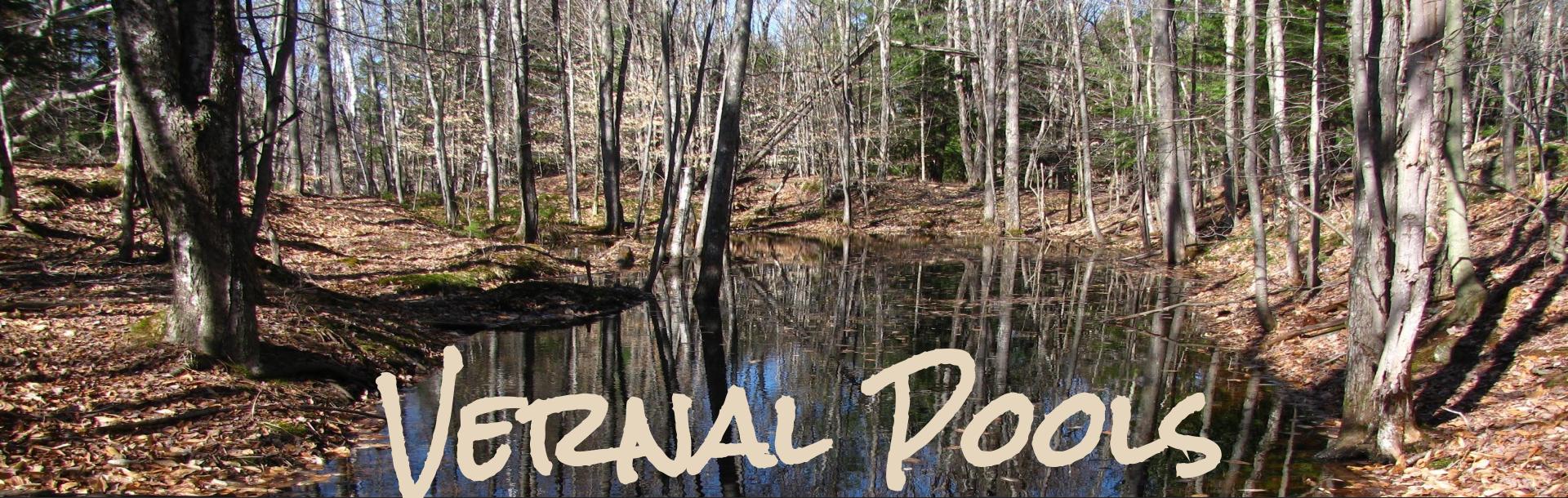


Section 2

Vernal Pool Slides



Vernal Pools

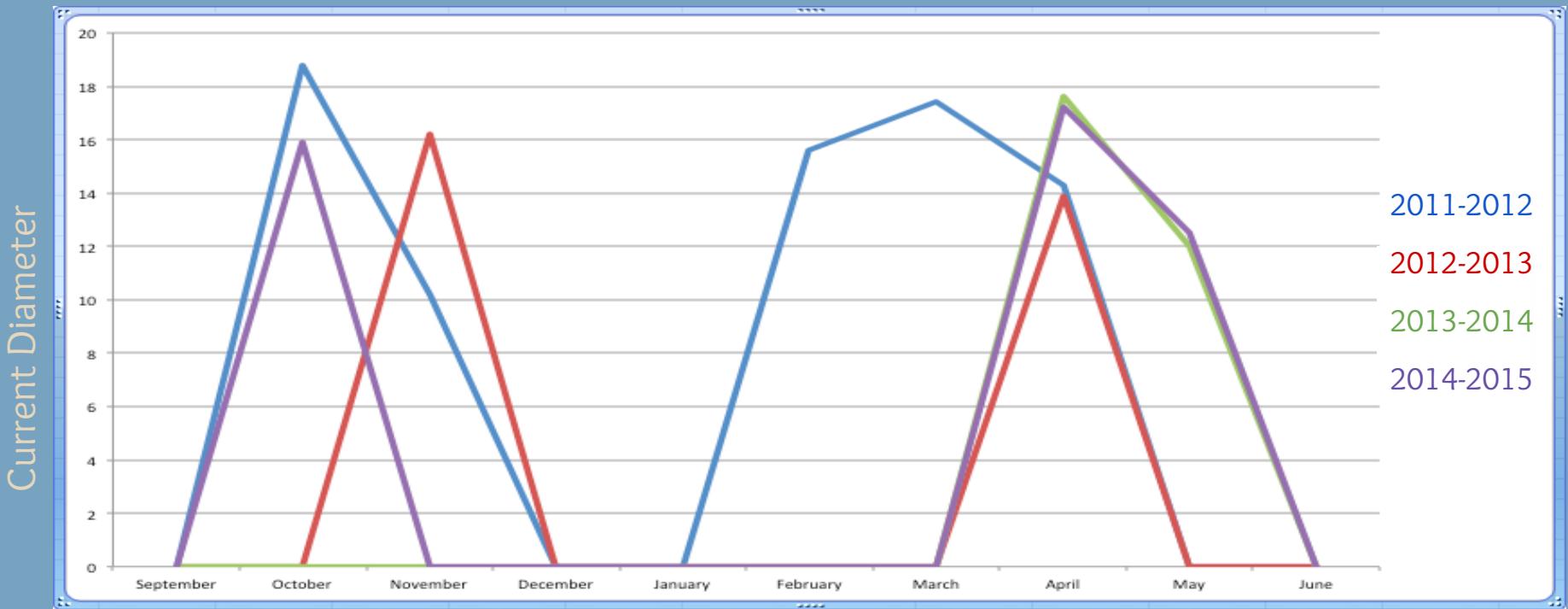
By Ava, Si, Leighton, and Cindy

WHAT IS A VERNAL POOL?

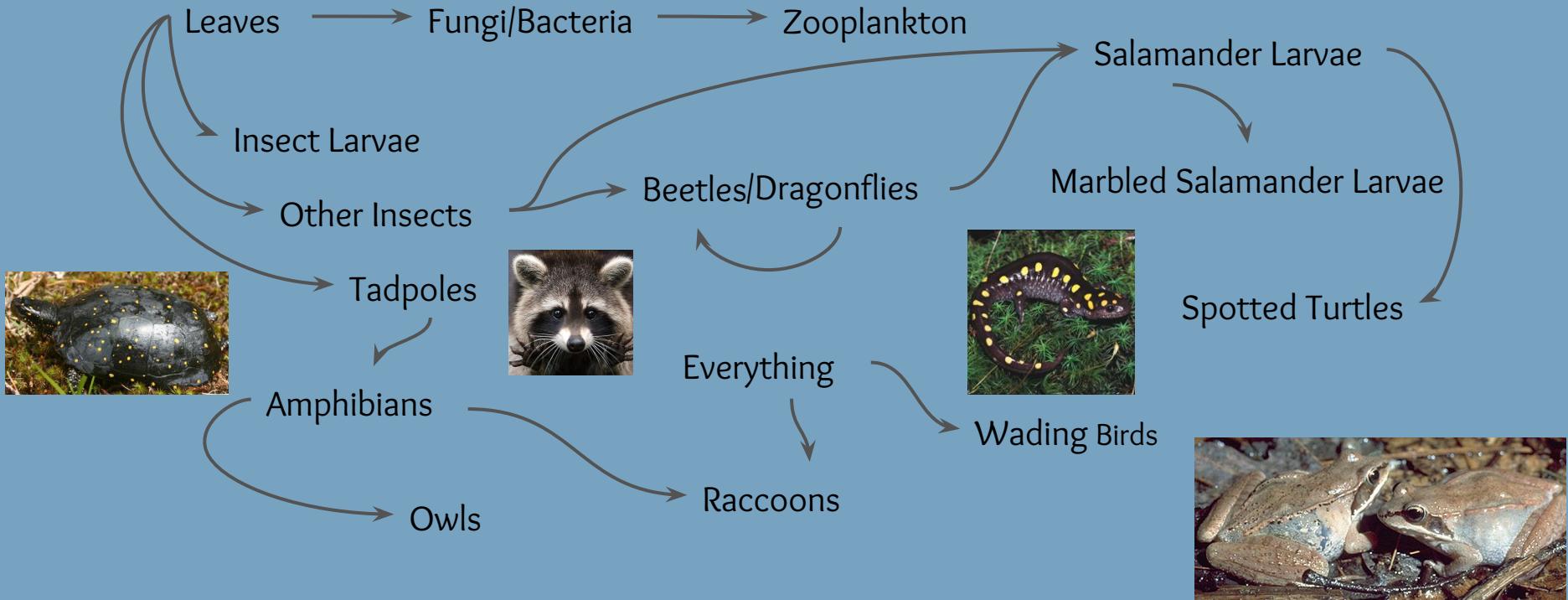
A Vernal Pool is a pool that isn't always wet and consists of lots of special wild life. It provides habitat for unique plants and animals and are usually considered to be a distinctive type of wetland. They are also designed to allow safe development for certain species such as the wood frog, spotted salamander, and fairy shrimp. They can also range in size, from being as big as a lake or as small as a puddle, so no fish are present.



GRAPH OF CURRENT DIAMETER



Food WEB



WHAT SEASONAL CHANGES TAKE PLACE IN VERNAL POOLS?

Every Vernal Pool dries up systematically. While most pools dry out every year around summer time, others will keep wet year round. If a pool doesn't have any plants in it, it may become lush with vegetation, while others that do have plants will become very dry or mucky form the soil. A vernal pool is usually able to spot, even during it's dry phase, as its leaves may turn gray, or there may be water marks on the tree trunks. This probably happens because the air around the pool becomes less moist in the summer, and there is much less rain. Temperatures dropping in Vernal Pools is another large issue today. As the air gets colder in the winter, the water in the pool may freeze, preventing animals to live there. When the weather gets really warm and the pool starts to dry up, there's nothing for the animals to live on, so they leave. Many different species depend on vernal pools. They are born at the pool and usually spend most of their lives within 1000 feet of it. For these reasons it's really important to protect the vernal pool.

Seasonal changes, such as water dropping can really affect an animal's life if they depends on the water from the pool. Soon enough everything would be killed off or leave and the vernal pool would be destroyed.

BY AVA GLAZIER

HOW DO FAIRY SHRIMP EGGS SURVIVE THE WINTER?

Fairy Shrimps lay two types of eggs, summer eggs and winter eggs. The summer eggs hatch quickly and develop in the same season, while the winter eggs are the ones that actually stay there and hatch in the next spring. These winter eggs are hard-shelled to withstand the freezing and drying from summer to fall to winter to spring but the crazy thing is that these eggs actually need a period of dryness to be able to hatch. After the female lays the eggs they drop to the bottom of the vernal pool and sit there through the winter and hatch in the following spring. When the vernal pool refills and the oxygen levels are at their peak the fairy eggs hatch and the whole cycle repeats again.

By Cindy Li

Sources: <http://www.fws.gov/oregonfwo/species/data/vernalpoolfairyshrimp/>
http://www.naturalheritage.state.pa.us/VernalPool_Invertebrate.aspx

WHAT HAPPENS IF ONE PART OF THE FOOD WEB DECREASES IN POPULATION?

Many things would happen. If trees were cut down and leaves did not fall, the insects and bacteria would have nothing to feed on. In return, every other organism on the food web loses their source of energy, so the entire population of the food web would decrease.

If the population of Salamander Larvae decreased, the population of Beetles, Dragonflies, and other insects would increase, but the population of Spotted Turtles would decrease.

There are many different ways the population of an area can change based on the decrease of one organism.

by Leighton Carter

Source: http://www.bbc.co.uk/bitesize/ks3/science/organisms_behaviour_health/food_chains/revision/8/

WHY IS THE NUMBER OF SPOTTED SALAMANDERS DECREASING AT THE CMS VERNAL POOL?

The decline in amphibian animals is well documented and studies, but studies are mainly focused on frogs and toads, and very little attention is paid to salamanders who are also facing significant declines. Some of the biggest threats the salamanders are facing according the [savethesalamander.com](http://www.savethesalamander.com) are habitat deconstruction, roadkill, water modification, cruelty issue, and experimentation. I think the main factor of the decreasing population of salamanders at the CMS Vernal Pool is water instability. According to the data collected from the recent years, the diameter and depth of the Vernal Pool at CMS has been very unstable. One of the main things for salamanders' survival is stable water condition for breeding and hatching. Without a stable condition, the eggs and larvae wouldn't be able to survive, and thereby the population of salamanders decreases.

By Si Chen

Source: <http://www.savethesalamanders.com/threats.html>

LINKS

Ava:

<http://extension.psu.edu/natural-resources/forests/news/2014/vernal-pools-critical-woodland-habitats>

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

<http://harvardforest.fas.harvard.edu/water-landscape-vernal-pools>

Cindy:

<http://www.fws.gov/oregonfwo/species/data/vernalpoolfairyshrimp/>

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

Leighton: http://www.bbc.co.uk/bitesize/ks3/science/organisms_behaviour_health/food_chains/revision/8/

Helen:

<http://www.savethesalamanders.com/threats.htm>



THANKS!



By Ava, Si, Leighton, and Cindy

Vernal Pool Notes

Created by Erin, Hailey, Sarah, and Sofia

What is a Vernal Pool?

A vernal pool is a temporary pool of water, that dries up in the summer, but comes back in the spring.

Vernal pools were once formed by melting glaciers, and they now continue to fill every year. Vernal pools are home to many species of creatures. that migrate away from the pool in the winter to find a more reliable source of food, and then return.



When the water comes back in the spring, they go back to mate and find food. Since the water is not reliably there, no fish, or other aquatic predators appear at the vernal pool, creating a safer environment for the animals that live there.

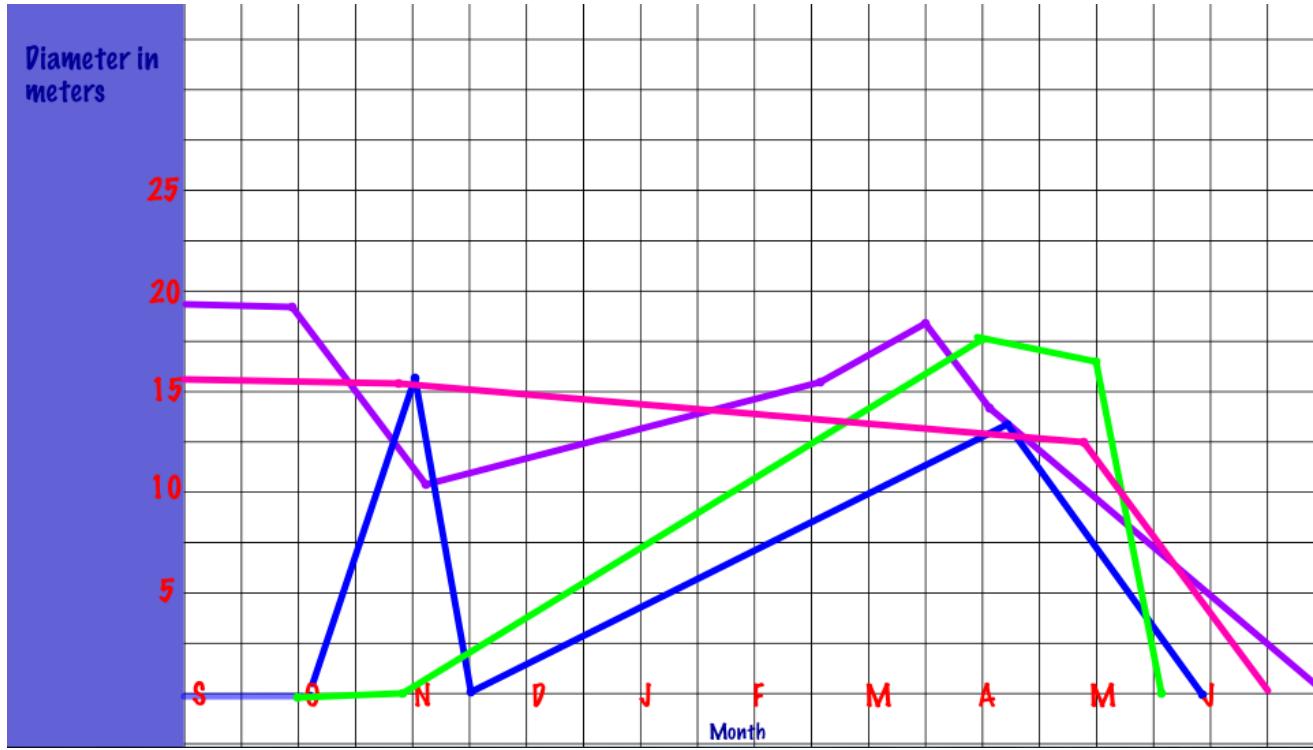
Key:

Purple= 2012

Blue= 2012-2013

Green= 2013-2014

Pink= 2014-2015



Graph Showing Diameter Change

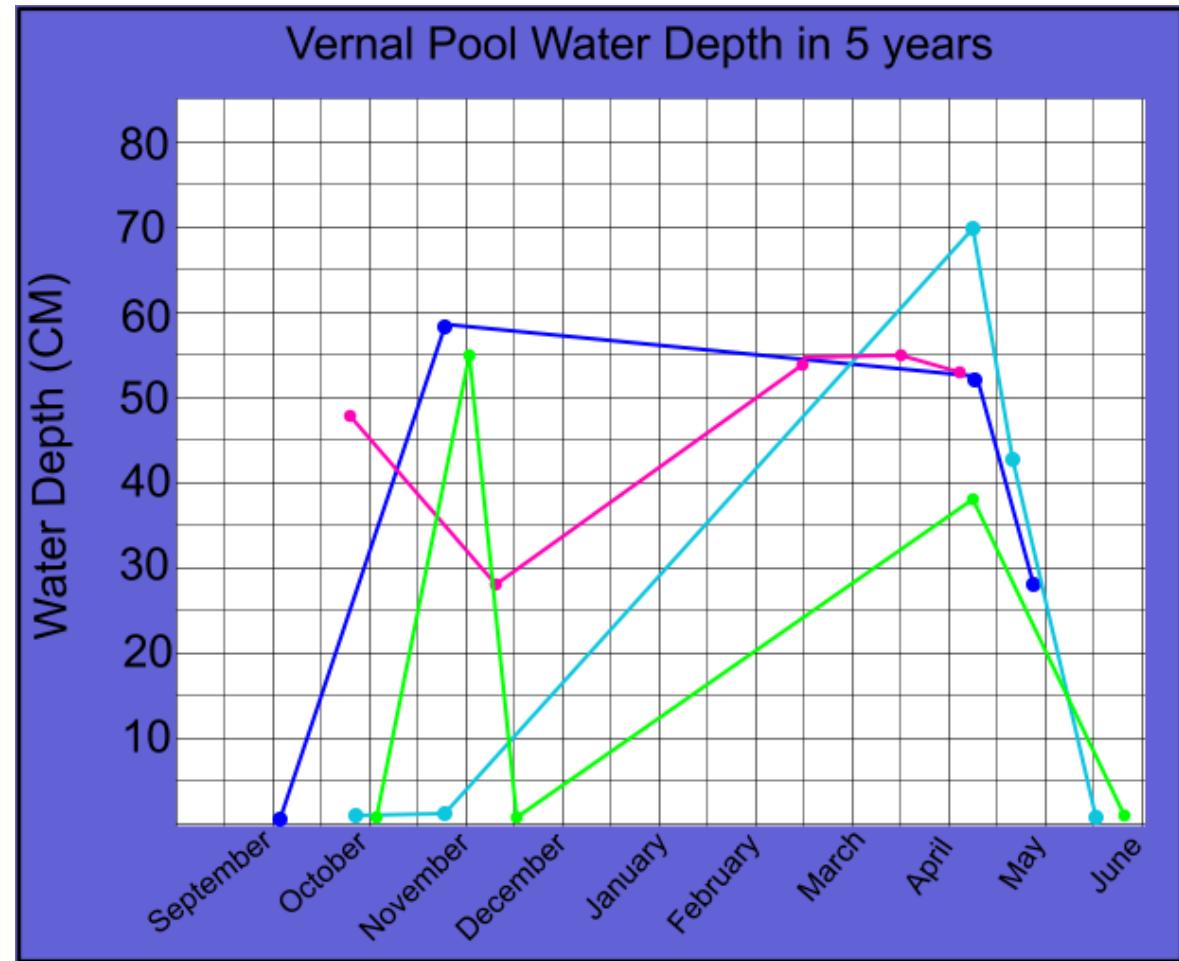
Key:

Pink= 2011-2012

Green= 2012-2013

Light Blue= 2013-2014

Dark Blue= 2014-2015

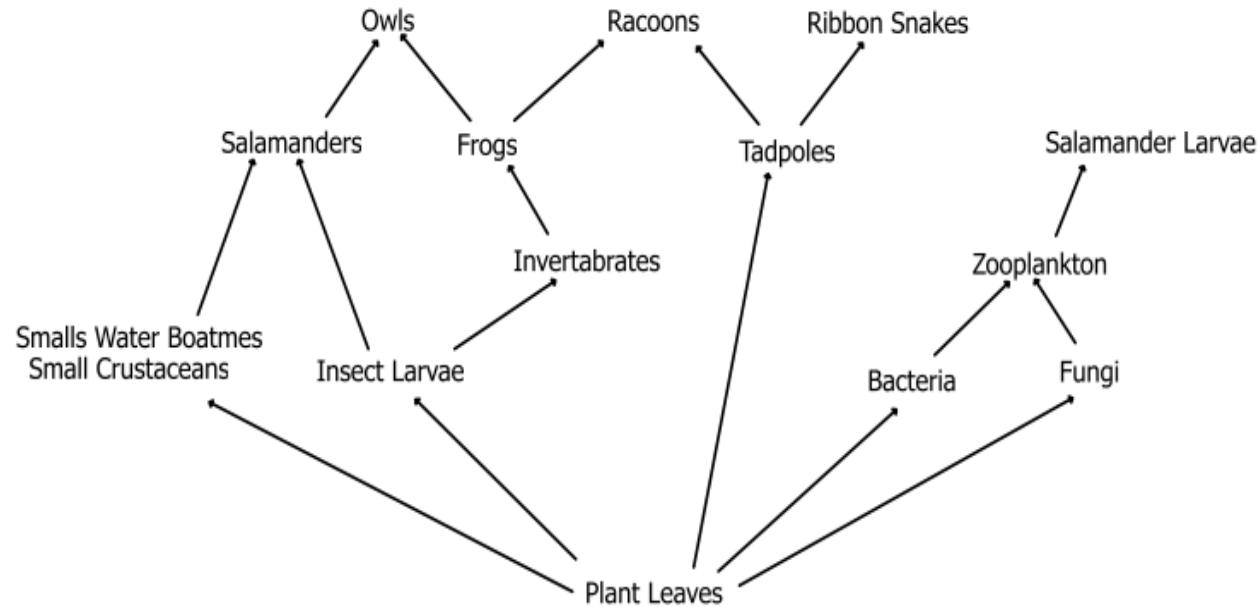


Food Web

Others:

- Spotted Turtles eat eggs of Spotted Salamanders

- Insects, birds, reptiles, and mammals eat decaying creatures.



Question #1

By Erin

Why do the animals even go to the vernal pool in the first place? Why don't they go to a lake or pond? What makes a vernal pool special?

Firstly, there are no fish in a vernal pool. The fish would eat every other creature. Secondly, they are isolated from other predators and are less out in the open compared to most lakes and ponds. The animals that often reside in or near the pool are more secretive compared to pond/lake creatures. Thirdly, most of the creatures rely on the decaying leaves that fall into the pool for food. They could not survive in open lakes or ponds.

Question #2

By Sofia

Where does the water come from in the vernal pool and how would the animals be affected if the pool did not produce enough water?

The water from the pool is shown to come from the rain and snow from the wetter part of the year, including the winter months. This causes the vernal pools to be very dependent on the weather patterns, hoping that the right amount of water will accumulate in the pool so that the animals who in turn depend on the pool, can return to reproduce. Were the pool not to have enough water, if there was a drought, it could mean bad news for some and even worse news for others. The eggs that different animals leave will most likely die. Eggs from the fairy shrimp, for example need to be dried and then resubmerged before they hatch or it means death for them. Others lay their eggs after the first spring rains. Adults have already been adapted to wet and dry land, so the effect will not be as bad on them, but for their young, it is not the same. The larvae must transform into terrestrial adults before the pool dries up.

Question #3

By Hailey

What would happen if salamanders and frogs stop coming to the pool? Will it affect the other animals?

Salamanders and frogs are very vital in the food chain. If they stopped coming to the vernal pool then the other animals that prey on them will have fewer resources of food. A lot of animals such as the spotted turtle and ribbon snakes eat the larvae of these animals. If the frogs stopped going then there would be no tadpoles left for the higher up predators, and they will not have enough food to eat. Raccoon's main diet is tadpole and adult frogs. It would not be the best thing if salamanders and frogs stop coming because so many animals eat their eggs and them.

Question #4

By Sarah

How do humans impact vernal pools?

Humans have made a huge negative impact on the life and ecosystem in the vernal pools around the world. Animals depend on the vernal pools for food, shelter, and water. Most animals spend eleven months of the year within 600 yards of the pool, and the other month in the pool breeding. Vernal pools tend to occur on flat land that is easy to develop. Because of expansion in developments like houses, malls, roads, and skateparks, the habitats in the vernal pool are rare and hard to find. The developments have caused the land around vernal pools to be reused for man-made buildings, and the actual pools have been filled in to create upland and water drainage. The roads near the vernal pools have also cause a high fatality rate. People also use vernal pools for irrigation, which causes them dry up faster. Also, an overdose of fertilizers and pesticides can make the water quality poor. The attempted mosquito control can damage, both biologically and chemically, the other species in the vernal pool. Also, the grazing of livestock and the space needed for agriculture have destroyed the habitat around the vernal pool. The impact of humans on the ecosystems and habitats around the vernal pools, have been negative in all ways.

Vernal Pool

By: Kelly Costello, Emma Drisko,
Sam Neville, and Andrew Younan



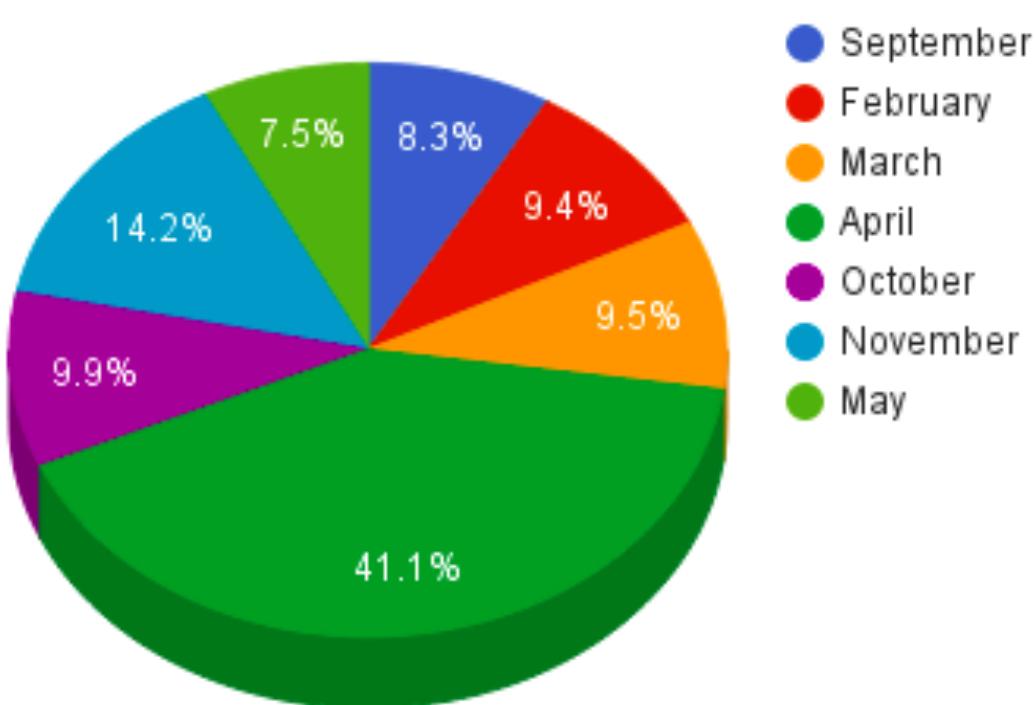
What is a Vernal Pool?

A vernal pool is formed from melting snow and ice and rain water. They are also formed by precipitation, runoff, and raising groundwater. This is why they are most likely going to be dry in the summer. A vernal pool contains no fish that swim in it. It also is a home for many endangered species of plants and animals, some of these species can't complete their lifecycles anywhere else.



Graph of Data

Vernal Pool Depth Over 4 years



This graph shows the depth of the vernal pool over four years, 2012-2015, and shows what month has the greatest depth

Do vernal pools change in different regional ecosystems?

The vernal pool itself does not change much in terms of function. The flora are typically different yet similar in that they share semi-aquatic qualities. The fauna are very diverse based on the ecosystem of the region, but they are typically amphibians, aquatic insects, and reptiles. Yet the fauna in one in California are pretty different than those in Africa.

by Andrew
Younan



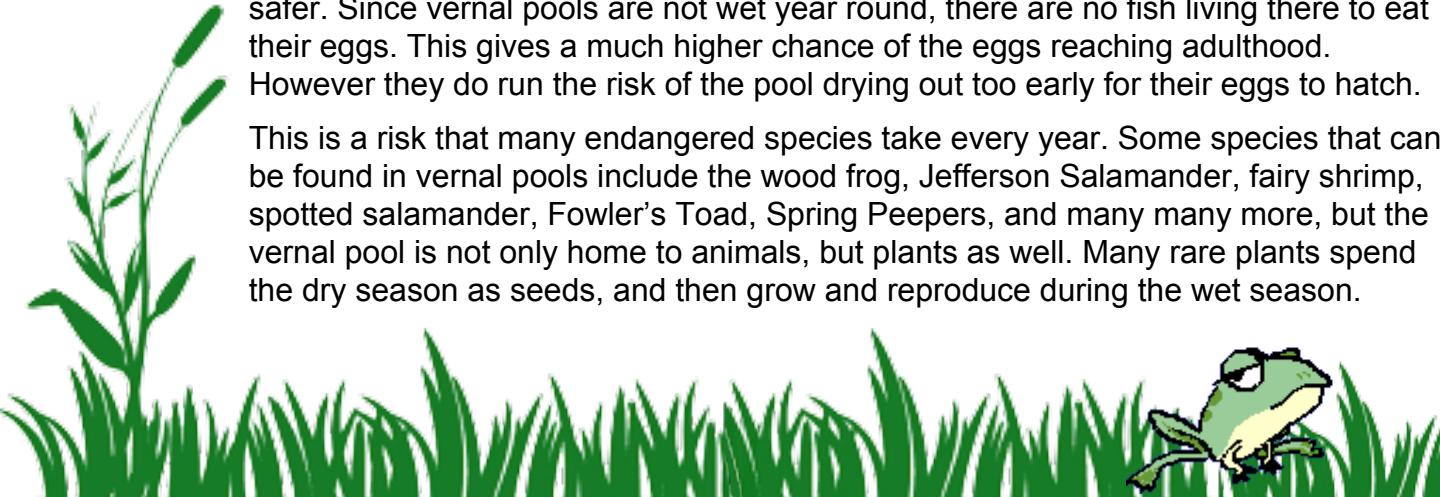
Why are the vernal pools important for the ecosystem?



Emma Drisko



 Vernal pools provide a habitat for many endangered species, that cannot complete their lifecycle anywhere else. Species that need the vernal pools do not need water year round, many only need the vernal pool in their first few months of life. For example the Wood frog hatches out of its egg and grows up in the pool, but once it reaches adulthood, it only comes back to the water to lay its own eggs.

 Many kinds of animals come to lay their eggs in the pools, where they will be safer. Since vernal pools are not wet year round, there are no fish living there to eat their eggs. This gives a much higher chance of the eggs reaching adulthood. However they do run the risk of the pool drying out too early for their eggs to hatch.

This is a risk that many endangered species take every year. Some species that can be found in vernal pools include the wood frog, Jefferson Salamander, fairy shrimp, spotted salamander, Fowler's Toad, Spring Peepers, and many many more, but the vernal pool is not only home to animals, but plants as well. Many rare plants spend the dry season as seeds, and then grow and reproduce during the wet season.



How does the vernal pool's drying up affect the wildlife?

By: Kelly Costello

During most of the year, vernal pools are dried up and there is very little life in them. The vernal pool mainly contains water in spring time months. In the spring there is usually water in the pools due to the rainy season and melting snow in colder climates. During the dry month, like Autumn, Summer, and Winter (when the water freezes over), vernal pools cease to exist because of evaporation. Many species have adapted to this cycle. Adult amphibians may find food and shelter in other wetlands in the surrounding area. One year of animals dying because of a drought, then could follow the next year by a huge population surviving



Why are spotted salamanders secretive and seldom seen ?

Sam Neville

- Spend almost their entire lives hidden under rocks or logs or in the burrows of other forest animals
- They emerge from their hiding spots only at night to feed and during spring mating
- Particular about when and where they lay their eggs, and about where they spend the rest of the year
- Spotted Salamanders crawl above ground and migrate to a nearby forest pond. When they reach the pond , the Spotted Salamanders go into the water where the males and females mate on the leafy bottom
- Both males and females hide out on the bottom of the pond and wait for the next heavy evening rain, then emerge from pond water into rainfall and journey back to their separate burrows
- By late spring, the larvae will transform, and on a rainy night will leave the breeding pond and begin their terrestrial life stage.

I think that Spotted Salamanders may be secretive and seldom seen because they don't like light, or being hot. I think this because they only come out at night when it's raining.



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http://vernalpools.ucmerced.edu/sites/vernalpools.ucmerced.edu/files/page/documents/1_1characterization_and_global_distribution_of_vernal_pools_by_jon_e_keely_and_paul_h_zedler_0.pdf
Andrew Younan

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

Field Guide to the animals of Vernal Pools by Leo Kenney

Kelly Costello

<http://animals.nationalgeographic.com/animals/amphibians/spotted-salamander/?source=A-to-Z> Sam Neville

<http://wildsouth.org/the-secretive-spotted-salamander/> Sam Neville



Vernal Pool Review

By: Jeff Dillon, Cliff Freund and Haley
Wixom

What is a vernal pool?

A vernal pool is a body of water that is only filled with water for certain parts of the year. For this reason, fish can't live here. Only animals that can survive in water, and out of water live here.

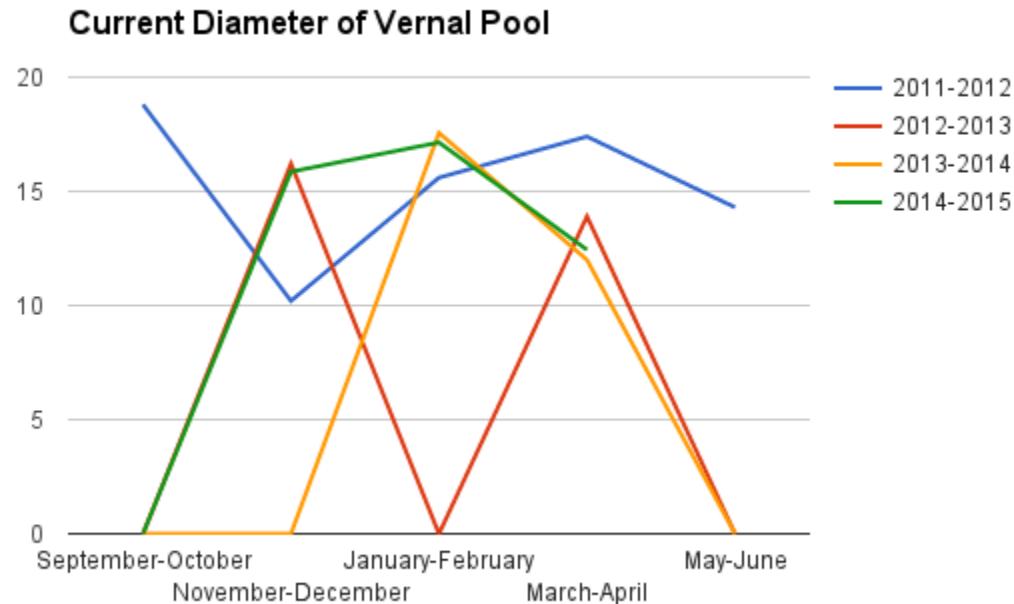
What types of things are in them?

There are many things that live in a vernal pool. These are some of the main obligate species that live in the pool:

- The Wood Frog- This tan/grey frog lays its eggs every year in the vernal pool and can grow to be 2.5" in length
- Spotted salamander- They can grow to be 8 inches long, have yellow spots, and also lay their eggs there.
- Fairy shrimp- Can grow to be 1.5" inches long, swim "upside down", and are green and orange.

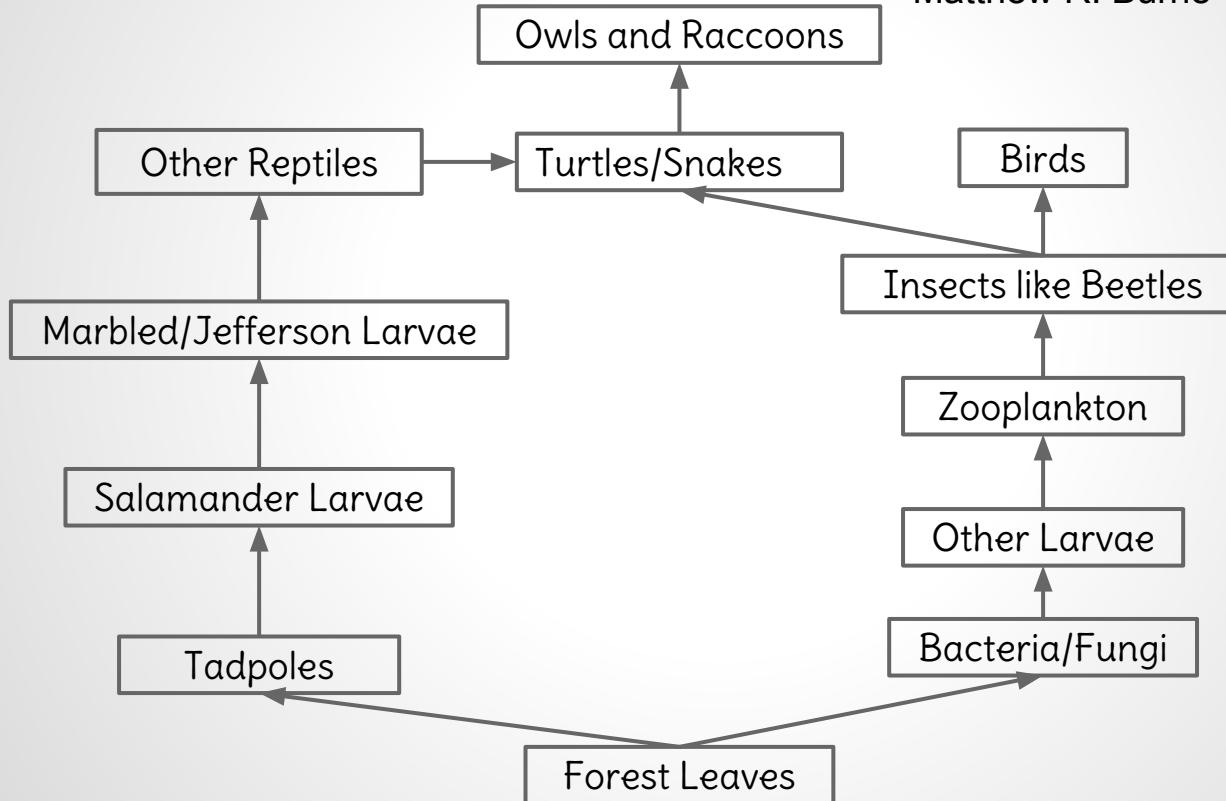
Resource: A Field Guide to the animals of Vernal Pools By: Leo P. Kenney and Matthew R. Burne

Graph



Food Web

Resource: A Field Guide to the animals of Vernal Pools By: Leo P. Kenney and Matthew R. Burne



Haley's Question of Interest

What causes the wood frog to lighten in color as they develop? Frog's coloring changes so they can optimize camouflage. As a tadpole they have to blend in with the muddy colored water, as an adult they have to blend in with the leaves.



Cliff's Question of Interest

What flowers grow around the vernal pool?

There aren't many flowers that have bloomed yet or even there may not be any and there are more skunk cabbage and moss. Also, the leaves covering the ground, the lack of sunlight, and the steep slope can stop flowers from growing in the vernal pool.