. Salamanders also like to lay eggs on vegetation.

Garrett: How does the environment help how wood frogs grow?

The environment helps wood frogs grow because of the plants and water. The sticks and other debris in the vernal pool helped with the growth of the wood frogs. They need water to grow and they have it. The eggs are sometimes attached different debris that help the frog eggs hatch.

Jonah: What plant life does the vernal pool support ?

Trees Plant life

I noticed that the vernal pool had a large oak tree sitting comfortably in the middle . several other trees hug around the perimeter of the pool. The reason why I think there was so many healthy trees there is because there is an abundance of water in late spring and early fall that would help the trees grow and get water which is a major resource for all living things.

Mosses Plant life

At the vernal pool we saw 5 major types of mosses, 1 of which was in such bulk that the surrounding rocks and grounds were riddled with it. The moss looked like mini trees, with a dark green top, and smaller root like structures under it. The reason why I think there was so much moss in the area, was because the weather is heating up outside, when water heats up it evaporates. Moss is a nonvascular plant, which means it doesn't use roots to get water, it absorbs evaporated water, and since there is more evaporated water, more moss can form.

Small plants Plant life

Large amounts of bushes and grass were also in the area. A few notable varieties that grew in mass, larger than the others were a sort of sea-grass that grew directly in the pool on a plateau of roots. Also, Pitcher plants seem to be doing very well. The reason why they are doing so well is because of the water,

Small plants continued

The fact that there are bigger plants and trees around to support the smaller plants and finally because of the ecosystem of bugs that allow plants like the pitcher to survive.

Vernal Pool Review

Jonah: In conclusion, the vernal pool helps trees, small plants, and moss all grow and thrive by giving them water.

Adam: Leaves play the biggest role in the food chain and in general in the vernal pool.

Aaron: Salamander eggs are very unique and require things of the environment in order to reproduce.

Garrett: The wood frogs are helped by the environment to help reproduce and grow

Citations

Jonah: I did my research at the vernal pool.

Aaron: Got research from vernal pool, and got photo from http://www.dpughphoto.com/salamanders.htm.

Garrett: I did some research at the vernal pool and I also used A Field Guide to the animals of Vernal Pools by Leo Kenney and Matthew Burne